# RF Exposure Evaluation

# (Mobile Condition)

| | | |
|---|---|---|
| **FCC ID** | : | **A4RG8V0U** |
| **Equipment** | : | **Phone** |
| **Model Name** | : | **G8V0U, GF5KQ** |
| **Applicant** | : | **Google LLC**<br>**1600 Amphitheatre Parkway,**<br>**Mountain View, California, 94043 USA** |
| **Standard** | : | **47 CFR Part 2.1091** |

**We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.**

**The 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***
*No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)*

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# History of this test report

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FA121931-04A | Rev. 01 | Initial issue of report | Aug. 08, 2021 |
| FA121931-04A | Rev. 02 | Updated page 12 | Aug. 27, 2021 |
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# 1. Description of Equipment Under Test (EUT)

| Product Feature & Specification | |
|---|---|
| **Equipment Name** | Phone |
| **Model Name** | G8V0U, GF5KQ |
| **FCC ID** | A4RG8V0U |
| **Wireless Technology and Frequency Range** | GSM850: 824.2 MHz ~ 848.8 MHz<br>GSM1900: 1850.2 MHz ~ 1909.8 MHz<br>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 17: 704 MHz ~ 716 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>LTE Band 71: 663 MHz ~ 698 MHz<br>5G NR n2 : 1850 MHz ~ 1910 MHz<br>5G NR n5 : 824 MHz ~ 849 MHz<br>5G NR n7 : 2500 MHz ~ 2570 MHz<br>5G NR n12 : 699 MHz ~ 716 MHz<br>5G NR n25 : 1850 MHz ~ 1915 MHz<br>5G NR n30 : 2305 MHz ~ 2315 MHz<br>5G NR n38 : 2570 MHz ~ 2620 MHz<br>5G NR n41 : 2496 MHz ~ 2690 MHz<br>5G NR n66 : 1710 MHz ~ 1780 MHz<br>5G NR n71: 663 MHz ~ 698 MHz<br>5G NR n77 : 3450MHz ~ 3550MHz, 3700 MHz ~ 3980 MHz<br>5G NR n258 : 24.25 GHz~24.45 GHz, 24.75GHz ~25.25GHz<br>5G NR n260 : 37 GHz~40 GHz<br>5G NR n261 : 27.5 GHz~28.35 GHz<br>WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz<br>WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz<br>WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz<br>WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz<br>WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz<br>WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz<br>Bluetooth: 2400 MHz ~ 2483.5 MHz<br>NFC : 13.56 MHz<br>WPT: 110KHz ~ 148.5KHz<br>UWB: 6489.6 MHz, 7987.2 MHz |
| **Mode** | GSM/GPRS/EGPRS<br>RMC/AMR 12.2Kbps<br>HSDPA<br>HSUPA<br>LTE: QPSK, 16QAM, 64QAM, 256QAM<br>5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM<br>WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160<br>Bluetooth BR/EDR/LE<br>NFC:ASK<br>WPT: ASK<br>UWB: BPM-BPSK |

**Reviewed by: Jason Wang**

**Report Producer: Carlie Tsai**

# 2. Maximum Tune-up Limit (unit: dBm)

**General Note:**

1. For each cellular band, the device has 5 antennas, the antenna selection is based on the connection quality condition, and only one antenna will transmit at a time.
2. The maximum power of the WWAN antenna will be selected to evaluate the power density
3. For MPE calculation is using the highest output among 2Tx switching antennas for each frequency band.

**<WWAN Maximum Power>**

| Maximum Transmit Power Level (dBm) | | | | |
|---|---|---|---|---|
| Band | Config | Antenna | duty cycle | Default |
| | | | | Index 1 |
| GSM850 GPRS 1TX | TX0 | 0 | 12.50% | 34.0 |
| GSM850 GPRS 2TX | TX0 | 0 | 25.00% | 32.5 |
| GSM850 GPRS 3TX | TX0 | 0 | 37.50% | 31.5 |
| GSM850 GPRS 4TX | TX0 | 0 | 50.00% | 30.5 |
| GSM850 EDGE 1TX | TX0 | 0 | 12.50% | 28.0 |
| GSM850 EDGE 2TX | TX0 | 0 | 25.00% | 27.5 |
| GSM850 EDGE 3TX | TX0 | 0 | 37.50% | 27.5 |
| GSM850 EDGE 4TX | TX0 | 0 | 50.00% | 25.5 |
| GSM1900 GPRS 1TX | TX0 | 2 | 12.50% | 31.0 |
| GSM1900 GPRS 2TX | TX0 | 2 | 25.00% | 29.5 |
| GSM1900 GPRS 3TX | TX0 | 2 | 37.50% | 29.0 |
| GSM1900 GPRS 4TX | TX0 | 2 | 50.00% | 28.0 |
| GSM1900 EDGE 1TX | TX0 | 2 | 12.50% | 26.0 |
| GSM1900 EDGE 2TX | TX0 | 2 | 25.00% | 25.0 |
| GSM1900 EDGE 3TX | TX0 | 2 | 37.50% | 25.0 |
| GSM1900 EDGE 4TX | TX0 | 2 | 50.00% | 24.0 |
| WCDMA B2 | TX0 | 2 | 100.00% | 25.25 |
| WCDMA B4 | TX0 | 2 | 100.00% | 25.25 |
| WCDMA B5 | TX0 | 0 | 100.00% | 25.4 |
| LTE B7 | TX0 | 2 | 100.00% | 25.5 |
| LTE B12/17 | TX0 | 0 | 100.00% | 25.5 |
| LTE B13 | TX0 | 0 | 100.00% | 25.5 |
| LTE B14 | TX0 | 0 | 100.00% | 25.5 |
| LTE B25/2 | TX0 | 2 | 100.00% | 25.5 |
| LTE B26/5 | TX0 | 0 | 100.00% | 25.5 |
| LTE B30 | TX0 | 2 | 100.00% | 25.5 |
| LTE B41/B38 PC3 | TX0 | 2 | 63.30% | 25.5 |
| LTE B38 PC2 | TX0 | 2 | 43.30% | 27 |
| LTE B41 PC2 | TX0 | 2 | 43.30% | 27.5 |
| LTE B48 | TX0 | 6 | 63.30% | 25.5 |
| LTE B66/4 | TX0 | 2 | 100.00% | 25.5 |
| LTE B71 | TX0 | 0 | 100.00% | 25.5 |
| FR1 n25/2 | TX0 | 2 | 100.00% | 25.5 |
| FR1 n5 | TX0 | 0 | 100.00% | 25.5 |
| FR1 n7 | TX0 | 2 | 100.00% | 25.5 |
| FR1 n12 | TX0 | 0 | 100.00% | 25.5 |
| FR1 n30 | TX0 | 2 | 100.00% | 25.5 |
| FR1 n41/38 PC3 | TX0 | 5 | 100.00% | 25.5 |
| FR1 n41/38 PC2 | TX0 | 5 | 50.00% | 27.0 |
| FR1 n66 | TX0 | 2 | 100.00% | 25.5 |
| FR1 n71 | TX0 | 0 | 100.00% | 25.5 |
| FR1 n77 PC3 | TX0 | 6 | 100.00% | 25.3 |
| FR1 n77 PC2 | TX0 | 6 | 50.00% | 27.0 |

| Maximum Transmit Burst Average Power (dBm) | | | | |
|---|---|---|---|---|
| Band | Config | Antenna | duty cycle | Default |
| | | | | Index 1 |
| GSM850 GPRS 1TX | TX1 | 1 | 12.50% | 34.0 |
| GSM850 GPRS 2TX | TX1 | 1 | 25.00% | 32.0 |
| GSM850 GPRS 3TX | TX1 | 1 | 37.50% | 30.7 |
| GSM850 GPRS 4TX | TX1 | 1 | 50.00% | 29.5 |
| GSM850 EDGE 1TX | TX0 | 1 | 12.50% | 27.7 |
| GSM850 EDGE 2TX | TX0 | 1 | 25.00% | 27.3 |
| GSM850 EDGE 3TX | TX0 | 1 | 37.50% | 27.2 |
| GSM850 EDGE 4TX | TX0 | 1 | 50.00% | 24.9 |
| GSM1900 GPRS 1TX | TX1 | 0 | 12.50% | 30.8 |
| GSM1900 GPRS 2TX | TX1 | 0 | 25.00% | 28.7 |
| GSM1900 GPRS 3TX | TX1 | 0 | 37.50% | 27.5 |
| GSM1900 GPRS 4TX | TX1 | 0 | 50.00% | 26.2 |
| GSM1900 EDGE 1TX | TX0 | 0 | 12.50% | 25.4 |
| GSM1900 EDGE 2TX | TX0 | 0 | 25.00% | 24.3 |
| GSM1900 EDGE 3TX | TX0 | 0 | 37.50% | 24.1 |
| GSM1900 EDGE 4TX | TX0 | 0 | 50.00% | 22.8 |
| WCDMA B2 | TX1 | 0 | 100.00% | 24.3 |
| WCDMA B4 | TX1 | 0 | 100.00% | 24.5 |
| WCDMA B5 | TX1 | 1 | 100.00% | 25.2 |
| LTE B7 | TX1 | 0 | 100.00% | 24.1 |
| LTE B12/17 | TX1 | 1 | 100.00% | 25.2 |
| LTE B13 | TX1 | 1 | 100.00% | 25.2 |
| LTE B14 | TX1 | 1 | 100.00% | 25.2 |
| LTE B25/2 | TX1 | 0 | 100.00% | 24.6 |
| LTE B26/5 | TX1 | 1 | 100.00% | 25.0 |
| LTE B30 | TX1 | 0 | 100.00% | 24.4 |
| LTE B41/38 PC3 | TX1 | 0 | 63.30% | 24.5 |
| LTE B38 PC2 | TX1 | 0 | 43.30% | 25.7 |
| LTE B41 PC2 | TX1 | 0 | 43.30% | 26.6 |
| LTE B48 | TX1 | 2 | 63.30% | 22.9 |
| LTE B66/4 | TX1 | 0 | 100.00% | 24.4 |
| LTE B71 | TX1 | 1 | 100.00% | 25.0 |
| FR1 n25/2 | TX1 | 0 | 100.00% | 24.6 |
| FR1 n5 | TX1 | 1 | 100.00% | 25.1 |
| FR1 n7 | TX1 | 0 | 100.00% | 24.7 |
| FR1 n12 | TX1 | 1 | 100.00% | 25.1 |
| FR1 n30 | TX1 | 0 | 100.00% | 24.5 |
| FR1 n38 PC3 | TX1 | 1 | 100.00% | 25.2 |
| FR1 n41 PC3 | TX1 | 1 | 100.00% | 25.0 |
| FR1 n41/38 PC2 | TX1 | 1 | 50.00% | 26.4 |
| FR1 n66 | TX1 | 0 | 100.00% | 24.2 |
| FR1 n71 | TX1 | 1 | 100.00% | 25.1 |
| FR1 n77 PC3 | TX1 | 2 | 100.00% | 23.3 |
| FR1 n77 PC2 | TX1 | 2 | 50.00% | 25.0 |

| Band | EIRP(dBm) |
|---|---|
| 5G NR n258 | 27.81 |
| 5G NR n260 | 30.98 |
| 5G NR n261 | 31.54 |

## <WLAN Maximum Power>

## <2.4GHz WLAN>

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 4+3(4) Tune-Up Limit | Ant 4+3(3) Tune-Up Limit | Ant 4+3 Tune-Up Limit |
| 2.4GHz WLAN | 802.11b 1Mbps | 1 | 2412 | 23.00 | 23.00 | 26.0 |
| | | 6 | 2437 | 22.00 | 22.00 | 25.0 |
| | | 11 | 2462 | 22.50 | 22.50 | 25.5 |
| | | 12 | 2467 | 22.50 | 22.50 | 25.5 |
| | | 13 | 2472 | 21.00 | 21.00 | 24.0 |
| | 802.11g 6Mbps | 1 | 2412 | 21.00 | 21.00 | 24.0 |
| | | 6 | 2437 | 21.00 | 21.00 | 24.0 |
| | | 11 | 2462 | 21.00 | 21.00 | 24.0 |
| | | 12 | 2467 | 21.00 | 21.00 | 24.0 |
| | | 13 | 2472 | 21.00 | 21.00 | 24.0 |
| | 802.11n-HT20 MCS0 | 1 | 2412 | 21.00 | 21.00 | 24.0 |
| | | 6 | 2437 | 21.00 | 21.00 | 24.0 |
| | | 11 | 2462 | 21.00 | 21.00 | 24.0 |
| | | 12 | 2467 | 21.00 | 21.00 | 24.0 |
| | | 13 | 2472 | 21.00 | 21.00 | 24.0 |
| | 802.11ac-VHT20 MCS0 | 1 | 2412 | 21.00 | 21.00 | 24.0 |
| | | 6 | 2437 | 21.00 | 21.00 | 24.0 |
| | | 11 | 2462 | 21.00 | 21.00 | 24.0 |
| | | 12 | 2467 | 21.00 | 21.00 | 24.0 |
| | | 13 | 2472 | 21.00 | 21.00 | 24.0 |
| | 802.11ax-HE20 MCS0 | 1 | 2412 | 21.00 | 21.00 | 24.0 |
| | | 6 | 2437 | 21.00 | 21.00 | 24.0 |
| | | 11 | 2462 | 21.00 | 21.00 | 24.0 |
| | | 12 | 2467 | 21.00 | 21.00 | 24.0 |
| | | 13 | 2472 | 21.00 | 21.00 | 24.0 |

**<5GHz WLAN>**

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 7+3(7) Tune-Up Limit | Ant 7+3(3) Tune-Up Limit | Ant 7+3 Tune-Up Limit |
| 5.2GHz WLAN | 802.11a 6Mbps | 36 | 5180 | 18.00 | 18.00 | 21.0 |
| | | 40 | 5200 | 18.00 | 18.00 | 21.0 |
| | | 44 | 5220 | 18.50 | 18.50 | 21.5 |
| | | 48 | 5240 | 18.50 | 18.50 | 21.5 |
| | 802.11n-HT20 MCS0 | 36 | 5180 | 18.50 | 18.50 | 21.5 |
| | | 40 | 5200 | 18.00 | 18.00 | 21.0 |
| | | 44 | 5220 | 18.00 | 18.00 | 21.0 |
| | | 48 | 5240 | 18.50 | 18.50 | 21.5 |
| | 802.11n-HT40 MCS0 | 38 | 5190 | 21.00 | 21.00 | 24.0 |
| | | 46 | 5230 | 20.50 | 20.50 | 23.5 |
| | 802.11ac-VHT20 MCS0 | 36 | 5180 | 18.50 | 18.50 | 21.5 |
| | | 40 | 5200 | 18.00 | 18.00 | 21.0 |
| | | 44 | 5220 | 18.50 | 18.50 | 21.5 |
| | | 48 | 5240 | 19.00 | 19.00 | 22.0 |
| | 802.11ac-VHT40 MCS0 | 38 | 5190 | 21.00 | 21.00 | 24.0 |
| | | 46 | 5230 | 20.50 | 20.50 | 23.5 |
| | 802.11ac-VHT80 MCS0 | 42 | 5210 | 16.00 | 16.00 | 19.0 |
| | 802.11ax-HE20 MCS0 | 36 | 5180 | 18.50 | 18.50 | 21.5 |
| | | 40 | 5200 | 18.50 | 18.50 | 21.5 |
| | | 44 | 5220 | 18.50 | 18.50 | 21.5 |
| | | 48 | 5240 | 19.00 | 19.00 | 22.0 |
| | 802.11ax-HE40 MCS0 | 38 | 5190 | 20.00 | 20.00 | 23.0 |
| | | 46 | 5230 | 19.50 | 19.50 | 22.5 |
| | 802.11ax-HE80 MCS0 | 42 | 5210 | 16.00 | 16.00 | 19.0 |

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 7+3(7) Tune-Up Limit | Ant 7+3(3) Tune-Up Limit | Ant 7+3 Tune-Up Limit |
| 5.3GHz WLAN | 802.11a 6Mbps | 52 | 5260 | 18.50 | 18.50 | 21.50 |
| | | 56 | 5280 | 18.50 | 18.50 | 21.50 |
| | | 60 | 5300 | 18.50 | 18.50 | 21.50 |
| | | 64 | 5320 | 18.50 | 18.50 | 21.50 |
| | 802.11n-HT20 MCS0 | 52 | 5260 | 18.50 | 18.50 | 21.50 |
| | | 56 | 5280 | 18.50 | 18.50 | 21.50 |
| | | 60 | 5300 | 18.50 | 18.50 | 21.50 |
| | | 64 | 5320 | 18.50 | 18.50 | 21.50 |
| | 802.11n-HT40 MCS0 | 54 | 5270 | 21.00 | 21.00 | 24.00 |
| | | 62 | 5310 | 16.00 | 16.00 | 19.00 |
| | 802.11ac-VHT20 MCS0 | 52 | 5260 | 18.50 | 18.50 | 21.50 |
| | | 56 | 5280 | 18.50 | 18.50 | 21.50 |
| | | 60 | 5300 | 18.50 | 18.50 | 21.50 |
| | | 64 | 5320 | 18.50 | 18.50 | 21.50 |
| | 802.11ac-VHT40 MCS0 | 54 | 5270 | 21.00 | 21.00 | 24.00 |
| | | 62 | 5310 | 16.50 | 16.50 | 19.50 |
| | 802.11ac-VHT80 MCS0 | 58 | 5290 | 16.50 | 16.50 | 19.50 |
| | 802.11ac-VHT160 MCS0 | 50 | 5250 | 15.00 | 15.00 | 18.00 |
| | 802.11ax-HE20 MCS0 | 52 | 5260 | 18.50 | 18.50 | 21.50 |
| | | 56 | 5280 | 18.50 | 18.50 | 21.50 |
| | | 60 | 5300 | 18.50 | 18.50 | 21.50 |
| | | 64 | 5320 | 18.50 | 18.50 | 21.50 |
| | 802.11ax-HE40 MCS0 | 54 | 5270 | 20.00 | 20.00 | 23.00 |
| | | 62 | 5310 | 16.50 | 16.50 | 19.50 |
| | 802.11ax-HE80 MCS0 | 58 | 5290 | 16.50 | 16.50 | 19.50 |
| | 802.11ax-HE160 MCS0 | 50 | 5250 | 18.50 | 18.50 | 21.50 |

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 7+3(7) Tune-Up Limit | Ant 7+3(3) Tune-Up Limit | Ant 7+3 Tune-Up Limit |
| 5.5GHz WLAN | 802.11a 6Mbps | 100 | 5500 | 16.50 | 16.50 | 19.50 |
| | | 116 | 5580 | 18.50 | 18.50 | 21.50 |
| | | 124 | 5620 | 18.50 | 18.50 | 21.50 |
| | | 132 | 5660 | 18.50 | 18.50 | 21.50 |
| | | 144 | 5720 | 17.00 | 17.00 | 20.00 |
| | 802.11n-HT20 MCS0 | 100 | 5500 | 18.50 | 18.50 | 21.50 |
| | | 116 | 5580 | 17.50 | 17.50 | 20.50 |
| | | 124 | 5620 | 18.50 | 18.50 | 21.50 |
| | | 132 | 5660 | 18.50 | 18.50 | 21.50 |
| | | 144 | 5720 | 18.50 | 18.50 | 21.50 |
| | 802.11n-HT40 MCS0 | 102 | 5510 | 17.00 | 17.00 | 20.00 |
| | | 110 | 5550 | 18.50 | 18.50 | 21.50 |
| | | 126 | 5630 | 17.00 | 17.00 | 20.00 |
| | | 134 | 5670 | 21.00 | 21.00 | 24.00 |
| | | 142 | 5710 | 21.00 | 21.00 | 24.00 |
| | 802.11ac-VHT20 MCS0 | 100 | 5500 | 21.00 | 21.00 | 24.00 |
| | | 116 | 5580 | 21.00 | 21.00 | 24.00 |
| | | 124 | 5620 | 17.00 | 17.00 | 20.00 |
| | | 132 | 5660 | 18.50 | 18.50 | 21.50 |
| | | 144 | 5720 | 18.50 | 18.50 | 21.50 |
| | 802.11ac-VHT40 MCS0 | 102 | 5510 | 18.50 | 18.50 | 21.50 |
| | | 110 | 5550 | 17.00 | 17.00 | 20.00 |
| | | 126 | 5630 | 18.50 | 18.50 | 21.50 |
| | | 134 | 5670 | 17.00 | 17.00 | 20.00 |
| | | 142 | 5710 | 21.00 | 21.00 | 24.00 |
| | 802.11ac-VHT80 MCS0 | 106 | 5530 | 21.00 | 21.00 | 24.00 |
| | | 122 | 5610 | 21.00 | 21.00 | 24.00 |
| | | 138 | 5690 | 21.00 | 21.00 | 24.00 |
| | 802.11ac-VHT160 MCS0 | 114 | 5570 | 16.00 | 16.00 | 19.00 |
| | 802.11ax-HE20 MCS0 | 100 | 5500 | 21.00 | 21.00 | 24.00 |
| | | 116 | 5580 | 21.00 | 21.00 | 24.00 |
| | | 124 | 5620 | 16.00 | 16.00 | 19.00 |
| | | 132 | 5660 | 17.00 | 17.00 | 20.00 |
| | | 144 | 5720 | 18.50 | 18.50 | 21.50 |
| | 802.11ax-HE40 MCS0 | 102 | 5510 | 18.50 | 18.50 | 21.50 |
| | | 110 | 5550 | 18.50 | 18.50 | 21.50 |
| | | 126 | 5630 | 17.00 | 17.00 | 20.00 |
| | | 134 | 5670 | 18.50 | 18.50 | 21.50 |
| | | 142 | 5710 | 17.00 | 17.00 | 20.00 |
| | 802.11ax-HE80 MCS0 | 106 | 5530 | 20.00 | 20.00 | 23.00 |
| | | 122 | 5610 | 20.00 | 20.00 | 23.00 |
| | | 138 | 5690 | 20.00 | 20.00 | 23.00 |
| | 802.11ax-HE160 MCS0 | 114 | 5570 | 20.00 | 20.00 | 23.00 |

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 7+3(7) Tune-Up Limit | Ant 7+3(3) Tune-Up Limit | Ant 7+3 Tune-Up Limit |
| 5.8GHz WLAN | 802.11a 6Mbps | 149 | 5745 | 18.50 | 18.50 | 21.50 |
| | | 157 | 5785 | 19.00 | 19.00 | 22.00 |
| | | 165 | 5825 | 19.00 | 19.00 | 22.00 |
| | 802.11n-HT20 MCS0 | 149 | 5745 | 19.50 | 19.50 | 22.50 |
| | | 157 | 5785 | 19.50 | 19.50 | 22.50 |
| | | 165 | 5825 | 19.00 | 19.00 | 22.00 |
| | 802.11n-HT40 MCS0 | 151 | 5755 | 21.00 | 21.00 | 24.00 |
| | | 159 | 5795 | 21.00 | 21.00 | 24.00 |
| | 802.11ac-VHT20 MCS0 | 149 | 5745 | 19.50 | 19.50 | 22.50 |
| | | 157 | 5785 | 19.50 | 19.50 | 22.50 |
| | | 165 | 5825 | 19.00 | 19.00 | 22.00 |
| | 802.11ac-VHT40 MCS0 | 151 | 5755 | 21.00 | 21.00 | 24.00 |
| | | 159 | 5795 | 21.00 | 21.00 | 24.00 |
| | 802.11ac-VHT80 MCS0 | 155 | 5775 | 21.00 | 21.00 | 24.00 |
| | 802.11ax-HE20 MCS0 | 149 | 5745 | 19.50 | 19.50 | 22.50 |
| | | 157 | 5785 | 20.00 | 20.00 | 23.00 |
| | | 165 | 5825 | 19.50 | 19.50 | 22.50 |
| | 802.11ax-HE40 MCS0 | 151 | 5755 | 20.00 | 20.00 | 23.00 |
| | | 159 | 5795 | 20.00 | 20.00 | 23.00 |
| | 802.11ax-HE80 MCS0 | 155 | 5775 | 20.00 | 20.00 | 23.00 |

**<6GHz WLAN>**

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Transmit Antenna | | | | MIMO | | |
| | Mode | Channel | Frequency (MHz) | Ant 7+3(7) Tune-Up Limit | Ant 7+3(3) Tune-Up Limit | Ant 7+3 Tune-Up Limit |
| WiFi 6 GHz | 802.11ax-HE20 MCS0 | 1 | 5955 | 6.00 | 6.00 | 9.00 |
| | | 57 | 6235 | 6.00 | 6.00 | 9.00 |
| | | 113 | 6515 | 4.00 | 4.00 | 7.00 |
| | | 173 | 6815 | 6.00 | 6.00 | 9.00 |
| | | 233 | 7115 | 6.00 | 6.00 | 9.00 |
| | 802.11ax-HE40 MCS0 | 3 | 5965 | 9.00 | 9.00 | 12.00 |
| | | 59 | 6245 | 9.00 | 9.00 | 12.00 |
| | | 107 | 6485 | 7.00 | 7.00 | 10.00 |
| | | 171 | 6805 | 9.00 | 9.00 | 12.00 |
| | | 227 | 7085 | 9.00 | 10.00 | 12.54 |
| | 802.11ax-HE80 MCS0 | 7 | 5985 | 12.00 | 12.00 | 15.00 |
| | | 71 | 6305 | 12.00 | 12.00 | 15.00 |
| | | 119 | 6545 | 12.00 | 12.00 | 15.00 |
| | | 167 | 6785 | 12.00 | 12.00 | 15.00 |
| | | 215 | 7025 | 12.00 | 12.00 | 15.00 |
| | 802.11ax-HE160 MCS0 | 15 | 6025 | 15.00 | 15.00 | 18.00 |
| | | 47 | 6185 | 15.00 | 15.00 | 18.00 |
| | | 111 | 6505 | 13.50 | 13.50 | 16.50 |
| | | 175 | 6825 | 15.00 | 15.00 | 18.00 |
| | | 207 | 6985 | 16.50 | 16.50 | 19.50 |

## <Bluetooth Maximum Power>

| Mode | Burst Average Power (dBm) | | | | |
|---|---|---|---|---|---|
| | Ant 4 | | | Ant 4 | |
| | BR / EDR | | | LE | |
| | 1Mbps | 2Mbps | 3Mbps | 1Mbps | 2Mbps |
| Tune-up Limit | 21 | 18 | 18 | 21 | 21 |

| Mode | Burst Average Power (dBm) | | | | |
|---|---|---|---|---|---|
| | Ant 3 | | | Ant 3 | |
| | BR / EDR | | | LE | |
| | 1Mbps | 2Mbps | 3Mbps | 1Mbps | 2Mbps |
| Tune-up Limit | 21 | 18 | 18 | 21 | 21 |

| Mode | BR / EDR | Burst Average Power (dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1Mbps | | | 2Mbps | | | 3Mbps | | |
| | | Ant 4+3(4) | Ant 4+3(3) | Ant 4+3 | Ant 4+3(4) | Ant 4+3(3) | Ant 4+3 | Ant 4+3(4) | Ant 4+3(3) | Ant 4+3 |
| Tune-up Limit | | 18 | 18 | 21 | 15 | 15 | 18 | 15 | 15 | 18 |

## <UWB maximum Power>

| Band | Average Power (dBm) |
|---|---|
| UWB | -17 |

# 3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density ($mW/cm^2$) | Averaging time (minutes) |
|---|---|---|---|---|
| (A) Limits for Occupational/Controlled Exposures | | | | |
| 0.3-3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0-30 | 1842/f | 4.89/f | *(900/f2) | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | | | f/300 | 6 |
| 1500-100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *(180/f2) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | | | f/1500 | 30 |
| 1500-100,000 | | | 1.0 | 30 |

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

# 4. Radio Frequency Radiation Exposure Evaluation

## 4.1. Power Density Calculation

| Band | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm^2) | Limit (mW/cm^2) | Power Density / Limit |
|---|---|---|---|---|---|---|---|---|
| GSM/GPRS 850 (1 Tx slot) | -3.20 | 34.00 | 30.8 | 1.20 | 151.36 | 0.030 | 0.549 | 0.055 |
| GPRS 850 (2 Tx slots) | -3.20 | 32.50 | 29.3 | 0.85 | 212.78 | 0.042 | 0.549 | 0.077 |
| GPRS 850 (3 Tx slots) | -3.20 | 31.50 | 28.3 | 0.68 | 253.51 | 0.050 | 0.549 | 0.092 |
| GPRS 850 (4 Tx slots) | -3.20 | 30.50 | 27.3 | 0.54 | 269.15 | 0.054 | 0.549 | 0.098 |
| EGPRS 850 (1 Tx slot) | -3.20 | 28.00 | 24.8 | 0.30 | 38.02 | 0.008 | 0.549 | 0.014 |
| EGPRS 850 (2 Tx slots) | -3.20 | 27.50 | 24.3 | 0.27 | 67.29 | 0.013 | 0.549 | 0.024 |
| EGPRS 850 (3 Tx slots) | -3.20 | 27.50 | 24.3 | 0.27 | 100.93 | 0.020 | 0.549 | 0.037 |
| EGPRS 850 (4 Tx slots) | -3.20 | 25.50 | 22.3 | 0.17 | 84.91 | 0.017 | 0.549 | 0.031 |
| GSM/GPRS 1900 (1 Tx slot) | -0.50 | 31.00 | 30.5 | 1.12 | 141.25 | 0.028 | 1.000 | 0.028 |
| GPRS 1900 (2 Tx slots) | -0.50 | 29.50 | 29.0 | 0.79 | 198.58 | 0.040 | 1.000 | 0.040 |
| GPRS 1900 (3 Tx slots) | -0.50 | 29.00 | 28.5 | 0.71 | 265.46 | 0.053 | 1.000 | 0.053 |
| GPRS 1900 (4 Tx slots) | -0.50 | 28.00 | 27.5 | 0.56 | 281.84 | 0.056 | 1.000 | 0.056 |
| EGPRS 1900 (1 Tx slot) | -0.50 | 26.00 | 25.5 | 0.35 | 44.67 | 0.009 | 1.000 | 0.009 |
| EGPRS 1900 (2 Tx slots) | -0.50 | 25.00 | 24.5 | 0.28 | 70.46 | 0.014 | 1.000 | 0.014 |
| EGPRS 1900 (3 Tx slots) | -0.50 | 25.00 | 24.5 | 0.28 | 105.69 | 0.021 | 1.000 | 0.021 |
| EGPRS 1900 (4 Tx slots) | -0.50 | 24.00 | 23.5 | 0.22 | 111.94 | 0.022 | 1.000 | 0.022 |
| WCDMA Band 2 | -0.50 | 25.25 | 24.8 | 0.30 | 298.54 | 0.059 | 1.000 | 0.059 |
| WCDMA Band 4 | -0.70 | 25.25 | 24.6 | 0.29 | 285.10 | 0.057 | 1.000 | 0.057 |
| WCDMA Band 5 | -3.20 | 25.40 | 22.2 | 0.17 | 165.96 | 0.033 | 0.549 | 0.060 |
| LTE Band 2 | -0.50 | 25.50 | 25.0 | 0.32 | 316.23 | 0.063 | 1.000 | 0.063 |
| LTE Band 4 | -0.70 | 25.50 | 24.8 | 0.30 | 302.00 | 0.060 | 1.000 | 0.060 |
| LTE Band 5 | -3.20 | 25.50 | 22.3 | 0.17 | 169.82 | 0.034 | 0.549 | 0.062 |
| LTE Band 7 | -1.70 | 25.50 | 23.8 | 0.24 | 239.88 | 0.048 | 1.000 | 0.048 |
| LTE Band 12 | -3.80 | 25.50 | 21.7 | 0.15 | 147.91 | 0.029 | 0.466 | 0.063 |
| LTE Band 13 | -3.10 | 25.50 | 22.4 | 0.17 | 173.78 | 0.035 | 0.518 | 0.067 |
| LTE Band 14 | -3.10 | 25.50 | 22.4 | 0.17 | 173.78 | 0.035 | 0.525 | 0.066 |
| LTE Band 17 | -3.80 | 25.50 | 21.7 | 0.15 | 147.91 | 0.029 | 0.469 | 0.063 |
| LTE Band 25 | -0.50 | 25.50 | 25.0 | 0.32 | 316.23 | 0.063 | 1.000 | 0.063 |
| LTE Band 26 | -3.20 | 25.50 | 22.3 | 0.17 | 169.82 | 0.034 | 0.543 | 0.062 |
| LTE Band 30 | -0.70 | 25.50 | 24.8 | 0.30 | 302.00 | 0.060 | 1.000 | 0.060 |
| LTE Band 38 | -1.30 | 25.50 | 24.2 | 0.26 | 263.03 | 0.052 | 1.000 | 0.052 |
| LTE Band 38 HPUE | -1.30 | 27.00 | 25.7 | 0.37 | 371.54 | 0.074 | 1.000 | 0.074 |
| LTE Band 41 | -1.30 | 25.50 | 24.2 | 0.26 | 263.03 | 0.052 | 1.000 | 0.052 |
| LTE Band 41 HPUE | -1.30 | 27.50 | 26.2 | 0.42 | 416.87 | 0.083 | 1.000 | 0.083 |
| LTE Band 48 | -1.00 | 25.50 | 24.5 | 0.28 | 281.84 | 0.056 | 1.000 | 0.056 |
| LTE Band 66 | -0.70 | 25.50 | 24.8 | 0.30 | 302.00 | 0.060 | 1.000 | 0.060 |
| LTE Band 71 | -3.20 | 25.50 | 22.3 | 0.17 | 169.82 | 0.034 | 0.442 | 0.076 |
| 5G NR n2 | -0.50 | 25.50 | 25.0 | 0.32 | 316.23 | 0.063 | 1.000 | 0.063 |
| 5G NR n5 | -3.20 | 25.50 | 22.3 | 0.17 | 169.82 | 0.034 | 0.549 | 0.062 |
| 5G NR n7 | -1.70 | 25.50 | 23.8 | 0.24 | 239.88 | 0.048 | 1.000 | 0.048 |
| 5G NR n12 | -3.80 | 25.50 | 21.7 | 0.15 | 147.91 | 0.029 | 0.466 | 0.063 |
| 5G NR n25 | -0.50 | 25.50 | 25.0 | 0.32 | 316.23 | 0.063 | 1.000 | 0.063 |
| 5G NR n30 | -0.70 | 25.50 | 24.8 | 0.30 | 302.00 | 0.060 | 1.000 | 0.060 |
| 5G NR n38 | -1.30 | 25.50 | 24.2 | 0.26 | 263.03 | 0.052 | 1.000 | 0.052 |
| 5G NR n38_HPUE | -1.30 | 27.00 | 25.7 | 0.37 | 371.54 | 0.074 | 1.000 | 0.074 |
| 5G NR n41 | -1.30 | 25.50 | 24.2 | 0.26 | 263.03 | 0.052 | 1.000 | 0.052 |
| 5G NR n41 HPUE | -1.30 | 27.00 | 25.7 | 0.37 | 371.54 | 0.074 | 1.000 | 0.074 |
| 5G NR n66 | -0.70 | 25.50 | 24.8 | 0.30 | 302.00 | 0.060 | 1.000 | 0.060 |
| 5G NR n71 | -3.20 | 25.50 | 22.3 | 0.17 | 169.82 | 0.034 | 0.442 | 0.076 |
| 5G NR n77 | -1.00 | 25.30 | 24.3 | 0.27 | 269.15 | 0.054 | 1.000 | 0.054 |
| 5G NR n77 HPUE | -1.00 | 27.00 | 26.0 | 0.40 | 398.11 | 0.079 | 1.000 | 0.079 |
| 5G NR n258 | | | 27.81 | 0.60 | 603.95 | 0.120 | 1.000 | 0.120 |
| 5G NR n260 | | | 30.98 | 1.25 | 1253.14 | 0.249 | 1.000 | 0.249 |
| 5G NR n261 | | | 31.5 | 1.43 | 1425.61 | 0.284 | 1.000 | 0.284 |
| WLAN2.4GHz Band | -0.6 | 26.0 | 25.4 | 0.35 | 346.74 | 0.069 | 1.000 | 0.069 |
| WLAN5GHz/6GHz Band | -0.4 | 24.0 | 23.6 | 0.23 | 229.09 | 0.046 | 1.000 | 0.046 |
| Bluetooth | -0.6 | 21.0 | 20.4 | 0.11 | 109.65 | 0.022 | 1.000 | 0.022 |
| UWB | 2.8 | -17.00 | -14.16 | < 0.001 | 0.0384 | < 0.001 | 1.000 | < 0.001 |

| WWAN Power Density / Limit | 2.4GHz WLAN Power Density / Limit | 5GHz/6GHz WLAN Power Density / Limit | WPT | UWB | Σ(Power Density / Limit) |
|---|---|---|---|---|---|
| 0.284 | 0.069 | 0.046 | 0.039 | 0.001 | 0.439 |
| **WWAN Power Density / Limit** | **5GHz/6GHz WLAN Power Density / Limit** | **Bluetooth Power Density / Limit** | **WPT** | **UWB** | **Σ(Power Density / Limit)** |
| 0.284 | 0.046 | 0.022 | 0.039 | 0.001 | 0.392 |

**GNote:**

1. WPT ratio is, from Sporton WPT evaluation report (FCC ID: A4RG8V0U, Report No.: FA131931-04B), 0.039 = 0.0629 / 1.63 for calculation.
2. For colocation analysis, the highest (power density/limit) among all WWAN wireless modes is chosen for summation.
3. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + 2.4GHz WLAN + 5GHz WLAN + WPT + UWB transmitter or WWAN + 5GHz WLAN + Bluetooth + WPT + UWB transmitter.
4. Considering the all the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 4 collocated transmitters is compliant

## Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.