

# TEST REPORT

|                        |                                            |
|------------------------|--------------------------------------------|
| EUT Description        | Notebook PC                                |
| Brand Name             | HP                                         |
| Model Name             | HSN-I45C-3                                 |
| FCC/IC ID              | FCC ID: B94HNI45C3KL; IC ID: 21374-FM350GL |
| Date of Test Start/End | 2021-12-01 / 2021-12-09                    |
| Features               | WWAN (LTE,UMTS,NR)                         |

|                      |                                                                                      |
|----------------------|--------------------------------------------------------------------------------------|
| Applicant            | HP Inc.                                                                              |
| Address              | 1501 Page Mill Road, Palo Alto CA 94304 USA                                          |
| Contact Person       | Cindy Su                                                                             |
| Telephone/Fax/ Email | (TEL) +886 2 37895951 / (Email) <a href="mailto:cindy.su@hp.com">cindy.su@hp.com</a> |

|                     |                                                                                                                                                                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Standards | FCC CFR Title 47 Part 2, 22, 24, 27, 90, 96<br>RSS-Gen issue 5 A1, RSS 130 issue 2, RSS 132 issue 3, RSS 133 issue 6 A1, RSS 140 issue 1, RSS 139 issue 3, RSS-192 issue 4, RSS-195 issue 2, RSS 199 issue 3, RSS 197 issue 1<br>(see section 1) |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                            |                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------|
| Test Report identification | 210825-01.TR03                                                                                     |
| Revision Control           | Rev. 00<br>This test report revision replaces any previous test report revision<br>(see section 8) |

The test results relate only to the samples tested.

Reference to accreditation shall be used only by full reproduction of test report.

Issued by



Digitally signed by Khodor  
RIDA  
Date: 2022.01.17 19:41:06  
+01'00'

Khodor RIDA  
(RF Test Engineer Lead)

Reviewed by



Digitally signed by Ines  
KHARRAT  
Date: 2022.01.17  
19:44:01 +01'00'

Ines KHARRAT  
(Technical Manager)

Intel Corporation S.A.S  
425 rue de Goa – Le Cargo B6 - 06600, Antibes, France  
Tel. +33493001400 / Fax +33493001401

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## 1. Standards, reference documents and applicable test methods

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC  | <ol style="list-style-type: none"> <li>1. FCC Title 47 CFR part 2 - Subpart J - Equipment Authorization Procedures. 2020-10-01 Edition</li> <li>2. FCC Title 47 CFR part 22 - Subpart H - Cellular Radiotelephone Service. 2020-10-01 Edition</li> <li>3. FCC Title 47 CFR part 24 – Subpart E - Broadband PCS. 2020-10-01 Edition</li> <li>4. FCC Title 47 CFR part 27 – Subpart C - Technical Standards. 2020-10-01 Edition</li> <li>5. FCC Title 47 CFR part 27 – Subpart L - 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands. 2020-10-01 Edition</li> <li>6. FCC Title 47 CFR Part 90 - Subpart R - Regulations governing the licensing and use of frequencies in the 763-775 and 793-805 MHz bands. 2020-10-01 Edition</li> <li>7. FCC Title 47 CFR Part 90 - Subpart S - Regulations governing licensing and use of frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz bands. 2020-10-01 Edition</li> <li>8. FCC Title 47 CFR Part 96 - Subpart E - Technical rules. 2020-10-01 Edition</li> <li>9. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.</li> <li>10. FCC OET KDB 842590 D01 v01r01 Upper Microwave Flexible Use Service.</li> <li>11. C63.26-2015 - IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services</li> </ol>                                                                                                                                                                                                                                                                                                              |
| ISED | <ol style="list-style-type: none"> <li>1. ISED RSS-Gen issue 5 A1 - General Requirements for Compliance of Radio Apparatus.</li> <li>2. ISED RSS-130 issue 2 - Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz</li> <li>3. ISED RSS 132 issue 3 - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz</li> <li>4. ISED RSS 133 issue 6 A1 - 2 GHz Personal Communications Services.</li> <li>5. ISED SRSP-510 — Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz</li> <li>6. ISED RSS 139 issue 3 - Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz</li> <li>7. ISED RSS-140 issue 1 - Equipment Operating in the Public Safety Broadband Frequency Bands 758-768 MHz and 788-798 MHz</li> <li>8. ISED RSS-192 issue 4 - Flexible Use Broadband Equipment Operating in the Band 3450-3650 MHz</li> <li>9. ISED RSS-195 issue 2 - Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz</li> <li>10. ISED RSS-199 issue 3 - Broadband Radio Services (BRS) Equipment Operating in the Bands 2500-2690 MHz</li> <li>11. ISED RSS-197 issue 1 - Wireless Broadband Access Equipment Operating in the Band 3650–3700 MHz</li> <li>12. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.</li> <li>13. FCC OET KDB 842590 D01 v01r01 Upper Microwave Flexible Use Service.</li> <li>14. C63.26-2015 - IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services</li> </ol> |

## 2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified in section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified in section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y.
- ✓ Intel WRF Lab declines any responsibility with respect to the identified information provided by the customer and that may affect the validity of results.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

### 3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

|             |                                                |
|-------------|------------------------------------------------|
| Temperature | $20.2^{\circ}\text{C} \pm 1.1^{\circ}\text{C}$ |
| Humidity    | $31.4\% \pm 10.5\%$                            |

## 4. Test samples

| Sample | Control #     | Description | Model      | Serial #   | Date of receipt | Note |
|--------|---------------|-------------|------------|------------|-----------------|------|
| #01    | 210825-01.S05 | Notebook PC | HSN-I45C-3 | 00017609XH | 29/09/2021      | WNC  |
| #02    | 210825-02.S06 | Notebook PC | HSN-I45C-3 | 00017605X0 | 29/09/2021      | HB   |

## 5. EUT Features

The herein information is provided by the customer

|                        |            |  |  |  |  |  |  |
|------------------------|------------|--|--|--|--|--|--|
| Brand Name             | HP         |  |  |  |  |  |  |
| Model Name             | HSN-I45C-3 |  |  |  |  |  |  |
| Prototype / Production | Production |  |  |  |  |  |  |
| Supported Radios       |            |  |  |  |  |  |  |
|                        |            |  |  |  |  |  |  |
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|                                         |                                         |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
|-----------------------------------------|-----------------------------------------|-------------------------------------------------------|-----------------------------------------------|----------------|-----------------------------------|---------|--------|-----------------------------|---------|--------|----|----|----|----|----|----|-----|---|--|--|
| Supported Radios                        | Mode                                    | Bands                                                 | Modulation                                    | SCS (KHz)      | Supported Channel Bandwidth (MHz) |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         |                                                       |                                               |                | 5                                 | 10      | 15     | 20                          | 25      | 30     | 40 | 50 | 60 | 70 | 80 | 90 | 100 |   |  |  |
|                                         | NR-5G                                   | N2 FDD<br>(1850.0 – 1910.0 MHz)                       | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       | ✓      | ✓                           |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N5 FDD<br>(824.0 – 849.0 MHz)                         | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       | ✓      | ✓                           |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N7 FDD<br>(2500.0 – 2570.0 MHz)                       | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30<br>60 | ✓                                 | ✓       | ✓      | ✓                           |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N25 FDD<br>(1850.0 – 1915 MHz)                        | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       | ✓      | ✓                           |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N30 FDD<br>(2305.0 – 2315.0 MHz)                      | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N38 TDD<br>(2570.0 – 2620.0 MHz)                      | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       | ✓      | ✓                           |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         |                                         | N41 TDD<br>(2496.0 – 2690.0 MHz)                      | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       |                                   | ✓       | ✓      | ✓                           |         |        |    | ✓  | ✓  | ✓  |    | ✓  | ✓   | ✓ |  |  |
|                                         |                                         | N66 FDD<br>(1710.0 – 1780.0 MHz)                      | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       | ✓                                 | ✓       | ✓      | ✓                           |         |        |    | ✓  |    |    |    |    |     |   |  |  |
|                                         |                                         | N77 TDD*<br>(3450-3550.0MHz)<br>(3700.0 – 3980.0 MHz) | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       |                                   | ✓       | ✓      | ✓                           |         |        |    | ✓  | ✓  | ✓  |    | ✓  | ✓   | ✓ |  |  |
|                                         |                                         | N78 TDD**<br>(3700.0 – 3800.0 MHz)                    | PI/2 BPSK<br>QPSK<br>16QAM<br>64QAM<br>256QAM | 15<br>30       |                                   | ✓       | ✓      | ✓                           |         |        |    | ✓  | ✓  | ✓  |    | ✓  | ✓   | ✓ |  |  |
|                                         | UL carrier aggregation LTE (Inter-Band) |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         | Supported combinations                  |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
|                                         | 2A-5A                                   |                                                       |                                               | 2A-12A         |                                   |         | 2A-13A |                             |         | 2A-14A |    |    |    |    |    |    |     |   |  |  |
|                                         | 2A-48A                                  |                                                       |                                               | 4A-5A          |                                   |         | 4A-12A |                             |         | 4A-13A |    |    |    |    |    |    |     |   |  |  |
|                                         | 5A-7A                                   |                                                       |                                               | 5A-30A         |                                   |         | 5A-48A |                             |         | 5A-66A |    |    |    |    |    |    |     |   |  |  |
| 12A-30A                                 |                                         |                                                       | 12A-66A                                       |                |                                   | 13A-48A |        |                             | 13A-66A |        |    |    |    |    |    |    |     |   |  |  |
| 14A-30A                                 |                                         |                                                       | 14A-66A                                       |                |                                   | 25A-26A |        |                             | 48A-66A |        |    |    |    |    |    |    |     |   |  |  |
| UL carrier aggregation LTE (Intra-band) |                                         |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
| Supported combinations                  |                                         |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
| 5B                                      |                                         |                                                       | 7C                                            |                |                                   | 38C     |        |                             | 41C     |        |    |    |    |    |    |    |     |   |  |  |
| 48C                                     |                                         |                                                       | 66B                                           |                |                                   | 66C     |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
| EN-DC                                   |                                         |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
| Supported combinations                  |                                         |                                                       |                                               |                |                                   |         |        |                             |         |        |    |    |    |    |    |    |     |   |  |  |
| NR 5G Band                              |                                         |                                                       |                                               |                |                                   |         |        | Associated LTE Bands        |         |        |    |    |    |    |    |    |     |   |  |  |
| N2A                                     |                                         |                                                       |                                               |                |                                   |         |        | LTE Bands: 5, 12, 13, 14    |         |        |    |    |    |    |    |    |     |   |  |  |
| N5A                                     |                                         |                                                       |                                               |                |                                   |         |        | LTE Bands: 2, 7, 30, 66, 48 |         |        |    |    |    |    |    |    |     |   |  |  |

|  |                               |                               |                                         |
|--|-------------------------------|-------------------------------|-----------------------------------------|
|  |                               | N66A                          | LTE Bands: 5, 12, 13, 48                |
|  |                               | N41A                          | LTE Bands: 2, 66, 41                    |
|  |                               | N77A                          | LTE Bands: 2, 5, 12, 13, 14, 30, 66, 41 |
|  |                               | N78A                          | LTE Bands: 2, 5, 7, 38                  |
|  | UL carrier aggregation 5G FR1 |                               |                                         |
|  |                               | UL carrier aggregation 5G FR1 |                                         |
|  |                               | n2A-n5A                       |                                         |
|  |                               | n5A-n66A                      |                                         |

|                     |                         |                                  |                                  |
|---------------------|-------------------------|----------------------------------|----------------------------------|
| Antenna Information | Transmitter             | Main (Ant 5)                     | Aux (Ant8)                       |
|                     | Manufacturer            | WNC                              | WNC                              |
|                     | Antenna type            | PIFA antenna                     | PIFA antenna                     |
|                     | Part number             | 6036B0306201<br>(81ELA215.G01)   | 6036B0306401<br>(81EABL15.G09)   |
|                     | Antenna peak gain (dBi) | 2.24                             | 2.41                             |
|                     | Transmitter             | Main (Ant5)                      | Aux (Ant 8)                      |
|                     | Manufacturer            | HongBo                           | HongBo                           |
|                     | Antenna type            | PIFA Antenna                     | PIFA Antenna                     |
|                     | Part number             | 6036B0310901<br>(00-3302700050)) | 6036B0308801<br>(00-2602749150)) |
|                     | Antenna peak gain (dBi) | 1.99                             | -2.19                            |

## 6. Remarks and comments

1. The tested configurations were selected based on the worst-case spurious emissions per frequency band from modular type approval report (FCC ID: ZMOFM350GL).
2. The DUT has two antenna manufacturers (WNC and Hong-Bo) but the WWAN module and the rated output power remain the same. For each band, tests were performed on the highest peak antenna gain.
3. In regard of RSS 197 annex C shows a description of the algorithm implementation for both reducing the EIRP the limit allowed and decoding an enabling signal from the base station before the mobile equipment can transmit.

## 7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

| Band      | Band       | FCC part                           | RSS part                               | Verdict |
|-----------|------------|------------------------------------|----------------------------------------|---------|
| WCDMA     | WCDMA II*  | 24.238(a), 2.1053                  | 133-ch 6.5.1                           | P       |
|           | WCDMA IV   | 27.53 (h), 2.1053                  | 139-ch.6.5                             | P       |
|           | WCDMA V*   | 22.917(a), 2.1053                  | 132-ch.5.5                             | P       |
| LTE       | LTE 2*     | 24.238(a), 2.1053                  | 133-ch 6.5.1                           | NM      |
|           | LTE4       | 27.53 (h), 2.1053                  | 139-ch.6.5                             | NM      |
|           | LTE 5*     | 22.917(a), 2.1053                  | 132-ch.5.5                             | NM      |
|           | LTE 7      | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | P       |
|           | LTE12      | 27.53 (g), 2.1053                  | 130-ch.4.7                             | P       |
|           | LTE 13     | 27.53 (c)(f), 2.1053               | 130-ch.4.7                             | P       |
|           | LTE14      | 90.543(e)(f), 2.1053               | 140-ch.4.4                             | P       |
|           | LTE17      | 27.53 (g), 2.1053                  | 130-ch.4.7                             | NM      |
|           | LTE 25*    | 24.238(a), 2.1053                  | 133-ch 6.5.1                           | P       |
|           | LTE 26*    | 90.691, 22.917(a), 2.1053          | 132-ch.5.5                             | P       |
|           | LTE 30     | 27.53 (a)(4), 2.1053               | 195- ch.5.6.2                          | P       |
|           | LTE 38     | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | NM      |
|           | LTE 41     | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | P       |
|           | LTE 48*    | 96.41(e), 2.1053                   | 192-ch.8.7, 197-ch.5.7                 | P       |
|           | LTE 66     | 27.53(h), 2.1053                   | 139-ch.6.5                             | P       |
| LTE ULCA  | 5B_CA      | 22.917(a), 2.1053                  | 132-ch.5.5                             | P       |
|           | 66B_CA     | 27.53(h), 2.1053                   | 139-ch.6.5                             | P       |
|           | 66C_CA     | 27.53(h), 2.1053                   | 139-ch.6.5                             | NM      |
|           | 7C_CA      | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | P       |
|           | 38C_CA     | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | NM      |
|           | 41C_CA     | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | P       |
|           | 48C_CA     | 96.41(e), 2.1053                   | 192-ch.8.7, 197-ch.5.7                 | P       |
|           | 2A-13A     | 24.238(a), 27.53 (c)(f), 2.1053    | 133-ch 6.5.1, 130-ch.4.7               | P       |
|           | 2A-48A     | 24.238(a), 96.41(e), 2.1053        | 133-ch 6.5.1, 192-ch.8.7<br>197-ch.5.7 | P       |
|           | 5A-7A      | 22.917(a), 27.53 (m)(4), 2.1053    | 132-ch.5.5, 199-ch.4.5                 | P       |
|           | 5A-66A     | 22.917(a), 27.53(h), 2.1053        | 132-ch.5.5, 139-ch.6.5                 | P       |
|           | 12A-30A    | 27.53 (g), 27.53 (a)(4), 2.1053    | 130-ch.4.7, 195- ch.5.6.2              | P       |
|           | 12A-66A    | 27.53 (g), 27.53(h), 2.1053        | 130-ch.4.7, 139-ch.6.5                 | P       |
|           | 13A-48A    | 27.53 (c)(f), 96.41(e), 2.1053     | 130-ch.4.7, 192-ch.8.7<br>197-ch.5.7   | P       |
|           | 14A-30A    | 90.543(e)(f), 27.53 (a)(4), 2.1053 | 140-ch.4.4, 195- ch.5.6.2              | P       |
|           | 14A-66A    | 90.543(e)(f), 27.53(h), 2.1053     | 140-ch.4.4, 139-ch.6.5                 | P       |
|           | 25A-26A    | 24.238, 90.691, 22.917, 2.1053     | 133-ch 6.5.1, 132-ch.5.5               | P       |
| 5G NR FR1 | N2*        | 24.238(a), 2.1053                  | 133-ch 6.5.1                           | NM      |
|           | N5*        | 22.917(a), 2.1053                  | 132-ch.5.5                             | P       |
|           | N7         | 27.53(m)(4), 2.1053                | 199-ch.4.5                             | P       |
|           | N25*       | 24.238, 2.1053                     | 133-ch 6.5.1                           | P       |
|           | N30        | 27.53 (a)(4), 2.1053               | 195- ch.5.6.2                          | P       |
|           | N38        | 27.53 (m)(4), 2.1053               | 199-ch.4.5                             | NM      |
|           | N41 (HPUE) | 27.53(m)(4), 2.1053                | 199-ch.4.5                             | P       |
|           | N66        | 27.53(h), 2.1053                   | 139-ch.6.5                             | P       |

|                   |                   |                                   |                                       |    |
|-------------------|-------------------|-----------------------------------|---------------------------------------|----|
|                   | N77 (HPUE)        | 27.53(l)(n), 2.1053               | NA                                    | P  |
|                   | N78               | 27.53(l), 2.1053                  | NA                                    | NM |
| 5G NR FR1<br>ULCA | N2A - N5A         | 24.238(a), 22.917(a), 2.1053      | 133-ch 6.5.1, 132-ch.5.5,             | NM |
|                   | N5A - N66A        | 22.917(a), 27.53(h), 2.1053       | 132-ch.5.5, 139-ch.6.5                | NM |
| EN-DC             | 5A - N2A          | 22.917(a), 24.238(a), 2.1053      | 132-ch.5.5, 133-ch 6.5.1              | P  |
|                   | 12A - N2A         | 27.53 (g), 24.238(a), 2.1053      | 130-ch.4.7, 133-ch 6.5.1              | NM |
|                   | 13A - N2A         | 27.53 (c)(f), 24.238(a), 2.1053   | 130-ch.4.7, 133-ch 6.5.1              | NM |
|                   | 14A - N2A         | 90.543(e)(f), 24.238(a) 2.1053    | 140-ch.4.4, 133-ch 6.5.1              | NM |
|                   | 2A - N5A          | 24.238(a), 22.917(a), 2.1053      | 133-ch 6.5.1, 132-ch.5.5              | P  |
|                   | 7A - N5A          | 27.53 (m)(4), 22.917(a), 2.1053   | 199-ch.4.5 ,132-ch.5.5                | NM |
|                   | 30A - N5A         | 27.53 (a)(4), 22.917(a), 2.1053   | 195- ch.5.6.2, 132-ch.5.5             | NM |
|                   | 66A - N5A         | 27.53(h), 22.917(a), 2.1053       | 139-ch.6.5, 132-ch.5.5                | NM |
|                   | 48A - N5A         | 96.41(e), 22.917(a), 2.1053       | 192-ch.8.7, 197-ch.5.7,<br>132-ch.5.5 | NM |
|                   | 5A - N66A         | 22.917(a), 27.53(h), 2.1053       | 132-ch.5.5, 139-ch.6.5                | NM |
|                   | 12A - N66A        | 27.53 (g), 27.53(h), 2.1053       | 130-ch.4.7 ,139-ch.6.5                | NM |
|                   | 13A - N66A        | 27.53 (c)(f), 27.53(h), 2.1053    | 130-ch.4.7, 139-ch.6.5                | NM |
|                   | 48A - N66A        | 96.41(e), 27.53(h), 2.1053        | 192-ch.8.7<br>197-ch.5.7, 139-ch.6.5  | P  |
|                   | 2A - N41A (HPUE)  | 24.238(a)27.53 (m)(4), 2.1053     | 133-ch 6.5.1, 199-ch.4.5              | NM |
|                   | 66A - N41A (HPUE) | 27.53(h), 27.53 (m)(4), 2.1053    | 139-ch.6.5, 199-ch.4.5                | NM |
|                   | 41A - N41A (HPUE) | 27.53 (m)(4), 2.1053              | 199-ch.4.5                            | P  |
|                   | 2A - N77A (HPUE)  | 24.238(a), 27.53(l)(n), 2.1053    | NA                                    | NM |
|                   | 5A - N77A (HPUE)  | 22.917(a), 27.53(l)(n), 2.1053    | NA                                    | NM |
|                   | 12A - N77A (HPUE) | 27.53 (g), 27.53(l)(n), 2.1053    | NA                                    | NM |
|                   | 13A - N77A (HPUE) | 27.53(c)(f), 27.53(l)(n), 2.1053  | NA                                    | NM |
|                   | 14A - N77A (HPUE) | 90.543(e)(f), 27.53(l)(n), 2.1053 | NA                                    | NM |
|                   | 30A - N77A (HPUE) | 27.53 (a)(4), 27.53(l)(n), 2.1053 | NA                                    | NM |
|                   | 66A - N77A (HPUE) | 27.53(h), 27.53(l)(n), 2.1053     | NA                                    | NM |
|                   | 41A - N77A (HPUE) | 27.53 (m)(4), 27.53(l)(n), 2.1053 | NA                                    | NM |
|                   | 2A - N78A         | 24.238(a), 27.53 (l), 2.1053      | NA                                    | P  |
|                   | 5A - N78A         | 22.917(a), 27.53 (l), 2.1053      | NA                                    | NM |
|                   | 7A - N78A         | 27.53(m)(4), 27.53 (l), 2.1053    | NA                                    | NM |
|                   | 38A - N78A        | 27.53 (m)(4), 27.53 (l), 2.1053   | NA                                    | NM |

\* Rx Spurious emission not measured for RSS Parts 132, 133 and 197

P: Pass  
F: Fail  
NM: Not Measured  
NA: Not Applicable

## 8. Document Revision History

| Revision # | Modified by | Revision Details |
|------------|-------------|------------------|
| Rev. 00    | N.Bui       | First Issue      |

# Annex A. Test & System Description

## A.1 Measurement System

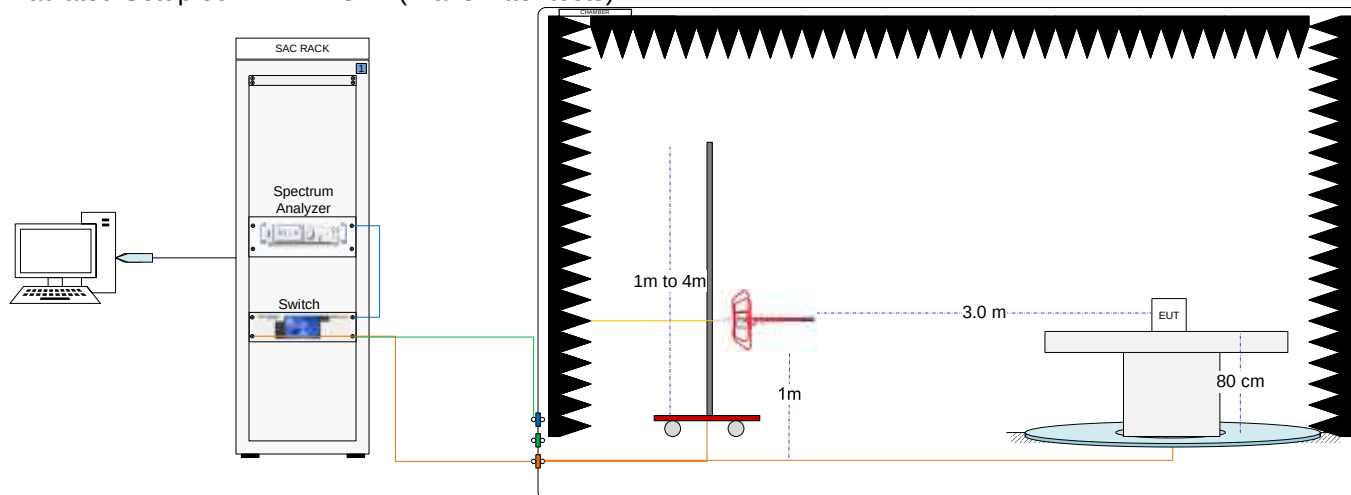
Measurements were performed using the following setups.

For WCDMA, LTE and ULCA-LTE (Intra-band), a communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

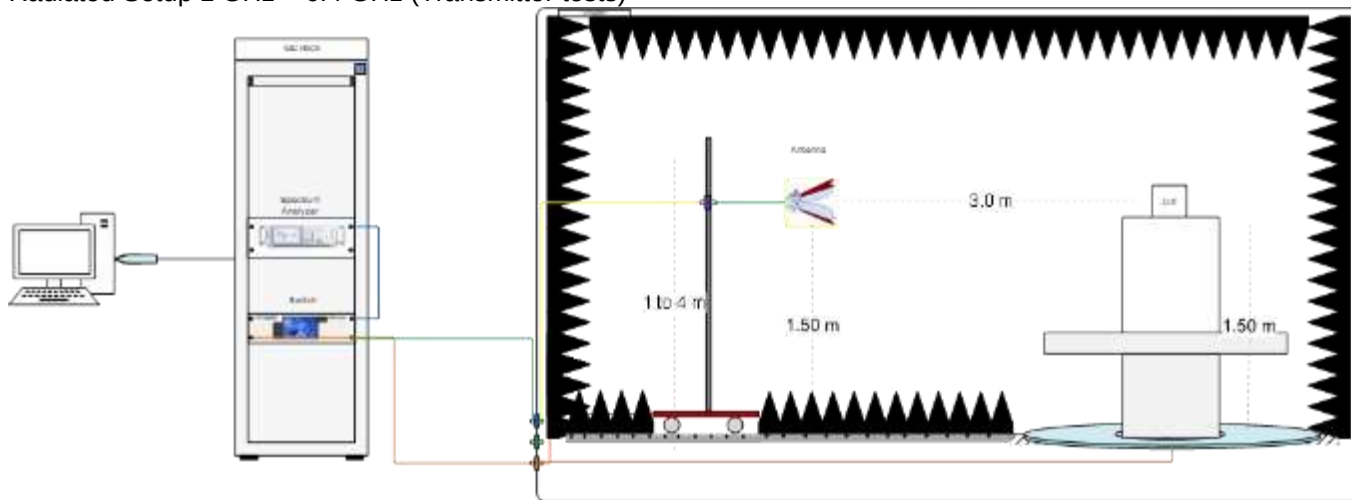
For 5G NR standalone and EN-DC modes and for ULCA-LTE (Inter-band), a factory test mode software (NoiseProfilingTool5G V1.0.18) provided by the applicant is used to put device in transmission mode at the maximum output power.

### Radiated test setup

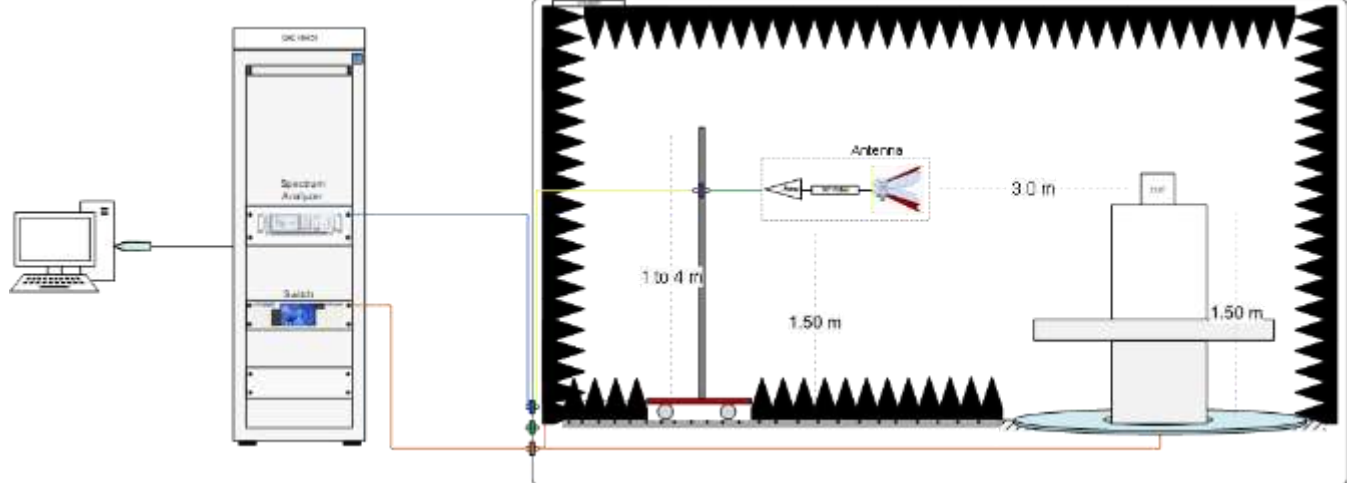
#### Radiated Setup 30 MHz - 1 GHz (Transmitter tests)



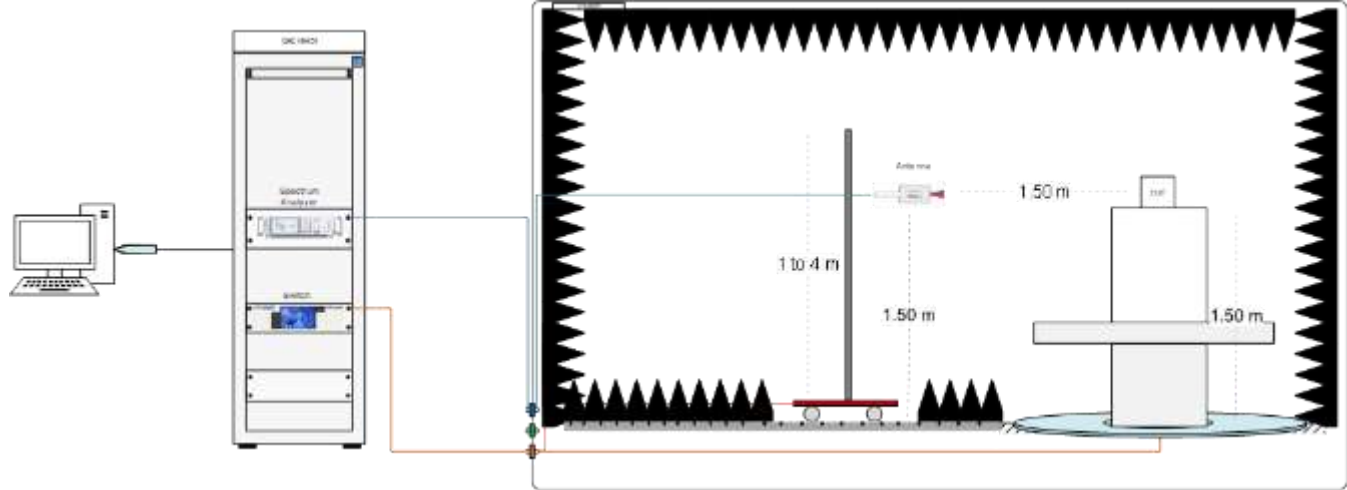
#### Radiated Setup 1 GHz – 6.4 GHz (Transmitter tests)



### Radiated Setup 6.4 GHz – 18 GHz (Transmitter tests)



### Radiated Setup 18 GHz – 40 GHz (Receiver tests)



### Sample Calculation

The spurious received power  $P$  at the spectrum Analyzer is converted to EIRP the equivalent isotropically radiated power, in dBm using the transducer factor  $F$  corresponding to the Rx path Loss:

$$F \text{ (dB)} = \text{Free Space Attenuation (dB)} + \text{Cable losses (dB)} - \text{Amplifiers Gain (dB)} - \text{Rx Antenna Gain (dBi)}$$

$$\text{EIRP (dBm)} = P(\text{dBm}) + F \text{ (dB)}$$

## A.2 Test Equipment List

### A.2.1 Radiated Setup

#### Radiated Setup #1

| ID#     | Device                                    | Type/Model            | Serial #               | Manufacturer    | Cal. Date  | Cal. Due Date |
|---------|-------------------------------------------|-----------------------|------------------------|-----------------|------------|---------------|
| 006-000 | Anechoic chamber                          | FACT 3                | 5720                   | ETS Lindgren    | 2020-01-07 | 2022-01-07    |
| 006-008 | Measurement Software V11.30.00            | EMC32                 | 100623                 | Rohde & Schwarz | N/A        | N/A           |
| 147-000 | Spectrum analyzer                         | FSW43                 | 101847                 | Rohde & Schwarz | 2020-11-02 | 2022-11-02    |
| 006-002 | Switch & Positioning                      | EMC center            | 00159757               | ETS Lindgren    | N/A        | N/A           |
| 006-011 | Boresight antenna mast                    | BAM4.0-P              | P/278/2890.01          | Maturo          | N/A        | N/A           |
| 006-003 | Multi axis Positioning                    | 2116CR-5905           | 00153265               | ETS Lindgren    | N/A        | N/A           |
| 056-000 | Double Ridged Horn Antenna 1 GHz – 18 GHz | 3117                  | 00157736               | ETS Lindgren    | 2020-04-01 | 2022-04-01    |
| 007-008 | Double Horn Ridged antenna                | 3116C-PA              | 00169308bis + 00196308 | ETS-Lindgren    | 2021-08-05 | 2023-08-05    |
| 006-023 | Conical log spiral antenna                | 3102                  | 00154400               | ETS Lindgren    | NA         | NA            |
| 006-022 | BiConiLog antenna 25MHz – 1GHz            | 3142E                 | 156946                 | ETS Lindgren    | 2021-08-05 | 2023-08-05    |
| 006-020 | Double Ridged Horn Antenna 1 GHz – 18 GHz | 3117                  | 00157734               | ETS Lindgren    | 2021-08-05 | 2023-08-05    |
| 006-052 | RF Cable 7.5m                             | 05010510570 00GX      | 19.35.850              | Radiall         | 2021-08-12 | 2022-02-12    |
| 006-051 | RF Cable 1.0m                             | CBL-1.5M-SMSM+        | 202879                 | Mini-Circuits   | 2021-08-12 | 2022-02-12    |
| 006-030 | RF Cable 1.2m                             | UFA147A-0-0480-200200 | MFR 64639223720-003    | Micro-coax      | 2021-08-12 | 2022-02-12    |
| 006-034 | RF Cable 1.0m                             | UFA147A               | -                      | Utilflex        | 2021-08-12 | 2022-02-12    |
| 006-036 | RF Cable 1.0m                             | UFB311A-0-0590-50U50U | MFR 64639 223230-001   | Micro-coax      | 2021-08-12 | 2022-02-12    |
| 006-038 | RF Cable 7.0m                             | R286304009            | -                      | Radiall         | 2021-08-12 | 2022-02-12    |
| 006-039 | RF Cable 2.5m                             | 05009909925 00KE      | 19.23.395              | Radiall         | 2021-08-12 | 2022-02-12    |
| 006-033 | RF Cable 2.5m                             | UFA147A-0-1380-50U200 | MFR 64639223219-001    | Micro-coax      | NA         | NA            |
| 365-000 | Temperature & Humidity logger             | RA12E-TH1-RAS         | 00-80-A3-E1-6E-55      | Avtech          | 2021-03-08 | 2023-03-08    |
| 295-000 | Communication tester                      | CMW500                | 147712                 | Rohde & Schwarz | N/A        | N/A           |
| 142-000 | Communication tester                      | CMW500                | 163186                 | Rohde & Schwarz | 2021-05-07 | 2023-05-07    |

## Radiated Setup #2

| ID#     | Device                                 | Type/Model            | Serial #               | Manufacturer    | Cal. Date  | Cal. Due Date |
|---------|----------------------------------------|-----------------------|------------------------|-----------------|------------|---------------|
| 007-000 | Anechoic chamber                       | RFD-FA-100            | 5996                   | ETS Lindgren    | 2021-09-14 | 2023-09-14    |
| 007-002 | Turntable                              | -                     | -                      | ETS Lindgren    | N/A        | N/A           |
| 007-003 | Antenna Tower                          | 2171B-3.0M            | 00150123               | ETS Lindgren    | N/A        | N/A           |
| 007-006 | Switch & Positioner                    | EMCenter              | 00151232               | ETS Lindgren    | N/A        | N/A           |
| 007-005 | Measurement SW, V11.20.00              | EMC32                 | 100401                 | Rohde & Schwarz | N/A        | N/A           |
| 127-000 | Spectrum Analyzer                      | FSV40                 | 101358                 | Rohde & Schwarz | 2021-01-15 | 2023-01-15    |
| 007-030 | Horn Antenna 1-18GHz                   | 3115                  | 9911-5967              | Emco            | NA         | NA            |
| 007-007 | Double Ridge Horn (1-18GHz)            | 3117                  | 00152266               | ETS Lindgren    | 2020-03-18 | 2022-03-18    |
| 056-000 | Horn Antenna 3117 + Amplifier + HPF6.4 | 3117                  | 00157736               | ETS-Lindgren    | 2020-04-01 | 2022-04-01    |
| 007-008 | Double Horn Ridged antenna             | 3116C-PA              | 00169308bis + 00196308 | ETS-Lindgren    | 2021-08-05 | 2023-08-05    |
| 007-022 | RF Cable 1-18GHz, 1.5m                 | 0501050991200GX       | 19.23.493              | Radiall         | 2021-08-12 | 2022-02-12    |
| 007-020 | RF Cable 1-18GHz, 1.2 m                | 2301761761200PJ       | 12.22.1104             | Radiall         | 2021-08-12 | 2022-02-12    |
| 007-011 | RF Cable 1-18GHz – 6.5m                | 140-8500-11-51        | 001                    | Spectrum        | 2021-08-12 | 2022-02-12    |
| 007-015 | RF Cable 1GHz-18GHz 1.5m               | -                     | -                      | Spirent         | 2021-08-12 | 2022-02-12    |
| 007-014 | RF Cable 18-40 GHz 6m                  | R286304009            | 1747364                | Radiall         | 2021-08-12 | 2022-02-12    |
| 007-023 | RF Cable 1m DC-40GHz                   | PE360-100CM           | -                      | Pasternack      | 2021-08-12 | 2022-02-12    |
| 007-018 | RF Cable 1-9.5GHz 1.2m                 | 0500990991200KE       | -                      | Radiall         | 2021-08-12 | 2022-02-12    |
| 256-000 | RF Cable 18GHz                         | UFB311A-0-0590-50U50U | MFR 64639 223230-002   | Micro-Coax      | N/A        | N/A           |
| 145-000 | Temp & Humidity Logger                 | RA12E-TH1-RAS         | RA12-B89BE3            | Avtech          | 2020-01-22 | 2022-01-22    |
| 295-000 | Communication tester                   | CMW500                | 147712                 | Rohde & Schwarz | N/A        | N/A           |
| 142-000 | Communication tester                   | CMW500                | 163186                 | Rohde & Schwarz | 2021-05-07 | 2023-05-07    |

### A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the table below with a coverage factor of  $k = 2$  to indicate a 95% level of confidence:

| Measurement type               | Uncertainty | Unit |
|--------------------------------|-------------|------|
| Tx Radiated test < 1GHz        | $\pm 5.26$  | dB   |
| Tx Radiated test 1GHz - 40 GHz | $\pm 5.19$  | dB   |

# Annex B. Test Results

The herein test results were performed by:

|                             |                |
|-----------------------------|----------------|
| Test case measurement       | Test Personnel |
| Radiated spurious emissions | N.BUI          |

## B.1 Radiated spurious emission

### B.1.1 Standard references

| Band                                       | FCC part                        | RSS Part        | FCC Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                | IC Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------|---------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WCDMA II<br>LTE 2<br>LTE 25<br>N 2<br>N 25 | 24.238(a),<br>2.1053            | 133-ch<br>6.5.1 | The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB                                                                                                                                                                                                                                                                          | (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1 MHz is required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WCDMA IV<br>LTE 4<br>LTE 66<br>N 66        | 27.53 (h),<br>2.1053            | 139-ch.6.5      | The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB                                                                                                                                                                                                                                                                          | (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WCDMA V<br>LTE 5<br>N 5<br>LTE 26          | 22.917(a),<br>2.1053,<br>90.691 | 132-ch.5.5      | The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB                                                                                                                                                                                                                                                                          | (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| LTE 12<br>LTE 13<br>LTE 17                 | 27.53 (c)(f),<br>2.1053         | 130-ch.4.7      | The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions 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. | The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.<br>In addition, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:<br>a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:<br>(i) $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment, and<br>(ii) $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment.<br>b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz. |
| N 77                                       | 27.53 (l)(n)<br>2.1053          | NA              | (l)(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.<br>(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.                                                                                                           | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| N 78                                       | 27.53 (l)<br>2.1053             | NA              | (l)(2) For mobile operations in the 3700-3980 MHz band, the conducted power of                                                                                                                                                                                                                                                                                                                                                                           | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                 |                         |                 | any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
|-----------------|-------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|-------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------|------------------------|
| LTE 14          | 90.543(e)(f)            | 140-ch4.4       | <p>(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:</p> <p>(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than <math>76 + 10 \log (P)</math> dB in a 6.25 kHz band segment, for base and fixed stations.</p> <p>(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than <math>65 + 10 \log (P)</math> dB in a 6.25 kHz band segment, for mobile and portable stations.</p> <p>(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least <math>43 + 10 \log (P)</math> dB.</p> <p>(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.</p> <p>(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.</p> <p>(f) 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.</p> | <p>The power of any unwanted emission outside the bands 758-768 MHz and 788-798 MHz shall be attenuated below the transmitter output power P in dBW as follows, where p is the transmitter output power in watts:</p> <p>For any frequency between 769-775 MHz and 799-806 MHz:</p> <ul style="list-style-type: none"><li>• <math>76 + 10 \log (p)</math>, dB in a 6.25 kHz band for fixed and base station equipment</li><li>• <math>65 + 10 \log (p)</math>, dB in a 6.25 kHz band for mobile and portable/hand-held equipment</li></ul> <p>For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: <math>43 + 10 \log (p)</math>, dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.</p> <p>In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed -70 dBW/MHz for wideband emissions, and -80 dBW/kHz for discrete emissions of less than 700 Hz bandwidth.</p>                                                                                                      |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| LTE 30*<br>N30* | 27.53 (a)(4),<br>2.1053 | 195<br>ch.5.6.2 | <p>By a factor of not less than: <math>43 + 10 \log (P)</math> 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 <math>55 + 10 \log (P)</math> dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than <math>61 + 10 \log (P)</math> dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than <math>67 + 10 \log (P)</math> dB on all frequencies between 2328 and 2337 MHz;</p> <p>(ii) By a factor of not less than <math>43 + 10 \log (P)</math> dB on all frequencies between 2300 and 2305 MHz, <math>55 + 10 \log (P)</math> dB on all frequencies between 2296 and 2300 MHz, <math>61 + 10 \log (P)</math> dB on all frequencies between 2292 and 2296 MHz, <math>67 + 10 \log (P)</math> dB on all frequencies between 2288 and 2292 MHz, and <math>70 + 10 \log (P)</math> dB below 2288 MHz;</p> <p>(iii) By a factor of not less than <math>43 + 10 \log (P)</math> dB on all frequencies between 2360 and 2365 MHz, and not less than <math>70 + 10 \log (P)</math> dB above 2365 MHz.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <table><tr><th>Frequency (MHz)</th><th>Attenuation (dB)</th></tr><tr><td>&lt;2200</td><td><math>43 + 10 \log_{10}(p)</math></td></tr><tr><td>2200 - 2288</td><td><math>70 + 10 \log_{10}(p)</math></td></tr><tr><td>2288 - 2292</td><td><math>67 + 10 \log_{10}(p)</math></td></tr><tr><td>2292 - 2296</td><td><math>61 + 10 \log_{10}(p)</math></td></tr><tr><td>2296 - 2300</td><td><math>55 + 10 \log_{10}(p)</math></td></tr><tr><td>2300 - 2305</td><td><math>43 + 10 \log_{10}(p)</math></td></tr><tr><td>2305 - 2320</td><td><math>43 + 10 \log_{10}(p)</math></td></tr><tr><td>2320 - 2324</td><td><math>55 + 10 \log_{10}(p)</math></td></tr><tr><td>2324 - 2328</td><td><math>61 + 10 \log_{10}(p)</math></td></tr><tr><td>2328 - 2337</td><td><math>67 + 10 \log_{10}(p)</math></td></tr><tr><td>2337 - 2341</td><td><math>61 + 10 \log_{10}(p)</math></td></tr><tr><td>2341 - 2345</td><td><math>55 + 10 \log_{10}(p)</math></td></tr><tr><td>2345 - 2360</td><td><math>43 + 10 \log_{10}(p)</math></td></tr><tr><td>2360 - 2365</td><td><math>43 + 10 \log_{10}(p)</math></td></tr><tr><td>2365 - 2395</td><td><math>70 + 10 \log_{10}(p)</math></td></tr><tr><td>&gt;2395</td><td><math>43 + 10 \log_{10}(p)</math></td></tr></table> | Frequency (MHz) | Attenuation (dB) | <2200 | $43 + 10 \log_{10}(p)$ | 2200 - 2288 | $70 + 10 \log_{10}(p)$ | 2288 - 2292 | $67 + 10 \log_{10}(p)$ | 2292 - 2296 | $61 + 10 \log_{10}(p)$ | 2296 - 2300 | $55 + 10 \log_{10}(p)$ | 2300 - 2305 | $43 + 10 \log_{10}(p)$ | 2305 - 2320 | $43 + 10 \log_{10}(p)$ | 2320 - 2324 | $55 + 10 \log_{10}(p)$ | 2324 - 2328 | $61 + 10 \log_{10}(p)$ | 2328 - 2337 | $67 + 10 \log_{10}(p)$ | 2337 - 2341 | $61 + 10 \log_{10}(p)$ | 2341 - 2345 | $55 + 10 \log_{10}(p)$ | 2345 - 2360 | $43 + 10 \log_{10}(p)$ | 2360 - 2365 | $43 + 10 \log_{10}(p)$ | 2365 - 2395 | $70 + 10 \log_{10}(p)$ | >2395 | $43 + 10 \log_{10}(p)$ |
| Frequency (MHz) | Attenuation (dB)        |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| <2200           | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2200 - 2288     | $70 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2288 - 2292     | $67 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2292 - 2296     | $61 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2296 - 2300     | $55 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2300 - 2305     | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2305 - 2320     | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2320 - 2324     | $55 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2324 - 2328     | $61 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2328 - 2337     | $67 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2337 - 2341     | $61 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2341 - 2345     | $55 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2345 - 2360     | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2360 - 2365     | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| 2365 - 2395     | $70 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |
| >2395           | $43 + 10 \log_{10}(p)$  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                  |       |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |             |                        |       |                        |

| LTE 7<br>LTE 38<br>LTE 41<br>N 7<br>N38<br>N 41 | 27.53<br>(m)(4),<br>2.1053     | 199-ch.4.5  | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:<br><br>(i) 40 + 10 log10 p from the channel edges to 5 MHz away<br>(ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and<br>(iii) 55 + 10 log10 p at X MHz and beyond from the channel edges<br>In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.                                                                                                                                                                                                                                                                                                                                                                                                                |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
|-------------------------------------------------|--------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------|--|--|-----|-----|----------------------------------|----------------|-------------|----------|----------------|-------------|
| LTE 48                                          | 96.41(e)                       |             | (ii) Except as otherwise specified in paragraph (e)(2) of this section, 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. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.<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 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
| LTE48                                           |                                | 192-ch.8.7  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Subscriber equipment shall have the TRP (per cell) or conducted power (per single antenna connector), where applicable, of unwanted emission outside the frequency block group not exceeding the following, where B is the frequency block group in MHz as shown in table 5. <table><tr><th>Frequency block group (B)</th><th colspan="2">Offset frequency from the edge</th></tr><tr><td></td><th>0-1</th><th>1-5</th></tr><tr><td>10 MHz, 20MHz, 30 MHz and 40 MHz</td><td>-13dBm/1% of B</td><td>-10 dBm/MHz</td></tr><tr><td>&gt; 40 MHz</td><td>-24 dBm/30 kHz</td><td>-10 dBm/MHz</td></tr></table> Notwithstanding the above limits in 8.7.2 and 8.7.3, the TRP (per cell) or conducted power (per single antenna connector), where applicable, for the unwanted emissions shall not exceed:<br>for subscriber equipment: -30 dBm/MHz in the frequency range greater than (B+5) MHz from the edge of the frequency band, where B is the frequency block group in MHz | Frequency block group (B) | Offset frequency from the edge |  |  | 0-1 | 1-5 | 10 MHz, 20MHz, 30 MHz and 40 MHz | -13dBm/1% of B | -10 dBm/MHz | > 40 MHz | -24 dBm/30 kHz | -10 dBm/MHz |
| Frequency block group (B)                       | Offset frequency from the edge |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
|                                                 | 0-1                            | 1-5         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
| 10 MHz, 20MHz, 30 MHz and 40 MHz                | -13dBm/1% of B                 | -10 dBm/MHz |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
| > 40 MHz                                        | -24 dBm/30 kHz                 | -10 dBm/MHz |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |                                |  |  |     |     |                                  |                |             |          |                |             |
| LTE 48                                          |                                | 197-ch.5.7  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The unwanted emissions shall be measured at the frequencies of the highest and lowest channel of all bandwidths and types of modulation that the equipment can operate with a resolution bandwidth of 1 MHz or less, but at least 1% of the occupied bandwidth of the transmitter, provided that the measured power is integrated over a 1 MHz bandwidth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |                                |  |  |     |     |                                  |                |             |          |                |             |

|  |  |  |  |                                                                                                                                                                                         |
|--|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  |  | The power of any emissions outside the frequency band 3650-3700 MHz shall be attenuated below the channel transmitter power P (dBW) by $43 + 10 \log(p)$ , where p is measured in watts |
|--|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

\*Worst case limit between FCC part and RSS part is applied

### B.1.2 Test procedure

The setup described in Test & System Description section was used to measure the radiated spurious emissions. Depending on the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

## B.1.3 Test Results

### B.1.3.1 WCDMA

#### WCDMA 2 - WNC Antenna

| 30 MHz to 26.5 GHz - Radiated Spurious<br>WCDMA 2- QPSK - Low channel – 1852.4 MHz |       |       |        |
|------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                          | RMS   | Limit | Margin |
| MHz                                                                                | dBm   | dBm   | dB     |
| 43.7                                                                               | -55.0 | -13.0 | 42.0   |
| 3374.0                                                                             | -37.9 | -13.0 | 24.9   |
| 6958.0                                                                             | -49.7 | -13.0 | 36.7   |
| 17086.0                                                                            | -37.6 | -13.0 | 24.6   |
| 17807.8                                                                            | -37.6 | -13.0 | 24.6   |
| 18328.2                                                                            | -58.2 | -13.0 | 45.2   |

#### WCDMA 4 - WNC Antenna

| 30 MHz to 18GHz - Radiated Spurious<br>WCDMA 4- QPSK - High channel – 1752.6 MHz |       |       |        |
|----------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                        | RMS   | Limit | Margin |
| MHz                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                             | -52.5 | -13.0 | 39.5   |
| 3364.5                                                                           | -37.9 | -13.0 | 24.9   |
| 6909.8                                                                           | -49.5 | -13.0 | 36.5   |
| 12684.6                                                                          | -43.5 | -13.0 | 30.5   |
| 16374.5                                                                          | -38.4 | -13.0 | 25.4   |
| 17079.7                                                                          | -38.3 | -13.0 | 25.3   |

#### WCDMA 5 - HongBo Antenna

| 30 MHz to 9.5 GHz - Radiated Spurious<br>WCDMA 5- QPSK - Low channel – 826.4 MHz |       |       |        |
|----------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                        | RMS   | Limit | Margin |
| MHz                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                             | -55.6 | -13.0 | 42.6   |
| 1339.1                                                                           | -56.3 | -13.0 | 43.3   |
| 1651.1                                                                           | -58.1 | -13.0 | 45.1   |
| 2476.0                                                                           | -56.5 | -13.0 | 43.5   |
| 3459.7                                                                           | -55.8 | -13.0 | 42.8   |
| 7921.0                                                                           | -49.8 | -13.0 | 36.8   |

**B.1.3.2 LTE****LTE 7 - Hong-Bo Antenna**

| <b>30MHz to 26.5GHz - Radiated Spurious</b><br><b>LTE 7 - QPSK - High channel – 2560 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -54.9 | -25.0 | 29.9   |
| 3372.0                                                                                                           | -37.9 | -25.0 | 12.9   |
| 5101.9                                                                                                           | -51.2 | -25.0 | 26.2   |
| 17063.2                                                                                                          | -38.3 | -25.0 | 13.3   |
| 17445.7                                                                                                          | -37.3 | -25.0 | 12.3   |
| 23108.0                                                                                                          | -55.4 | -25.0 | 30.4   |

**LTE 12 - Hong-Bo Antenna**

| <b>30MHz to 9.5GHz - Radiated Spurious</b><br><b>LTE 12 - QPSK - Low channel – 704 MHz</b><br><b>BW 10 MHz</b> |       |       |        |
|----------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                      | RMS   | Limit | Margin |
| MHz                                                                                                            | dBm   | dBm   | dB     |
| 43.8                                                                                                           | -55.2 | -13.0 | 42.2   |
| 1427.4                                                                                                         | -55.5 | -13.0 | 42.5   |
| 1923.0                                                                                                         | -56.9 | -13.0 | 43.9   |
| 2412.1                                                                                                         | -55.5 | -13.0 | 42.5   |
| 3453.8                                                                                                         | -55.9 | -13.0 | 42.9   |
| 6845.7                                                                                                         | -50.7 | -13.0 | 37.7   |

**LTE 13 - Hong-Bo Antenna**

| <b>30MHz to 9.5GHz - Radiated Spurious</b><br><b>LTE 13 - QPSK - High channel – 784.5 MHz</b><br><b>BW 5 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -55.4 | -13.0 | 42.4   |
| 1564.4                                                                                                           | -55.2 | -40.0 | 15.2   |
| 2347.1                                                                                                           | -48.9 | -13.0 | 35.9   |
| 2943.0                                                                                                           | -54.9 | -13.0 | 41.9   |
| 3440.8                                                                                                           | -55.3 | -13.0 | 42.3   |
| 6971.3                                                                                                           | -50.8 | -13.0 | 37.8   |

**LTE 14 - WNC Antenna**

| <b>30MHz to 9.5GHz - Radiated Spurious</b><br><b>LTE 14 - QPSK - Mid channel – 793 MHz</b><br><b>BW 5 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                     | RMS   | Limit | Margin |
| MHz                                                                                                           | dBm   | dBm   | dB     |
| 43.8                                                                                                          | -53.7 | -13.0 | 40.7   |
| 1437.7                                                                                                        | -53.8 | -13.0 | 40.8   |
| 1581.8                                                                                                        | -56.4 | -40.0 | 16.4   |
| 1904.0                                                                                                        | -58.6 | -13.0 | 45.6   |
| 2372.6                                                                                                        | -47.0 | -13.0 | 34.0   |
| 6997.3                                                                                                        | -50.5 | -13.0 | 37.5   |

**LTE 25 - WNC Antenna**

| <b>30MHz to 26.5GHz - Radiated Spurious</b><br><b>LTE 25 - QPSK - Low channel – 1860 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -54.3 | -13.0 | 41.3   |
| 3386.5                                                                                                           | -38.0 | -13.0 | 25.0   |
| 3702.2                                                                                                           | -49.2 | -13.0 | 36.2   |
| 5553.0                                                                                                           | -36.1 | -13.0 | 23.1   |
| 17110.9                                                                                                          | -37.8 | -13.0 | 24.8   |
| 18387.2                                                                                                          | -58.1 | -13.0 | 45.1   |

**LTE 26 - HongBo Antenna**

| <b>30MHz to 9.5GHz - Radiated Spurious</b><br><b>LTE 26 - QPSK - Low channel – 831.5 MHz</b><br><b>BW 15 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -54.6 | -13.0 | 41.6   |
| 1419.2                                                                                                           | -56.2 | -13.0 | 43.2   |
| 1649.5                                                                                                           | -54.7 | -13.0 | 41.7   |
| 1915.4                                                                                                           | -56.6 | -13.0 | 43.6   |
| 2474.4                                                                                                           | -48.0 | -13.0 | 35.0   |
| 7926.2                                                                                                           | -49.9 | -13.0 | 36.9   |

**LTE 30 - WNC Antenna**

| <b>30MHz to 26.5GHz - Radiated Spurious</b><br><b>LTE 30 - QPSK - Mid channel – 2310 MHz</b><br><b>BW 10 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -55.7 | -40.0 | 15.7   |
| 1438.0                                                                                                           | -51.9 | -40.0 | 11.9   |
| 3387.5                                                                                                           | -49.0 | -40.0 | 9.0    |
| 6916.7                                                                                                           | -56.5 | -40.0 | 16.6   |
| 17165.3                                                                                                          | -53.4 | -40.0 | 13.4   |
| 21207.8                                                                                                          | -56.2 | -40.0 | 16.2   |

**LTE 41 - WNC Antenna**

| <b>30MHz to 40GHz - Radiated Spurious</b><br><b>LTE 41 - QPSK - High channel – 2680 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                       | RMS   | Limit | Margin |
| MHz                                                                                                             | dBm   | dBm   | dB     |
| 43.8                                                                                                            | -56.0 | -25.0 | 31.0   |
| 1428.0                                                                                                          | -52.1 | -25.0 | 27.1   |
| 3378.5                                                                                                          | -49.4 | -25.0 | 24.4   |
| 6994.0                                                                                                          | -51.5 | -25.0 | 26.5   |
| 17568.5                                                                                                         | -37.6 | -25.0 | 12.7   |
| 24225.5                                                                                                         | -56.9 | -25.0 | 31.9   |

**LTE 48 – WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>LTE 48 - QPSK - Mid channel – 3625 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                         | RMS   | Limit | Margin |
| MHz                                                                                                               | dBm   | dBm   | dB     |
| 43.8                                                                                                              | -55.5 | -40.0 | 15.5   |
| 3395.5                                                                                                            | -49.4 | -40.0 | 9.4    |
| 6166.2                                                                                                            | -52.0 | -40.0 | 12.0   |
| 7232.5                                                                                                            | -45.6 | -40.0 | 5.6    |
| 10848.0                                                                                                           | -58.6 | -40.0 | 18.6   |
| 33971.0                                                                                                           | -54.2 | -40.0 | 14.2   |

**LTE 66 - WNC Antenna**

| <b>30MHz to 18GHz – Tx Radiated Spurious</b><br><b>LTE 66 - QPSK - High channel – 1770 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|--------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                          | RMS   | Limit | Margin |
| MHz                                                                                                                | dBm   | dBm   | dB     |
| 43.8                                                                                                               | -54.9 | -13.0 | 41.9   |
| 3378.5                                                                                                             | -38.2 | -13.0 | 25.2   |
| 3522.2                                                                                                             | -51.3 | -13.0 | 38.3   |
| 5282.9                                                                                                             | -49.7 | -13.0 | 36.7   |
| 16395.0                                                                                                            | -38.6 | -13.0 | 25.6   |
| 17093.3                                                                                                            | -38.3 | -13.0 | 25.3   |

**B.1.3.3 5G NR****N5 - HongBo Antenna**

| <b>30MHz to 9.5GHz – Tx Radiated Spurious</b><br><b>N5 - QPSK - Low channel – 834 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                     | RMS   | Limit | Margin |
| MHz                                                                                                           | dBm   | dBm   | dB     |
| 43.8                                                                                                          | -55.3 | -13.0 | 42.3   |
| 1415.5                                                                                                        | -54.8 | -13.0 | 41.8   |
| 1666.8                                                                                                        | -53.2 | -13.0 | 40.2   |
| 1917.6                                                                                                        | -56.2 | -13.0 | 43.2   |
| 2499.9                                                                                                        | -44.3 | -13.0 | 31.3   |
| 7991.6                                                                                                        | -49.2 | -13.0 | 36.2   |

**N7 - HongBo Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>N7 - QPSK - Low channel – 2510 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                       | RMS   | Limit | Margin |
| MHz                                                                                                             | dBm   | dBm   | dB     |
| 43.8                                                                                                            | -54.6 | -25.0 | 29.6   |
| 1361.0                                                                                                          | -46.0 | -25.0 | 21.0   |
| 3311.5                                                                                                          | -38.1 | -25.0 | 13.1   |
| 7527.9                                                                                                          | -49.0 | -25.0 | 24.0   |
| 17107.9                                                                                                         | -37.7 | -25.0 | 12.7   |
| 23103.3                                                                                                         | -56.0 | -25.0 | 31.0   |

**N25 - WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>N25 - QPSK - Low channel – 1860 MHz</b><br><b>BW 20 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -54.2 | -13.0 | 41.2   |
| 3379.0                                                                                                           | -38.0 | -13.0 | 25.0   |
| 3718.3                                                                                                           | -54.4 | -13.0 | 41.4   |
| 5577.8                                                                                                           | -50.4 | -13.0 | 37.4   |
| 17111.8                                                                                                          | -37.2 | -13.0 | 24.2   |
| 18295.1                                                                                                          | -58.3 | -13.0 | 45.3   |

**N30 - WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>N30 - QPSK - Mid channel – 2310 MHz</b><br><b>BW 10 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                        | RMS   | Limit | Margin |
| MHz                                                                                                              | dBm   | dBm   | dB     |
| 43.8                                                                                                             | -55.4 | -40.0 | 15.3   |
| 3387.0                                                                                                           | -48.6 | -40.0 | 8.7    |
| 6246.2                                                                                                           | -50.9 | -40.0 | 10.9   |
| 7318.8                                                                                                           | -57.6 | -40.0 | 17.6   |
| 17129.5                                                                                                          | -53.8 | -40.0 | 13.8   |
| 21268.7                                                                                                          | -56.0 | -40.0 | 16.0   |

**N41 HPUE - WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>N41_HPUE - QPSK - Mid channel – 2592.99 MHz</b><br><b>BW 80 MHz</b> |       |       |        |
|--------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                | RMS   | Limit | Margin |
| MHz                                                                                                                      | dBm   | dBm   | dB     |
| 43.8                                                                                                                     | -55.9 | -25.0 | 30.9   |
| 3355.0                                                                                                                   | -49.4 | -25.0 | 24.4   |
| 6991.5                                                                                                                   | -51.6 | -25.0 | 26.6   |
| 16055.0                                                                                                                  | -40.3 | -25.0 | 15.3   |
| 17396.5                                                                                                                  | -37.9 | -25.0 | 12.9   |
| 24232.0                                                                                                                  | -56.8 | -25.0 | 31.8   |

**N66 - WNC Antenna**

| <b>30MHz to 18GHz – Tx Radiated Spurious</b><br><b>N66 - QPSK - High channel – 1760 MHz</b><br><b>BW 40 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                       | RMS   | Limit | Margin |
| MHz                                                                                                             | dBm   | dBm   | dB     |
| 43.8                                                                                                            | -55.2 | -13.0 | 42.2   |
| 3379.5                                                                                                          | -37.7 | -13.0 | 24.7   |
| 5759.4                                                                                                          | -52.0 | -13.0 | 39.0   |
| 6977.5                                                                                                          | -50.0 | -13.0 | 37.0   |
| 16440.7                                                                                                         | -39.0 | -13.0 | 25.9   |
| 17094.8                                                                                                         | -38.0 | -13.0 | 25.0   |

**N77\_HPUE - WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>N77_HPUE - QPSK - Low channel – 3750 MHz</b><br><b>BW 100 MHz</b> |       |       |        |
|----------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                            | RMS   | Limit | Margin |
| MHz                                                                                                                  | dBm   | dBm   | dB     |
| 43.8                                                                                                                 | -56.1 | -13.0 | 43.1   |
| 1435.5                                                                                                               | -53.7 | -13.0 | 40.7   |
| 6045.4                                                                                                               | -52.4 | -13.0 | 39.4   |
| 8043.5                                                                                                               | -58.8 | -13.0 | 45.8   |
| 17177.5                                                                                                              | -54.6 | -13.0 | 41.6   |
| 32338.5                                                                                                              | -54.6 | -13.0 | 41.6   |

**B.1.3.4 LTE ULCA-INTRA****LTE 5B\_CA – HongBo Antenna**

| <b>30MHz to 9.5GHz – Tx Radiated Spurious</b><br><b>LTE 5B_CA – QPSK – Low channel – 829/838.9 MHz</b><br><b>BW 10 MHz / 10 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                           | RMS   | Limit | Margin |
| MHz                                                                                                                                 | dBm   | dBm   | dB     |
| 43.8                                                                                                                                | -55.3 | -13.0 | 42.3   |
| 1439.3                                                                                                                              | -56.0 | -13.0 | 43.0   |
| 1921.4                                                                                                                              | -57.6 | -13.0 | 44.6   |
| 2412.7                                                                                                                              | -54.4 | -13.0 | 41.4   |
| 3418.0                                                                                                                              | -56.2 | -13.0 | 43.2   |
| 7922.9                                                                                                                              | -49.5 | -13.0 | 36.5   |

**LTE 66B\_CA – WNC Antenna**

| <b>30MHz to 18GHz – Tx Radiated Spurious</b><br><b>LTE 66B_CA – QPSK – High channel – 1765.1/1775 MHz</b><br><b>BW 10MHz / 10 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                             | RMS   | Limit | Margin |
| MHz                                                                                                                                   | dBm   | dBm   | dB     |
| 43.8                                                                                                                                  | -54.4 | -13.0 | 41.4   |
| 1348.5                                                                                                                                | -45.6 | -13.0 | 32.6   |
| 3378.5                                                                                                                                | -38.2 | -13.0 | 25.2   |
| 4970.0                                                                                                                                | -53.5 | -13.0 | 40.5   |
| 6946.8                                                                                                                                | -49.8 | -13.0 | 36.8   |
| 17114.8                                                                                                                               | -37.8 | -13.0 | 24.8   |

**LTE 7C\_CA – HongBo Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 7C_CA – QPSK – Low channel – 2510/2529.8 MHz</b><br><b>BW 20 MHz / 20 MHz</b> |       |       |        |
|----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                              | RMS   | Limit | Margin |
| MHz                                                                                                                                    | dBm   | dBm   | dB     |
| 43.8                                                                                                                                   | -54.7 | -25.0 | 29.7   |
| 1361.0                                                                                                                                 | -46.2 | -25.0 | 21.2   |
| 3387.0                                                                                                                                 | -37.7 | -25.0 | 12.7   |
| 15711.7                                                                                                                                | -39.7 | -25.0 | 14.7   |
| 17787.8                                                                                                                                | -37.0 | -25.0 | 12.0   |
| 21500.6                                                                                                                                | -55.7 | -25.0 | 30.7   |

**LTE 41C\_CA – WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 41C_CA – QPSK – High channel – 2660.2/2680 MHz</b><br><b>BW 20 MHz / 20 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                | RMS   | Limit | Margin |
| MHz                                                                                                                                      | dBm   | dBm   | dB     |
| 43.8                                                                                                                                     | -56.1 | -25.0 | 31.1   |
| 3393.0                                                                                                                                   | -49.9 | -25.0 | 24.9   |
| 6989.0                                                                                                                                   | -51.7 | -25.0 | 26.7   |
| 15976.0                                                                                                                                  | -39.8 | -25.0 | 14.8   |
| 17568.5                                                                                                                                  | -37.8 | -25.0 | 12.8   |
| 25782.5                                                                                                                                  | -57.0 | -25.0 | 32.0   |

**LTE 48C\_CA – WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>LTE 48C_CA – QPSK – Mid channel – 3615.1/3634.9 MHz</b><br><b>BW 20 MHz / 20 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                               | RMS   | Limit | Margin |
| MHz                                                                                                                                     | dBm   | dBm   | dB     |
| 43.8                                                                                                                                    | -57.4 | -40.0 | 17.4   |
| 3111.0                                                                                                                                  | -49.9 | -40.0 | 9.9    |
| 6167.4                                                                                                                                  | -52.2 | -40.0 | 12.2   |
| 7718.5                                                                                                                                  | -57.0 | -40.0 | 17.0   |
| 17836.0                                                                                                                                 | -54.4 | -40.0 | 14.4   |
| 33890.0                                                                                                                                 | -54.1 | -40.0 | 14.1   |

**B.1.3.5 LTE ULCA-INTER****LTE 2A-13A – HongBo Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 2A-13A – QPSK – Mid/Mid channel – 1880/782 MHz</b><br><b>BW 20 MHz / 10 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                | RMS   | Limit | Margin |
| MHz                                                                                                                                      | dBm   | dBm   | dB     |
| 43.8                                                                                                                                     | -55.0 | -13.0 | 42.0   |
| 3332.0                                                                                                                                   | -47.7 | -13.0 | 34.7   |
| 3443.8                                                                                                                                   | -49.6 | -13.0 | 36.6   |
| 6991.1                                                                                                                                   | -49.9 | -13.0 | 36.9   |
| 17107.5                                                                                                                                  | -37.2 | -13.0 | 24.2   |
| 18383.4                                                                                                                                  | -58.2 | -13.0 | 45.2   |

**LTE 2A-48A – WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>LTE 2A-48A – QPSK – Mid/Mid channel – 1880/3625 MHz</b><br><b>BW 20 MHz / 20 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                               | RMS   | Limit | Margin |
| MHz                                                                                                                                     | dBm   | dBm   | dB     |
| 43.8                                                                                                                                    | -53.9 | -40.0 | 13.9   |
| 3759.5                                                                                                                                  | -53.2 | -40.0 | 13.2   |
| 5639.9                                                                                                                                  | -50.3 | -40.0 | 10.3   |
| 6162.0                                                                                                                                  | -51.8 | -40.0 | 11.8   |
| 17192.0                                                                                                                                 | -54.6 | -40.0 | 14.6   |
| 32341.5                                                                                                                                 | -54.8 | -40.0 | 14.8   |

**LTE 5A-7A – HongBo Antenna**

**30MHz to 26.5GHz – Tx Radiated Spurious**  
**LTE 5A-7A – QPSK – Low/High channel – 829/2560 MHz**  
**BW 10 MHz / 20 MHz**

| Frequency | RMS   | Limit | Margin |
|-----------|-------|-------|--------|
| MHz       | dBm   | dBm   | dB     |
| 43.7      | -55.8 | -25.0 | 30.8   |
| 1348.5    | -43.6 | -25.0 | 18.6   |
| 3388.5    | -34.5 | -25.0 | 9.5    |
| 4208.8    | -49.6 | -25.0 | 24.6   |
| 4295.0    | -50.6 | -25.0 | 25.6   |
| 7679.7    | -46.1 | -25.0 | 21.1   |
| 23177.9   | -56.3 | -25.0 | 31.3   |

**LTE 5A-66A – WNC Antenna**

**30MHz to 18GHz – Tx Radiated Spurious**  
**LTE 5A-66A – QPSK – Low/High channel – 829/1770 MHz**  
**BW 10 MHz / 20 MHz**

| Frequency | RMS   | Limit | Margin |
|-----------|-------|-------|--------|
| MHz       | dBm   | dBm   | dB     |
| 43.8      | -55.5 | -13.0 | 42.5   |
| 3419.0    | -45.4 | -13.0 | 32.4   |
| 4364.1    | -49.1 | -13.0 | 36.1   |
| 13398.6   | -42.9 | -13.0 | 29.9   |
| 16400.8   | -38.6 | -13.0 | 25.6   |
| 17110.4   | -38.5 | -13.0 | 25.4   |

**LTE 12A-30A – HongBo Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 12A-30A – QPSK – Low/Mid channel – 704/2310 MHz</b><br><b>BW 10 MHz / 10 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                 | RMS   | Limit | Margin |
| MHz                                                                                                                                       | dBm   | dBm   | dB     |
| 893.2                                                                                                                                     | -49.1 | -40.0 | 9.1    |
| 913.1                                                                                                                                     | -52.4 | -40.0 | 12.4   |
| 3379.0                                                                                                                                    | -47.2 | -40.0 | 7.2    |
| 4359.1                                                                                                                                    | -53.7 | -40.0 | 13.7   |
| 6930.2                                                                                                                                    | -56.0 | -40.0 | 16.0   |
| 22720.8                                                                                                                                   | -56.5 | -40.0 | 16.5   |

**LTE 12A-66A – WNC Antenna**

| <b>30MHz to 18GHz – Tx Radiated Spurious</b><br><b>LTE 12A-66A – QPSK – High/High channel – 711/1770 MHz</b><br><b>BW 10 MHz / 20 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                 | RMS   | Limit | Margin |
| MHz                                                                                                                                       | dBm   | dBm   | dB     |
| 43.8                                                                                                                                      | -51.9 | -13.0 | 38.9   |
| 3375.5                                                                                                                                    | -35.0 | -13.0 | 22.0   |
| 6975.5                                                                                                                                    | -50.1 | -13.0 | 37.1   |
| 13389.3                                                                                                                                   | -43.4 | -13.0 | 30.4   |
| 16409.6                                                                                                                                   | -38.8 | -13.0 | 25.8   |
| 17100.2                                                                                                                                   | -37.4 | -13.0 | 24.4   |

**LTE 13A-48A – WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>LTE 13A-48A – QPSK – Mid/Mid channel – 782/3625 MHz</b><br><b>BW 10 MHz / 20 MHz</b> |       |       |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                               | RMS   | Limit | Margin |
| MHz                                                                                                                                     | dBm   | dBm   | dB     |
| 43.8                                                                                                                                    | -54.9 | -40.0 | 14.9   |
| 2346.5                                                                                                                                  | -54.7 | -40.0 | 14.7   |
| 6166.2                                                                                                                                  | -51.7 | -40.0 | 11.7   |
| 7250.0                                                                                                                                  | -52.1 | -40.0 | 12.1   |
| 8031.5                                                                                                                                  | -59.1 | -40.0 | 19.1   |
| 31728.0                                                                                                                                 | -55.2 | -40.0 | 15.2   |

**LTE 14A-30A – WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 14A-30A – QPSK – Mid/Mid channel – 793/2310 MHz</b><br><b>BW 10 MHz / 10 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                 | RMS   | Limit | Margin |
| MHz                                                                                                                                       | dBm   | dBm   | dB     |
| 43.8                                                                                                                                      | -55.4 | -40.0 | 15.4   |
| 1594.5                                                                                                                                    | -44.4 | -40.0 | 4.4    |
| 3904.6                                                                                                                                    | -51.2 | -40.0 | 11.2   |
| 6929.7                                                                                                                                    | -56.1 | -40.0 | 16.1   |
| 17832.3                                                                                                                                   | -54.3 | -40.0 | 14.3   |
| 21180.4                                                                                                                                   | -56.1 | -40.0 | 16.1   |

**LTE 14A-66A – WNC Antenna**

| <b>30MHz to 18GHz – Tx Radiated Spurious</b><br><b>LTE 14A-66A – QPSK – Mid/High channel – 793/1770 MHz</b><br><b>BW 10 MHz / 20 MHz</b> |       |       |        |
|------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                | RMS   | Limit | Margin |
| MHz                                                                                                                                      | dBm   | dBm   | dB     |
| 43.8                                                                                                                                     | -51.9 | -13.0 | 38.9   |
| 1353.0                                                                                                                                   | -43.5 | -13.0 | 30.5   |
| 3365.0                                                                                                                                   | -35.5 | -13.0 | 22.5   |
| 12509.4                                                                                                                                  | -43.3 | -13.0 | 30.3   |
| 16362.9                                                                                                                                  | -38.3 | -13.0 | 25.3   |
| 17125.0                                                                                                                                  | -37.7 | -13.0 | 24.7   |

**LTE 25A-26A – HongBo Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 25A-26A – QPSK – Low/Low channel – 1860/831.5 MHz</b><br><b>BW 20 MHz / 15 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                   | RMS   | Limit | Margin |
| MHz                                                                                                                                         | dBm   | dBm   | dB     |
| 43.8                                                                                                                                        | -55.2 | -13.0 | 42.2   |
| 3354.5                                                                                                                                      | -35.5 | -13.0 | 22.5   |
| 3527.0                                                                                                                                      | -50.9 | -13.0 | 37.9   |
| 6993.5                                                                                                                                      | -49.6 | -13.0 | 36.6   |
| 17749.9                                                                                                                                     | -36.7 | -13.0 | 23.7   |
| 18399.0                                                                                                                                     | -57.8 | -13.0 | 44.8   |

**B.1.3.6 EN-DC****LTE 5A –N2A – WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 5A- N2A – QPSK – Low/Mid channel – 829/1880 MHz</b><br><b>BW 10 MHz / 20 MHz</b> |       |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                 | RMS   | Limit | Margin |
| MHz                                                                                                                                       | dBm   | dBm   | dB     |
| 43.8                                                                                                                                      | -51.5 | -13.0 | 38.5   |
| 1320.0                                                                                                                                    | -43.5 | -13.0 | 30.5   |
| 3365.0                                                                                                                                    | -35.2 | -13.0 | 22.2   |
| 5637.7                                                                                                                                    | -51.0 | -13.0 | 38.0   |
| 7971.7                                                                                                                                    | -50.3 | -13.0 | 37.3   |
| 18374.0                                                                                                                                   | -57.9 | -13.0 | 44.9   |

**LTE 2A –N5A – WNC Antenna**

| <b>30MHz to 26.5GHz – Tx Radiated Spurious</b><br><b>LTE 2A- N5A – QPSK – Mid/Mid channel – 1880/836.5 MHz</b><br><b>BW 20 MHz / 20 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                   | RMS   | Limit | Margin |
| MHz                                                                                                                                         | dBm   | dBm   | dB     |
| 43.8                                                                                                                                        | -51.9 | -13.0 | 38.9   |
| 1339.5                                                                                                                                      | -43.3 | -13.0 | 30.3   |
| 3384.0                                                                                                                                      | -35.0 | -13.0 | 22.0   |
| 13392.7                                                                                                                                     | -43.4 | -13.0 | 30.4   |
| 17154.2                                                                                                                                     | -38.0 | -13.0 | 24.9   |
| 18400.0                                                                                                                                     | -58.0 | -13.0 | 45.0   |

**LTE 48A –N66A – WNC Antenna**

| <b>30MHz to 40GHz – Tx Radiated Spurious</b><br><b>LTE 48A- N66A – QPSK – Mid/High channel – 3625/1760 MHz</b><br><b>BW 20 MHz / 40 MHz</b> |       |       |        |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------|
| Frequency                                                                                                                                   | RMS   | Limit | Margin |
| MHz                                                                                                                                         | dBm   | dBm   | dB     |
| 43.8                                                                                                                                        | -54.5 | -40.0 | 14.5   |
| 1344.0                                                                                                                                      | -51.2 | -40.0 | 11.2   |
| 5280.5                                                                                                                                      | -44.0 | -40.0 | 4.0    |
| 8024.0                                                                                                                                      | -58.8 | -40.0 | 18.8   |
| 17150.0                                                                                                                                     | -54.9 | -40.0 | 14.9   |
| 32333.0                                                                                                                                     | -54.8 | -40.0 | 14.8   |

**LTE 41A –N41A HPUE – HongBo Antenna**

**30MHz to 40GHz – Tx Radiated Spurious**  
**LTE 41A- N41A\_HPUE – QPSK – Mid/High channel – 2593/2649.99 MHz**  
**BW 20 MHz / 80 MHz**

| Frequency | RMS   | Limit | Margin |
|-----------|-------|-------|--------|
| MHz       | dBm   | dBm   | dB     |
| 43.8      | -56.3 | -25.0 | 31.3   |
| 1342.5    | -45.9 | -25.0 | 20.9   |
| 3349.0    | -38.5 | -25.0 | 13.5   |
| 6964.5    | -51.5 | -25.0 | 26.5   |
| 17537.0   | -37.4 | -25.0 | 12.4   |
| 21255.0   | -57.4 | -25.0 | 32.4   |

**LTE 2A –N78A – WNC Antenna**

**30MHz to 40GHz – Tx Radiated Spurious**  
**LTE 2A- N78A – QPSK – Mid/Mid channel – 1880/3750 MHz**  
**BW 20 MHz / 50 MHz**

| Frequency | RMS   | Limit | Margin |
|-----------|-------|-------|--------|
| MHz       | dBm   | dBm   | dB     |
| 43.8      | -54.1 | -13.0 | 41.1   |
| 1370.0    | -52.8 | -13.0 | 39.8   |
| 5589.1    | -52.8 | -13.0 | 39.8   |
| 7342.0    | -57.8 | -13.0 | 44.8   |
| 17154.0   | -54.6 | -13.0 | 41.6   |
| 32404.0   | -54.7 | -13.0 | 41.7   |