Sony Corporation

Document number:
PY7-46195Y
Date:
2024/1/19

Revision:
A

FCC ID: PY7-46195Y

Part 0 SAR Characterization

1. SAR Characterization

1.1 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 10 represent different exposure scenarios.

Table 10
DSI and Corresponding Exposure Scenarios

Scenario	Description	SAR Test Cases
Free Space (DSI = 4)	- Max power	N/A
All surfaces and side edges (DSI =3)	- UMPC device for data mode	UMPC SAR per KDB Publication 941225 D07
Hotspot (DSI = 3)	- UMPC for Hotspot mode	UMPC SAR per KDB Publication 941225 D07
Extremity (DSI =3)	- UMPC with device form factor	UMPC SAR per KDB Publication 941225 D07

1.2 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 11).

Table 11
SAR_design_target Calculation

SAR_design_target			
$SAR\_design\_target < SAR\_regulatory\_limit \times 10^{\frac{-Total\ Uncertainty}{10}}$			
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	1.2 W/kg	*SAR_design_target*	3.0 W/kg

1.3 SAR Char

SAR test results corresponding to Pmax for each antenna/technology/band/DSI can be found in Part 1 SAR Report.

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 12.

Table 12
Limit Determination

Device State Index (DSI)	Plimit Determination Scenarios
4	Free space. SAR measurement is not applicable
3	Plimit is calculated based on the following scenarios: -1g Body-worn SAR measured at 5mm for Front, Bottom, Top, Right and Left surfaces and 0mm for Back surface - 10g Extremity SAR measured at 0mm for Bottom surface

Table 13 : SAR Characterizations

(1) FreeSpace(DSI=4) : Power table #4

Band	Antenna	**P Limit* (dBm)**	**Pmax* (dBm)**
LTE B25/2	Main	40.0	24.0
LTE B66/4	Main	40.0	24.0
LTE B5	Main	40.0	24.0
LTE B12/17	Main	40.0	24.0
LTE B13	Main	40.0	24.0
LTE B30	Main	40.0	22.0
LTE B41	Main	40.0	22.0
LTE B48	Main	40.0	19.0
LTE B71	Main	40.0	24.0
5GNR n25/n2	Main	40.0	24.0
5GNR n5	Main	40.0	24.3
5GNR n30	Main	40.0	21.5
5GNR n41	Main	40.0	24.0
5GNR n41 PC2	Main	40.0	23.0
5GNR n48	Main	40.0	21.0
5GNR n66	Main	40.0	24.0
5GNR n71	Main	40.0	24.0
5GNR n77	Main	40.0	24.3
5GNR n77 PC2	Main	40.0	23.5
LTE B5	Sub(ASDiv)	40.0	24.0
LTE B12/17	Sub(ASDiv)	40.0	24.0
LTE B13	Sub(ASDiv)	40.0	23.7
LTE B48	Sub-UHB(ASDiv)	40.0	19.0
5GNR n5	Sub(ASDiv)	40.0	23.8
5GNR n77	Sub-UHB(ASDiv)	40.0	22.8
5GNR n77 PC2	Sub-UHB(ASDiv)	40.0	22.0
LTE B2	Sub(ENDC)	40.0	23.0
LTE B30	Sub(ENDC)	40.0	22.0
LTE B66	Sub(ENDC)	40.0	23.0
LTE B48	Sub-UHB(ENDC)	40.0	19.0
NR n41 UL-MIMO	Main	40.0	19.5
NR n41 UL-MIMO	Sub	40.0	19.5
NR n48 UL-MIMO	Main	40.0	18.0
NR n48 UL-MIMO	Sub-UHB	40.0	18.0
NR n77 UL-MIMO	Main	40.0	19.8
NR n77 UL-MIMO	Sub-UHB	40.0	19.8
NR n41 SRS Tx-Switching 1T4R	Main	40.0	24.0
NR n41 SRS Tx-Switching 1T4R	Sub	40.0	22.4
NR n41 SRS Tx-Switching 1T4R	3rd	40.0	23.2
NR n41 SRS Tx-Switching 1T4R	4th	40.0	23.3
NR n41 SRS Tx-Switching 1T4R PC2	Main	40.0	23.0
NR n41 SRS Tx-Switching 1T4R PC2	Sub	40.0	21.4
NR n41 SRS Tx-Switching 1T4R PC2	3rd	40.0	22.2
NR n41 SRS Tx-Switching 1T4R PC2	4th	40.0	22.3
NR n41 SRS Tx-Switching 2T4R	Main	40.0	19.5
NR n41 SRS Tx-Switching 2T4R	Sub	40.0	19.5
NR n41 SRS Tx-Switching 2T4R	3rd	40.0	18.7
NR n41 SRS Tx-Switching 2T4R	4th	40.0	17.7
NR n48 SRS Tx-Switching 2T4R	Main	40.0	18.0
NR n48 SRS Tx-Switching 2T4R	Sub-UHB	40.0	18.0
NR n48 SRS Tx-Switching 2T4R	3rd	40.0	16.8
NR n48 SRS Tx-Switching 2T4R	4th	40.0	16.2
NR n77 SRS Tx-Switching 1T4R	Main	40.0	24.3
NR n77 SRS Tx-Switching 1T4R	3rd	40.0	22.0
NR n77 SRS Tx-Switching 1T4R	4th	40.0	22.2
NR n77 SRS Tx-Switching 1T4R	Sub-UHB	40.0	22.8
NR n77 SRS Tx-Switching 1T4R PC2	Main	40.0	23.5
NR n77 SRS Tx-Switching 1T4R PC2	3rd	40.0	21.2
NR n77 SRS Tx-Switching 1T4R PC2	4th	40.0	21.4
NR n77 SRS Tx-Switching 1T4R PC2	Sub-UHB	40.0	22.0
NR n77 SRS Tx-Switching 2T4R	Main	40.0	19.8
NR n77 SRS Tx-Switching 2T4R	3rd	40.0	17.5
NR n77 SRS Tx-Switching 2T4R	4th	40.0	16.9
NR n77 SRS Tx-Switching 2T4R	Sub-UHB	40.0	19.8

* Frame averaged power

** Meshed cells are work with time averaging

(2) Body-Worn, Hotspot(DSI=3) : Power table #3

Band	Antenna	Test Distance (mm)	Measured Power* (dBm)	Measured 1g SAR (W/kg)	Position	**Calculated upper power limit* (dBm)**	**P Limit* (dBm)**	**Pmax* (dBm)**
LTE B25/2	Main	0 or 5***	18.0	0.66	Front 5mm	20.60	18.0	24.0
LTE B66/4	Main	0 or 5***	18.5	0.56	Front 5mm	21.81	18.5	24.0
LTE B5	Main	0 or 5***	21.5	0.54	Back 0mm	24.97	21.5	24.0
LTE B12/17	Main	0 or 5***	22.0	0.48	Back 0mm	25.98	22.0	24.0
LTE B13	Main	0 or 5***	22.5	0.51	Back 0mm	26.22	22.5	24.0
LTE B30	Main	0 or 5***	16.5	0.53	Back 0mm	20.05	16.5	22.0
LTE B41	Main	0 or 5***	17.0	0.55	Front 5mm	20.39	17.0	22.0
LTE B48	Main	0 or 5***	17.0	0.70	Bottom 5mm	19.34	17.0	19.0
LTE B71	Main	0 or 5***	24.0	0.60	Back 0mm	27.01	24.0	24.0
5GNR n25/n2	Main	0 or 5***	18.0	0.65	Front 5mm	20.66	18.0	24.0
5GNR n5	Main	0 or 5***	21.0	0.51	Back 0mm	24.72	21.0	24.3
5GNR n30	Main	0 or 5***	16.5	0.54	Back 0mm	19.97	16.5	21.5
5GNR n41	Main	0 or 5***	18.0	0.68	Front 5mm	20.47	18.0	24.0
5GNR n41 PC2	Main	0 or 5***	18.0	0.68	Front 5mm	20.47	18.0	23.0
5GNR n48	Main	0 or 5***	18.0	0.85	Bottom 5mm	19.50	18.0	21.0
5GNR n66	Main	0 or 5***	19.0	0.62	Front 5mm	21.87	19.0	24.0
5GNR n71	Main	0 or 5***	24.0	0.61	Back 0mm	26.94	24.0	24.0
5GNR n77	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	24.3
5GNR n77 PC2	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	23.5
LTE B5	Sub(ASDiv)	0 or 5***	20.0	0.21	Back 0mm	27.57	20.0	24.0
LTE B12/17	Sub(ASDiv)	0 or 5***	21.0	0.26	Front 5mm	27.64	21.0	24.0
LTE B13	Sub(ASDiv)	0 or 5***	23.0	0.31	Top 5mm	28.88	23.0	23.7
LTE B48	Sub-UHB(ASDiv)	0 or 5***	16.5	0.50	Front 5mm	20.30	16.5	19.0
5GNR n5	Sub(ASDiv)	0 or 5***	20.0	0.23	Front 5mm	27.17	20.0	23.8
5GNR n77	Sub-UHB(ASDiv)	0 or 5***	15.5	0.51	Top 5mm	19.22	15.5	22.8
5GNR n77 PC2	Sub-UHB(ASDiv)	0 or 5***	15.5	0.51	Top 5mm	19.22	15.5	22.0
LTE B2	Sub(ENDC)	0 or 5***	16.0	0.22	Front 5mm	23.37	16.0	23.0
LTE B30	Sub(ENDC)	0 or 5***	13.5	0.23	Back 0mm	20.67	13.5	22.0
LTE B66	Sub(ENDC)	0 or 5***	15.5	0.28	Front 5mm	21.82	15.5	23.0
LTE B48	Sub-UHB(ENDC)	0 or 5***	16.5	0.50	Front 5mm	20.30	16.5	19.0
NR n41 UL-MIMO	Main	0 or 5***	15.5	0.38	Front 5mm	20.49	15.5	19.5
NR n41 UL-MIMO	Sub	0 or 5***	15.5	0.83	Top 5mm	17.10	15.5	19.5
NR n48 UL-MIMO	Main	0 or 5***	18.0	0.85	Right 5mm	19.50	18.0	18.0
NR n48 UL-MIMO	Sub-UHB	0 or 5***	18.0	0.46	Front 5mm	22.16	18.0	18.0
NR n77 UL-MIMO	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	19.8
NR n77 UL-MIMO	Sub-UHB	0 or 5***	16.5	0.64	Top 5mm	19.23	16.5	19.8
NR n41 SRS Tx-Switching 1T4R	Main	0 or 5***	18.0	0.68	Front 5mm	20.47	18.0	24.0
NR n41 SRS Tx-Switching 1T4R	Sub	0 or 5***	13.9	0.58	Top 5mm	17.06	13.9	22.4
NR n41 SRS Tx-Switching 1T4R	3rd	0 or 5***	15.2	0.25	Back 0mm	22.01	15.2	23.2
NR n41 SRS Tx-Switching 1T4R	4th	0 or 5***	13.3	0.13	Back 0mm	22.95	13.3	23.3
NR n41 SRS Tx-Switching 1T4R PC2	Main	0 or 5***	18.0	0.68	Front 5mm	20.47	18.0	23.0
NR n41 SRS Tx-Switching 1T4R PC2	Sub	0 or 5***	13.9	0.58	Top 5mm	17.06	13.9	21.4
NR n41 SRS Tx-Switching 1T4R PC2	3rd	0 or 5***	15.2	0.25	Back 0mm	22.01	15.2	22.2
NR n41 SRS Tx-Switching 1T4R PC2	4th	0 or 5***	13.3	0.13	Back 0mm	22.95	13.3	22.3
NR n41 SRS Tx-Switching 2T4R	Main	0 or 5***	15.5	0.38	Front 5mm	20.49	15.5	19.5
NR n41 SRS Tx-Switching 2T4R	Sub	0 or 5***	15.5	0.83	Top 5mm	17.10	15.5	19.5
NR n41 SRS Tx-Switching 2T4R	3rd	0 or 5***	14.7	0.22	Back 0mm	22.07	14.7	18.7
NR n41 SRS Tx-Switching 2T4R	4th	0 or 5***	12.2	0.11	Back 0mm	22.58	12.2	17.7
NR n48 SRS Tx-Switching 2T4R	Main	0 or 5***	18.0	0.85	Right 5mm	19.50	18.0	18.0
NR n48 SRS Tx-Switching 2T4R	Sub-UHB	0 or 5***	18.0	0.46	Front 5mm	22.16	18.0	18.0
NR n48 SRS Tx-Switching 2T4R	3rd	0 or 5***	8.8	0.31	Back 0mm	14.68	8.8	16.8
NR n48 SRS Tx-Switching 2T4R	4th	0 or 5***	11.7	0.33	Left 5mm	17.31	11.7	16.2
NR n77 SRS Tx-Switching 1T4R	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	24.3
NR n77 SRS Tx-Switching 1T4R	3rd	0 or 5***	12.7	0.18	Back 0mm	20.94	12.7	22.0
NR n77 SRS Tx-Switching 1T4R	4th	0 or 5***	10.4	0.24	Left 5mm	17.39	10.4	22.2
NR n77 SRS Tx-Switching 1T4R	Sub-UHB	0 or 5***	15.5	0.51	Top 5mm	19.22	15.5	22.8
NR n77 SRS Tx-Switching 1T4R PC2	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	23.5
NR n77 SRS Tx-Switching 1T4R PC2	3rd	0 or 5***	12.7	0.18	Back 0mm	20.94	12.7	21.2
NR n77 SRS Tx-Switching 1T4R PC2	4th	0 or 5***	10.4	0.24	Left 5mm	17.39	10.4	21.4
NR n77 SRS Tx-Switching 1T4R PC2	Sub-UHB	0 or 5***	15.5	0.51	Top 5mm	19.22	15.5	22.0
NR n77 SRS Tx-Switching 2T4R	Main	0 or 5***	16.5	0.86	Bottom 5mm	17.95	16.5	19.8
NR n77 SRS Tx-Switching 2T4R	3rd	0 or 5***	12.7	0.18	Back 0mm	20.94	12.7	17.5
NR n77 SRS Tx-Switching 2T4R	4th	0 or 5***	9.6	0.20	Left 5mm	17.38	9.6	16.9
NR n77 SRS Tx-Switching 2T4R	Sub-UHB	0 or 5***	16.5	0.64	Top 5mm	19.23	16.5	19.8

* Frame averaged power

** Meshed cells are work with time averaging

*** Front/Bottom/Top/Right/Left side: 5mm, Back:0mm

(3) Extremity(DSI=3) : Power table #3

Band	Antenna	Test Distance (mm)	Measured Power* (dBm)	Measured 10g SAR (W/kg)	Position	**Calculated upper power limit* (dBm)**	**P Limit* (dBm)**	**Pmax* (dBm)**
LTE B25/2	Main	0	18.0	0.15	Bottom	31.01	18.0	24.0
LTE B66/4	Main	0	18.5	0.16	Bottom	31.23	18.5	24.0
LTE B5	Main	0	21.5	0.32	Bottom	31.22	21.5	24.0
LTE B12/17	Main	0	22.0	0.42	Bottom	30.54	22.0	24.0
LTE B13	Main	0	22.5	0.47	Bottom	30.55	22.5	24.0
LTE B30	Main	0	16.5	0.12	Bottom	30.48	16.5	22.0
LTE B41	Main	0	17.0	0.18	Bottom	29.22	17.0	22.0
LTE B48	Main	0	17.0	0.70	Bottom	23.32	17.0	19.0
LTE B71	Main	0	24.0	0.57	Bottom	31.21	24.0	24.0
5GNR n25/n2	Main	0	18.0	0.14	Bottom	31.31	18.0	24.0
5GNR n5	Main	0	21.0	0.30	Bottom	31.00	21.0	24.3
5GNR n30	Main	0	16.5	0.12	Bottom	30.48	16.5	21.5
5GNR n41	Main	0	18.0	0.22	Bottom	29.35	18.0	24.0
5GNR n41 PC2	Main	0	18.0	0.22	Bottom	29.35	18.0	23.0
5GNR n48	Main	0	18.0	0.86	Bottom	23.43	18.0	21.0
5GNR n66	Main	0	19.0	0.19	Bottom	30.98	19.0	24.0
5GNR n71	Main	0	24.0	0.57	Bottom	31.21	24.0	24.0
5GNR n77	Main	0	16.5	0.80	Bottom	22.24	16.5	24.3
5GNR n77 PC2	Main	0	16.5	0.80	Bottom	22.24	16.5	23.5
LTE B5	Sub(ASDiv)	0	20.0	N/A	Bottom	N/A	20.0	24.0
LTE B12/17	Sub(ASDiv)	0	21.0	N/A	Bottom	N/A	21.0	24.0
LTE B13	Sub(ASDiv)	0	23.0	N/A	Bottom	N/A	23.0	23.7
LTE B48	Sub-UHB(ASDiv)	0	16.5	N/A	Bottom	N/A	16.5	19.0
5GNR n5	Sub(ASDiv)	0	20.0	N/A	Bottom	N/A	20.0	23.8
5GNR n77	Sub-UHB(ASDiv)	0	15.5	N/A	Bottom	N/A	15.5	22.8
5GNR n77 PC2	Sub-UHB(ASDiv)	0	15.5	N/A	Bottom	N/A	15.5	22.0
LTE B2	Sub(ENDC)	0	16.0	N/A	Bottom	N/A	16.0	23.0
LTE B30	Sub(ENDC)	0	13.5	N/A	Bottom	N/A	13.5	22.0
LTE B66	Sub(ENDC)	0	15.5	N/A	Bottom	N/A	15.5	23.0
LTE B48	Sub-UHB(ENDC)	0	16.5	N/A	Bottom	N/A	16.5	19.0
NR n41 UL-MIMO	Main	0	15.5	0.12	Bottom	29.48	15.5	19.5
NR n41 UL-MIMO	Sub	0	15.5	N/A	Bottom	N/A	15.5	19.5
NR n48 UL-MIMO	Main	0	18.0	0.86	Bottom	23.43	18.0	18.0
NR n48 UL-MIMO	Sub-UHB	0	18.0	N/A	Bottom	N/A	18.0	18.0
NR n77 UL-MIMO	Main	0	16.5	0.80	Bottom	22.24	16.5	19.8
NR n77 UL-MIMO	Sub-UHB	0	16.5	N/A	Bottom	N/A	16.5	19.8
NR n41 SRS Tx-Switching 1T4R	Main	0	18.0	0.22	Bottom	29.35	18.0	24.0
NR n41 SRS Tx-Switching 1T4R	Sub	0	13.9	N/A	Bottom	N/A	13.9	22.4
NR n41 SRS Tx-Switching 1T4R	3rd	0	15.2	N/A	Bottom	N/A	15.2	23.2
NR n41 SRS Tx-Switching 1T4R	4th	0	13.3	N/A	Bottom	N/A	13.3	23.3
NR n41 SRS Tx-Switching 1T4R PC2	Main	0	18.0	0.22	Bottom	29.35	18.0	23.0
NR n41 SRS Tx-Switching 1T4R PC2	Sub	0	13.9	N/A	Bottom	N/A	13.9	21.4
NR n41 SRS Tx-Switching 1T4R PC2	3rd	0	15.2	N/A	Bottom	N/A	15.2	22.2
NR n41 SRS Tx-Switching 1T4R PC2	4th	0	13.3	N/A	Bottom	N/A	13.3	22.3
NR n41 SRS Tx-Switching 2T4R	Main	0	15.5	0.12	Bottom	29.48	15.5	19.5
NR n41 SRS Tx-Switching 2T4R	Sub	0	15.5	N/A	Bottom	N/A	15.5	19.5
NR n41 SRS Tx-Switching 2T4R	3rd	0	14.7	N/A	Bottom	N/A	14.7	18.7
NR n41 SRS Tx-Switching 2T4R	4th	0	12.2	N/A	Bottom	N/A	12.2	17.7
NR n48 SRS Tx-Switching 2T4R	Main	0	18.0	0.86	Bottom	23.43	18.0	18.0
NR n48 SRS Tx-Switching 2T4R	Sub-UHB	0	18.0	N/A	Bottom	N/A	18.0	18.0
NR n48 SRS Tx-Switching 2T4R	3rd	0	8.8	N/A	Bottom	N/A	8.8	16.8
NR n48 SRS Tx-Switching 2T4R	4th	0	11.7	N/A	Bottom	N/A	11.7	16.2
NR n77 SRS Tx-Switching 1T4R	Main	0	16.5	0.80	Bottom	22.24	16.5	24.3
NR n77 SRS Tx-Switching 1T4R	3rd	0	12.7	N/A	Bottom	N/A	12.7	22.0
NR n77 SRS Tx-Switching 1T4R	4th	0	10.4	N/A	Bottom	N/A	10.4	22.2
NR n77 SRS Tx-Switching 1T4R	Sub-UHB	0	15.5	N/A	Bottom	N/A	15.5	22.8
NR n77 SRS Tx-Switching 1T4R PC2	Main	0	16.5	0.80	Bottom	22.24	16.5	23.5
NR n77 SRS Tx-Switching 1T4R PC2	3rd	0	12.7	N/A	Bottom	N/A	12.7	21.2
NR n77 SRS Tx-Switching 1T4R PC2	4th	0	10.4	N/A	Bottom	N/A	10.4	21.4
NR n77 SRS Tx-Switching 1T4R PC2	Sub-UHB	0	15.5	N/A	Bottom	N/A	15.5	22.0
NR n77 SRS Tx-Switching 2T4R	Main	0	16.5	0.80	Bottom	22.24	16.5	19.8
NR n77 SRS Tx-Switching 2T4R	3rd	0	12.7	N/A	Bottom	N/A	12.7	17.5
NR n77 SRS Tx-Switching 2T4R	4th	0	9.6	N/A	Bottom	N/A	9.6	16.9
NR n77 SRS Tx-Switching 2T4R	Sub-UHB	0	16.5	N/A	Bottom	N/A	16.5	19.8

* Frame averaged power

** Meshed cells are work with time averaging