# FCC SAR TEST REPORT

| | | |
|---|---|---|
| **FCC ID** | : | **2AJN7-TP00130A** |
| **Equipment** | : | **Notebook Computer** |
| **Brand Name** | : | **Lenovo** |
| **Model Name** | : | **TP00130A, TP00130B** |
| **Applicant** | : | **LC Future Center Limited Taiwan Branch<br>7F., No. 780, Bei'an Rd., Zhongshan Dist., Taipei City 104, Taiwan** |
| **Manufacturer** | : | **LCFC (HeFei) Electronics Technology Co., Ltd.<br>No. 3188-1, Yungu Road (Hefei Export Processing Zone), Hefei Economics & Technology Development Area, Anhui, CHINA** |
| **Standard** | : | **FCC 47 CFR Part 2 (2.1093)** |

**Equipment: Quectel EM120R-GL tested inside of Lenovo Notebook Computer.**

**We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.**

**Approved by: Cona Huang / Deputy Manager**

***SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory***

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# History of this test report

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FA0O2238-01 | 01 | Initial issue of report | May. 10, 2021 |
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# 1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for LC Future Center Limited Taiwan Branch, Notebook Computer, TP00130A, TP00130B, are as follows.

| Equipment Class | Frequency Band | | Highest SAR Summary Body 1g SAR (W/kg) | Highest Simultaneous Transmission 1g SAR (W/kg) |
|---|---|---|---|---|
| Licensed | WCDMA | WCDMA II | 1.19 | 1.20 |
| | | WCDMA IV | 1.12 | |
| | | WCDMA V | 1.15 | |
| | LTE | LTE Band 5 | 1.18 | |
| | | LTE Band 7 | 1.20 | |
| | | LTE Band 12 | 1.03 | |
| | | LTE Band 13 | 1.18 | |
| | | LTE Band 14 | 1.02 | |
| | | LTE Band 2 / 25 | 1.12 | |
| | | LTE Band 26 | 1.01 | |
| | | LTE Band 30 | 1.19 | |
| | | LTE Band 38 | 1.03 | |
| | | LTE Band 41 | 1.13 | |
| | | LTE Band 48 | 1.10 | |
| | | LTE Band 4 / 66 | 1.01 | |

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No.TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

**Reviewed by: Jason Wang**
**Report Producer: Carlie Tsai**

# 2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02

# 3. Equipment Under Test (EUT) Information

## 3.1 General Information

| Product Feature & Specification | |
|---|---|
| **Equipment Name** | Notebook Computer |
| **Brand Name** | Lenovo |
| **Model Name** | TP00130A, TP00130B |
| **FCC ID** | 2AJN7-TP00130A |
| **Integrated WWAN Module** | Brand Name: Quectel<br>Model Name: EM120R-GL |
| **Integrated UWB Module** | Brand Name: Novelda AS<br>Model Name: X4C007 |
| **Integrated NFC Module** | Brand Name: Foxconn<br>Model Name: T77H747 |
| **Wireless Technology and Frequency Range** | WCDMA Band II: 1850 MHz ~ 1910 MHz<br>WCDMA Band IV: 1710 MHz ~ 1755 MHz<br>WCDMA Band V: 824 MHz ~ 849 MHz<br>LTE Band 2: 1850 MHz ~ 1910 MHz<br>LTE Band 4: 1710 MHz ~ 1755 MHz<br>LTE Band 5: 824 MHz ~ 849 MHz<br>LTE Band 7: 2500 MHz ~ 2570 MHz<br>LTE Band 12: 699 MHz ~ 716 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz<br>LTE Band 14: 788 MHz ~ 798 MHz<br>LTE Band 25: 1850 MHz ~ 1915 MHz<br>LTE Band 26: 814 MHz ~ 849 MHz<br>LTE Band 30: 2305 MHz ~ 2315 MHz<br>LTE Band 38: 2570 MHz ~ 2620 MHz<br>LTE Band 41: 2496 MHz ~ 2690 MHz<br>LTE Band 48: 3550 MHz ~ 3700 MHz<br>LTE Band 66: 1710 MHz ~ 1780 MHz<br>NFC : 13.56 MHz<br>UWB: 7490 MHz ~ 8450 MHz |
| **Mode** | GSM/GPRS/EGPRS/DTM<br>RMC/AMR 12.2Kbps<br>HSDPA<br>HSUPA<br>DC-HSDPA<br>LTE: QPSK, 16QAM, 64QAM,<br>NFC:ASK<br>UWB: Pulsed TX with pseudo random bi-phase |
| **EUT Stage** | Production Unit |
| **Remark:**<br>1. The UWB output power is -15 dBm was referring to FCC ID: 2AD9Q-X4C007, test report no.: 2711ERM.002, according to 201810 TCBC workshops the UWB output power is less than 1mW and exempt from power density testing.<br>2. Based on original report FA0O2238 to add WLAN/BT Intel AX201D2W module to evaluation Sim-Tx analysis. | |

| WLAN Module Information | |
|---|---|
| Integrated WLAN Module | Brand Name: Intel® Wi-Fi 6 AX201<br>Model Name: AX201D2W |
| Wireless Technology and Frequency Range | WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz<br>WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz<br>WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz<br>WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz<br>WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz<br>Bluetooth: 2400 MHz ~ 2483.5 MHz |
| Mode | WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160<br>Bluetooth BR/EDR/LE |
| **Remark:**<br>1. The Intel AX201D2W is also integrated into this host, the WLAN and Bluetooth SAR results are referenced to FCC ID:PD9AX201D2, report no.: 180717-03.TR07 and the results are used to perform simultaneous transmission analysis | |

| WWAN Antenna Information | | | | |
|---|---|---|---|---|
| Main Antenna | Manufacturer | Luxshare-ICT | Peak gain(dBi) | 1.90 |
| | Part number | DC33001R140 | Type | PIFA |
| | Manufacturer | Amphenol Taiwan Corporation | Peak gain(dBi) | 1.90 |
| | Part number | DC33001R840 | Type | PIFA |

## 3.2 General LTE SAR Test and Reporting Considerations

| Summarized necessary items addressed in KDB 941225 D05 v02r05 | |
|---|---|
| FCC ID | 2AJN7-TP00130A |
| Equipment Name | Notebook Computer |
| Operating Frequency Range of each LTE transmission band | LTE Band 2: 1850 MHz ~ 1910 MHz<br>LTE Band 4: 1710 MHz ~ 1755 MHz<br>LTE Band 5: 824 MHz ~ 849 MHz<br>LTE Band 7: 2500 MHz ~ 2570 MHz<br>LTE Band 12: 699 MHz ~ 716 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz<br>LTE Band 14: 788 MHz ~ 798 MHz<br>LTE Band 25: 1850 MHz ~ 1915 MHz<br>LTE Band 26: 814 MHz ~ 849 MHz<br>LTE Band 30: 2305 MHz ~ 2315 MHz<br>LTE Band 38: 2570 MHz ~ 2620 MHz<br>LTE Band 41: 2496 MHz ~ 2690 MHz<br>LTE Band 48: 3550 MHz ~ 3700 MHz<br>LTE Band 66: 1710 MHz ~ 1780 MHz |
| Channel Bandwidth | LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz<br>LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz<br>LTE Band 13: 5MHz, 10MHz<br>LTE Band 14: 5MHz, 10MHz<br>LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz<br>LTE Band 30: 5MHz, 10MHz<br>LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz<br>LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz |
| uplink modulations used | QPSK / 16QAM / 64QAM |
| LTE Voice / Data requirements | Data only |
| LTE MPR permanently built-in by design | **Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**<br>Modulation \| Channel bandwidth / Transmission bandwidth ($N_{RB}$) \| MPR (dB)<br>1.4 MHz \| 3.0 MHz \| 5 MHz \| 10 MHz \| 15 MHz \| 20 MHz<br>QPSK: > 5 \| > 4 \| > 8 \| > 12 \| > 16 \| > 18 \| ≤ 1<br>16 QAM: ≤ 5 \| ≤ 4 \| ≤ 8 \| ≤ 12 \| ≤ 16 \| ≤ 18 \| ≤ 1<br>16 QAM: > 5 \| > 4 \| > 8 \| > 12 \| > 16 \| > 18 \| ≤ 2<br>64 QAM: ≤ 5 \| ≤ 4 \| ≤ 8 \| ≤ 12 \| ≤ 16 \| ≤ 18 \| ≤ 2<br>64 QAM: > 5 \| > 4 \| > 8 \| > 12 \| > 16 \| > 18 \| ≤ 3<br>256 QAM: ≥ 1 \| ≤ 5 |
| LTE A-MPR | In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI) |
| Spectrum plots for RB configuration | A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report. |
| Power reduction applied to satisfy SAR compliance | Yes, Proximity Sensor, for the P-sensor trigger test refer to original report FA0O2238. |
| LTE Carrier Aggregation Combinations | Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to original SAR report, FA0O2238. |
| LTE Carrier Aggregation Additional Information | This device supports 3 carriers in downlink, 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA. |

| Transmission (H, M, L) channel numbers and frequencies in each LTE band | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LTE Band 2 | | | | | | | | | | | | |
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 18607 | 1850.7 | 18615 | 1851.5 | 18625 | 1852.5 | 18650 | 1855 | 18675 | 1857.5 | 18700 | 1860 |
| M | 18900 | 1880 | 18900 | 1880 | 18900 | 1880 | 18900 | 1880 | 18900 | 1880 | 18900 | 1880 |
| H | 19193 | 1909.3 | 19185 | 1908.5 | 19175 | 1907.5 | 19150 | 1905 | 19125 | 1902.5 | 19100 | 1900 |
| LTE Band 4 | | | | | | | | | | | | |
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 19957 | 1710.7 | 19965 | 1711.5 | 19975 | 1712.5 | 20000 | 1715 | 20025 | 1717.5 | 20050 | 1720 |
| M | 20175 | 1732.5 | 20175 | 1732.5 | 20175 | 1732.5 | 20175 | 1732.5 | 20175 | 1732.5 | 20175 | 1732.5 |
| H | 20393 | 1754.3 | 20385 | 1753.5 | 20375 | 1752.5 | 20350 | 1750 | 20325 | 1747.5 | 20300 | 1745 |
| LTE Band 5 | | | | | | | | |
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 20407 | 824.7 | 20415 | 825.5 | 20425 | 826.5 | 20450 | 829 |
| M | 20525 | 836.5 | 20525 | 836.5 | 20525 | 836.5 | 20525 | 836.5 |
| H | 20643 | 848.3 | 20635 | 847.5 | 20625 | 846.5 | 20600 | 844 |
| LTE Band 7 | | | | | | | | |
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 20775 | 2502.5 | 20800 | 2505 | 20825 | 2507.5 | 20850 | 2510 |
| M | 21100 | 2535 | 21100 | 2535 | 21100 | 2535 | 21100 | 2535 |
| H | 21425 | 2567.5 | 21400 | 2565 | 21375 | 2562.5 | 21350 | 2560 |
| LTE Band 12 | | | | | | | | |
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 23017 | 699.7 | 23025 | 700.5 | 23035 | 701.5 | 23060 | 704 |
| M | 23095 | 707.5 | 23095 | 707.5 | 23095 | 707.5 | 23095 | 707.5 |
| H | 23173 | 715.3 | 23165 | 714.5 | 23155 | 713.5 | 23130 | 711 |
| LTE Band 13 | | | | |
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | |
| | Channel # | Freq.(MHz) | Channel # | Freq.(MHz) |
| L | 23205 | 779.5 | 23230 | 782 |
| M | 23230 | 782 | | |
| H | 23255 | 784.5 | | |
| LTE Band 14 | | | | |
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | |
| | Channel # | Channel # | Channel # | Freq.(MHz) |
| L | 23305 | 790.5 | 23330 | 793 |
| M | 23330 | 793 | | |
| H | 23355 | 795.5 | | |
| LTE Band 25 | | | | | | | | | | | | |
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 26047 | 1850.7 | 26055 | 1851.5 | 26065 | 1852.5 | 26090 | 1855 | 26115 | 1857.5 | 26140 | 1860 |
| M | 26340 | 1880 | 26340 | 1880 | 26340 | 1880 | 26340 | 1880 | 26340 | 1880 | 26340 | 1880 |
| H | 26683 | 1914.3 | 26675 | 1913.5 | 26665 | 1912.5 | 26640 | 1910 | 26615 | 1907.5 | 26590 | 1905 |

| LTE Band 26 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 26697 | 814.7 | 26705 | 815.5 | 26715 | 816.5 | 26740 | 819 | 26765 | 821.5 |
| M | 26865 | 831.5 | 26865 | 831.5 | 26865 | 831.5 | 26865 | 831.5 | 26865 | 831.5 |
| H | 27033 | 848.3 | 27025 | 847.5 | 27015 | 846.5 | 26990 | 844 | 26965 | 841.5 |

| LTE Band 30 | | | | |
|---|---|---|---|---|
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | |
| | Channel # | Freq.(MHz) | Channel # | Freq.(MHz) |
| L | 27685 | 2307.5 | 27710 | 2310 |
| M | 27710 | 2310 | | |
| H | 27735 | 2312.5 | | |

| LTE Band 38 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 37775 | 2572.5 | 37800 | 2575 | 37825 | 2577.5 | 37850 | 2580 |
| M | 38000 | 2595 | 38000 | 2595 | 38000 | 2595 | 38000 | 2595 |
| H | 38225 | 2617.5 | 38200 | 2615 | 38175 | 2612.5 | 38150 | 2610 |

| LTE Band 41 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 39675 | 2498.5 | 39700 | 2501 | 39725 | 2503.5 | 39750 | 2506 |
| L M | 40148 | 2545.8 | 40160 | 2547 | 40173 | 2548.3 | 40185 | 2549.5 |
| M | 40620 | 2593 | 40620 | 2593 | 40620 | 2593 | 40620 | 2593 |
| H M | 41093 | 2640.3 | 41080 | 2639 | 41068 | 2637.8 | 41055 | 2636.5 |
| H | 41565 | 2687.5 | 41540 | 2685 | 41515 | 2682.5 | 41490 | 2680 |

| LTE Band 66 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bandwidth 1.4 MHz | | Bandwidth 3 MHz | | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 131979 | 1710.7 | 131987 | 1711.5 | 131997 | 1712.5 | 132022 | 1715 | 132047 | 1717.5 | 132072 | 1720 |
| M | 132322 | 1745 | 132322 | 1745 | 132322 | 1745 | 132322 | 1745 | 132322 | 1745 | 132322 | 1745 |
| H | 132665 | 1779.3 | 132657 | 1778.5 | 132647 | 1777.5 | 132622 | 1775 | 132597 | 1772.5 | 132572 | 1770 |

| LTE Band 48 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bandwidth 5 MHz | | Bandwidth 10 MHz | | Bandwidth 15 MHz | | Bandwidth 20 MHz | |
| | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) | Ch. # | Freq. (MHz) |
| L | 55265 | 3552.5 | 55290 | 3555 | 55315 | 3557.5 | 55340 | 3560 |
| L M | 55810 | 3607 | 55815 | 3607.5 | 55820 | 3608 | 55830 | 3609 |
| M H | 56170 | 3643 | 56165 | 3642.5 | 56160 | 3642 | 56150 | 3641 |
| H | 56715 | 3697.5 | 56690 | 3695 | 56665 | 3692.5 | 56640 | 3690 |

# 4. RF Exposure Limits

## 4.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

## 4.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

**Limits for Occupational/Controlled Exposure (W/kg)**

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|---|---|---|
| 0.4 | 8.0 | 20.0 |

**Limits for General Population/Uncontrolled Exposure (W/kg)**

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|---|---|---|
| 0.08 | 1.6 | 4.0 |

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

# 5. Simultaneous Transmission Analysis

| NO. | Simultaneous Transmission Configurations | Body |
|---|---|---|
| 1. | WWAN + WLAN2.4GHz Ant 1 + WLAN 2.4GHz Ant 2 | Yes |
| 2. | WWAN + WLAN2.4GHz Ant 2 + Bluetooth Ant 1 | Yes |
| 3. | WWAN + WLAN5GHz Ant 1 + WLAN5GHz Ant 2 + Bluetooth Ant 1 | Yes |

**General Note:**

1. The Intel AX201D2W is also integrated into this host, the WLAN and Bluetooth SAR results are referenced to Intel SAR report, FCC ID: PD9AX201D2, report no.: 180717-03.TR07 and the results are used to perform simultaneous transmission analysis.
2. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

## 5.1 Body Exposure Conditions

**<Quectel EM120R-GL with AX201D2W>**

| Exposure Position | 1 | 2 | 3 | 4 | 5 | 6 | 1+2+3 Summed 1g SAR (W/kg) | 1+3+6 Summed 1g SAR (W/kg) | 1+4+5+6 Summed 1g SAR (W/kg) | 1+2+3 SPLSR | 1+2+3 Case No | 1+3+6 SPLSR | 1+4+5+6 Case No | 1+4+5+6 SPLSR | 1+4+5+6 Case No |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WWAN | 2.4GHz WLAN Ant 1 | 2.4GHz WLAN Ant 2 | 5GHz WLAN Ant 1 | 5GHz WLAN Ant 2 | Bluetooth Ant 1 | | | | | | | | | |
| | 1g SAR (W/kg) | 1g SAR (W/kg) | 1g SAR (W/kg) | 1g SAR (W/kg) | 1g SAR (W/kg) | 1g SAR (W/kg) | | | | | | | | | |
| Bottom of Laptop at 0mm | 1.197 | 0.590 | 0.530 | 0.730 | 0.790 | 0.040 | 2.317 | 1.767 | 2.757 | 0.01 | Case 5 | 0.01 | Case 6 | 0.02 | Case 7 |

## 5.2 SPLSR Evaluation and Analysis

**General Note:**

1. According to antenna location in original report FA0O2238, the minimum distance is using for SPLSR analysis
2. Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Therefore, the adjacent transmit antennas will be summed first, and then the SPLSR calculation will be evaluated with the farther transmitted antennas.
3. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary

**<Quectel EM120R-GL with AX201D2W>**

| | Band | Position | SAR (W/kg) | Gap (mm) | Minimum distance (mm) | Summed SAR (W/kg) | SPLSR Results | Simultaneous SAR |
|---|---|---|---|---|---|---|---|---|
| Case 5 | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 167.0 | 1.79 | 0.01 | Not required |
| | 2.4GHz WLAN Ant1 | | 0.59 | 0 | | | | |
| | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 350.0 | 1.73 | 0.01 | Not required |
| | 2.4GHz WLAN Ant2 | | 0.53 | 0 | | | | |
| | 2.4GHz WLAN Ant1 | Bottom of Laptop | 0.59 | 0 | 197.0 | 1.12 | 0.01 | Not required |
| | 2.4GHz WLAN Ant2 | | 0.53 | 0 | | | | |
| Case6 | Band | Position | SAR (W/kg) | Gap (mm) | Minimum distance (mm) | Summed SAR (W/kg) | SPLSR Results | Simultaneous SAR |
| | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 350.0 | 1.73 | 0.01 | Not required |
| | 2.4GHz WLAN Ant2 | | 0.53 | 0 | | | | |
| | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 167.0 | 1.24 | 0.01 | Not required |
| | BT Ant1 | | 0.04 | 0 | | | | |
| | 2.4GHz WLAN Ant2 | Bottom of Laptop | 0.53 | 0 | 197.0 | 0.57 | 0.00 | Not required |
| | BT Ant1 | | 0.04 | 0 | | | | |
| Case7 | Band | Position | SAR (W/kg) | Gap (mm) | Minimum distance (mm) | Summed SAR (W/kg) | SPLSR Results | Simultaneous SAR |
| | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 167.0 | 1.97 | 0.02 | Not required |
| | 5GHz WLAN Ant1+BT Ant1 | | 0.77 | 0 | | | | |
| | LTE Band 7 | Bottom of Laptop | 1.197 | 0 | 350.0 | 1.99 | 0.01 | Not required |
| | 5GHz WLAN Ant2 | | 0.79 | 0 | | | | |
| | 5GHz WLAN Ant1+BT Ant1 | Bottom of Laptop | 0.77 | 0 | 197.0 | 1.56 | 0.01 | Not required |
| | 5GHz WLAN Ant2 | | 0.79 | 0 | | | | |

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# 6. References


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