



**Part 0: SAR Characterization  
EUT RF Exposure Compliance Test Report**

*For*  
**SMARTPHONE**

**FCC ID: BCG-3540A  
Model Name: A2398**

**Report Number: 13190901-S6V3  
Issue Date: 10/27/2020**

*Prepared for*  
**APPLE INC  
1 APPLE PARK WAY  
CUPERTINO, CA 95014-2084**

*Prepared by*  
**UL VERIFICATION SERVICES INC.  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 319-4000  
FAX: (510) 661-0888**

**Revision History**

| Rev. | Date       | Revisions                                                 | Revised By   |
|------|------------|-----------------------------------------------------------|--------------|
| V1   | 9/25/2020  | Initial Issue                                             | --           |
| V2   | 9/25/2020  | Updated Tables 2-2 and 2-3 with the correct SAR and power | Nathan Sousa |
| V3   | 10/27/2020 | Removed all mention of millimeter wave support            | Dave Weaver  |
|      |            |                                                           |              |

Table of Contents

1 Introduction.....4

2 SAR Characterization .....5

    2.1 Worst-case SAR determination ..... 5

    2.2 Usage Scenarios in SAR Evaluation ..... 6

    2.3 SAR design target ..... 7

    2.4 SAR Char of EUT ..... 8

Figures

Figure 2-1: SAR evaluation for smartphone application..... 5

Figure 2-2: Worst-case SAR determination based on DSI..... 6

Tables

Table 2-1: Usage/Exposure Scenario ..... 6

Table 2-2: Worst-case reported SAR (extracted from UL report 13190901-S1) ..... 8

Table 2-3: SAR Char of EUT ..... 9

## 1 Introduction

The equipment under test (EUT) is a smart phone. It contains the Qualcomm modem supporting 2G/3G/4G WWAN technologies and 5G NR Sub-6 GHz technologies. These WWAN modems enable Qualcomm Smart Transmit feature to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is in compliance with the FCC requirement.

In the Part 0 report, the EUT SAR are characterized for WWAN radios (2G/3G/4G/Sub6 NR) to determine the power limit that corresponds to the exposure design target after accounting for all device design related uncertainties, i.e., SAR\_design\_target (< FCC SAR limit) for sub-6. The SAR characterization are denoted as SAR Char.

SAR Char will be used as input for Qualcomm Smart Transmit to operate. SAR Char will be loaded and store in the EUT via the Embedded File System (EFS).

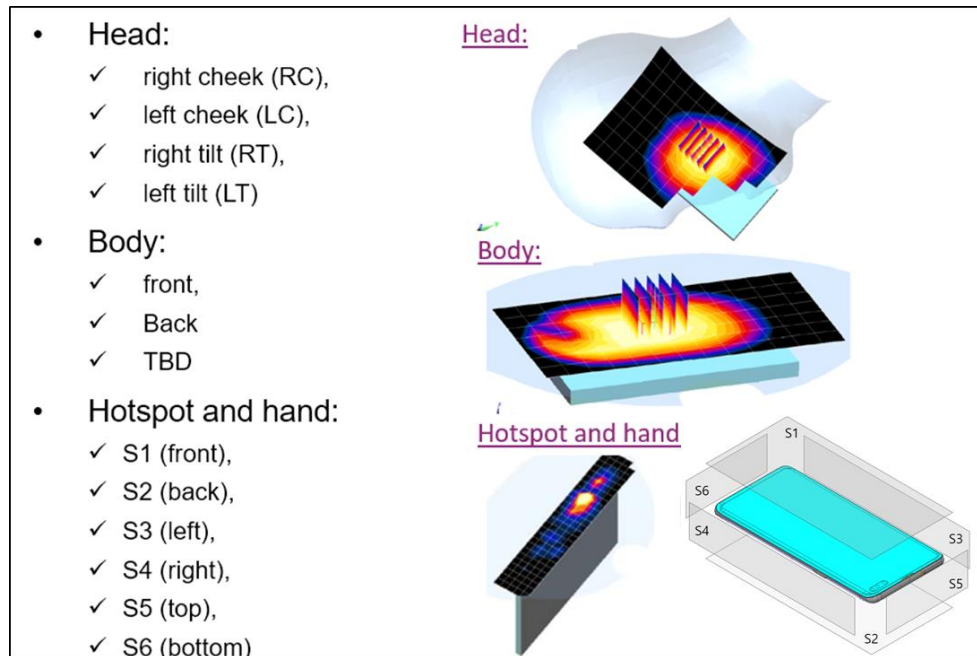
The EUT supports WLAN/BT radio as well but WLAN/BT modem is not enabled with Smart Transmit.

## 2 SAR Characterization

SAR Char is generated to cover all radio configurations and usage scenarios that are reported in the initial FCC submission.

### 2.1 Worst-case SAR determination

Based on FCC KDBs, in general, for a smartphone, the SAR evaluation is required for the exposure scenarios shown in Figure 2-1.



**Figure 2-1: SAR evaluation for smartphone application**

The device state index (DSI) used in Figure 2-2 represents each exposure scenario. Depending on the detection scheme implemented in the smartphone, the worst-case SAR is further grouped and determined for each or combined exposure scenario(s). Note for the 1g SAR versus 10g SAR exposure scenario, the worst-case is determined in term of exposure ratio (i.e., exposure level relative to the corresponding 1g- or 10g-SAR limit).

- If the device does not have any detection mechanism (**all “no”** in Figure 2-2), then the worst-case SAR is determined by taking the maximum SAR value among all exposure scenarios, i.e., worst-case SAR =  $\max\{SAR_{head}, SAR_{body}, SAR_{hotspot/extremity}\}$
- If the device can distinguish each of the above scenarios (**all “yes”** in Figure 2-2), then the worst-case SAR for each individual exposure scenario is given by corresponding  $SAR_{head}$ ,  $SAR_{body}$ , and  $SAR_{hotspot/extremity}$
- If the device can only distinguish a subset of the scenarios (**some “yes”, some “no”** in Figure 2-2), then the worst-case SAR is given by:
  - Corresponding SAR for each exposure scenario that can be distinguished (DSI=yes)
  - Worst-case SAR among all other exposure scenario(s) that cannot be distinguished (DSI=no)

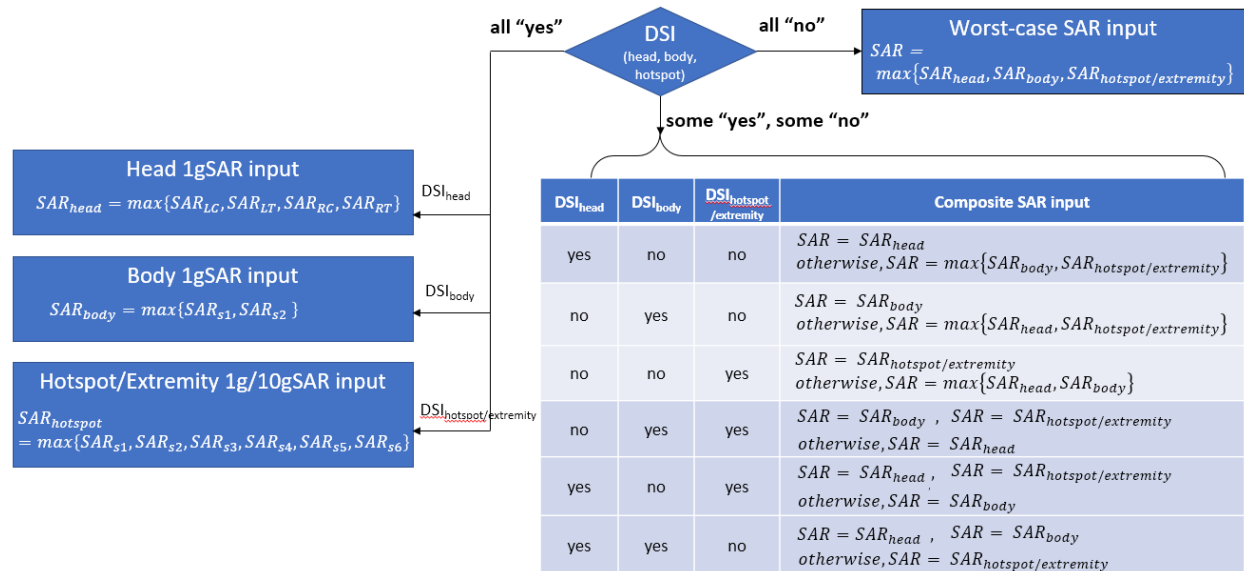


Figure 2-2: Worst-case SAR determination based on DSI

## 2.2 Usage Scenarios in SAR Evaluation

The EUT has a detection mechanism to distinguish head/body-worn/hotspot exposure, which is represented using DSI = 0 or DSI = 1. These two DSI states were used to determine power limit for Smart Transmit to operate.

The corresponding usage scenarios supported by EUT are summarized in Table 2-1:

Table 2-1: Usage/Exposure Scenario

| Scenario                       | Description                                                                                                                                                                                                                                                                                           | SAR Definition                                                                                                                     | Worst-case SAR      |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Head<br>(DSI = 0)              | <ul style="list-style-type: none"> <li>Device positioned next to head</li> <li>1g SAR evaluated in four positions (left/right cheek/tilt)</li> </ul>                                                                                                                                                  | $SAR_{head} = \max\{SAR_{LC}, SAR_{LT}, SAR_{RC}, SAR_{RT}\}$                                                                      | $SAR_{head}$        |
| Body worn/Hotspot<br>(DSI = 1) | <ul style="list-style-type: none"> <li>Device state is either body worn or Hotspot at 5mm</li> <li>1g SAR evaluated at all surfaces (S<sub>1</sub>-S<sub>6</sub> as shown in Figure 2-1) of the EUT with 5 mm test separation distance relative to the flat phantom for body worn exposure</li> </ul> | $SAR_{body\_DSI=1} = \max\{SAR_{s1\_DSI=1}, SAR_{s2\_DSI=1}, SAR_{s3\_DSI=1}, SAR_{s4\_DSI=1}, SAR_{s5\_DSI=1}, SAR_{s6\_DSI=1}\}$ | $SAR_{body\_DSI=1}$ |

## 2.3 SAR design target

The total device design related uncertainties of EUT is 1dB (k=2), which includes TxAGC and device to device variation.

To account for the total uncertainty, *SAR\_design\_target* needs to be:

$$SAR\_design\_target < SAR_{regulatory\_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

For FCC SAR requirement of 1.6 W/kg for 1g SAR the *SAR\_design\_target* for EUT is determined as

*SAR\_design\_target* = 0.8 W/kg for 1gSAR.

## 2.4 SAR Char of EUT

Referring to the initial FCC submission, the worst-case *reported* SAR for each antenna/technology/band/DSI is summarized in Table 2-2:

**Table 2-2: Worst-case reported SAR (extracted from UL report 13190901-S1)**

| Tech/Band  | Port   |        | Worst-case SAR (W/kg) |              | P <sub>limit</sub> Max Tune-up Power (dBm) |        |
|------------|--------|--------|-----------------------|--------------|--------------------------------------------|--------|
|            | DSI: 0 | DSI: 1 | DSI: 0                | DSI: 1       | DSI: 0                                     | DSI: 1 |
| GSM850     | B      | A      | 0.741                 | 0.731        | 31.00                                      | 31.50  |
| GSM1900    | D      | B      | 0.984                 | 0.990        | 26.75                                      | 25.50  |
| W-CDMA B2  | B      | C      | 0.975                 | 0.993        | 21.50                                      | 21.00  |
| W-CDMA B4  | D      | C      | 0.995                 | 0.986        | 20.00                                      | 20.75  |
| W-CDMA B5  | B      | A      | 0.938                 | 0.794        | 24.50                                      | 25.25  |
| CDMA BC0   | B      | A      | 0.923                 | 0.585        | 24.50                                      | 25.25  |
| CDMA BC1   | B      | A      | 0.973                 | 0.938        | 21.50                                      | 17.50  |
| CDMA BC10  | B      | A      | 0.832                 | 0.647        | 24.50                                      | 25.25  |
| LTE B5     | B      | A      | 0.832                 | 0.816        | 24.50                                      | 25.25  |
| LTE B7     | B      | A      | 0.996                 | 0.997        | 19.00                                      | 19.00  |
| LTE B12    | B      | A      | 0.833                 | 0.536        | 24.50                                      | 25.70  |
| LTE B13    | B      | A      | 0.674                 | 0.706        | 24.50                                      | 25.70  |
| LTE B14    | B      | A      | 0.477                 | 0.653        | 24.50                                      | 25.70  |
| LTE B25/2  | B      | D      | 0.972                 | 0.997        | 21.50                                      | 21.75  |
| LTE B26    | B      | A      | 0.880                 | 0.777        | 24.50                                      | 25.25  |
| LTE B30    | C      | C      | 0.976                 | 0.995        | 24.50                                      | 20.75  |
| LTE B41    | B      | A      | 0.992                 | 0.997        | 19.75                                      | 22.50  |
| LTE B48    | B      | C      | 0.983                 | <b>0.999</b> | 20.00                                      | 23.00  |
| LTE B66/4  | D      | B      | 0.898                 | 0.989        | 20.00                                      | 18.25  |
| LTE B71    | B      | A      | 0.741                 | 0.414        | 24.50                                      | 25.70  |
| FR1 n5     | B      | A      | 0.653                 | 0.396        | 24.50                                      | 25.25  |
| FR1 n12    | B      | A      | 0.419                 | 0.333        | 24.50                                      | 25.70  |
| FR1 n25/n2 | D      | C      | 0.749                 | 0.951        | 20.50                                      | 21.25  |
| FR1 n41    | B      | A      | 0.760                 | 0.922        | 17.75                                      | 20.50  |
| FR1 n66    | D      | A      | 0.840                 | 0.733        | 20.00                                      | 18.50  |
| FR1 n71    | B      | B      | 0.375                 | 0.287        | 24.50                                      | 24.50  |
| FR1 n77    | A      | B      | <b>0.999</b>          | 0.997        | 25.70                                      | 17.00  |



Using the reported SAR listed in Table 2-2, and following the procedure described in Section 2.1, the SAR Char of this EUT, i.e.,  $P_{limit}$  corresponding to  $SAR_{design\_target}$ , is determined for each supported antenna/technology/band/DSI as:

1. for DSI = 0,  $P_{limit}$  is calculated based on 1gSAR head exposure evaluation
2. for DSI = 1,  $P_{limit}$  is calculated based on body-worn/hotspot 1gSAR evaluation at 5 mm spacing

$$P_{limit} = \min \{ P_{limit} \text{ corresponding to body worn 1gSAR evaluation at 5mm spacing, } P_{limit} \text{ corresponding to 1g SAR extremity evaluation at 5mm spacing, } P_{max} \text{ maximum RF tuneup power for the case that the SAR test is excluded} \}$$

The SAR Char is listed in Table 2-3.

**Table 2-3: SAR Char of EUT**

| Exposure Scenario |                  | Head                                                                            |                                                    | Body-worn & Hotspot                                                             |                                                    | P <sub>max</sub> (dBm)<br>Tune-up<br>power table |
|-------------------|------------------|---------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|
| Spatial-average   |                  | 1g                                                                              |                                                    | 1g                                                                              |                                                    |                                                  |
| Test Distance     |                  | 0 mm                                                                            |                                                    | 5 mm                                                                            |                                                    |                                                  |
| Power Mode (DSI)  |                  | Mode A (DSI=0)                                                                  |                                                    | Mode B (DSI=1)                                                                  |                                                    |                                                  |
| Antenna           | Tech/Band        | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR design target) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR design target) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table |                                                  |
|                   | Transmit Average | Burst Average                                                                   |                                                    | Burst Average                                                                   |                                                    | Burst Average                                    |
| A                 | GSM 850 2 slots  | 37.40                                                                           | 32.50                                              | 32.86                                                                           | 31.50                                              | 32.50                                            |
|                   | GSM 1900 2 slots | 37.09                                                                           | 31.00                                              | 24.02                                                                           | 23.75                                              | 31.00                                            |
|                   | W-CDMA B2        | 27.38                                                                           | 25.70                                              | 17.84                                                                           | 17.50                                              | 25.70                                            |
|                   | W-CDMA B4        | 29.97                                                                           | 25.70                                              | 18.57                                                                           | 18.50                                              | 25.70                                            |
|                   | W-CDMA B5        | 30.36                                                                           | 25.70                                              | 26.25                                                                           | 25.25                                              | 25.70                                            |
|                   | CDMA BC0         | 31.84                                                                           | 25.70                                              | 27.58                                                                           | 25.25                                              | 25.70                                            |
|                   | CDMA BC1         | 28.35                                                                           | 25.70                                              | 17.78                                                                           | 17.50                                              | 25.70                                            |
|                   | CDMA BC10        | 32.61                                                                           | 25.70                                              | 27.14                                                                           | 25.25                                              | 25.70                                            |
|                   | LTE Band 5       | 30.85                                                                           | 25.70                                              | 26.13                                                                           | 25.25                                              | 25.70                                            |
|                   | LTE Band 7       | 26.25                                                                           | 25.25                                              | 19.01                                                                           | 19.00                                              | 25.70                                            |
|                   | LTE Band 12/17   | 32.91                                                                           | 25.70                                              | 28.41                                                                           | 25.70                                              | 25.70                                            |
|                   | LTE Band 13      | 32.68                                                                           | 25.70                                              | 27.21                                                                           | 25.70                                              | 25.70                                            |
|                   | LTE Band 14      | 32.22                                                                           | 25.70                                              | 27.55                                                                           | 25.70                                              | 25.70                                            |
|                   | LTE Band 25/2    | 30.40                                                                           | 25.70                                              | 17.74                                                                           | 17.50                                              | 25.70                                            |
|                   | LTE Band 26      | 30.95                                                                           | 25.70                                              | 26.35                                                                           | 25.25                                              | 25.70                                            |
|                   | LTE Band 30      | 27.77                                                                           | 25.70                                              | 22.36                                                                           | 22.25                                              | 25.70                                            |
|                   | LTE Band 41      | 26.78                                                                           | 25.70                                              | 22.51                                                                           | 22.50                                              | 25.70                                            |
|                   | LTE Band 48      | 26.69                                                                           | 25.70                                              | 21.51                                                                           | 21.50                                              | 22.00                                            |
|                   | LTE Band 66/4    | 29.62                                                                           | 25.70                                              | 18.61                                                                           | 18.50                                              | 25.70                                            |
|                   | LTE Band 71      | 33.47                                                                           | 25.70                                              | 29.53                                                                           | 25.70                                              | 25.70                                            |
|                   | NR n5            | 32.89                                                                           | 25.70                                              | 29.27                                                                           | 25.25                                              | 25.70                                            |
|                   | NR n12           | 35.17                                                                           | 25.70                                              | 30.48                                                                           | 25.70                                              | 25.70                                            |
|                   | NR n25/2         | 31.20                                                                           | 25.70                                              | 18.47                                                                           | 17.50                                              | 25.70                                            |
|                   | NR n41           | 27.69                                                                           | 25.25                                              | 20.85                                                                           | 20.50                                              | 24.00                                            |
|                   | NR n66           | 29.86                                                                           | 25.70                                              | 19.85                                                                           | 18.50                                              | 25.70                                            |
|                   | NR n71           | 36.21                                                                           | 25.70                                              | 31.29                                                                           | 25.70                                              | 25.70                                            |
|                   | NR n77           | 25.71                                                                           | 25.70                                              | 19.78                                                                           | 19.75                                              | 25.70                                            |

| Exposure Scenario |                  | Head                                                                            |                                                    | Body-worn & Hotspot                                                             |                                                    | P <sub>max</sub> (dBm)<br>Tune-up<br>power table |
|-------------------|------------------|---------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|
| Spatial-average   |                  | 1g                                                                              |                                                    | 1g                                                                              |                                                    |                                                  |
| Test Distance     |                  | 0 mm                                                                            |                                                    | 5 mm                                                                            |                                                    |                                                  |
| Power Mode (DSI)  |                  | Mode A (DSI=0)                                                                  |                                                    | Mode B (DSI=1)                                                                  |                                                    |                                                  |
| Antenna           | Tech/Band        | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR design target) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR design target) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table |                                                  |
|                   | Transmit Average | Burst Average                                                                   |                                                    | Burst Average                                                                   |                                                    | Burst Average                                    |
| B                 | GSM 850 2 slots  | 32.30                                                                           | 31.00                                              | 34.70                                                                           | 31.00                                              | 31.00                                            |
|                   | GSM 1900 2 slots | 27.88                                                                           | 27.75                                              | 25.55                                                                           | 25.50                                              | 28.50                                            |
|                   | W-CDMA B2        | 21.61                                                                           | 21.50                                              | 19.58                                                                           | 19.25                                              | 23.10                                            |
|                   | W-CDMA B4        | 20.25                                                                           | 20.00                                              | 18.47                                                                           | 18.25                                              | 23.10                                            |
|                   | W-CDMA B5        | 24.78                                                                           | 24.50                                              | 27.34                                                                           | 24.50                                              | 24.50                                            |
|                   | CDMA BC0         | 24.85                                                                           | 24.50                                              | 27.77                                                                           | 24.50                                              | 24.50                                            |
|                   | CDMA BC1         | 21.62                                                                           | 21.50                                              | 19.54                                                                           | 19.25                                              | 23.10                                            |
|                   | CDMA BC10        | 25.30                                                                           | 24.50                                              | 28.54                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 5       | 25.30                                                                           | 24.50                                              | 28.46                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 7       | 19.02                                                                           | 19.00                                              | 19.27                                                                           | 19.25                                              | 22.80                                            |
|                   | LTE Band 12/17   | 25.29                                                                           | 24.50                                              | 28.93                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 13      | 26.22                                                                           | 24.50                                              | 28.99                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 14      | 27.72                                                                           | 24.50                                              | 27.80                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 25/2    | 21.62                                                                           | 21.50                                              | 19.29                                                                           | 19.25                                              | 23.10                                            |
|                   | LTE Band 26      | 25.06                                                                           | 24.50                                              | 28.10                                                                           | 24.50                                              | 24.50                                            |
|                   | LTE Band 30      | 19.00                                                                           | 18.50                                              | 19.55                                                                           | 19.50                                              | 22.80                                            |
|                   | LTE Band 41      | 19.78                                                                           | 19.75                                              | 21.01                                                                           | 21.00                                              | 23.70                                            |
|                   | LTE Band 48      | 20.07                                                                           | 20.00                                              | 21.52                                                                           | 21.50                                              | 22.50                                            |
|                   | LTE Band 66/4    | 20.58                                                                           | 20.00                                              | 18.30                                                                           | 18.25                                              | 23.10                                            |
|                   | LTE Band 71      | 25.80                                                                           | 24.50                                              | 28.60                                                                           | 24.50                                              | 24.50                                            |
|                   | NR n5            | 26.35                                                                           | 24.50                                              | 28.99                                                                           | 24.50                                              | 24.50                                            |
|                   | NR n12           | 28.28                                                                           | 24.50                                              | 30.88                                                                           | 24.50                                              | 24.50                                            |
|                   | NR n25/2         | 23.84                                                                           | 21.50                                              | 20.09                                                                           | 19.25                                              | 23.10                                            |
|                   | NR n41           | 18.94                                                                           | 17.75                                              | 19.73                                                                           | 19.00                                              | 26.00                                            |
|                   | NR n66           | 23.15                                                                           | 20.00                                              | 19.67                                                                           | 18.25                                              | 23.10                                            |
|                   | NR n71           | 28.76                                                                           | 24.50                                              | 29.92                                                                           | 24.50                                              | 24.50                                            |
| NR n77            | 16.69            | 16.25                                                                           | 17.01                                              | 17.00                                                                           | 22.50                                              |                                                  |

| Exposure Scenario |                  | Head                                                                                        |                                                    | Body-worn & Hotspot                                                                         |                                                    | P <sub>max</sub> (dBm)<br>Tune-up<br>power table |
|-------------------|------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|
| Spatial-average   |                  | 1g                                                                                          |                                                    | 1g                                                                                          |                                                    |                                                  |
| Test Distance     |                  | 0 mm                                                                                        |                                                    | 5 mm                                                                                        |                                                    |                                                  |
| Power Mode (DSI)  |                  | Mode A (DSI=0)                                                                              |                                                    | Mode B (DSI=1)                                                                              |                                                    |                                                  |
| Antenna           | Tech/Band        | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR <sub>design_target</sub> ) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table | P <sub>design</sub> (dBm)<br>corresponding to 10<br>W/kg<br>(SAR <sub>design_target</sub> ) | P <sub>limit</sub> (dBm)<br>Tune-up power<br>table | Burst Average                                    |
|                   | Transmit Average | Burst Average                                                                               |                                                    | Burst Average                                                                               |                                                    |                                                  |
| C                 | GSM 1900 2 slots | 32.40                                                                                       | 30.00                                              | 27.57                                                                                       | 27.50                                              | 30.00                                            |
|                   | W-CDMA B2        | 25.85                                                                                       | 24.70                                              | 21.03                                                                                       | 21.00                                              | 24.70                                            |
|                   | W-CDMA B4        | 26.97                                                                                       | 24.70                                              | 20.81                                                                                       | 20.75                                              | 24.70                                            |
|                   | LTE Band 7       | 26.82                                                                                       | 24.50                                              | 19.05                                                                                       | 19.00                                              | 25.00                                            |
|                   | LTE Band 25/2    | 25.87                                                                                       | 24.70                                              | 21.28                                                                                       | 21.25                                              | 25.00                                            |
|                   | LTE Band 30      | 24.60                                                                                       | 24.50                                              | 20.77                                                                                       | 20.75                                              | 25.00                                            |
|                   | LTE Band 41      | 26.34                                                                                       | 24.70                                              | 21.78                                                                                       | 21.75                                              | 25.00                                            |
|                   | LTE Band 48      | 29.09                                                                                       | 25.70                                              | 23.00                                                                                       | 23.00                                              | 24.60                                            |
|                   | LTE Band 66/4    | 28.20                                                                                       | 24.70                                              | 21.18                                                                                       | 20.75                                              | 25.00                                            |
|                   | NR n25/2         | 28.60                                                                                       | 24.70                                              | 21.47                                                                                       | 21.25                                              | 25.00                                            |
|                   | NR n41           | 26.99                                                                                       | 24.50                                              | 21.85                                                                                       | 19.75                                              | 23.00                                            |
|                   | NR n66           | 30.29                                                                                       | 24.70                                              | 24.38                                                                                       | 20.75                                              | 25.00                                            |
|                   | NR n77           | 29.09                                                                                       | 25.70                                              | 21.11                                                                                       | 20.75                                              | 26.00                                            |
| D                 | GSM 1900 2 slots | 26.82                                                                                       | 26.75                                              | 28.20                                                                                       | 28.00                                              | 28.00                                            |
|                   | W-CDMA B2        | 20.42                                                                                       | 20.25                                              | 22.60                                                                                       | 22.50                                              | 22.70                                            |
|                   | W-CDMA B4        | 20.02                                                                                       | 20.00                                              | 21.59                                                                                       | 21.25                                              | 22.70                                            |
|                   | LTE Band 7       | 19.69                                                                                       | 19.50                                              | 20.33                                                                                       | 20.25                                              | 22.50                                            |
|                   | LTE Band 25/2    | 20.84                                                                                       | 20.50                                              | 21.76                                                                                       | 21.75                                              | 23.00                                            |
|                   | LTE Band 30      | 20.93                                                                                       | 20.75                                              | 21.44                                                                                       | 21.25                                              | 22.50                                            |
|                   | LTE Band 41      | 21.29                                                                                       | 21.25                                              | 22.48                                                                                       | 22.20                                              | 22.50                                            |
|                   | LTE Band 48      | 20.35                                                                                       | 20.25                                              | 21.73                                                                                       | 21.50                                              | 22.80                                            |
|                   | LTE Band 66/4    | 20.47                                                                                       | 20.00                                              | 21.47                                                                                       | 21.25                                              | 23.00                                            |
|                   | NR n25/2         | 21.76                                                                                       | 20.50                                              | 24.28                                                                                       | 21.75                                              | 23.00                                            |
|                   | NR n41           | 22.27                                                                                       | 19.25                                              | 23.66                                                                                       | 20.25                                              | 25.00                                            |
|                   | NR n66           | 20.76                                                                                       | 20.00                                              | 23.45                                                                                       | 21.25                                              | 23.00                                            |
|                   | NR n77           | 18.01                                                                                       | 18.00                                              | 18.53                                                                                       | 18.50                                              | 22.80                                            |