HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401

PART 0 SAR CHAR REPORT

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue:** Jul. 16, 2020 **Test Report No.:** HCT-SR-2004-FC006 **Test Site: HCT CO., LTD.**

FCC ID: **A3LSMT878U**

Report Type:	**Part 0 SAR Characterization**
Equipment Type:	**Portable handset**
Model Name:	**SM-T878U**

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.
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Tested By

Bong-kyun, Park
Test Engineer
SAR Team
Certification Division

Reviewed By

Yun-jeang, Heo
Technical Manager
SAR Team
Certification Division

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REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Jul. 16, 2020	Initial Release

This test results were applied only to the test methods required by the standard.

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.

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1. Test Location

1.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Telephone	031-645-6300
Fax.	031-645-6401

1.2 Test Facilities

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Korea	National Radio Research Agency (Designation No. KR0032)
	KOLAS (Testing No. KT197)

2. DEVICE UNDER TEST

2.1 General Information of the EUT

Device Wireless specification overview		
Band & Mode	**Operating Mode**	**Tx Frequency**
UMTS 850	Data	826.4 MHz ~ 846.6 MHz
UMTS 1700	Data	1 712.4 MHz ~ 1 752.6 MHz
UMTS 1900	Data	1 852.4 MHz ~ 1 907.6 MHz
LTE Band 2	Data	1 850.7 MHz ~ 1 909.3 MHz
LTE Band 4	Data	1 710.7 MHz ~ 1 754.3 MHz
LTE Band 5 (Cell)	Data	824.7 MHz ~ 848.3 MHz
LTE Band 7	Data	2 502.5 MHz ~ 2 567.5 MHz
LTE Band 12	Data	699.7 MHz ~ 715.3 MHz
LTE Band 13	Data	779.5 MHz ~ 784.5 MHz
LTE Band 14	Data	790.5 MHz ~ 795.5 MHz
LTE Band 25	Data	1 850.7 MHz ~ 1 914.3 MHz
LTE Band 26	Data	814.7 MHz ~ 848.3 MHz
LTE Band 30	Data	2 307.5 MHz ~ 2 312.5 MHz
LTE TDD Band 41	Data	2 498.5 MHz ~ 2 687.5 MHz
LTE Band 66 (AWS)	Data	1 710.7 MHz ~ 1 779.3 MHz
LTE Band 71	Data	665.5 MHz ~ 695.5 MHz
NR Band 2	Data	1 852.5 MHz ~ 1 907.5 MHz
NR Band 5	Data	826.5 MHz ~ 846.5 MHz
NR Band 25	Data	1852.5 MHz ~ 1912.5 MHz
NR Band 41	Data	2 506.02 MHz ~ 2 679.99 MHz
NR Band 66	Data	1 712.5 MHz ~ 1 777.5 MHz
NR Band 71	Data	665.5 MHz - 695.5 MHz
802.11b	Data	2 412 MHz ~ 2 462 MHz
U-NII-1	Data	5 180 MHz ~ 5 240 MHz
U-NII-2A	Data	5 260 MHz ~ 5 320 MHz
U-NII-2C	Data	5 500 MHz ~ 5 720 MHz
U-NII-3	Data	5 745 MHz ~ 5 825 MHz
Bluetooth	Data	2 402 MHz ~ 2 480 MHz
ANT+	Data	2 402 MHz ~ 2 480 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/NFC /MST technologies, but the output power of these modems is not controlled by the Smart Transmit algorithm

2.2 Time-Averaging for SAR

This device is enabled with Qualcomm® Smart Transmit algorithm to control and manage transmitting power in real time and to ensure that the time-averaged RF exposure from 2G/3G/4G/5G NR WWAN is in compliance with FCC requirements.
This Part 0 report shows SAR and Power Density characterization of WWAN radios for 2G/3G/4G and 5G Sub-6 NR respectively. Characterization is achieved by determining PLimit for 2G/3G/4G and 5G Sub-6 NR 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
The SAR characterization is denoted as SAR 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 Part 2 report

2.3 Nomenclature for Part 0 Report

Technology	Term	Description
2G/3G/4G/5G Sub 6 NR	*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

3. SAR MEASUREMENTS

3.1 SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body

$$SAR = \frac{d}{d\ t}\left(\frac{d\ U}{d\ m}\right)$$

Figure 1. SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \sigma\ E^2 / \rho$$

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/㎥)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

3.2 SAR Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

1.The SAR distribution at the exposed side of the head or body was measuredat a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device head and body interface andthe horizontal grid resolution was determined per FCC KDB Publication865664 D01v01r04 (See .Table 3-1) and IEEE 1528-2013.

2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.

3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (SeeTable 3-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with: the following procedure (see references or the DASY manual online for more details)

a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in
b. Table 3-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
c. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
d. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-easured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Frequency	Maximum Area Scan Resolution (mm) (Δxarea, Δyarea)	Maximum Zoom Scan Resolution (mm) (Δxzoom, Δyzoom)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			Δzzoom(n)	Δzzoom(1)*	Δzzoom(n>1)*	
≤2 GHz	≤15	≤8	≤5	≤4	≤1.5*Δzzoom(n-1)	≥30
2-3 GHz	≤12	≤5	≤5	≤4	≤1.5*Δzzoom(n-1)	≥30
3-4 GHz	≤12	≤5	≤4	≤3	≤1.5*Δzzoom(n-1)	≥28
4-5 GHz	≤10	≤4	≤3	≤2.5	≤1.5*Δzzoom(n-1)	≥25
5-6 GHz	≤10	≤4	≤2	≤2	≤1.5*Δzzoom(n-1)	≥22

Table 3-1

Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

4. SAR CHARAC TERIZATION

4.1 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 4-1 represent different exposure scenarios.

Scenario	Description	SAR Test Cases
Phablet (DSI = 0)	▪ Device is held with hand and grip sensor is not triggered ▪ Distance grip sensor not triggered	*Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04*
Phablet Grip (DSI=1)	▪ Device is held with hand and grip sensor is triggered ▪ Grip sensor triggered or earjack is active	*Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04*

Table 4-1 DSI and Corresponding Exposure Scenarios

4.2 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 4-2).

SAR_design_target			
$SAR\_design\_target < SAR\_regulatory\_limit \times 10^{-Total\ Uncertainty/10}$			
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	1.0 W/kg	*SAR_design_target*	2.5 W/kg

Table 4-2 *SAR_design_target* Calculations

4.3 SAR Characterization

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 4-3.

Device State Index (DSI)	*PLimit* Determination Scenarios
0	The worst-case SAR exposure is determined as maximum SAR normalized to the limit among: 1. Body SAR measured at 17, 8 and 23mm spacing for Rear, Right and Top respectively for Main Ant 1 Body SAR measured at 0 mm for Left surfaces 2. Body SAR measured at 4 and 6 mm spacing for Rear and Top respectively Main Ant 2 Body SAR measured at 0 mm for Left and Right surfaces
1	1. P_{limit} is calculated based on 1g Body SAR at 0 mm for Rear, Right and Top surfaces (Main Ant 1) 2. P_{limit} is calculated based on 1g Body SAR at 0 mm for Rear, Left, Right and Top surfaces (Main Ant 2)

Table 4-3 *PLimit* Determination

Note:

Main Ant 1) For DSI=0,*Plimit* is calculated by :

Plimit = min{ *Plimit* cooresponding to 1g Body SAR evaluation at 8 (Right), 17(Rear) and 23mm(Top) spacing,
Plimit cooresponding to 1g Body SAR evaluation at 0mm for Left surfaces}

Main Ant 2) For DSI=0,*Plimit* is calculated by :

Plimit = min{ *Plimit* cooresponding to 1g Body SAR evaluation at 4(Rear) and 6mm(Top) spacing,
Plimit cooresponding to 1g Body SAR evaluation at 0mm for Left and Right surfaces}

Table 4-4 SAR Characterization

Device State Index (DSI)	0	1	Maximum Tune up Power	Maximum Tune up Power
Exposure Scenario	Body SAR	Body SAR		
Averaging Volume Spacing	1g SAR 8,17,23 mm	1g SAR 0 mm		
Mode/Band	P_{Limit} (dBm)		Plimit (dBm)	Pmax (dBm)
UMTS Band 2	24.4	15.3	**13.5**	**23.5**
UMTS Band 4	25.5	14.6	**13.5**	**23.5**
UMTS Band 5	26.0	19.1	**17.5**	**23.5**
LTE Band 7	26.3	14.1	**12.0**	**22.0**
LTE Band 12	28.8	18.3	**16.0**	**24.8**
LTE Band 13	27.5	18.2	**16.0**	**24.0**
LTE Band 14	26.6	18.6	**16.0**	**24.5**
LTE Band 25	25.0	15.8	**14.0**	**24.0**
LTE Band 26	27.3	19.3	**16.0**	**24.5**
LTE Band 30	26.1	14.4	**12.5**	**22.3**
LTE Band 41	29.2	18.7	**14.0**	**24.5**
LTE Band 66	25.7	14.9	**14.0**	**24.0**
LTE Band 71	28.4	19.5	**14.0**	**24.8**
5G NR n5	28.3	19.3	**16.0**	**24.0**
5G NR n25	26.5	15.0	**14.0**	**24.0**
5G NR n41	24.1	16.2	**14.0**	**24.0**
5G NR n66	27.5	15.1	**14.0**	**24.0**
5G NR n71	30.8	18.9	**14.0**	**24.5**

Note:

1. when the Proximity sensor is triggered ,the *Plimit* for DSI=1 is set
2. When *Pmax* < *Plimit*, the DUT will operate at a power level up to *Pmax*.
3. When DSI=1, *Plimit((Tune-up)< Plimit(cal),* the DUT will operate at a power level up to *Plimit as tune-up document*
3. Maximum Tune up Power,P*max*. Is configured in NV settings in EUT to limit maximum transmitting power

5. Equipment List

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
SPEAG	SAM Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F01/ 5K08A1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F12/ 5K9GA1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/ 59CHA1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/ 59RAA1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F01/ 5K08A1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F12/ 5K9GA1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/ 59CHA1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/ 59RAA1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	01.13P 00679	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1206 0513	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	010963	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	011578	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1203 0309	N/A	N/A	N/A
SPEAG	DAE4	1417	02/26/2020	Annual	02/26/2021
SPEAG	DAE4	466	04/22/2020	Annual	04/22/2021
SPEAG	DAE4	869	09/19/2019	Annual	09/19/2020
SPEAG	DAE4	868	09/04/2019	Annual	09/04/2020
SPEAG	DAE4	648	05/25/2020	Annual	05/25/2021
SPEAG	E-Field Probe EX3DV4	3903	03/25/2020	Annual	03/25/2021
SPEAG	E-Field Probe EX3DV4	3968	09/27/2019	Annual	09/27/2020
SPEAG	E-Field Probe ES3DV3	3076	07/23/2019	Annual	07/23/2020
SPEAG	E-Field Probe ET3DV6	1630	02/26/2020	Annual	02/26/2021
SPEAG	E-Field Probe EX3DV4	7370	08/29/2019	Annual	08/29/2020
SPEAG	Dipole D750V3	1014	05/19/2020	Annual	05/19/2021
SPEAG	Dipole D835V2	441	08/23/2019	Annual	08/23/2020
SPEAG	Dipole D1800V2	2d015	09/19/2019	Annual	09/19/2020
SPEAG	Dipole D1900V2	5d061	01/21/2020	Annual	01/21/2021
SPEAG	Dipole D2300V2	1010	08/26/2019	Annual	08/26/2020
SPEAG	Dipole D2450V2	743	02/20/2020	Annual	02/20/2021
SPEAG	Dipole D2600V2	1106	09/19/2019	Annual	09/19/2020
SPEAG	Dipole D5GHzV2	1107	09/26/2019	Annual	09/26/2020
Agilent	Power Meter E4419B	MY41291386	10/07/2019	Annual	10/07/2020
Agilent	Power Meter N1911A	MY45101406	09/10/2019	Annual	09/10/2020
Agilent	Power Sensor 8481A	SG1091286	10/07/2019	Annual	10/07/2020
Agilent	Power Sensor 8481A	MY41090873	10/07/2019	Annual	10/07/2020
Agilent	Power Sensor N1921A	MY55220026	09/06/2019	Annual	09/06/2020
SPEAG	DAKS 3.5	1038	03/24/2020	Annual	03/24/2021
H.P	Network Analyzer /8753ES	JP39240221	01/28/2020	Annual	01/28/2021
Agilent	WIRELESS COMMUNICATION E5515C	MY48361100	10/07/2019	Annual	10/07/2020
Agilent	WIRELESS COMMUNICATION E5515C	MY48360252	08/07/2019	Annual	08/07/2020
Agilent	WIRELESS COMMUNICATION E5515C	GB44051865	06/04/2019	Annual	06/04/2020
Agilent	WIRELESS COMMUNICATION E5515C	GB44051865	06/01/2020	Annual	06/01/2021

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
Agilent	Signal Generator N5182A	MY47070230	05/08/2019	Annual	05/08/2020
Agilent	Signal Generator N5182A	MY47070230	05/06/2020	Annual	05/06/2021
Agilent	11636B/Power Divider	58698	02/28/2020	Annual	02/28/2021
TESTO	175-H1/Thermometer	40331936309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331939309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331915309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331922309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331949309	01/29/2020	Annual	01/29/2021
EMPOWER	RF Power Amplifier	1084	07/23/2019	Annual	07/23/2020
EMPOWER	RF Power Amplifier	1011	10/08/2019	Annual	10/08/2020
MICRO LAB	LP Filter / LA-15N	10453	10/07/2019	Annual	10/07/2020
MICRO LAB	LP Filter / LA-30N	-	10/07/2019	Annual	10/07/2020
MICRO LAB	LP Filter / LA-60N	32011	10/07/2019	Annual	10/07/2020
Agilent	Attenuator (3dB) 8693B	MY39260298	09/18/2019	Annual	09/18/2020
HP	Attenuator (20dB) 8493C	09271	09/18/2019	Annual	09/18/2020
Agilent	Directional Bridge	3140A03878	06/12/2019	Annual	06/12/2020
Agilent	Directional Bridge	3140A03878	06/08/2020	Annual	06/08/2021
Agilent	MXA Signal Analyzer N9020A	MY50510407	10/29/2019	Annual	10/29/2020
HP	Dual Directional Coupler	16072	10/07/2019	Annual	10/07/2020
Anritsu	Radio Communication Tester MT8820C	6201074225	03/02/2020	Annual	03/02/2021
Anritsu	Radio Communication Tester MT8820C	6200695605	05/06/2020	Annual	05/06/2021
Anritsu	Radio Communication Tester MT8820C	6200628628	09/20/2019	Annual	09/20/2020
Anritsu	Radio Communication Tester MT8821C	6201502997	08/09/2019	Annual	08/09/2020
Anritsu	Radio Communication Tester MT8821C	6262044720	01/06/2020	Annual	01/06/2021
Anritsu Corp	Radio Communication Tester MT8821C	6201588559	02/11/2020	Annual	02/11/2021
Anritsu	Radio Communication Tester MT8821C	6261849028	2020/03/03	Annual	2021/03/03
Anritsu	Radio Communication Test Station MT8000A	6262036812	01/06/2020	Annual	01/06/2021
Keysight	UXM 5G Wireless Test Set E7515B	MY60102101	2020/05/29	Annual	2021/05/29
R&S	Bluetooth CBT	100272	03/02/2020	Annual	03/02/2021

* The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

6. Measurement Uncertainty

The measured SAR was <1.5 W/Kg for 1g SAR and <3.75 W/Kg For 10g SAR for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

Appendix A: SAR Test Results For Plimit CALCULATIONS

Table A-10 DSI = 0 *PLimit* Calculations - – 2G/3G Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS										
Frequency		Mode		Conducted Power	Test Position	Distance	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(dBm)		(mm)		(W/kg)	(dBm)	(dBm)
836.6	4183	UMTS 850	RMC	23.71	Rear	17	1:1	0.594	26.0	26.0
836.6	4183	UMTS 850	RMC	23.71	Top	23	1:1	0.357	28.2	
836.6	4183	UMTS 850	RMC	23.71	Right	8	1:1	0.141	32.2	
836.6	4183	UMTS 850	RMC	23.71	Left	0	1:1	0.121	32.9	
1732.4	1412	UMTS 1700	RMC	23.80	Rear	17	1:1	0.642	25.7	25.5
1732.4	1412	UMTS 1700	RMC	23.80	Top	23	1:1	0.681	25.5	
1732.4	1412	UMTS 1700	RMC	23.80	Right	8	1:1	0.160	31.8	
1732.4	1412	UMTS 1700	RMC	23.80	Left	0	1:1	0.113	33.3	
1 880	9400	UMTS 1900	RMC	23.59	Rear	17	1:1	0.787	24.6	24.4
1 880	9400	UMTS 1900	RMC	23.59	Top	23	1:1	0.829	24.4	
1 880	9400	UMTS 1900	RMC	23.59	Right	8	1:1	0.238	29.8	
1 880	9400	UMTS 1900	RMC	23.59	Left	0	1:1	0.197	30.6	

Table A-11 DSI = 0 *PLimit* Calculations - – 4G Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS														
Frequency		Mode		Band width	Conducted Power	Test Position	Distance	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(MHz)	(dBm)		(mm)	(dBm)				(W/kg)	(dBm)	(dBm)
2510	20850	LTE Band 7	Mid	20	21.95	Rear	17	0	1	49	1:1	0.225	28.4	26.3
2510	20850	LTE Band 7	Mid	20	21.95	Top	23	0	1	49	1:1	0.370	26.3	
2510	20850	LTE Band 7	Mid	20	21.95	Right	8	0	1	49	1:1	0.135	30.6	
2510	20850	LTE Band 7	Mid	20	21.95	Left	0	0	1	49	1:1	0.200	28.9	
707.5	23095	LTE Band 12	Mid	10	24.87	Rear	17	0	1	0	1:1	0.409	28.8	28.8
707.5	23095	LTE Band 12	Mid	10	24.87	Top	23	0	1	0	1:1	0.224	31.4	
707.5	23095	LTE Band 12	Mid	10	24.87	Right	8	0	1	0	1:1	0.100	34.9	
707.5	23095	LTE Band 12	Mid	10	24.87	Left	0	0	1	0	1:1	0.144	33.3	
782	23230	LTE Band 13	Mid	10	24.17	Rear	17	0	1	49	1:1	0.462	27.5	27.5
782	23230	LTE Band 13	Mid	10	24.17	Top	23	0	1	49	1:1	0.350	28.7	
782	23230	LTE Band 13	Mid	10	24.17	Right	8	0	1	49	1:1	0.092	34.5	
782	23230	LTE Band 13	Mid	10	24.17	Left	0	0	1	49	1:1	0.116	33.5	
793	23330	LTE Band 14	Mid	10	24.20	Rear	17	0	1	0	1:1	0.580	26.6	26.6
793	23330	LTE Band 14	Mid	10	24.20	Top	23	0	1	0	1:1	0.378	28.4	
793	23330	LTE Band 14	Mid	10	24.20	Right	8	0	1	0	1:1	0.124	33.3	
793	23330	LTE Band 14	Mid	10	24.20	Left	0	0	1	0	1:1	0.135	32.9	
1905	26590	LTE Band 25	High	20	24.18	Rear	17	0	1	49	1:1	0.789	25.2	25.0
1905	26590	LTE Band 25	High	20	24.18	Top	23	0	1	49	1:1	0.835	25.0	
1905	26590	LTE Band 25	High	20	24.18	Right	8	0	1	49	1:1	0.240	30.4	
1905	26590	LTE Band 25	High	20	24.18	Left	0	0	1	49	1:1	0.114	33.6	
831.5	26865	LTE Band 26	Mid	15	24.25	Rear	17	0	1	0	1:1	0.498	27.3	27.3
831.5	26865	LTE Band 26	Mid	15	24.25	Top	23	0	1	0	1:1	0.357	28.7	
831.5	26865	LTE Band 26	Mid	15	24.25	Right	8	0	1	0	1:1	0.133	33.0	
831.5	26865	LTE Band 26	Mid	15	24.25	Left	0	0	1	0	1:1	0.147	32.6	
2310	27710	LTE Band 30	Mid	10	22.49	Rear	17	0	1	0	1:1	0.365	26.9	26.1
2310	27710	LTE Band 30	Mid	10	22.49	Top	23	0	1	0	1:1	0.432	26.1	
2310	27710	LTE Band 30	Mid	10	22.49	Right	8	0	1	0	1:1	0.121	31.7	
2310	27710	LTE Band 30	Mid	10	22.49	Left	0	0	1	0	1:1	0.344	27.1	
2593	40620	LTE Band 41	Mid	20	24.71	Rear	17	0	1	49	1:1.58	0.262	30.5	29.2
2593	40620	LTE Band 41	Mid	20	24.71	Top	23	0	1	49	1:1.58	0.356	29.2	
2593	40620	LTE Band 41	Mid	20	24.71	Right	8	0	1	49	1:1.58	0.154	32.8	
2593	40620	LTE Band 41	Mid	20	24.71	Left	0	0	1	49	1:1.58	0.142	33.2	
1770	132572	LTE Band 66	High	20	24.03	Rear	17	0	1	0	1:1	0.681	25.7	25.7
1770	132572	LTE Band 66	High	20	24.03	Top	23	0	1	0	1:1	0.657	25.9	
1770	132572	LTE Band 66	High	20	24.03	Right	8	0	1	0	1:1	0.165	31.9	
1770	132572	LTE Band 66	High	20	24.03	Left	0	0	1	0	1:1	0.157	32.1	
683	133322	LTE Band 71	Mid	20	24.72	Rear	17	0	1	49	1:1	0.424	28.4	28.4
683	133322	LTE Band 71	Mid	20	24.72	Top	23	0	1	49	1:1	0.302	29.9	
683	133322	LTE Band 71	Mid	20	24.72	Right	8	0	1	49	1:1	0.106	34.5	
683	133322	LTE Band 71	Mid	20	24.72	Left	0	0	1	49	1:1	0.131	33.5	

Table A-11 DSI = 0 *PLimit* Calculations - – NR Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS															
Frequency		Mode		Band width	Conducted Power	Test Position		MPR	Spacing (mm)	RB Size	RB offset	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(MHz)	(dBm)			(dBm)					(W/kg)	(dBm)	(dBm)
836.5	167300	NR Band n5	Mid	20	24.51	Rear	DFT-s-OFDM QPSK	0	17	1	104	1:1	0.417	28.3	28.3
836.5	167300	NR Band n5	Mid	20	24.51	Top	DFT-s-OFDM QPSK	0	23	1	104	1:1	0.337	29.2	
836.5	167300	NR Band n5	Mid	20	24.51	Right	DFT-s-OFDM QPSK	0	8	1	104	1:1	0.115	33.9	
836.5	167300	NR Band n5	Mid	20	24.51	Left	DFT-s-OFDM QPSK	0	0	1	104	1:1	0.155	32.6	
1882.5	376500	NR Band n25	Mid	20	24.06	Rear	DFT-s-OFDM QPSK	0	17	1	1	1:1	0.569	26.5	26.5
1882.5	376500	NR Band n25	Mid	20	24.06	Top	DFT-s-OFDM QPSK	0	23	1	1	1:1	0.517	26.9	
1882.5	376500	NR Band n25	Mid	20	24.06	Right	DFT-s-OFDM QPSK	0	8	1	1	1:1	0.107	33.8	
1882.5	376500	NR Band n25	Mid	20	24.06	Left	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.080	35.0	
2592.99	518598	NR Band n41	Mid	20	24.00	Rear	DFT-s-OFDM QPSK	0	4	1	1	1:1	0.873	24.6	24.1
2592.99	518598	NR Band n41	Mid	20	24.00	Top	DFT-s-OFDM QPSK	0	6	1	1	1:1	0.988	24.1	
2592.99	518598	NR Band n41	Mid	20	24.00	Right	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.00736	45.5	
2592.99	518598	NR Band n41	Mid	20	24.00	Left	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.402	28.0	
1745	349000	NR Band n66	Mid	20	24.02	Rear	DFT-s-OFDM QPSK	0	17	1	53	1:1	0.452	27.5	27.5
1745	349000	NR Band n66	Mid	20	24.02	Top	DFT-s-OFDM QPSK	0	23	1	53	1:1	0.350	28.6	
1745	349000	NR Band n66	Mid	20	24.02	Right	DFT-s-OFDM QPSK	0	8	1	53	1:1	0.059	36.3	
1745	349000	NR Band n66	Mid	20	24.02	Left	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.051	36.9	
680.5	136100	NR Band n71	Mid	20	24.60	Rear	DFT-s-OFDM QPSK	0	17	1	53	1:1	0.242	30.8	30.8
680.5	136100	NR Band n71	Mid	20	24.60	Top	DFT-s-OFDM QPSK	0	23	1	53	1:1	0.167	32.4	
680.5	136100	NR Band n71	Mid	20	24.60	Right	DFT-s-OFDM QPSK	0	8	1	53	1:1	0.063	36.6	
680.5	136100	NR Band n71	Mid	20	24.60	Left	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.135	33.3	

Table A-11 DSI = 1 P_{Limit} Calculations - – 2G/3G Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS										
Frequency		Mode		Conducted Power	Test Position	Distance	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(dBm)		(mm)		(W/kg)	(dBm)	(dBm)
836.6	4183	UMTS 850	RMC	17.70	Rear	0	1:1	0.702	19.2	19.1
836.6	4183	UMTS 850	RMC	17.70	Top	0	1:1	0.721	19.1	
836.6	4183	UMTS 850	RMC	17.70	Right	0	1:1	0.132	26.5	
1732.4	1412	UMTS 1700	RMC	13.73	Rear	0	1:1	0.812	14.6	14.6
1732.4	1412	UMTS 1700	RMC	13.73	Top	0	1:1	0.788	14.8	
1732.4	1412	UMTS 1700	RMC	13.73	Right	0	1:1	0.096	23.9	
1 880	9400	UMTS 1900	RMC	13.56	Rear	0	1:1	0.669	15.3	15.3
1 880	9400	UMTS 1900	RMC	13.56	Top	0	1:1	0.498	16.6	
1 880	9400	UMTS 1900	RMC	13.56	Right	0	1:1	0.159	21.5	

Table A-13 DSI = 1 *PLimit* Calculations - – 4G Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS														
Frequency		Mode		Band width	Conducted Power	Test Position	Distance	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(MHz)	(dBm)		(mm)	(dBm)				(W/kg)	(dBm)	(dBm)
2535	21100	LTE Band 7	Mid	20	11.98	Rear	0	0	1	49	1:1	0.471	15.2	14.1
2535	21100	LTE Band 7	Mid	20	11.98	Top	0	0	1	49	1:1	0.613	14.1	
2535	21100	LTE Band 7	Mid	20	11.98	Right	0	0	1	49	1:1	0.078	23.1	
707.5	23095	LTE Band 12	Mid	10	15.85	Rear	0	0	1	0	1:1	0.569	18.3	18.3
707.5	23095	LTE Band 12	Mid	10	15.85	Top	0	0	1	0	1:1	0.543	18.5	
707.5	23095	LTE Band 12	Mid	10	15.85	Right	0	0	1	0	1:1	0.038	30.1	
782	23230	LTE Band 13	Mid	10	16.09	Rear	0	0	1	49	1:1	0.534	18.8	18.2
782	23230	LTE Band 13	Mid	10	16.09	Top	0	0	1	49	1:1	0.612	18.2	
782	23230	LTE Band 13	Mid	10	16.09	Right	0	0	1	49	1:1	0.042	29.9	
793	23330	LTE Band 14	Mid	10	16.03	Rear	0	0	1	0	1:1	0.556	18.6	18.6
793	23330	LTE Band 14	Mid	10	16.03	Top	0	0	1	0	1:1	0.498	19.1	
793	23330	LTE Band 14	Mid	10	16.03	Right	0	0	1	0	1:1	0.057	28.5	
1882.5	26365	LTE Band 25	Mid	20	14.10	Rear	0	0	1	99	1:1	0.680	15.8	15.8
1882.5	26365	LTE Band 25	Mid	20	14.10	Top	0	0	1	99	1:1	0.498	17.1	
1882.5	26365	LTE Band 25	Mid	20	14.10	Right	0	0	1	99	1:1	0.144	22.5	
831.5	26865	LTE Band 26	Mid	15	15.94	Rear	0	0	1	74	1:1	0.387	20.1	19.3
831.5	26865	LTE Band 26	Mid	15	15.94	Top	0	0	1	74	1:1	0.461	19.3	
831.5	26865	LTE Band 26	Mid	15	15.94	Right	0	0	1	74	1:1	0.057	28.4	
2310	27710	LTE Band 30	Mid	10	12.69	Rear	0	0	1	0	1:1	0.549	15.3	14.4
2310	27710	LTE Band 30	Mid	10	12.69	Top	0	0	1	0	1:1	0.673	14.4	
2310	27710	LTE Band 30	Mid	10	12.69	Right	0	0	1	0	1:1	0.068	24.4	
2593	40620	LTE Band 41	Mid	20	14.33	Rear	0	0	1	49	1:1.58	0.608	16.5	16.3
2593	40620	LTE Band 41	Mid	20	14.33	Top	0	0	1	49	1:1.58	0.637	16.3	
2593	40620	LTE Band 41	Mid	20	14.33	Right	0	0	1	49	1:1.58	0.055	26.9	
1770	132572	LTE Band 66	High	20	14.09	Rear	0	0	1	0	1:1	0.810	14.9	14.9
1770	132572	LTE Band 66	High	20	14.09	Top	0	0	1	0	1:1	0.804	14.9	
1770	132572	LTE Band 66	High	20	14.09	Right	0	0	1	0	1:1	0.104	23.8	
683	133322	LTE Band 71	Mid	20	15.93	Rear	0	0	1	0	1:1	0.442	19.5	19.5
683	133322	LTE Band 71	Mid	20	15.93	Top	0	0	1	0	1:1	0.363	20.3	
683	133322	LTE Band 71	Mid	20	15.93	Right	0	0	1	0	1:1	0.048	29.1	

Table A-15 DSI = 1 *PLimit* Calculations - – NR Body SAR

For some bands/modes, a lower P_{Limit} was selected as a more conservative evaluation.

MEASUREMENT RESULTS															
Frequency		Mode		Band width	Conducted Power	Test Position		MPR	Spacing (mm)	RB Size	RB offset	Duty Cycle	Meas. SAR(1g)	Plimit	Minimum Plimit
MHz	Ch.			(MHz)	(dBm)			(dBm)					(W/kg)	(dBm)	(dBm)
836.5	167300	NR Band n5	Mid	20	16.74	Rear	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.485	19.9	19.3
836.5	167300	NR Band n5	Mid	20	16.74	Top	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.559	19.3	
836.5	167300	NR Band n5	Mid	20	16.74	Right	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.071	28.2	
1882.5	376500	NR Band n25	Mid	20	14.14	Rear	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.817	15.0	15.0
1882.5	376500	NR Band n25	Mid	20	14.14	Top	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.786	15.2	
1882.5	376500	NR Band n25	Mid	20	14.14	Right	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.052	27.0	
2592.99	518598	NR Band n41	Mid	20	13.56	Rear	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.303	18.7	18.7
2592.99	518598	NR Band n41	Mid	20	13.56	Top	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.268	19.3	
1745	349000	NR Band n66	Mid	20	14.21	Rear	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.811	15.1	15.1
1745	349000	NR Band n66	Mid	20	14.21	Top	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.780	15.3	
1745	349000	NR Band n66	Mid	20	14.21	Right	DFT-s-OFDM QPSK	0	0	1	1	1:1	0.105	24.0	
680.5	136100	NR Band n71	Mid	20	14.02	Rear	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.241	20.2	18.9
680.5	136100	NR Band n71	Mid	20	14.02	Top	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.327	18.9	
680.5	136100	NR Band n71	Mid	20	14.02	Right	DFT-s-OFDM QPSK	0	0	1	53	1:1	0.023	30.4	