

## APPENDIX G: POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

### G.1 Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

### G.2 Distance Verification Procedure

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 and FCC Guidance. Each applicable test position was evaluated. The distances were confirmed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Steps 1 and 2 were repeated for low, mid, and high bands, as appropriate (see note below Table G-2 for more details).
4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.

|                                    |                                                                                                                                                               |                              |                                                                                       |                                 |
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| FCC ID A3LSMS901U                  |  <b>PCTEST</b><br><small>Proud to be part of the Samsung ecosystem</small> | <b>SAR EVALUATION REPORT</b> |  | Approved by:<br>Quality Manager |
| Test Dates:<br>09/12/21 – 11/08/21 | DUT Type:<br>Portable Handset                                                                                                                                 |                              |                                                                                       | APPENDIX G:<br>Page 1 of 5      |

## G.3 Main Antenna Verification Summary

**Table G-1**  
**Power Measurement Verification for Licensed Modes**

| Mechanism(s) |             | Mode/Band               | Device State Index (DSI) |                        |                        |
|--------------|-------------|-------------------------|--------------------------|------------------------|------------------------|
| 1st          | 2nd         |                         | Un-triggered (Max)       | Mechanism #1 (Reduced) | Mechanism #2 (Reduced) |
| Hotspot On   |             | GPRS 1900 1 Tx Slot     | 0                        | 3                      |                        |
| Grip         |             | GPRS 1900 1 Tx Slot     | 0                        | 1                      |                        |
| Hotspot On   | Grip        | GPRS 1900 1 Tx Slot     | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | GPRS 1900 1 Tx Slot     | 0                        | 1                      | 3                      |
| Hotspot On   |             | UMTS 1750               | 0                        | 3                      |                        |
| Grip         |             | UMTS 1750               | 0                        | 1                      |                        |
| Hotspot On   | Grip        | UMTS 1750               | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | UMTS 1750               | 0                        | 1                      | 3                      |
| Hotspot On   |             | UMTS 1900               | 0                        | 3                      |                        |
| Grip         |             | UMTS 1900               | 0                        | 1                      |                        |
| Hotspot On   | Grip        | UMTS 1900               | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | UMTS 1900               | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 66             | 0                        | 3                      |                        |
| Grip         |             | LTE Band 66             | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 66             | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 66             | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 4              | 0                        | 3                      |                        |
| Grip         |             | LTE Band 4              | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 4              | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 4              | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 25             | 0                        | 3                      |                        |
| Grip         |             | LTE Band 25             | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 25             | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 25             | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 2              | 0                        | 3                      |                        |
| Grip         |             | LTE Band 2              | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 2              | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 2              | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 30 Ant A       | 0                        | 3                      |                        |
| Grip         |             | LTE Band 30 Ant A       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 30 Ant A       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 30 Ant A       | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 30 Ant B       | 0                        | 3                      |                        |
| Grip         |             | LTE Band 30 Ant B       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 30 Ant B       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 30 Ant B       | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 7              | 0                        | 3                      |                        |
| Grip         |             | LTE Band 7              | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 7              | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 7              | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 41 PC3         | 0                        | 3                      |                        |
| Grip         |             | LTE Band 41 PC3         | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 41 PC3         | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 41 PC3         | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 41 PC2         | 0                        | 3                      |                        |
| Grip         |             | LTE Band 41 PC2         | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 41 PC2         | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 41 PC2         | 0                        | 1                      | 3                      |
| Hotspot On   |             | LTE Band 38             | 0                        | 3                      |                        |
| Grip         |             | LTE Band 38             | 0                        | 1                      |                        |
| Hotspot On   | Grip        | LTE Band 38             | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | LTE Band 38             | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | LTE Band 48             | 0                        | 2                      |                        |
| Hotspot On   |             | NR Band n66 Ant A       | 0                        | 3                      |                        |
| Grip         |             | NR Band n66 Ant A       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n66 Ant A       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n66 Ant A       | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | NR Band n66 Ant F       | 0                        | 2                      |                        |
| Hotspot On   |             | NR Band n25 Ant A       | 0                        | 3                      |                        |
| Grip         |             | NR Band n25 Ant A       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n25 Ant A       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n25 Ant A       | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | NR Band n25 Ant F       | 0                        | 2                      |                        |
| Hotspot On   |             | NR Band n2 Ant A        | 0                        | 3                      |                        |
| Grip         |             | NR Band n2 Ant A        | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n2 Ant A        | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n2 Ant A        | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | NR Band n2 Ant F        | 0                        | 2                      |                        |
| Hotspot On   |             | NR Band n30 Ant A       | 0                        | 3                      |                        |
| Grip         |             | NR Band n30 Ant A       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n30 Ant A       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n30 Ant A       | 0                        | 1                      | 3                      |
| Hotspot On   |             | NR Band n30 Ant B       | 0                        | 3                      |                        |
| Grip         |             | NR Band n30 Ant B       | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n30 Ant B       | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n30 Ant B       | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | NR Band n30 Ant F       | 0                        | 2                      |                        |
| Hotspot On   |             | NR Band n30 Ant F       | 0                        | 3                      |                        |
| Held-to-Ear  | Hotspot On  | NR Band n30 Ant F       | 0                        | 2                      | 2                      |
| Hotspot On   | Held-to-Ear | NR Band n30 Ant F       | 0                        | 3                      | 2                      |
| Hotspot On   |             | NR Band n7              | 0                        | 3                      |                        |
| Grip         |             | NR Band n7              | 0                        | 1                      |                        |
| Hotspot On   | Grip        | NR Band n7              | 0                        | 3                      | 3                      |
| Grip         | Hotspot On  | NR Band n7              | 0                        | 1                      | 3                      |
| Held-to-Ear  |             | NR Band n41 Ant F (PC3) | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n41 Ant F (PC2) | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n38             | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n77Ant G (PC3)  | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n77 Ant G (PC2) | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n77Ant H (PC3)  | 0                        | 2                      |                        |
| Held-to-Ear  |             | NR Band n77 Ant H (PC2) | 0                        | 2                      |                        |

\*Note: This device uses different Device State Indices (DSI) to configure different time averaged power levels based on certain exposure scenarios. For this device in the open configuration, DSI = 1 represents the case when the grip sensor is active, DSI = 2 represents the case where the device is held to ear, and DSI = 3 represents the case when hotspot mode is active. DSI = 0 is configured when the device cannot detect the use condition.

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| <b>Test Dates:</b><br>09/12/21 – 11/08/21 | <b>DUT Type:</b><br>Portable Handset                                                                                                                                                                         |                              |                                                                                       | <b>APPENDIX G:</b><br>Page 2 of 5      |

**Table G-2**  
**Distance Measurement Verification for Main Antenna**

| Mechanism(s) | Test Condition        | Band | Distance Measurements (mm) |             | Minimum Distance per Manufacturer (mm) |
|--------------|-----------------------|------|----------------------------|-------------|----------------------------------------|
|              |                       |      | Moving Toward              | Moving Away |                                        |
| Grip         | Phablet - Back Side   | Mid  | 9                          | 11          | 9                                      |
| Grip         | Phablet - Back Side   | High | 9                          | 11          | 9                                      |
| Grip         | Phablet - Front Side  | Mid  | 7                          | 9           | 7                                      |
| Grip         | Phablet - Front Side  | High | 7                          | 9           | 7                                      |
| Grip         | Phablet - Bottom Edge | Mid  | 12                         | 14          | 12                                     |
| Grip         | Phablet - Bottom Edge | High | 12                         | 14          | 12                                     |

\*Note: Mid band refers to: GSM1900, UMTS B2/4, LTE B2/4/25/66, and NR Band n2 Ant A/n25 Ant A/n66 Ant A; High band refers to: LTE B7/30 Ant A and Ant B/38/41 PC3/41 PC2 and NR Band n7/n30 Ant A and Ant B

## G.4 WIFI Verification Summary

**Table G-3**  
**Power Measurement Verification WIFI – Antenna 1**

| Mechanism(s) | Mode/Band                | Conducted Power (dBm) |                        |
|--------------|--------------------------|-----------------------|------------------------|
|              |                          | Un-triggered (Max)    | Mechanism #1 (Reduced) |
| 1st          |                          |                       |                        |
| Held-to-Ear  | 802.11b                  | 18.78                 | 14.58                  |
| Held-to-Ear  | 802.11g                  | 16.81                 | 14.02                  |
| Held-to-Ear  | 802.11n (2.4GHz)         | 17.19                 | 13.85                  |
| Held-to-Ear  | 802.11a                  | 16.67                 | 10.02                  |
| Held-to-Ear  | 802.11n (5GHz, 20MHz BW) | 16.77                 | 10.12                  |
| Held-to-Ear  | 802.11ac (20MHz BW)      | 16.71                 | 10.30                  |
| Held-to-Ear  | 802.11n (5GHz, 40MHz BW) | 17.22                 | 10.79                  |
| Held-to-Ear  | 802.11ac (40MHz BW)      | 17.38                 | 11.48                  |
| Held-to-Ear  | 802.11ac (80MHz BW)      | 16.71                 | 11.87                  |

\*Note: IEEE 802.11ax and MIMO WIFI modes were not evaluated due to equipment limitations.

|                                    |                                                                                                                                                                                                                             |                              |                                                                                       |                                 |
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**Table G-4**  
**Power Measurement Verification WIFI – Antenna 2**

| Mechanism(s) | Mode/Band                | Conducted Power (dBm) |                        |
|--------------|--------------------------|-----------------------|------------------------|
| 1st          |                          | Un-triggered (Max)    | Mechanism #1 (Reduced) |
| Held-to-Ear  | 802.11b                  | 18.64                 | 14.38                  |
| Held-to-Ear  | 802.11g                  | 17.53                 | 15.00                  |
| Held-to-Ear  | 802.11n (2.4GHz)         | 17.79                 | 15.00                  |
| Held-to-Ear  | 802.11a                  | 17.08                 | 10.07                  |
| Held-to-Ear  | 802.11n (5GHz, 20MHz BW) | 17.24                 | 10.11                  |
| Held-to-Ear  | 802.11ac (20MHz BW)      | 17.17                 | 10.02                  |
| Held-to-Ear  | 802.11n (5GHz, 40MHz BW) | 16.75                 | 10.22                  |
| Held-to-Ear  | 802.11ac (40MHz BW)      | 16.65                 | 10.00                  |
| Held-to-Ear  | 802.11ac (80MHz BW)      | 16.83                 | 11.22                  |

\*Note: IEEE 802.11ax and MIMO WIFI modes were not evaluated due to equipment limitations.

**Table G-5**  
**Power Measurement Verification WIFI – Antenna 1 with NR Active**

| Mode/Band                | Conducted Power (dBm) |                                  |                                          |
|--------------------------|-----------------------|----------------------------------|------------------------------------------|
|                          | Un-triggered (Max)    | Mechanism #1 NR Active (Reduced) | Mechanism #2 RCV and NR Active (Reduced) |
| 802.11b                  | 17.90                 | 13.90                            | 13.80                                    |
| 802.11g                  | 16.80                 | 14.00                            | 13.90                                    |
| 802.11n (2.4GHz)         | 16.90                 | 14.10                            | 14.00                                    |
| 802.11a                  | 16.80                 | 11.80                            | 9.90                                     |
| 802.11n (5GHz, 20MHz BW) | 16.80                 | 11.70                            | 9.80                                     |
| 802.11ac (20MHz BW)      | 16.60                 | 11.80                            | 9.70                                     |
| 802.11n (5GHz, 40MHz BW) | 16.70                 | 11.90                            | 9.80                                     |
| 802.11ac (40MHz BW)      | 16.90                 | 12.00                            | 9.90                                     |
| 802.11ac (80MHz BW)      | 16.50                 | 11.80                            | 9.60                                     |

\*Note: IEEE 802.11ax and MIMO WIFI modes were not evaluated due to equipment limitations.

|                                    |                                                                                                                                         |                              |                                                                                       |                                 |
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**Table G-6**  
**Power Measurement Verification WIFI – Antenna 2 with NR Active**

| Mode/Band                | Conducted Power (dBm) |                                  |                                          |
|--------------------------|-----------------------|----------------------------------|------------------------------------------|
|                          | Un-triggered (Max)    | Mechanism #1 NR Active (Reduced) | Mechanism #2 RCV and NR Active (Reduced) |
| 802.11b                  | 18.20                 | 14.30                            | 14.20                                    |
| 802.11g                  | 17.30                 | 14.20                            | 14.10                                    |
| 802.11n (2.4GHz)         | 17.10                 | 14.20                            | 13.90                                    |
| 802.11a                  | 16.80                 | 12.20                            | 9.90                                     |
| 802.11n (5GHz, 20MHz BW) | 16.90                 | 12.30                            | 10.10                                    |
| 802.11ac (20MHz BW)      | 17.00                 | 12.10                            | 10.20                                    |
| 802.11n (5GHz, 40MHz BW) | 17.10                 | 12.20                            | 10.10                                    |
| 802.11ac (40MHz BW)      | 16.80                 | 11.90                            | 10.20                                    |
| 802.11ac (80MHz BW)      | 16.70                 | 12.10                            | 10.00                                    |

\*Note: IEEE 802.11ax and MIMO WIFI modes were not evaluated due to equipment limitations.

## G.5 Bluetooth Verification Summary

**Table G-7**  
**Power Measurement Verification - Bluetooth**

| Mode/Band | Conducted Power (dBm) |                                   |                                  |                                          |                                        |                                                |                                               |                                                     |
|-----------|-----------------------|-----------------------------------|----------------------------------|------------------------------------------|----------------------------------------|------------------------------------------------|-----------------------------------------------|-----------------------------------------------------|
|           | Un-triggered (Max)    | Mechanism #1 RCV Active (Reduced) | Mechanism #2 NR Active (Reduced) | Mechanism #3 5 GHz WLAN Active (Reduced) | Mechanism #4 RCV & NR Active (Reduced) | Mechanism #5 RCV & 5 GHz WLAN Active (Reduced) | Mechanism #6 NR & 5 GHz WLAN Active (Reduced) | Mechanism #7 RCV, NR, & 5 GHz WLAN Active (Reduced) |
| Bluetooth | 15.10                 | 11.80                             | 11.90                            | 12.00                                    | 12.00                                  | 12.00                                          | 12.10                                         | 11.90                                               |

|                                           |                                                                                                                                                                                                                             |                              |                                                                                       |                                        |
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| <b>Test Dates:</b><br>09/12/21 – 11/08/21 | <b>DUT Type:</b><br>Portable Handset                                                                                                                                                                                        |                              |                                                                                       | APPENDIX G:<br>Page 5 of 5             |