



FCC SAR Compliance Test Report PART 0 (SAR Characterization)

Applicant: vivo Mobile Communication Co., Ltd
Product Name: Mobile Phone
Brand Name: vivo
Model Name: V2521
FCC ID: 2AUCY-V2521
Standard: FCC Part 2 (2.1093)
Test Date: 08/23/2025 – 09/15/2025
Issued Date: 09/15/2025
Test conclusion: PASS

Approved By:	Reviewed By:	Tested By:
Huanbin Wei	Xiaofeng Shan	Kun Shen
LAB Manager	Technical Director	Test Engineer

※ ※ Notice ※ ※

1. The laboratory has passed the accreditation by The America Association for Laboratory Accreditation(A2LA). The accreditation number is 7172.01.
2. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
3. The test report is invalid if there is any evidence of erasure and/or falsification.
4. The test report is only valid for the test samples.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. If any question about this report, please contact the laboratory.
7. We evaluated the uncertainty of the relevant test items. The U_{lab} (lab Uncertainty) is less than IEEE standard Uncertainty. Test uncertainty is not added to the test results.
8. The Product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
9. N/A: Not required/not applicable.

※ ※ Modified History ※ ※

REV.	DESCRIPTION	ISSUED DATE	AUTHOR	REMARK
Rev.1.0	Initial Test Report Release	09/15/2025	Kun Shen	

※ ※ Table of Contents ※ ※

1.INTRODUCTION	5
2.SAR CHARACTERIZATION	5
2.1.Worst-case SAR Determination	5
2.2.Usage Scenarios in SAR Evaluation	6
2.3.SARDESIGN TARGET	8

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 SUB6 bands. These WWAN modems enable Qualcomm's Smart Transmit feature to control and manage transmitting power, in real time, and to ensure the time-averaged RF exposure is always in compliance with the FCC requirement.

In this report, the EUT SAR is characterized for WWAN radios (2G/3G/4G/5G) 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 GHz radio.

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

The EUT supports WLAN/BT radio(s) as well, but the WLAN/BT modem is not enabled with Qualcomm's Smart Transmit feature.

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 IEC/IEEE 62209-1528, in general, for a smartphone, the SAR evaluation is required for the exposure scenarios shown in Figure 2-1.

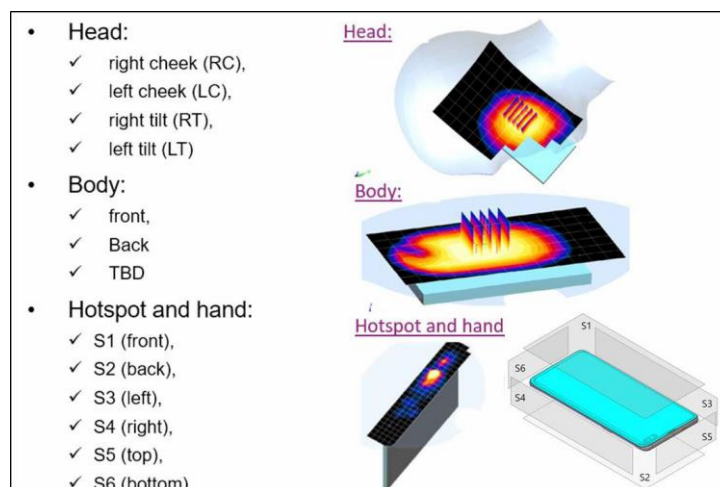


Figure 2-1: SAR evaluation for smartphone application

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 1-g SAR versus 10-g SAR exposure scenario, the worst-case is determined in term of exposure ratio (i.e., exposure level relative to the corresponding 1-g or 10-g 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 = $\max\{SAR_{head}, SAR_{body}\}$
- 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} .

- 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)

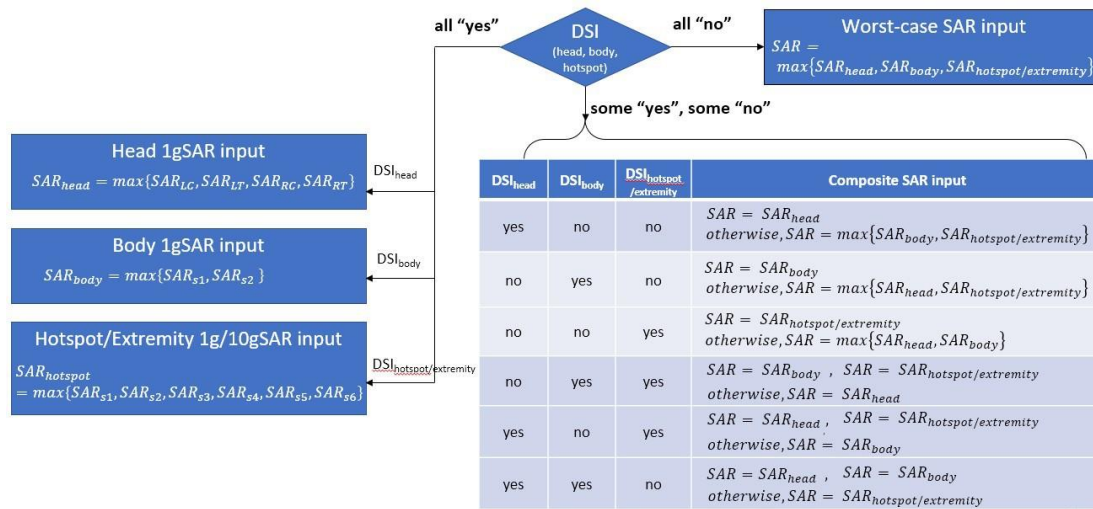


Figure 2-2: Worst-case SAR determination based on DSI

2.2. Usage Scenarios in SAR Evaluation

The EUT has a detection mechanism to distinguish Head and Body-worn conditions, which is represented using DSI2 and 4. These DSI states were used to determine the power limit for Smart Transmit to operate; where the exposure scenario is managed as same DSI state, all other exposures which cannot be distinguished, in this particular instance and based on the worst-case SAR determination criteria described in §2.1, the maximum SAR (or the minimum P_{limit}) among all remaining exposure scenarios (i.e., Body-worn 1-g SAR evaluation at a specified test separation distance, phablet extremity 1-g SAR evaluation at a specified test separation distance, and maximum RF tune-up power (P_{max}) supported by the device if SAR measurement is not performed for this tech/band/antenna because of meeting SAR test exclusion criteria) is used to determine the 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	DSI State	Description	SAR Definition	Worst-case SAR
Head	2	Device positioned next to head 1-g SAR evaluated in four positions (Right/Left Cheek/Tilt)	$SAR_{head} = \max(SAR_{RC}, SAR_{RT}, SAR_{LC}, SAR_{LT})$	SAR_{head}
Body-Worn & Product specific 10g SAR	4/5	Device stages include Body-Worn and Product specific 10g SAR. For Body-Worn, 1g-SAR is evaluated at 15mm test separation distance for front face, rear face side relative to the flat phantom. For Product specific 10g SAR, 10g-SAR is evaluated at 0mm test separation distance for front face, rear face, right side, left side, top side, and bottom side relative to the flat phantom.	$SAR_{Product\ specific\ 10g\ SAR} = \max(SAR_{front\ side}, SAR_{back\ side}, SAR_{left\ side}, SAR_{right\ side}, SAR_{top\ side}, SAR_{bottom\ side})$ $SAR_{Body} = \max(SAR_{front\ side}, SAR_{back\ side})$	$SAR_{body-worn}$ $SAR_{Product\ specific\ 10g\ SAR}$

Hotspot	10	Device stage is either Hotspot at 10mm 1g-SAR is evaluated for front face, rear face, right side, left side, topside and bottom side at 10mm test separation distance relative to the flat phantom	$SAR_{\text{Hotspot}} = \max(SAR_{\text{front side}},$ $SAR_{\text{back side}}, SAR_{\text{left side}}, SAR_{\text{top side}})$	SAR_{Hotspot}
---------	----	---	--	------------------------

2.3. SAR_{DESIGN TARGET}

The total device design and related uncertainties of the EUT is shown below (in dB), which includes TxAGC and device variation.

To account for the total uncertainty, SAR_{Design Target} needs to be:

$$SAR_{Design Target} < SAR_{Design Limit} * 10^{\frac{-total\ uncertainty}{10}}$$

For the FCC SAR requirement of 1.6 W/kg@1-g, the SAR_{Design Target} for EUT is determined as:

Total Uncertainty(dB)	SAR _{Design Target} (Head_1-g W/Kg)	SAR _{Design Target} (Body_1-g W/Kg)	SAR _{Design Target} (Hotspot _1-g W/Kg)	SAR _{Design Target} (Product specific 10g SAR _10-g W/Kg)
1.414	0.7	0.7	0.7	2.1

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

Table 2-2: Worst-case Measured SAR

Band	ANT	Part1 worst case Measured SAR@1g			
		Head SAR	Body SAR(15mm)	Hotspot (10mm)	Product specific 10g SAR (0mm)
GSM 850	31#	0.220	0.162	0.382	/
GSM 1900	13#	0.559	0.226	0.503	1.59
GSM 1900	31#	0.072	0.279	0.706	1.65
UMTS Band II	13#	0.835	0.588	0.382	2.28
UMTS Band II	31#	0.161	0.333	0.678	/
UMTS Band IV	13#	0.689	0.400	0.366	1.99
UMTS Band IV	31#	0.144	0.302	0.660	/
UMTS Band V	13#	0.620	0.154	0.288	/
UMTS Band V	31#	0.254	0.230	0.380	/
LTE Band 2	13#	0.787	0.460	0.438	1.66
LTE Band 2	31#	0.137	0.424	0.784	1.52
LTE Band 7	11#	0.734	0.588	0.371	1.57
LTE Band 7	13#	0.577	0.299	0.319	1.99
LTE Band 7	31#	0.242	0.185	0.340	/
LTE Band 12	13#	0.652	0.137	0.154	/
LTE Band 12	31#	0.146	0.216	0.236	/
LTE Band 13	13#	0.516	0.091	0.149	/
LTE Band 13	31#	0.100	0.127	0.163	/
LTE Band 26	13#	0.674	0.145	0.235	/
LTE Band 26	31#	0.215	0.203	0.329	/
LTE Band 38	11#	0.863	0.440	0.624	2.16
LTE Band 38	13#	0.610	0.222	0.378	1.89
LTE Band 41	11#	0.757	0.422	0.339	1.83
LTE Band 41	13#	0.568	0.386	0.402	2.29

LTE Band 41	31#	0.233	0.255	0.530	/
LTE Band 66	11#	0.524	0.240	0.193	/
LTE Band 66	13#	0.521	0.358	0.357	1.39
LTE Band 66	31#	0.100	0.267	0.691	/
n2	13#	0.695	0.460	0.391	1.86
n2	31#	0.172	0.373	0.798	/
n7	11#	0.959	0.717	0.459	2.19
n7	13#	0.509	0.325	0.180	/
n7	31#	0.270	0.230	0.370	/
n26	13#	0.704	0.164	0.263	/
n26	31#	0.265	0.260	0.422	/
n66	11#	0.763	0.247	0.282	/
n66	13#	0.744	0.404	0.450	1.45
n66	31#	0.116	0.328	0.772	/
n38	11#	0.830	0.763	0.423	2.41
n38	13#	0.618	0.441	0.310	2.08
n38	31#	0.302	0.329	0.888	/
n41	11#	0.881	0.682	0.413	2.22
n41	13#	0.808	0.412	0.347	1.65
n41	31#	0.299	0.507	0.673	2.21
n77	11#	0.784	0.777	0.508	1.86
n77	12#	0.600	0.229	0.308	/
n77	21#	0.676	0.357	0.346	/
n77	23#	0.567	0.425	0.511	/
n78	11#	0.631	0.664	0.426	1.77
n78	21#	0.570	0.257	0.274	/
n78	23#	0.516	0.326	0.379	/

Using the Measured SAR listed in Table 2-2, and following the procedure described in §3.1, the SAR Char of this EUT, i.e., P_{limit} corresponding to $\text{SAR}_{\text{Design Target}}$, is determined for each supported antenna/technology/band/DSI as:

1. For DSI = 2, P_{limit} is calculated based on 1-g SAR head exposure evaluation.
2. For DSI = 4/5, P_{limit} is calculated based on 1-g SAR body-worn evaluation at 15 mm or Product specific 10g SAR evaluation at 0 mm. $P_{\text{limit}} = \min\{P_{\text{limit}}$ corresponding to body worn 1gSAR or Product specific 10g SAR, P_{max} maximum RF tune up power for the case that the SAR test is excluded}

Table 2-3: SAR Characterization(actual EFS setting)

Band	ANT	Duty Cycle	DSI2	DSI4	DSI5	DSI10	Pmax
GSM 850 GPRS 1TS	31#	12.5%	33.5	33.5	33.5	33.5	33.5
GSM 1900 GPRS 1TS	13#	12.5%	26.5	30.5	30.5	30.5	30.5
GSM 1900 GPRS 1TS	31#	12.5%	30.5	30.5	30.5	30.5	30.5
UMTS Band II	13#	100%	16.5	24.5	20.5	18.0	24.5
UMTS Band II	31#	100%	24.5	22.5	22.5	21.0	24.5
UMTS Band IV	13#	100%	17.5	25.0	21.0	19.5	25.0
UMTS Band IV	31#	100%	25.0	22.5	22.5	22.0	25.0
UMTS Band V	13#	100%	22.0	25.0	25.0	24.0	25.0
UMTS Band V	31#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 2	13#	100%	16.2	24.7	20.7	19.2	24.7
LTE Band 2	31#	100%	24.7	22.2	22.2	20.7	24.7
LTE Band 7	13#	100%	18.5	24.5	20.5	19.0	24.5
LTE Band 7	31#	100%	24.5	22.5	22.5	22.5	24.5
LTE Band 7	11#	100%	18.5	24.0	19.0	17.5	24.5
LTE Band 12	13#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 12	31#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 13	13#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 13	31#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 26	13#	100%	22.5	25.0	25.0	24.0	25.0
LTE Band 26	31#	100%	25.0	25.0	25.0	25.0	25.0
LTE Band 38	13#	63.30%	20.3	24.8	21.8	20.3	24.8
LTE Band 38	11#	63.30%	20.3	24.8	20.8	20.8	24.8
LTE Band 41	13#	63.30%	19.0	26.5	20.0	18.5	26.5
LTE Band 41	31#	63.30%	26.5	22.5	22.5	22.5	26.5
LTE Band 41	11#	63.30%	20.0	26.5	19.5	17.5	26.5
LTE Band 66	13#	63.30%	17.5	24.5	21.5	20.0	24.5
LTE Band 66	31#	63.30%	24.5	22.5	22.5	22.5	24.5
LTE Band 66	11#	63.30%	22.5	24.5	21.0	19.5	24.5
n2	13#	100%	16.5	24.5	20.5	18.5	24.5
n2	31#	100%	24.5	23.0	23.0	22.0	24.5
n7	13#	100%	18.5	24.5	19.5	18.0	24.5
n7	31#	100%	24.5	22.5	22.5	21.5	24.5
n7	11#	100%	18.0	24.0	19.0	17.0	24.5
n26	13#	100%	22.0	25.0	25.0	24.0	25.0
n26	31#	100%	25.0	25.0	25.0	25.0	25.0
n66	13#	100%	17.5	24.5	21.0	20.0	24.5
n66	31#	100%	24.5	22.5	22.5	22.0	24.5
n66	11#	100%	23.0	24.5	22.5	21.0	24.5
n38	13#	100%	18.0	24.5	19.5	18.0	24.5
n38	11#	100%	18.0	24.5	18.5	16.5	24.5
n38	31#	100%	24.5	22.0	22.0	21.5	24.5
n41	13#	100%	19.0	26.5	20.0	18.5	26.5
n41	31#	100%	26.5	22.5	22.5	22.5	26.5

n41	11#	100%	20.0	26.5	19.5	17.5	26.5
n77	11#	100%	19.5	23.5	19.0	17.0	24.5
n77	12#	100%	16.0	20.5	20.5	19.0	25.0
n77	21#	100%	15.0	20.0	20.0	17.0	22.5
n77	23#	100%	18.5	22.5	22.5	20.0	22.5
n78	11#	100%	19.5	23.0	19.0	17.0	26.5
n78	21#	100%	15.5	20.5	20.5	17.5	25.0
n78	23#	100%	18.0	24.0	24.0	19.5	24.0

Note:

1) *Pmax is used for RF tune-up procedure. The maximum allowed output power is equal to P max + Total uncertainty.

2) The max allowed output is the P_{limit} +Total uncertainty, and if P_{limit} is higher than Pmax, the device output power will be Pmax instead.

----End of Test Report----