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PART 0 SAR AND POWER DENSITY CHAR REPORT

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KYOCERA CORPORATION

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1. INTRODUCTION

Qualcomm Smart Transmit cannot operate without SAR and PD characterization at the device level, Beforehand. The parameters obtained from SAR and PD characterization (referred to as SAR char and PD char, respectively) will be used as input for Smart Transmit. Both SAR char and PD char will be entered via the Embedded File System (EFS) to enable the Smart Transmit feature.

2. DEVICE UNDER TEST

2.1. Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824 - 849 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850 - 1910 MHz
UMTS 850	Voice/Data	824.2 - 848.8 MHz
UMTS 1900	Voice/Data	1850.2 - 1909.8 MHz
LTE Band 2	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 4	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE Band 5	Voice/Data	824.7 - 848.3 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 66	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 48	Voice/Data	3552.5 - 3697.5 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
NR Band n2	Data	1852.5 - 1907.5 MHz
NR Band n5	Data	826.5 - 846.5 MHz
NR Band n66	Data	1712.5 - 1777.5 MHz
NR Band n71	Data	665.5 - 695.5 MHz
NR Band n260	Data	37025 - 39975 MHz
NR Band n261	Data	27525 - 28325 MHz
2.4GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

This device uses the Qualcomm® Smart Transmit feature to control and manage transmitting power in real time and to ensure the time-averaged RF exposure is in compliance with the FCC requirement at all times for 2G/3G/4G/5G WWAN operations. Additionally, this device supports WLAN/BT/NEC technologies but the output power of these modems is not controlled by the Smart Transmit algorithm.

2.2. Time-Averaging for SAR and Power Density

This device is enabled with Qualcomm® Smart Transmit algorithm to control and manage transmitting power in real time to ensure that the time-averaged RF exposure from 2G/3G/4G/5G NR Sub6/5G NR mmW WWAN is in compliance with FCC requirements. This Part 0 report shows SAR and Power Density characterization of WWAN radios for 2G/3G/4G/5G NR Sub6/5G NR mmW respectively. Characterization is achieved by determining PLimit for 2G/3G/4G/5G NR Sub6 and input.power.limit for 5G NR mmW that correspond to the exposure design targets after accounting for all device design related uncertainties, i.e., SAR_design_target (< FCC SAR limit) for sub-6 radio and PD_design_target (< FCC PD limit) for mmW radio. The SAR characterization and PD characterization are denoted as SAR Char and PD Char in this report. Section 2.3 includes a nomenclature of the specific terms used in this report.

The compliance test under the static transmission scenario and simultaneous transmission analysis are reported in Part 1 report. The validation of the time-averaging algorithm and compliance under the dynamic (time-varying) transmission scenario for WWAN technologies are reported in Part2 report.

2.3. Nomenclature for Part 0 Report

Technology	Term	Description
2G/3G/4G/ 5G NR Sub6	Plimit	Power level that corresponds to the exposure design target (SAR_design_target) after accounting for all device design related uncertainties.
	Pmax	Maximum tune up output power
	SAR_design_target	Target SAR level < FCC SAR limit after accounting for all device design related uncertainties
	SAR Char	Table containing Plimit for all technologies and bands
	Reserve_power_margin	The margin, in dB, below the Plimit to reserve for future transmission with a minimum transmit power
5G NR mmW	input.power.limit	Power level at antenna element for each beam corresponding to the exposure design target (PD_design_target)
	PD_design_target	Target PD level < FCC PD limit after accounting for all device design related uncertainties
	Δmin	Housing material influence
	PD Char	Table containing input.power.limit for all beams and bands

3. SAR CHARACTERIZATION

3.1. DSI and SAR Determination

This device uses different Device State Index (DSI) to configure different time averaged power levels based on certain exposure scenarios. Depending on the detection scheme implemented in the smartphone, the worst-case SAR was determined by measurements for the relevant exposure conditions for that DSI. Detailed descriptions of the detection mechanisms are included in the operational description. When 1g SAR and 10g SAR exposure comparison is needed, the worst-case was determined from SAR normalized to 1g or 10g SAR limit. The device state index (DSI) conditions used in Table 3-1 represent different exposure scenarios.

Table 3-1 DSI and Corresponding Exposure Scenarios

Scenario	Description	SAR Test Cases
Proximity sensor ANT0 active (DSI = 1)	■ Device transmits near body and proximity sensor is triggered ■ Proximity sensor triggered	Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04
Proximity sensor ANT1 active (DSI = 2)	■ Device transmits near body and proximity sensor is triggered ■ Proximity sensor triggered	Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04
Proximity sensor ANT0,ANT1 active (DSI = 3)	■ Device transmits near body and proximity sensor is triggered ■ Proximity sensor triggered	Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04
Hotspot mode (DSI = 4)	■ Device transmits in hotspot mode near body ■ Hotspot Mode Active	Hotspot SAR per KDB Publication 941225 D06

3.2. SAR Design Target

SAR_design_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer (see Table 3-2). The reserve_power_margin is 3dB.

Table 3-2 SAR_design_target Calculations

SAR_design_target			
SAR_design_target < SAR_regulatory_limit × $10^{-\text{Total Uncertainty}/10}$			
1g SAR (W/kg)		10g SAR (W/kg)	
Total Uncertainty	1.0 dB	Total Uncertainty	1.0 dB
SAR_regulatory_limit	1.6 W/kg	SAR_regulatory_limit	4.0 W/kg
SAR_design_target	1.13W/kg	SAR_design_target	2.83W/kg

3.3. SAR Char

SAR test results corresponding to Pmax for each antenna/technology/band/DSI can be found in Appendix A. Plimit is calculated by linearly scaling with the measured SAR at the Pmax to correspond to the SAR_design_target. Plimit determination for each exposure scenario corresponding to SAR_design_target are shown in Table 3-3.

Table 3-3 PLimit Determination

Device State Index (DSI)	Plimit Determination Scenarios
0	The worst-case SAR exposure is determined as maximum SAR normalized to the limit among: 1. 1g Head SAR and 2. Body Worn SAR and 3. Extremity SAR measured at 2mm for back, front, bottom respectively 4. Extremity SAR measured at 0mm for left and right surfaces.
1	Plimit of ANT0 is calculated besed on 10g Extremity SAR at 0mm for back, front, bottom surfaces
2	Plimit of ANT1 is calculated besed on 10g Extremity SAR at 0mm for back, front, bottom surfaces
3	Plimit of ANT0 and ANT1 are calculated besed on 10g Extremity SAR at 0mm for back, front, bottom surfaces
4	Plimit is calculated besed on 1g Hotspot SAR at 10mm

Note:

For DSI = 0, Plimit is calculated by:

Plimit = min{Plimit corresponding to 1g Head SAR at 0mm spacing,

Plimit corresponding to 1g Body Worn SAR evaluation at 15mm spacing,

Plimit corresponding to 10g Extremity SAR evaluation at 2mm spacing,

Plimit corresponding to 10g Extremity SAR evaluation at 0mm for left and right surfaces}

Table 3-4 SAR Characterizations

Mode/Band	ANT	DSI=0	DSI=1	DSI=2	DSI=3	DSI=4	Pmax*
		proximity sensor de-active	proximity sensor ANT0 active	proximity sensor ANT1 active	proximity sensor ANT0,ANT1 active	Hotspot Mode	
		Plimit (dBm)	Plimit (dBm)	Plimit (dBm)	Plimit (dBm)	Plimit (dBm)	(dBm)
GSM850	ANT0	29.7	29.7	29.7	29.7	29.7	23.2
GSM1900	ANT0	24.3	24.3	24.3	24.3	24.3	20.2
WCDMA B5	ANT0	28.9	28.9	28.9	28.9	28.9	23.2
WCDMA B2	ANT0	24.4	21.2	21.2	21.2	20.7	23.2
LTE Band 2	ANT0	25.1	21.7	21.7	21.7	21.2	23.7
	ANT1	24.3	24.3	24.3	24.3	24.3	23.7
LTE Band 4	ANT0	24.1	21.7	21.7	21.7	24.1	23.7
	ANT1	24.9	24.9	24.9	24.9	24.9	23.7
LTE Band 7	ANT0	27.0	27.0	27.0	27.0	27.0	23.2
LTE Band 5	ANT0	29.2	29.2	29.2	29.2	29.2	23.7
LTE Band 12	ANT0	27.9	27.9	27.9	27.9	27.9	23.2
LTE Band 13	ANT0	29.5	29.5	29.5	29.5	29.5	23.7
LTE Band 66	ANT0	24.0	21.7	21.7	21.7	24.0	23.7
	ANT1	25.1	25.1	25.1	25.1	25.1	23.7
LTE Band 48	ANT1	23.1	19.7	19.7	19.7	20.7	21.7
LTE Band 71	ANT0	28.3	28.3	28.3	28.3	28.3	23.2
NR Band n2	ANT1	24.5	24.5	24.5	24.5	24.5	23.7
NR Band n5	ANT0	29.2	29.2	29.2	29.2	29.2	23.7
NR Band n66	ANT1	24.7	24.7	24.7	24.7	24.7	23.7
NR Band n71	ANT0	28.9	28.9	28.9	28.9	28.9	23.7

Notes:

1. DSI=0 is corresponding to head SAR, body-worn SAR and extremity SAR.
2. When Pmax < PLimit, the DUT will operate at a power level up to Pmax.

*Pmax is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + device uncertainty.

**All PLimit power levels entered in Table 3-4 correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

4. POWER DENSITY CHARACTERIZATION

4.1. Exposure Scenarios in Power Density Evaluation

For a Portable handset at frequencies > 6GHz, the power density (PD) is required to be assessed for all antenna configurations (beams) from all mmW antenna modules installed inside the device. This device has 2 patch antenna arrays (QTM#0, QTM#1). Per each supported band, there are a total of 72 beams : 48 SISO beams and 24 MIMO beam pairs.

As showed in Figure 4-1, the surfaces near-by each mmW antenna module for PD characterization are identified and listed in Table 4-1.

Table 4-1 Evaluation Surface for PD Characterizations

Module	Front	Back	Right From Front View	Left From Front View	Top	Bottom
QTM#0	O	O	O	O	O	X
QTM#1	O	O	O	O	O	X

Figure 4-1 Location of mmW antenna modules looking from back of the DUT

4.2. Power Density Characterization Method

An overview of power density characterization method could be found in Figure 4-2 below.

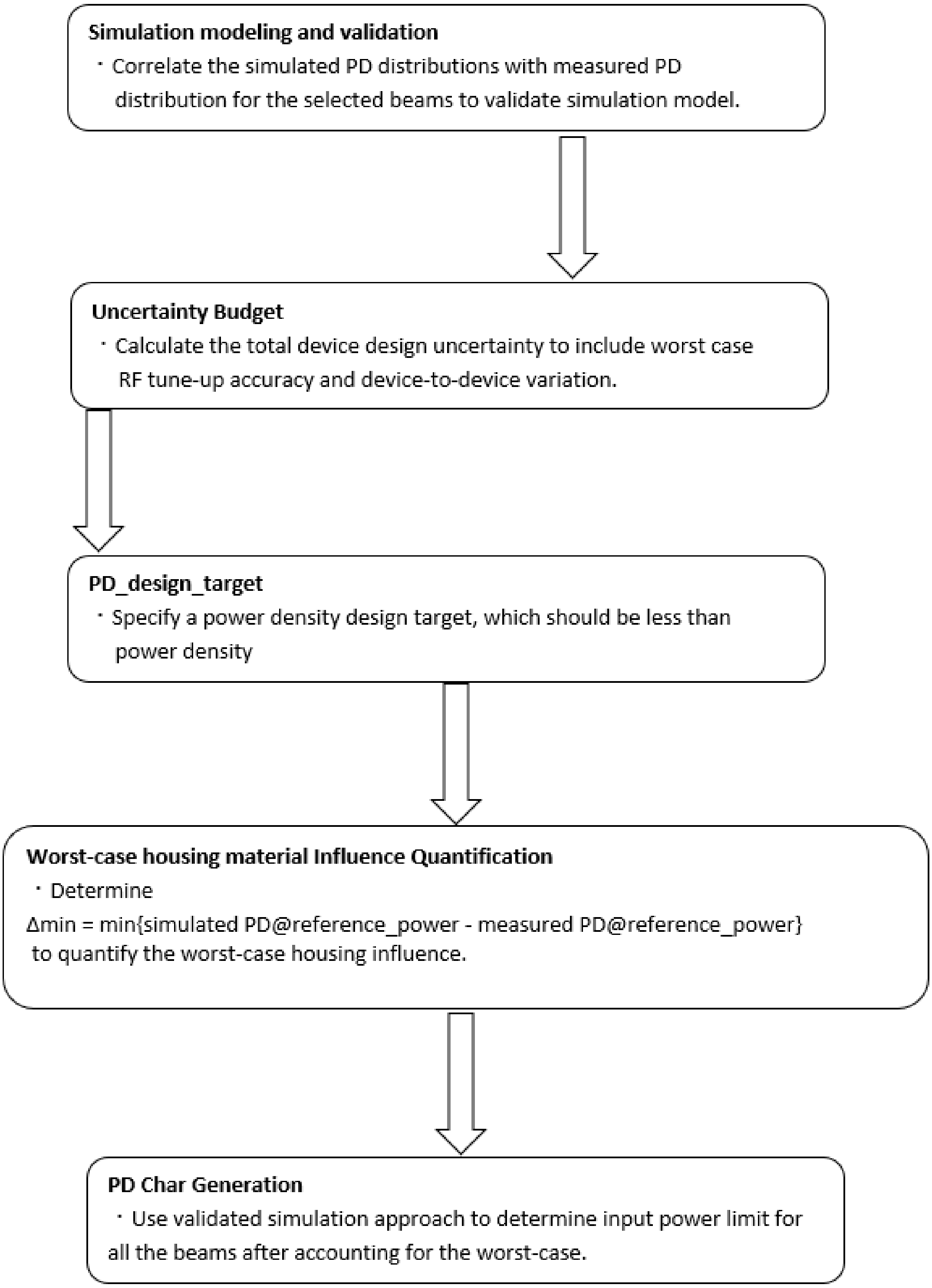

Figure 4-2 High level flow Chart for Power Density Characterization

4.3. Codebook for all supported beams

All the deams that the DUT supports are specified in the pre-defined codebook. The codebook for this device is specified as below.

Table 4-2 5G mmW NR Band n261 QTM#0 Codebook

Band	Beam_ID	Ant Module ID	Ant_Type	Paired_With	# of ANT Feed
261	1	0	PATCH	129	1
261	5	0	PATCH	133	2
261	6	0	PATCH	134	2
261	7	0	PATCH	135	2
261	10	0	PATCH	138	2
261	11	0	PATCH	139	2
261	14	0	PATCH	142	4
261	15	0	PATCH	143	4
261	16	0	PATCH	144	4
261	17	0	PATCH	145	4
261	18	0	PATCH	146	4
261	20	0	PATCH	148	4
261	21	0	PATCH	149	4
261	22	0	PATCH	150	4
261	23	0	PATCH	151	4
261	129	0	PATCH	1	1
261	133	0	PATCH	5	2
261	134	0	PATCH	6	2
261	135	0	PATCH	7	2
261	138	0	PATCH	10	2
261	139	0	PATCH	11	2
261	142	0	PATCH	14	4
261	143	0	PATCH	15	4
261	144	0	PATCH	16	4
261	145	0	PATCH	17	4
261	146	0	PATCH	18	4
261	148	0	PATCH	20	4
261	149	0	PATCH	21	4
261	150	0	PATCH	22	4
261	151	0	PATCH	23	4

Table 4-3 5G mmW NR Band n260 QTM#0 Codebook

Band	Beam_ID	Ant Module ID	Ant_Type	Paired_With	# of ANT Feed
260	1	0	PATCH	129	1
260	5	0	PATCH	133	2
260	6	0	PATCH	134	2
260	7	0	PATCH	135	2
260	10	0	PATCH	138	2
260	11	0	PATCH	139	2
260	14	0	PATCH	142	4
260	15	0	PATCH	143	4
260	16	0	PATCH	144	4
260	17	0	PATCH	145	4
260	18	0	PATCH	146	4
260	20	0	PATCH	148	4
260	21	0	PATCH	149	4
260	22	0	PATCH	150	4
260	23	0	PATCH	151	4
260	129	0	PATCH	1	1
260	133	0	PATCH	5	2
260	134	0	PATCH	6	2
260	135	0	PATCH	7	2
260	138	0	PATCH	10	2
260	139	0	PATCH	11	2
260	142	0	PATCH	14	4
260	143	0	PATCH	15	4
260	144	0	PATCH	16	4
260	145	0	PATCH	17	4
260	146	0	PATCH	18	4
260	148	0	PATCH	20	4
260	149	0	PATCH	21	4
260	150	0	PATCH	22	4
260	151	0	PATCH	23	4

Table 4-4 5G mmW NR Band n261 QTM#1 Codebook

Band	Beam_ID	Ant Module ID	Ant_Type	Paired_With	# of ANT Feed
261	0	1	PATCH	128	1
261	2	1	PATCH	130	2
261	3	1	PATCH	131	2
261	4	1	PATCH	132	2
261	8	1	PATCH	136	2
261	9	1	PATCH	137	2
261	12	1	PATCH	140	4
261	13	1	PATCH	141	4
261	19	1	PATCH	147	4
261	128	1	PATCH	0	1
261	130	1	PATCH	2	2
261	131	1	PATCH	3	2
261	132	1	PATCH	4	2
261	136	1	PATCH	8	2
261	137	1	PATCH	9	2
261	140	1	PATCH	12	4
261	141	1	PATCH	13	4
261	147	1	PATCH	19	4

Table 4-5 5G mmW NR Band n260 QTM#1 Codebook

Band	Beam_ID	Ant Module ID	Ant_Type	Paired_With	# of ANT Feed
260	0	1	PATCH	128	1
260	2	1	PATCH	130	2
260	3	1	PATCH	131	2
260	4	1	PATCH	132	2
260	8	1	PATCH	136	2
260	9	1	PATCH	137	2
260	12	1	PATCH	140	4
260	13	1	PATCH	141	4
260	19	1	PATCH	147	4
260	128	1	PATCH	0	1
260	130	1	PATCH	2	2
260	131	1	PATCH	3	2
260	132	1	PATCH	4	2
260	136	1	PATCH	8	2
260	137	1	PATCH	9	2
260	140	1	PATCH	12	4
260	141	1	PATCH	13	4
260	147	1	PATCH	19	4

4.4. Simulation and modeling validation

Power density simulations of all beams and surfaces were performed by the manufacturer. Details of these simulations and modeling validation can be found in the Power Density Simulation Report. Table 4-6 includes a summary of the validation results to support worst-case housing influence quantification in power density characterization for this model.

With an input power of 6dBm for both n261 and n260 band, PD measurements are conducted for at least one single beam per antenna type and per antenna module (QTM#0, QTM#1) on worst-surface(s) listed in Section 4.6. PD measurements are performed at mid channel of each mmW band and with CW modulation. All measured PD values are listed in Table 4-6 along with corresponding simulated PD values for the same configuration.

PD value will be used to determine worst-case housing influence for conservative assessment.

Table 4-6 Measured and Simulated 4cm² avg. PD for Selected Beams with 6 dBm Input Power for both n261 and n260

6dBm input measurement/ simulation							4cm² avg.PD (mW/cm²)		Δ (dB)	Δmin (dB)
Band	Ant Type	Module	Ant Group (Ant Polarization)	beam ID	Surface	Channel	Measured	Simulated		
n261	Patch	QTM#0	AG0(V)	17	Left	Mid	0.86	1.25	1.63	-1.18
			AG1(H)	149	Left	Mid	1.60	1.22	**-1.18**	
		QTM#1	AG0(V)	13	Back	Mid	0.81	1.17	1.60	0.84
			AG1(H)	141	Back	Mid	0.89	1.08	**0.84**	
n260	Patch	QTM#0	AG0(V)	22	Left	Mid	0.84	2.52	4.79	2.23
			AG1(H)	150	Left	Mid	1.09	1.81	**2.23**	
		QTM#1	AG0(V)	12	Back	Mch	0.62	2.43	5.96	4.31
			AG1(H)	140	Back	Mch	0.63	1.69	**4.31**	

4.5. PD_design_target

PD_design_target is determined by ensuring that it is less than FCC PD limit after accounting for total device design uncertainties including Tx AGC and device-to-device variation, specified by the manufacturer (see Table 4-7).

Table 4-7 PD_design_target Calculations

PD_design_target	
PD_design_target < PD_regulatory_limit × 10 $^{-\text{Total Uncertainty}/10}$	
PD over 4 cm^2 Averaging Area (mW/cm^2)	
Total Uncertainty	2.1dB
PD_regulatory_limit	1.0 mW/cm^2
PD_design_target	0.616 mW/cm^2

4.6. Worst-case Housing Influence Determination : Δmin

For non-metal material, the material property cannot be accurately characterized at mmW frequencies to data. The estimated material property for the device housing is used in the simulation model, which could influence the accuracy in simulation for PD amplitude quantification. Since the housing influence on PD could vary from surface to surface where the EM field propagates through, the most underestimated surface is used to quantify the worst-case housing influence for conservative assessment.

Since the mmW antenna modules are placed at different location as shown in Figure 4-1, only surrounding material/housing has impact on EM field propagation, and in turn power density.

Furthermore, depending on the type of antenna array, i.e., dipole antenna array or patch antenna array, the nature of EM field propagation in the near field is different. Therefore, the worst-case housing influence is determined per antenna module.

For this DUT, the below procedure was used to determine worst-case housing influence, Δmin :

1. Based on PD simulation, for each module and antenna type, determine one worst-surface(s) that has highest 4cm^2 PD for all the single beams per antenna module and per antenna type in the mid channel of each band.
2. For identified worst surface(s) per antenna module and per antenna type group,
   a. First determine Δmin based on identified worst surface(s), and derive input.power.limit
   b. Then prove all other near-by surface(s), i.e., non-selected surface(s), is not required for housing material loss quantification (in other words, these non-evaluated surfaces have no influence on the determined input.power.limit) by :

      I. re-scale all simulated 4cm^2 PD values to input.power.limit to identify the worst-PD beam per each non-evaluated surface.
      II. Measure 4cm^2 PD at input.power.limit on identified worst-PD beam per each non-evaluated surface

III. Demonstrate all measured $4cm^2$ PD values are below PD_design_target.

3. If any of the above surface(s) in Step (2.b.iii) have measured $4cm^2$ PD ≥ PD_design_target, then those surfaces must be included in the Δmin determination in Step (2.a), and re-evaluate input.power.limit with these added surfaces.

Following above procedure, based on Table 2 ~ Table 7 in PD simulation report, the worst-surface(s) having highest $4cm^2$ PD for all the single beams per each antenna type and each antenna module group in the mid channel of n261 and n260 bands are identified as :

a. For QTM#0 : Left
b. For QTM#1 : Back

Thus, when comparing a simulated $4cm^2$ -averaged PD and measured $4cm^2$ -averaged PD for the identified worst surface(s), the worst error introduced for each antenna module when using the estimated material property in the simulation is highlighted in bold numbers in Table 4-8. Thus, the worst-case housing influence, denoted as Δmin = Sim. PD – Meas. PD, is determined as

Table 4-8 Δmin for QTM#0, QTM#1

6dBm input measurement / simulation			Δmin (dB)
Band	Ant Type	Module	
n261	Patch	QTM#0	-1.18
		QTM#1	0.84
n260	Patch	QTM#0	2.23
		QTM#1	4.31

Δmin represents the worst case where RF exposure is underestimated the most in simulation when using the estimated material property of the housing. For conservative assessment, the Δmin is used as the worst-case factor and applied to all the beams in the corresponding antenna type and antenna module group to determine input power limits in PD char for compliance.

The detail input.power.limit derivation is described in Section 4.7.

Simulated $4cm^2$ PD values in Table 2 ~ Table 7 in Power Density Simulation Report are scaled to input.power.limit and are listed in Tables 4-9 ~ 4-12 for all single beams for all identified surfaces (shown in Table 4-1), when assuming the simulation is performed with correct housing influence.

Determine the worst beam for each of non-selected surface(s), i.e.,

a. For QTM#0 : Right, Front, Back, Top
b. For QTM#1 : Right, Left, Front, Top

Then perform PD measurement for all determined worst-case beams, highlighted in red in Table 4-9 ~ 4-12, on the corresponding surface. Measurement is performed in the mid channel of each band with CW modulation. The evaluation distance is at 2mm.

The test results in Table 4-13 shows that the all measured 4cm^2 PD values are less than PD_design_target of 0.616 mW/cm^2 , thus, the non-selected surfaces have no influence on the determined Δmin and input.power.limit in Section 4.7.

Table 4-9: n261/mid channel, QTM#0 simulated 4cm^2 ave.PD (mW/cm^2) at PD_Design_Target (if simulation performed with correct housing material properties) (Δmin)

Band	BeamID	ANT Module	ANT Type	Num of Feed	Front	Back	Right	Top
n261	1	QTM#0	Patch	1	0.015	0.150	0.001	0.021
	5	QTM#0	Patch	2	0.027	0.183	0.001	0.022
	6	QTM#0	Patch	2	0.028	0.196	0.001	0.009
	7	QTM#0	Patch	2	0.030	0.157	0.001	0.045
	10	QTM#0	Patch	2	0.020	0.199	0.001	0.018
	11	QTM#0	Patch	2	0.028	0.178	0.001	0.017
	14	QTM#0	Patch	4	0.035	0.267	0.002	0.071
	15	QTM#0	Patch	4	0.054	0.227	0.001	0.031
	16	QTM#0	Patch	4	0.044	0.167	0.001	0.007
	17	QTM#0	Patch	4	0.038	0.132	0.001	0.017
	18	QTM#0	Patch	4	0.023	0.154	0.002	0.032
	20	QTM#0	Patch	4	0.052	0.259	0.002	0.043
	21	QTM#0	Patch	4	0.053	0.201	0.001	0.019
	22	QTM#0	Patch	4	0.041	0.139	0.001	0.013
	23	QTM#0	Patch	4	0.026	0.132	0.002	0.013
	129	QTM#0	Patch	1	0.030	0.127	0.002	0.023
	133	QTM#0	Patch	2	0.013	0.171	0.001	0.003
	134	QTM#0	Patch	2	0.012	0.181	0.001	0.045
	135	QTM#0	Patch	2	0.026	0.173	0.002	0.028
	138	QTM#0	Patch	2	0.012	0.157	0.001	0.016
	139	QTM#0	Patch	2	0.014	0.156	0.001	0.069
	142	QTM#0	Patch	4	0.055	0.239	0.002	0.009
	143	QTM#0	Patch	4	0.039	0.222	0.001	0.009
	144	QTM#0	Patch	4	0.025	0.173	0.001	0.020
	145	QTM#0	Patch	4	0.045	0.357	0.004	0.199
	146	QTM#0	Patch	4	0.058	0.260	0.001	0.023
	148	QTM#0	Patch	4	0.052	0.236	0.002	0.009
	149	QTM#0	Patch	4	0.030	0.196	0.001	0.007
	150	QTM#0	Patch	4	0.027	0.168	0.003	0.076
	151	QTM#0	Patch	4	0.054	0.305	0.003	0.094

Please note the above scaled simulation values correspond to PD_design_target if the simulation was performed with correct housing material properties.

Table 4-10: n261/mid channel, QTM#1 simulated 4cm^2 ave.PD (mW/cm^2) at PD_Design_Target (if simulation performed with correct housing material properties) (Δmin)

Band	BeamID	ANT Module	ANT Type	Num of Feed	Front	Left	Right	Top
n261	0	QTM#1	Patch	1	0.005	0.005	0.045	0.105
	2	QTM#1	Patch	2	0.006	0.002	0.017	0.143
	3	QTM#1	Patch	2	0.008	0.002	0.007	0.164
	4	QTM#1	Patch	2	0.008	0.003	0.014	0.106
	8	QTM#1	Patch	2	0.008	0.002	0.008	0.166
	9	QTM#1	Patch	2	0.009	0.001	0.006	0.161
	12	QTM#1	Patch	4	0.017	0.004	0.011	0.166
	13	QTM#1	Patch	4	0.017	0.003	0.021	0.151
	19	QTM#1	Patch	4	0.016	0.004	0.012	0.156
	128	QTM#1	Patch	1	0.004	0.004	0.017	0.109
	130	QTM#1	Patch	2	0.009	0.007	0.059	0.064
	131	QTM#1	Patch	2	0.009	0.009	0.044	0.276
	132	QTM#1	Patch	2	0.009	0.005	0.029	0.207
	136	QTM#1	Patch	2	0.009	0.008	0.040	0.263
	137	QTM#1	Patch	2	0.009	0.008	0.040	0.263
	140	QTM#1	Patch	4	0.017	0.010	0.058	0.250
	141	QTM#1	Patch	4	0.013	0.006	0.047	0.192
	147	QTM#1	Patch	4	0.017	0.011	0.063	0.239

Please note the above scaled simulation values correspond to PD_design_target if the simulation was performed with correct housing material properties

Table 4-11: n260/mid channel, QTM#0 simulated 4cm² ave.PD (mW/cm²) at PD_Design_Target (if simulation performed with correct housing material properties) (Δmin)

Band	BeamID	ANT Module	ANT Type	Num of Feed	Front	Back	Right	Top
n260	1	QTM#0	Patch	1	0.003	0.032	0.001	0.004
	5	QTM#0	Patch	2	0.004	0.040	0.000	0.016
	6	QTM#0	Patch	2	0.008	0.026	0.001	0.009
	7	QTM#0	Patch	2	0.004	0.034	0.001	0.015
	10	QTM#0	Patch	2	0.005	0.019	0.001	0.013
	11	QTM#0	Patch	2	0.007	0.035	0.001	0.012
	14	QTM#0	Patch	4	0.008	0.055	0.001	0.020
	15	QTM#0	Patch	4	0.007	0.038	0.001	0.018
	16	QTM#0	Patch	4	0.005	0.034	0.001	0.013
	17	QTM#0	Patch	4	0.006	0.040	0.000	0.012
	18	QTM#0	Patch	4	0.007	0.064	0.001	0.023
	20	QTM#0	Patch	4	0.008	0.050	0.001	0.023
	21	QTM#0	Patch	4	0.004	0.037	0.001	0.024
	22	QTM#0	Patch	4	0.004	0.038	0.000	0.005
	23	QTM#0	Patch	4	0.007	0.062	0.001	0.016
	129	QTM#0	Patch	1	0.003	0.038	0.000	0.004
	133	QTM#0	Patch	2	0.006	0.026	0.001	0.019
	134	QTM#0	Patch	2	0.002	0.049	0.001	0.013
	135	QTM#0	Patch	2	0.005	0.043	0.000	0.009
	138	QTM#0	Patch	2	0.003	0.039	0.000	0.010
	139	QTM#0	Patch	2	0.004	0.055	0.000	0.014
	142	QTM#0	Patch	4	0.014	0.056	0.001	0.043
	143	QTM#0	Patch	4	0.009	0.057	0.001	0.029
	144	QTM#0	Patch	4	0.013	0.057	0.001	0.008
	145	QTM#0	Patch	4	0.009	0.054	0.001	0.032
	146	QTM#0	Patch	4	0.012	0.051	0.001	0.035
	148	QTM#0	Patch	4	0.014	0.049	0.001	0.032
	149	QTM#0	Patch	4	0.013	0.050	0.001	0.012
	150	QTM#0	Patch	4	0.012	0.061	0.001	0.019
	151	QTM#0	Patch	4	0.012	0.050	0.001	0.040

Please note the above scaled simulation values correspond to PD_design_target if the simulation was performed with correct housing material properties

Table 4-12: n260/mid channel, QTM#1 simulated 4cm² ave.PD (mW/cm²) at PD_Design_Target (if simulation performed with correct housing material properties) (Δmin)

Band	BeamID	ANT Module	ANT Type	Num of Feed	Front	Left	Right	Top
n260	0	QTM#1	Patch	1	0.010	0.016	0.054	0.207
	2	QTM#1	Patch	2	0.012	0.010	0.078	0.295
	3	QTM#1	Patch	2	0.014	0.005	0.059	0.277
	4	QTM#1	Patch	2	0.014	0.005	0.059	0.277
	8	QTM#1	Patch	2	0.014	0.005	0.059	0.277
	9	QTM#1	Patch	2	0.014	0.005	0.059	0.277
	12	QTM#1	Patch	4	0.011	0.007	0.069	0.240
	13	QTM#1	Patch	4	0.011	0.009	0.064	0.242
	19	QTM#1	Patch	4	0.011	0.008	0.083	0.269
	128	QTM#1	Patch	1	0.007	0.008	0.064	0.148
	130	QTM#1	Patch	2	0.017	0.004	0.059	0.291
	131	QTM#1	Patch	2	0.017	0.003	0.063	0.277
	132	QTM#1	Patch	2	0.011	0.016	0.072	0.224
	136	QTM#1	Patch	2	0.017	0.003	0.063	0.277
	137	QTM#1	Patch	2	0.017	0.004	0.059	0.291
	140	QTM#1	Patch	4	0.020	0.009	0.108	0.281
	141	QTM#1	Patch	4	0.016	0.014	0.134	0.304
	147	QTM#1	Patch	4	0.017	0.015	0.143	0.318

Please note the above scaled simulation values correspond to PD_design_target if the simulation was performed with correct housing material properties

Table 4-13: 4cm² ave.PD (mW/cm²) of the selected beams measured on the corresponding surfaces that are not selected for Δmin determination

Band	ANT Module	BeamID	Surface	input.power.limit (dBm)	Meas.4cm2 PD (mW/cm²)
n261	QTM#0	146	Front	3.59	0.46
		145	Back	5.86	0.57
		145	Right	5.86	0.00
		145	Top	5.86	0.09
	QTM#1	140	Front	4.17	0.05
		147	Left	4.40	0.01
		147	Right	4.40	0.02
		131	Top	5.90	0.23
n260	QTM#0	148	Front	3.15	0.46
		18	Back	1.82	0.28
		143	Right	3.48	0.00
		142	Top	3.22	0.40
	QTM#1	140	Front	3.82	0.04
		132	Left	5.50	0.01
		147	Right	4.73	0.09
		147	Top	4.73	0.20

4.7. PD Char

4.7.1 Scaling Factor for Single Beams

To determine the input power limit at each antenna port, simulation was performed at low, mid and high channel for each mmW band supported, with 6dBm input per active port for n261 band and 6dBm input power per active port for n260 band：

1. Obtained $PD_{surface}$ value (the worst PD among all identified surfaces of the DUT) at all three channels for all single beams specified in the codebook of Table 3-1.
2. Derived a scaling factor at low, mid and high channel, $s(i)_{low\_or\_mid\_or\_high}$, by：

$$s(i)_{low\_or\_mid\_or\_high} = \frac{PD\ design\ target}{sim.PDsurface(i)}\ ,\quad i \in \text{ single beams} \tag{1}$$

3. Determined the worst-case scaling factor, (ii), among low, mid and high channels：

$$s(i) = \min\{\, s_{low}(i),\ s_{mid}(i),\ s_{high}(i)\,\},\quad i \in \text{ single beams} \tag{2}$$

and this scaling factor applies to the input power at each antenna port.

4.7.2 Scaling Factor for Beam Pairs

Per the manufacturer, the relative phase between beam pair is not controlled in the chipset design and could vary from run to run. Therefore, for each beam pair, based on the simulation results, the worst-case scaling factor was determined mathematically to ensure the compliance. The worst-case PD for MIMO operations was found by sweeping the relative phase for all possible angles to ensure a conservative assessment. The power density simulation report contains the worst-case power density for each surface after sweeping through all relative phases between beams.
Once the power density was determined for the worst-case Φ, the scaling factor was obtained by the below equation for low, mid and high channels：

$$s(i)_{low\_or\_mid\_or\_high} = \frac{PD\ design\ target}{total.PD(\ \Phi(i)\text{worstcase})}\ ,\quad i \in \text{ single beams} \tag{3}$$

The total $PD(\Phi_{worstcase})$ varies with channel and beam pair, the lowest scaling factor among all three channels, s(i), is determined for the beam pair i：

$$s(i) = \min\{\, s_{low}(i),\ s_{mid}(i),\ s_{high}(i)\,\},\quad i \in \text{ single beams} \tag{4}$$

4.7.3 Input.Power.Limit Calculations

The PD Char specifies the limit of input power at antenna port that corresponds to PD_design_target for all the beams.

Ideally, if there is no uncertainty associated with hardware design, the input power limit, denoted as input.power.limit(i), for beam i can be obtained after accounting for the housing influence (Δmin) determined in Table 4-8, given by :

・For n261

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)) + \Delta\text{min}, \quad i \in \text{single beams} \tag{5a}$$

・For n260

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)) + \Delta\text{min}, \quad i \in \text{single beams} \tag{5b}$$

Where 6dBm is the input powers used in simulation for n261 and n260 ; s(i) is the scaling factor obtained from Eq.(2) or Eq.(4) for beam i ; Δmin is the worst-case housing influence factor (determined in Table 4-8) for beam i.

If simulation overestimates the housing influence, then Δmin (= simulated PD − measured PD) is negative, which means that the measured PD would be higher than the simulated PD. The input power to antenna elements determined via simulation must be decreased for compliance.

Similarly, if simulation underestimates the loss, then Δmin is positive (measured PD would be lower than the simulated value). Input power to antenna elements determined via simulation can be increased and still be PD compliant.

In really the hardware design has uncertainty which must be properly considered. The device design related uncertainty is embedded in the process of Δmin determination. Since the device uncertainty is already accounted for in PD_design_target, it needs to be removed to avoid double counting this uncertainty. Thus, Equation 5a and 5b is modified to :

If -TxAGC uncertainty < Δmin < TxAGC uncertainty

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)), \quad i \in \text{all beams, for n261} \tag{6a}$$

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)), \quad i \in \text{all beams, for n260} \tag{6b}$$

else if Δmin < -TxAGC uncertainty

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)) + (\Delta\text{min} + \text{TxAGC uncertainty}), \quad i \in \text{all beams, for n261} \tag{7a}$$

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)) + (\Delta\text{min} + \text{TxAGC uncertainty}), \quad i \in \text{all beams, for n260} \tag{7b}$$

else if Δmin > TxAGC uncertainty

$$\text{Input.power.limit(i)} = 6\text{dBm} + 10 * \log(s(i)) + (\Delta\text{min} - \text{TxAGC uncertainty}), \quad i \in \text{all beams, for n261} \tag{8a}$$

$$\text{Input.power.limit}(i) = 6\text{dBm} + 10 * \log(s(i)) + (\Delta\text{min} - \text{TxAGC uncertainty}),$$

$$i \in \text{all beams, for n260} \qquad (8b)$$

Following above logic, the input.power.limit for this DUT can be calculated using Equations (6a),(6b),(7a),(7b) and (8a) and (8b), i.e.,

Table 4-14 input.power.limit Calculation

Band	Ant Module	Δmin (dB)	Device Uncertainty (dB)	input.power.limit (dBm)	Notes
n261	QTM#0 (Patch Beam)	-1.18	2.1	6dBm + 10 * log(s(i))	Using Eq. 6a
	QTM#1 (Patch Beam)	0.84	2.1	6dBm + 10 * log(s(i))	Using Eq. 6a
n260	QTM#0 (Patch Beam)	2.23	2.1	6dBm + 10 * log(s(i))+(Δmin − TxAGC uncertainty)	Using Eq. 8b
	QTM#1 (Patch Beam)	4.31	2.1	6dBm + 10 * log(s(i))+(Δmin − TxAGC uncertainty)	Using Eq. 8b

Thus, the DUT PD Char for n261 and n260 bands is as shown in the tables 4-15—4-18 below. The full simulation results used to support this calculation can be found in the Power Density Simulation Report.

Table 4-15 5G NR n261 QTM#0 input.power.limit

Band	BeamID	Paired with Beam_ID	Input.Power.Limit (dBm)
n261	1		6.00
	5		4.33
	6		4.47
	7		5.96
	10		4.21
	11		4.89
	14		4.44
	15		4.06
	16		3.18
	17		2.93
	18		4.08
	20		4.14
	21		3.83
	22		2.93
	23		3.03
	129		6.00
	133		3.46
	134		4.82
	135		4.36
	138		3.92
	139		5.02
	142		3.81
	143		3.45
	144		3.05
	145		5.86
	146		3.59
	148		3.94
	149		2.85
	150		4.20
	151		4.61
	1	129	6.00
	5	133	2.08
	6	134	2.05
	7	135	2.84
	10	138	1.53
	11	139	1.53
	14	142	1.64
	15	143	0.93
	16	144	1.02
	17	145	1.25
	18	146	0.93
	20	148	2.02
	21	149	0.47
	22	150	1.63
	23	151	1.12

Table 4-16 5G NR n261 QTM#1 input.power.limit

Band	BeamID	Paired with Beam_ID	Input.Power.Limit (dBm)
n261	0		6.00
	2		3.07
	3		3.76
	4		3.28
	8		3.94
	9		3.54
	12		3.57
	13		2.79
	19		3.18
	128		6.00
	130		5.94
	131		5.90
	132		4.47
	136		5.54
	137		5.54
	140		4.17
	141		3.11
	147		4.40
	0	128	6.00
	2	130	3.25
	3	131	1.68
	4	132	2.36
	8	136	2.00
	9	137	1.93
	12	140	0.53
	13	141	0.48
	19	147	1.36

Table 4-17 5G NR n260 QTM#0 input.power.limit

Band	BeamID	Paired with Beam_ID	Input.Power.Limit (dBm)
n260	1		6.00
	5		4.21
	6		3.08
	7		3.50
	10		1.79
	11		3.31
	14		1.63
	15		2.65
	16		0.90
	17		0.12
	18		1.82
	20		2.30
	21		1.84
	22		0.01
	23		0.78
	129		5.24
	133		3.88
	134		2.67
	135		2.37
	138		2.61
	139		3.14
	142		3.22
	143		3.48
	144		2.43
	145		1.69
	146		2.97
	148		3.15
	149		2.79
	150		1.37
	151		2.86
	1	129	2.86
	5	133	1.84
	6	134	-0.47
	7	135	-0.85
	10	138	0.38
	11	139	-0.46
	14	142	-1.51
	15	143	-1.22
	16	144	-0.97
	17	145	-2.08
	18	146	-1.41
	20	148	-1.44
	21	149	0.02
	22	150	-1.82
	23	151	-1.42

Table 4-18 5G NR n260 QTM#1 input.power.limit

Band	BeamID	Paired with Beam_ID	Input.Power.Limit (dBm)
n260	0		6.00
	2		4.58
	3		5.76
	4		5.76
	8		5.76
	9		5.76
	12		2.15
	13		1.98
	19		2.34
	128		6.00
	130		5.69
	131		5.75
	132		5.50
	136		5.75
	137		5.69
	140		3.82
	141		4.44
	147		4.73
	0	128	5.87
	2	130	3.72
	3	131	2.06
	4	132	3.41
	8	136	2.38
	9	137	2.69
	12	140	0.84
	13	141	1.36
	19	147	1.28

APPENDIX A : SAR TEST RESULTS FOR PLIMIT CALCULATIONS

Table A-1 DSI = 0 PLimit Calculations-2G/3G Head SAR

Frequency		Mode	Service	Conducted Power	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[dBm]				[W/kg]	[W/kg]	[dBm]	[dBm]
824.2	128	GSM850	GSM	33.4	Right	Cheek	1:8.3	0.029	1.13	40.1	40.1
824.2	128	GSM850	GSM	33.4	Right	Tilt	1:8.3	0.027	1.13	40.4	
824.2	128	GSM850	GSM	33.4	Left	Cheek	1:8.3	0.022	1.13	41.3	
824.2	128	GSM850	GSM	33.4	Left	Tilt	1:8.3	0.021	1.13	41.6	
1909.8	661	GSM1900	GSM	30.4	Right	Cheek	1:8.3	0.023	1.13	38.1	35.8
1909.8	661	GSM1900	GSM	30.4	Right	Tilt	1:8.3	0.021	1.13	38.4	
1909.8	661	GSM1900	GSM	30.4	Left	Cheek	1:8.3	0.039	1.13	35.8	
1909.8	661	GSM1900	GSM	30.4	Left	Tilt	1:8.3	0.036	1.13	36.1	
826.4	4132	UMTS850	RMC	23.2	Right	Cheek	1:1	0.220	1.13	30.3	30.1
826.4	4132	UMTS850	RMC	23.2	Right	Tilt	1:1	0.205	1.13	30.6	
826.4	4132	UMTS850	RMC	23.2	Left	Cheek	1:1	0.230	1.13	30.1	
826.4	4132	UMTS850	RMC	23.2	Left	Tilt	1:1	0.215	1.13	30.4	
1880	9400	UMTS1900	RMC	23.2	Right	Cheek	1:1	0.320	1.13	28.7	26.6
1880	9400	UMTS1900	RMC	23.2	Right	Tilt	1:1	0.299	1.13	29.0	
1880	9400	UMTS1900	RMC	23.2	Left	Cheek	1:1	0.520	1.13	26.6	
1880	9400	UMTS1900	RMC	23.2	Left	Tilt	1:1	0.485	1.13	26.9	

Table A-2 DSI = 0 PLimit Calculations-4G Head SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	Right	Cheek	1:1	0.130	1.13	32.6	32.6
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	Right	Tilt	1:1	0.121	1.13	32.9	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	Left	Cheek	1:1	0.120	1.13	32.9	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	Left	Tilt	1:1	0.112	1.13	33.2	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	Right	Cheek	1:1	0.130	1.13	32.6	32.5
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	Right	Tilt	1:1	0.121	1.13	32.9	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	Left	Cheek	1:1	0.120	1.13	32.9	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	Left	Tilt	1:1	0.112	1.13	33.2	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	25	Right	Cheek	1:1	0.170	1.13	31.9	31.9
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	25	Right	Tilt	1:1	0.159	1.13	32.2	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	25	Left	Cheek	1:1	0.150	1.13	32.5	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	25	Left	Tilt	1:1	0.140	1.13	32.8	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	Right	Cheek	1:1	0.240	1.13	30.4	30.4
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	Right	Tilt	1:1	0.224	1.13	30.7	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	Left	Cheek	1:1	0.200	1.13	31.2	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	Left	Tilt	1:1	0.187	1.13	31.5	
1905	19150	LTE Band2	ANT0	10	23.7	QPSK	1	49	Right	Cheek	1:1	0.280	1.13	29.8	26.7
1905	19150	LTE Band2	ANT0	10	23.7	QPSK	1	49	Right	Tilt	1:1	0.261	1.13	30.1	
1905	19150	LTE Band2	ANT0	10	23.7	QPSK	1	49	Left	Cheek	1:1	0.560	1.13	26.7	
1905	19150	LTE Band2	ANT0	10	23.7	QPSK	1	49	Left	Tilt	1:1	0.523	1.13	27.0	
1880	18900	LTE Band2	ANT1	10	23.7	QPSK	1	24	Right	Cheek	1:1	0.220	1.13	30.8	30.6
1880	18900	LTE Band2	ANT1	10	23.7	QPSK	1	24	Right	Tilt	1:1	0.205	1.13	31.1	
1880	18900	LTE Band2	ANT1	10	23.7	QPSK	1	24	Left	Cheek	1:1	0.230	1.13	30.6	
1880	18900	LTE Band2	ANT1	10	23.7	QPSK	1	24	Left	Tilt	1:1	0.215	1.13	30.9	
1715	20000	LTE Band4	ANT0	10	23.7	QPSK	1	0	Right	Cheek	1:1	0.610	1.13	26.4	26.2
1715	20000	LTE Band4	ANT0	10	23.7	QPSK	1	0	Right	Tilt	1:1	0.386	1.13	28.4	
1715	20000	LTE Band4	ANT0	10	23.7	QPSK	1	0	Left	Cheek	1:1	0.620	1.13	26.3	
1715	20000	LTE Band4	ANT0	10	23.7	QPSK	1	0	Left	Tilt	1:1	0.642	1.13	26.2	
1715	20000	LTE Band4	ANT1	10	23.7	QPSK	1	0	Right	Cheek	1:1	0.228	1.13	30.7	28.4
1715	20000	LTE Band4	ANT1	10	23.7	QPSK	1	0	Right	Tilt	1:1	0.213	1.13	31.0	
1715	20000	LTE Band4	ANT1	10	23.7	QPSK	1	0	Left	Cheek	1:1	0.383	1.13	28.4	
1715	20000	LTE Band4	ANT1	10	23.7	QPSK	1	0	Left	Tilt	1:1	0.357	1.13	28.7	
1720	132072	LTE Band66	ANT0	10	23.7	QPSK	1	0	Right	Cheek	1:1	0.400	1.13	28.2	26.2
1720	132072	LTE Band66	ANT0	10	23.7	QPSK	1	0	Right	Tilt	1:1	0.373	1.13	28.5	
1720	132072	LTE Band66	ANT0	10	23.7	QPSK	1	0	Left	Cheek	1:1	0.630	1.13	26.2	
1720	132072	LTE Band66	ANT0	10	23.7	QPSK	1	0	Left	Tilt	1:1	0.588	1.13	26.5	
1745	132322	LTE Band66	ANT1	10	23.7	QPSK	1	24	Right	Cheek	1:1	0.220	1.13	30.8	28.5
1745	132322	LTE Band66	ANT1	10	23.7	QPSK	1	24	Right	Tilt	1:1	0.205	1.13	31.1	
1745	132322	LTE Band66	ANT1	10	23.7	QPSK	1	24	Left	Cheek	1:1	0.370	1.13	28.5	
1745	132322	LTE Band66	ANT1	10	23.7	QPSK	1	24	Left	Tilt	1:1	0.345	1.13	28.8	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	Right	Cheek	1:1.58	0.070	1.13	33.8	33.8
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	Right	Tilt	1:1.58	0.065	1.13	34.1	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	Left	Cheek	1:1.58	0.051	1.13	35.2	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	Left	Tilt	1:1.58	0.047	1.13	35.5	
2535	21100	LTE Band7	ANT1	10	23.2	QPSK	1	24	Right	Cheek	1:1	0.110	1.13	33.3	31.7
2535	21100	LTE Band7	ANT1	10	23.2	QPSK	1	24	Right	Tilt	1:1	0.103	1.13	33.6	
2535	21100	LTE Band7	ANT1	10	23.2	QPSK	1	24	Left	Cheek	1:1	0.160	1.13	31.7	
2535	21100	LTE Band7	ANT1	10	23.2	QPSK	1	24	Left	Tilt	1:1	0.149	1.13	32.0	

Table A-3 DSI = 0 PLimit Calculations-5G NR Sub6 Head SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	136100	NR Band n71	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Cheek	1:1	0.130	1.13	32.6	32.6
680.5	136100	NR Band n71	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Tilt	1:1	0.121	1.13	32.9	
680.5	136100	NR Band n71	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Cheek	1:1	0.120	1.13	32.9	
680.5	136100	NR Band n71	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Tilt	1:1	0.112	1.13	33.2	
829	165800	NR Band n5	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Cheek	1:1	0.200	1.13	31.2	31.2
829	165800	NR Band n5	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Tilt	1:1	0.191	1.13	31.4	
829	165800	NR Band n5	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Cheek	1:1	0.160	1.13	32.2	
829	165800	NR Band n5	ANT0	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Tilt	1:1	0.153	1.13	32.4	
1855	37100	NR Band n2	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Cheek	1:1	0.300	1.13	29.5	29.5
1855	37100	NR Band n2	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Tilt	1:1	0.286	1.13	29.7	
1855	37100	NR Band n2	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Cheek	1:1	0.290	1.13	29.6	
1855	37100	NR Band n2	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Tilt	1:1	0.277	1.13	29.8	
1720	344000	NR Band n66	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Cheek	1:1	0.250	1.13	30.3	28.7
1720	344000	NR Band n66	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Right	Tilt	1:1	0.239	1.13	30.5	
1720	344000	NR Band n66	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Cheek	1:1	0.360	1.13	28.7	
1720	344000	NR Band n66	ANT1	10	10.0	DFT-s-OFDM-QPSK	1	1	Left	Tilt	1:1	0.344	1.13	28.9	

Table A-4 DSI = 0 PLimit Calculations-2G/3G Body-Worn SAR

Frequency		Mode	Service	Conducted Power	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[dBm]				[W/kg]	[W/kg]	[dBm]	[dBm]
824.2	128	GSM850	GSM	33.4	back	15mm	1:8.3	0.034	1.13	39.5	39.5
1880	661	GSM1900	GSM	30.4	back	15mm	1:8.3	0.057	1.13	34.2	34.2
826.4	4132	UMTS850	RMC	23.2	back	15mm	1:1	0.250	1.13	29.8	29.8
1880	9400	UMTS1900	RMC	23.2	back	15mm	1:1	0.700	1.13	25.3	25.3

Table A-5 DSI = 0 PLimit Calculations-4G Body-Worn SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	back	15mm	1:1	0.246	1.13	29.8	29.8
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	back	15mm	1:1	0.250	1.13	29.8	29.8
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	back	15mm	1:1	0.280	1.13	29.8	29.8
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	back	15mm	1:1	0.280	1.13	29.8	29.8
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	back	15mm	1:1	0.670	1.13	26.0	26.0
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	back	15mm	1:1	0.370	1.13	28.5	28.5
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	49	back	15mm	1:1	0.534	1.13	27.0	27.0
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	49	back	15mm	1:1	0.419	1.13	28.0	28.0
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	back	15mm	1:1	0.510	1.13	27.2	27.2
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	back	15mm	1:1	0.400	1.13	28.2	28.2
3695	56690	LTE Band48	ANT0	10	23.7	QPSK	1	49	back	15mm	1:1.58	0.418	1.13	26.0	26.0
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	back	15mm	1:1	0.130	1.13	32.6	32.6

Table A-6 DSI = 1,2,3 PLimit Calculations-5G NR Sub6 Body-Worn SAR

Frequency		Mode	ANT0	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	back	15mm	1:1	0.248	1.13	29.8	29.8
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	back	15mm	1:1	0.240	1.13	30.4	30.4
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	15mm	1:1	0.370	1.13	28.5	28.5
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	15mm	1:1	0.420	1.13	28.0	28.0

Table A-7 DSI = 4 PLimit Calculations-2G/3G Hotspot SAR

Frequency		Mode	Service	Conducted Power	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[dBm]				[W/kg]	[W/kg]	[dBm]	[dBm]
824.2	128	GSM850	GPRS	33.4	back	10mm	1:4.15	0.072	1.13	39.2	39.2
824.2	128	GSM850	GPRS	33.4	front	10mm	1:4.15	0.055	1.13	40.3	
824.2	128	GSM850	GPRS	33.4	bottom	10mm	1:4.15	0.027	1.13	43.5	
824.2	128	GSM850	GPRS	33.4	right	10mm	1:4.15	0.055	1.13	40.3	
824.2	128	GSM850	GPRS	33.4	left	10mm	1:4.15	0.041	1.13	41.6	
1880	661	GSM1900	GPRS	30.4	back	10mm	1:4.15	0.190	1.13	32.0	31.7
1880	661	GSM1900	GPRS	30.4	front	10mm	1:4.15	0.104	1.13	34.6	
1880	661	GSM1900	GPRS	30.4	bottom	10mm	1:4.15	0.200	1.13	31.7	
1880	661	GSM1900	GPRS	30.4	right	10mm	1:4.15	0.002	1.13	50.9	
1880	661	GSM1900	GPRS	30.4	left	10mm	1:4.15	0.072	1.13	36.2	
826.4	4132	UMTS850	RMC	23.2	back	10mm	1:1	0.280	1.13	29.3	29.3
826.4	4132	UMTS850	RMC	23.2	front	10mm	1:1	0.220	1.13	30.3	
826.4	4132	UMTS850	RMC	23.2	bottom	10mm	1:1	0.100	1.13	33.7	
826.4	4132	UMTS850	RMC	23.2	right	10mm	1:1	0.210	1.13	30.5	
826.4	4132	UMTS850	RMC	23.2	left	10mm	1:1	0.150	1.13	32.0	
1880	9400	UMTS1900	RMC	23.2	back	10mm	1:1	2.000	1.13	20.7	20.7
1880	9400	UMTS1900	RMC	23.2	front	10mm	1:1	0.670	1.13	25.5	
1880	9400	UMTS1900	RMC	23.2	bottom	10mm	1:1	1.430	1.13	22.2	
1880	9400	UMTS1900	RMC	23.2	right	10mm	1:1	0.010	1.13	43.7	
1880	9400	UMTS1900	RMC	23.2	left	10mm	1:1	0.460	1.13	27.1	

Table A-8 DSI = 4 PLimit Calculations-4G Hotspot SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	back	10mm	1:1	0.268	1.13	29.4	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	front	10mm	1:1	0.210	1.13	30.5	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	bottom	10mm	1:1	0.046	1.13	37.1	29.4
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	right	10mm	1:1	0.110	1.13	33.3	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	left	10mm	1:1	0.170	1.13	31.4	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	back	10mm	1:1	0.270	1.13	29.4	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	front	10mm	1:1	0.220	1.13	30.3	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	bottom	10mm	1:1	0.050	1.13	36.7	29.4
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	right	10mm	1:1	0.130	1.13	32.6	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	left	10mm	1:1	0.200	1.13	30.7	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	back	10mm	1:1	0.300	1.13	29.5	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	front	10mm	1:1	0.260	1.13	30.1	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	bottom	10mm	1:1	0.090	1.13	34.7	29.5
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	right	10mm	1:1	0.170	1.13	31.9	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	left	10mm	1:1	0.260	1.13	30.1	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	back	10mm	1:1	0.320	1.13	29.2	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	front	10mm	1:1	0.140	1.13	32.8	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	bottom	10mm	1:1	0.060	1.13	36.4	29.2
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	right	10mm	1:1	0.050	1.13	37.2	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	left	10mm	1:1	0.090	1.13	34.7	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	back	10mm	1:1	1.990	1.13	21.2	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	front	10mm	1:1	0.600	1.13	26.4	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	bottom	10mm	1:1	1.420	1.13	22.7	21.2
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	right	10mm	1:1	0.260	1.13	30.1	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	left	10mm	1:1	0.420	1.13	28.0	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	back	10mm	1:1	0.580	1.13	26.6	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	front	10mm	1:1	0.590	1.13	26.5	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	bottom	10mm	1:1	0.590	1.13	26.5	26.5
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	right	10mm	1:1	0.240	1.13	30.4	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	left	10mm	1:1	0.001	1.13	54.2	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	back	10mm	1:1	0.984	1.13	24.3	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	front	10mm	1:1	0.450	1.13	27.7	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	bottom	10mm	1:1	0.691	1.13	25.8	24.3
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	right	10mm	1:1	0.126	1.13	33.2	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	left	10mm	1:1	0.199	1.13	31.2	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	back	10mm	1:1	0.597	1.13	26.5	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	front	10mm	1:1	0.691	1.13	25.8	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	bottom	10mm	1:1	0.325	1.13	29.1	25.8
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	right	10mm	1:1	0.262	1.13	30.1	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	left	10mm	1:1	0.001	1.13	54.0	
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	back	10mm	1:1	0.940	1.13	24.5	
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	front	10mm	1:1	0.430	1.13	27.9	
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	bottom	10mm	1:1	0.660	1.13	26.0	24.5
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	right	10mm	1:1	0.120	1.13	33.4	
1770	132572	LTE Band66	ANT0	10	23.7	QPSK	1	49	left	10mm	1:1	0.190	1.13	31.4	
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	back	10mm	1:1	0.570	1.13	26.7	
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	front	10mm	1:1	0.660	1.13	26.0	
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	bottom	10mm	1:1	0.310	1.13	29.3	26.0
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	right	10mm	1:1	0.250	1.13	30.3	
1720	132072	LTE Band66	ANT1	10	23.7	QPSK	1	0	left	10mm	1:1	0.001	1.13	54.2	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	back	10mm	1:1.58	0.905	1.13	22.7	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	front	10mm	1:1.58	0.215	1.13	28.9	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	bottom	10mm	1:1.58	0.373	1.13	26.5	22.7
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	right	10mm	1:1.58	0.335	1.13	27.0	
3695	56690	LTE Band48	ANT1	10	23.7	QPSK	1	49	left	10mm	1:1.58	0.001	1.13	54.2	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	back	10mm	1:1	0.23	1.13	30.1	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	front	10mm	1:1	0.16	1.13	31.7	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	bottom	10mm	1:1	0.22	1.13	30.3	29.3
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	right	10mm	1:1	0.18	1.13	31.2	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	left	10mm	1:1	0.28	1.13	29.3	

Table A-9 DSI = 4 PLimit Calculations-5G NR Sub6 Hotspot SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(1g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	back	10mm	1:1	0.290	1.13	29.1	29.1
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	front	10mm	1:1	0.090	1.13	34.2	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	bottom	10mm	1:1	0.043	1.13	37.4	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	right	10mm	1:1	0.054	1.13	36.4	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	left	10mm	1:1	0.065	1.13	35.6	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	back	10mm	1:1	0.280	1.13	29.8	29.5
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	front	10mm	1:1	0.110	1.13	33.8	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	10mm	1:1	0.050	1.13	37.2	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	right	10mm	1:1	0.050	1.13	37.2	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	left	10mm	1:1	0.070	1.13	35.8	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	10mm	1:1	0.580	1.13	26.6	26.6
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	front	10mm	1:1	0.580	1.13	26.6	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	10mm	1:1	0.570	1.13	26.7	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	right	10mm	1:1	0.240	1.13	30.4	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	left	10mm	1:1	0.001	1.13	54.2	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	10mm	1:1	0.610	1.13	26.4	25.8
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	front	10mm	1:1	0.690	1.13	25.8	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	10mm	1:1	0.330	1.13	29.0	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	right	10mm	1:1	0.280	1.13	29.8	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	left	10mm	1:1	0.001	1.13	54.2	

Table A-10 DSI = 0 PLimit Calculations-2G/3G Phablet SAR

Frequency		Mode	Service	Conducted Power	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[dBm]				[W/kg]	[W/kg]	[dBm]	[dBm]
836.6	190	GSM850	GPRS	33.4	back	0mm	1:4.15	0.19	2.83	38.9	38.9
836.6	190	GSM850	GPRS	33.4	front	0mm	1:4.15	0.14	2.83	40.4	
836.6	190	GSM850	GPRS	33.4	bottom	0mm	1:4.15	0.10	2.83	41.8	
836.6	190	GSM850	GPRS	33.4	right	0mm	1:4.15	0.03	2.83	46.8	
836.6	190	GSM850	GPRS	33.4	left	0mm	1:4.15	0.05	2.83	44.9	
1880	661	GSM1900	GPRS	30.4	back	0mm	1:4.15	0.30	2.83	34.0	33.5
1880	661	GSM1900	GPRS	30.4	front	0mm	1:4.15	0.28	2.83	34.3	
1880	661	GSM1900	GPRS	30.4	bottom	0mm	1:4.15	0.33	2.83	33.5	
1880	661	GSM1900	GPRS	30.4	right	0mm	1:4.15	0.03	2.83	44.0	
1880	661	GSM1900	GPRS	30.4	left	0mm	1:4.15	0.15	2.83	37.0	
826.4	4132	UMTS850	RMC	23.2	back	0mm	1:1	0.77	2.83	28.9	28.9
826.4	4132	UMTS850	RMC	23.2	front	0mm	1:1	0.63	2.83	29.7	
826.4	4132	UMTS850	RMC	23.2	bottom	0mm	1:1	0.35	2.83	32.3	
826.4	4132	UMTS850	RMC	23.2	right	0mm	1:1	0.14	2.83	36.3	
826.4	4132	UMTS850	RMC	23.2	left	0mm	1:1	0.20	2.83	34.7	
1880	9400	UMTS1900	RMC	23.2	back	2mm	1:1	2.15	2.83	24.4	24.4
1880	9400	UMTS1900	RMC	23.2	front	2mm	1:1	1.49	2.83	26.0	
1880	9400	UMTS1900	RMC	23.2	bottom	2mm	1:1	1.58	2.83	25.7	
1880	9400	UMTS1900	RMC	23.2	right	0mm	1:1	0.04	2.83	41.7	
1880	9400	UMTS1900	RMC	23.2	left	0mm	1:1	1.23	2.83	26.8	

Table A-11 DSI = 1,2,3 PLimit Calculations-2G/3G Phablet SAR

Frequency		Mode	Service	Conducted Power	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[dBm]				[W/kg]	[W/kg]	[dBm]	[dBm]
1880	9400	UMTS1900	RMC	23.2	back	0mm	1:1	4.45	2.83	21.2	21.2
1880	9400	UMTS1900	RMC	23.2	front	0mm	1:1	1.88	2.83	25.0	
1880	9400	UMTS1900	RMC	23.2	bottom	0mm	1:1	1.99	2.83	24.7	
1880	9400	UMTS1900	RMC	23.2	right	0mm	1:1	0.04	2.83	41.7	
1880	9400	UMTS1900	RMC	23.2	left	0mm	1:1	1.23	2.83	26.8	

Table A-12 DSI = 0 PLimit Calculations-4G Phablet SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	back	0mm	1:1	0.87	2.83	28.3	28.3
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	front	0mm	1:1	0.67	2.83	29.5	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	bottom	0mm	1:1	0.25	2.83	33.7	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	right	0mm	1:1	0.11	2.83	37.3	
680.5	133297	LTE Band71	ANT0	10	23.2	QPSK	1	24	left	0mm	1:1	0.13	2.83	36.6	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	back	0mm	1:1	0.95	2.83	27.9	27.9
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	front	0mm	1:1	0.76	2.83	28.9	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	bottom	0mm	1:1	0.30	2.83	32.9	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	right	0mm	1:1	0.15	2.83	36.0	
707.5	23095	LTE Band12	ANT0	10	23.2	QPSK	1	24	left	0mm	1:1	0.23	2.83	34.1	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	back	0mm	1:1	0.43	2.83	31.9	31.3
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	front	0mm	1:1	0.49	2.83	31.3	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	bottom	0mm	1:1	0.23	2.83	34.6	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.20	2.83	35.2	
782	23230	LTE Band13	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	0.32	2.83	33.2	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	back	0mm	1:1	0.44	2.83	31.8	31.8
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	front	0mm	1:1	0.34	2.83	32.9	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	bottom	0mm	1:1	0.20	2.83	35.2	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	right	0mm	1:1	0.07	2.83	39.8	
829	20450	LTE Band5	ANT0	10	23.7	QPSK	1	0	left	0mm	1:1	0.12	2.83	37.4	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	back	2mm	1:1	2.03	2.83	25.1	25.1
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	front	2mm	1:1	1.45	2.83	26.6	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	bottom	2mm	1:1	1.62	2.83	26.1	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.81	2.83	29.1	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.28	2.83	27.1	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	back	0mm	1:1	2.44	2.83	24.3	24.3
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	front	0mm	1:1	2.09	2.83	25.0	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	bottom	0mm	1:1	1.62	2.83	26.1	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	right	0mm	1:1	0.95	2.83	28.4	
1855	18650	LTE Band2	ANT1	10	23.7	QPSK	1	0	left	0mm	1:1	0.62	2.83	30.3	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	back	2mm	1:1	2.61	2.83	24.1	24.1
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	front	2mm	1:1	1.02	2.83	28.1	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	bottom	2mm	1:1	0.72	2.83	29.6	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.68	2.83	29.9	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.08	2.83	27.9	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	back	0mm	1:1	2.14	2.83	24.9	24.9
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	front	0mm	1:1	1.79	2.83	25.7	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	bottom	0mm	1:1	1.15	2.83	27.6	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	right	0mm	1:1	0.93	2.83	28.5	
1750	20350	LTE Band4	ANT1	10	23.7	QPSK	1	24	left	0mm	1:1	0.13	2.83	37.2	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	back	2mm	1:1	2.63	2.83	24.0	24.0
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	front	2mm	1:1	1.22	2.83	27.3	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	bottom	2mm	1:1	0.87	2.83	28.8	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.65	2.83	30.1	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.03	2.83	28.1	
1770	132572	LTE Band66	ANT1	10	23.7	QPSK	1	49	back	0mm	1:1	2.04	2.83	25.1	25.1
1770	132572	LTE Band66	ANT1	10	23.7	QPSK	1	49	front	0mm	1:1	1.71	2.83	25.9	
1770	132572	LTE Band66	ANT1	10	23.7	QPSK	1	49	bottom	0mm	1:1	1.10	2.83	27.8	
1770	132572	LTE Band66	ANT1	10	23.7	QPSK	1	49	right	0mm	1:1	0.89	2.83	28.7	
1770	132572	LTE Band66	ANT1	10	23.7	QPSK	1	49	left	0mm	1:1	0.12	2.83	37.4	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	back	2mm	1:1.58	1.11	2.83	25.8	26.1
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	front	2mm	1:1.58	0.57	2.83	28.7	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	bottom	2mm	1:1.58	0.72	2.83	27.7	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	right	0mm	1:1.58	0.58	2.83	28.6	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	left	0mm	1:1.58	0.20	2.83	33.2	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	back	0mm	1:1	1.18	2.83	27.0	27.0
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	front	0mm	1:1	0.90	2.83	28.2	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	bottom	0mm	1:1	0.75	2.83	29.0	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	right	0mm	1:1	0.25	2.83	33.7	
2535	21100	LTE Band7	ANT0	10	23.2	QPSK	1	24	left	0mm	1:1	0.66	2.83	29.5	

Table A-13 DSI = 1,2,3 PLimit Calculations-4G Phablet SAR(ANT0)

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	back	0mm	1:1	4.45	2.83	21.7	21.7
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	front	0mm	1:1	1.83	2.83	25.6	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	bottom	0mm	1:1	2.04	2.83	25.1	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.81	2.83	29.1	
1880	18900	LTE Band2	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.28	2.83	27.1	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	back	0mm	1:1	4.44	2.83	21.7	21.7
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	front	0mm	1:1	1.61	2.83	26.1	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	bottom	0mm	1:1	1.14	2.83	27.6	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.68	2.83	29.9	
1750	20350	LTE Band4	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.08	2.83	27.9	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	back	0mm	1:1	4.46	2.83	21.7	21.7
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	front	0mm	1:1	1.54	2.83	26.3	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	bottom	0mm	1:1	1.09	2.83	27.8	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	right	0mm	1:1	0.65	2.83	30.1	
1745	132322	LTE Band66	ANT0	10	23.7	QPSK	1	24	left	0mm	1:1	1.03	2.83	28.1	

Table A-14 DSI = 1,2,3 PLimit Calculations-4G Phablet SAR(ANT1)

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	back	0mm	1:1.58	2.85	2.83	21.7	21.7
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	front	0mm	1:1.58	0.72	2.83	27.7	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	bottom	0mm	1:1.58	0.91	2.83	26.7	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	right	0mm	1:1.58	0.23	2.83	32.6	
3601	55750	LTE Band48	ANT1	10	23.7	QPSK	1	24	left	0mm	1:1.58	0.65	2.83	28.1	

Table A-15 DSI = 0 PLimit Calculations-5G NR Sub6 Phablet SAR

Frequency		Mode	ANT	Bandwidth	Conducted Power	Modulation	RB Size	RB Offset	Test Position	Spacing	Duty Cycle	SAR(10g)	SAR design target	Plimit	Min Plimit
MHz	Ch.			[MHz]	[dBm]							[W/kg]	[W/kg]	[dBm]	[dBm]
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	back	0mm	1:1	0.76	2.83	28.9	28.9
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	front	0mm	1:1	0.51	2.83	30.6	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	bottom	0mm	1:1	0.33	2.83	32.5	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	right	0mm	1:1	0.11	2.83	37.3	
680.5	136100	NR Band n71	ANT0	10	23.2	DFT-s-OFDM-QPSK	1	1	left	0mm	1:1	0.14	2.83	36.3	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	back	0mm	1:1	0.80	2.83	29.2	29.2
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	front	0mm	1:1	0.56	2.83	30.7	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	0mm	1:1	0.36	2.83	32.7	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	right	0mm	1:1	0.12	2.83	37.4	
829	165800	NR Band n5	ANT0	10	23.7	DFT-s-OFDM-QPSK	1	1	left	0mm	1:1	0.18	2.83	35.7	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	0mm	1:1	2.38	2.83	24.5	24.5
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	front	0mm	1:1	2.08	2.83	25.0	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	0mm	1:1	1.44	2.83	26.6	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	right	0mm	1:1	0.85	2.83	28.9	
1855	371000	NR Band n2	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	left	0mm	1:1	0.00	2.83	58.2	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	back	0mm	1:1	2.26	2.83	24.7	24.7
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	front	0mm	1:1	2.04	2.83	25.1	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	bottom	0mm	1:1	1.02	2.83	28.1	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	right	0mm	1:1	1.04	2.83	28.0	
1720	344000	NR Band n66	ANT1	10	23.7	DFT-s-OFDM-QPSK	1	1	left	0mm	1:1	0.01	2.83	48.2	