

FCC SAR Test Report

APPLICANT : NOTHING TECHNOLOGY LIMITED
EQUIPMENT : Smart Phone
BRAND NAME : NOTHING
MODEL NAME : A059P
FCC ID : 2AZEQ-24111
STANDARD : FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

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People's Republic of China



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA490417-01	Rev. 01	Initial issue of report.	Jan. 03, 2025

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **NOTHING TECHNOLOGY LIMITED, Smart Phone, A059P**, are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	Highest Simultaneous Transmission
			1g SAR (W/kg)			1g SAR (W/kg)
Licensed	GSM	GSM850	1.03	0.81	0.61	1.59
		GSM1900	1.05	0.97	0.51	
	WCDMA	WCDMA II	0.98	0.94	0.50	
		WCDMA IV	1.03	0.97	0.77	
		WCDMA V	1.12	0.81	0.59	
	LTE	LTE Band 2	1.17	0.98	0.74	
		LTE Band 7	1.03	0.81	0.62	
		LTE Band 12/17	1.09	0.80	0.50	
		LTE Band 26/5	0.70	0.72	0.34	
		LTE Band 41/38	0.97	0.70	0.36	
		LTE Band 48	1.16	0.83	0.41	
	5G NR	LTE Band 66/4	1.17	0.92	0.89	
		FR1 n2	1.17	0.83	0.57	
		FR1 n5	0.72	0.80	0.41	
		FR1 n7	1.06	0.95	0.58	
		FR1 n12	0.77	0.87	0.59	
		FR1 n41/38	0.99	0.79	0.61	
		FR1 n48	1.17	0.98	0.45	
FR1 n66		1.05	0.98	0.86		
FR1 n77	1.14	0.98	0.50			
DTS	WLAN	2.4GHz WLAN	0.97	1.18	0.36	1.55
NII		5GHz WLAN	1.13	0.96	0.73	1.59
DSS	Bluetooth	2.4GHz Bluetooth	1.17	0.66	0.24	1.58
Highest 10g SAR Summary						
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)			Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	GSM	GSM850	1.12			3.84
		GSM1900	1.24			
	WCDMA	WCDMA II	2.91			
		WCDMA IV	2.88			
		WCDMA V	1.79			
	LTE	LTE Band 2	3.12			
		LTE Band 7	2.13			
		LTE Band 12/17	1.22			
		LTE Band 41/38	2.54			
		LTE Band 48	2.20			
		LTE Band 66/4	2.77			
	5G NR	FR1 n2	3.02			
		FR1 n5	1.59			
		FR1 n7	3.16			
FR1 n12		1.50				
FR1 n41/38		2.90				

		FR1 n48	3.11	
		FR1 n66	2.97	
NII	WLAN	5GHz WLAN	2.86	3.84
Date of Testing:			2024/12/7 ~ 2024/12/15	

Remark:

1. This device supports LTE B17/B5/B4/B38 and B12/B26/B66/B41. Since the supported frequency span for LTE B17/B5/B4/B38 falls completely within the supports frequency span for LTE B12/B26/B66/B41, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B12/B26/B66/B41.
2. This device supports 5GNR n38 and 5GNR n41. Since the supported frequency span for 5GNR n38 falls completely within the supports frequency span for 5GNR n41, both 5GNR bands have the same target power, and both 5GNR bands share the same transmission path; therefore, SAR was only assessed for 5GNR n41.
3. This is a variant report for A059P, the difference is that please refer to the A059P_Class II Permissive Change letter exhibit submitted. According to the difference, the following bands performed full SAR testing, all other bands only worst cases from original test report (Sporton Report Number FA490417) were verified for the differences.

Exposure Condition	Full Test Bands
Head	LTE Band 2 ant 4
Body worn	LTE Band 66 ant 2, 5G NR n66 ant 4, 5G NR n48 ant 6
Extremity	LTE Band 66 ant 2, 5G NR n66 ant 4, 5G NR n48 ant 6

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	NOTHING TECHNOLOGY LIMITED
Address	Bedford House, 21A John Street, London, United Kingdom WC1N 2BF

Manufacturer	
Company Name	NOTHING TECHNOLOGY LIMITED
Address	Bedford House, 21A John Street, London, United Kingdom WC1N 2BF

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Smart Phone
Brand Name	NOTHING
Model Name	A059P
FCC ID	2AZEQ-24111
IMEI Code	IMEI 1: 353458700017323 IMEI 2: 353458700017331
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n12: 699 MHz ~ 716 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n48: 3550 MHz ~ 3700 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3550 MHz ~ 3700 MHz, 3700 MHz ~ 3980 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA/HSUPA DC-HSDPA HSPA+ (16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac/ax VHT20/VHT40/HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE NFC: ASK
HW Version	24111 Pro
SW Version	Nothing OS 3.1
GSM / (E)GPRS Dual Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.

EUT Stage Identical Prototype

Remark:

1. This device supports VoIP in GPRS, EGPRS, WCDMA, LTE and 5GNR (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
3. This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
4. This device does not support DTM operation and supports GPRS/EGPRS mode up to multi-slot class 12.
5. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active).
6. The device implements the receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity) and the Qualcomm smart transmit will manage to ensure the power level not exceeding the associated power table. It uses the receiver to indicate whether the user is making a call in head scenario or not. The selection between head and body power levels is based on the receiver detection mechanism. The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to power table at appendix E.
7. For WLAN/BT when transmit simultaneously with each other, or when transmit simultaneously together with WWAN/BT antenna, the device power will be reduced power at head/hotspot/body-worn/extremity conditions, more details as following tables.

For WiFi antenna transmitter				
Trigger Conditions	Antenna No.	Exposure conditions		Power Reduction
Receiver on WIFI Only	Ant 5/6/5+6 Ant 6/7/6+7	Head Standalone	Head all Position	Power level 1
Receiver on WIFI 5G+BT	Ant 5/6/5+6 Ant 6/7/6+7	Head Simultaneous	Head all Position	Power level 2
Receiver on WWAN+WIFI 2.4G/5G	Ant 5/6/5+6 Ant 6/7/6+7	Head Simultaneous	Head all Position	Power level 3
Hotspot on WIFI Only	Ant 5/6/5+6 Ant 6/7/6+7	Hotspot Standalone	Hotspot all Position	Power level 1
Hotspot on WIFI 5G+BT	Ant 5/6/5+6 Ant 6/7/6+7	Hotspot Simultaneous	Hotspot all Position	Power level 2
Hotspot on WWAN+WIFI 2.4G/5G	Ant 5/6/5+6 Ant 6/7/6+7	Hotspot Simultaneous	Hotspot all Position	Power level 3
Hotspot on WWAN+WIFI5G + BT	Ant 5/6/5+6 Ant 6/7/6+7	Hotspot Simultaneous	Hotspot all Position	Power level 3
Receiver off WIFI Only	Ant 5/6/5+6 Ant 6/7/6+7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 1
Receiver off WIFI5G+BT	Ant 5/6/5+6 Ant 6/7/6+7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 2
Receiver off WWAN+WIFI 2.4G/5G	Ant 5/6/5+6 Ant 6/7/6+7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 2
Receiver off WWAN+WIFI5G + BT	Ant 5/6/5+6 Ant 6/7/6+7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 3
For BT antenna transmitter				
Trigger Conditions	Antenna No.	Exposure conditions		Power Reduction
Receiver on BT Only	Ant 6/7	Head Standalone	Head all Position	Power level 1
Receiver on WIFI 5G+BT	Ant 6/7	Head Simultaneous	Head all Position	Power level 2
Receiver on WWAN+BT	Ant 6/7	Head Simultaneous	Head all Position	Power level 3
Receiver on WWAN+WIFI5G + BT	Ant 6/7	Head Simultaneous	Head all Position	Power level 3
Hotspot on BT Only	Ant 6/7	Hotspot Standalone	Hotspot all Position	Power level 1
Hotspot on WIFI5G+BT	Ant 6/7	Hotspot Standalone	Hotspot all Position	Power level 1
Hotspot on WWAN+BT	Ant 6/7	Hotspot Standalone	Hotspot all Position	Power level 2
Hotspot on WWAN+WIFI5G + BT	Ant 6/7	Hotspot Standalone	Hotspot all Position	Power level 3
Receiver off BT Only	Ant 6/7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 1
Receiver off WIFI 5G+BT	Ant 6/7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 2
Receiver off WWAN+ BT	Ant 6/7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 2
Receiver off WWAN+WIFI5G + BT	Ant 6/7	Body-Worn/Extremity Standalone	Body-Worn/Extremity all Position	Power level 3

8. Bluetooth supports BR/EDR mode and don't supports BLE mode for ant7 only.
9. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
10. This device supports HPUE for 5GNR n41 with higher power, so power class 2 was chosen to perform full SAR testing and power class 2 SAR can represent power class 3 SAR.
11. This device has NFC function and the NFC SAR report will be separately submitted.
12. This device supports 5GNR FR1 bands as following table, including NSA mode and SA mode. NSA and SA mode performed SAR separately.

<5G NR>

Mode	Band	Duplex	SCS(KHz)	Bandwidths (BW)
NSA	n2	FDD	15	5, 10, 15, 20
	n5	FDD	15	5, 10, 15, 20
	n7	FDD	15	5, 10, 15, 20
	n66	FDD	15	5, 10, 15, 20, 30
	n41	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100
	n77	TDD	30	20, 30, 40, 60, 80, 100
SA	n2	FDD	15	5, 10, 15, 20
	n5	FDD	15	5, 10, 15, 20
	n7	FDD	15	5, 10, 15, 20
	n12	FDD	15	5, 10, 15
	n66	FDD	15	5, 10, 15, 20, 30
	n38	TDD	30	20, 30, 40
	n41	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100
	n48	TDD	30	20, 40
	n77	TDD	30	20, 30, 40, 60, 80, 100

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																																													
FCC ID	2AZEQ-24111																																																																												
Equipment Name	Smart Phone																																																																												
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz																																																																												
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz																																																																												
uplink modulations used	QPSK / 16QAM / 64QAM																																																																												
LTE Voice / Data requirements	Voice and Data																																																																												
LTE Release Version	R16																																																																												
CA Support	Supported, Uplink and Downlink																																																																												
LTE MPR permanently built-in by design	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr><tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr><tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr><tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr></table>							Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3								Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
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16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																																																						
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																																																						
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64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3																																																																						
256 QAM	≥ 1						≤ 5																																																																						
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)																																																																												
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																																												
Power reduction applied to satisfy SAR compliance	Yes, when operating in receiver detect/hotspot mode mechanism, head/ body-worn /hotspot/extremity will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to original report.																																																																												
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power verification please referred to original report.																																																																												
LTE Carrier Aggregation Additional Information	1. This device supports LTE Carrier Aggregation (CA) in the uplink for intra-band with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance. 2. This device supports maximum of 3 carriers in the downlink and 2 carriers in the uplink.																																																																												

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 12												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704				
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711				
LTE Band 17												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)					
L	23755		706.5		23780		709					
M	23790		710		23790		710					
H	23825		713.5		23800		711					

LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5		
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580	37875	2582.5		
M	38000	2595	38000	2595	38000	2595	38000	2595	38000	2595		
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610	38125	2607.5		
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506	39775	2508.5		
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5	40197	2550.7		
M	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593		
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5	41042	2635.2		
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680	41465	2677.5		
LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770
LTE Band 48												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560	55365	3562.5		
LM	55810	3607	55815	3607.5	55820	3608	55830	3609	55840	3610		
MH	56170	3643	56165	3642.5	56160	3642	56150	3641	56140	3640		
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690	56615	3687.5		

<For LTE Overlap Bands Description>
1) LTE Bands BW

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
LTE Band 4	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 66	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 5	Yes	Yes	Yes	Yes		
LTE Band 26	Yes	Yes	Yes	Yes	Yes	
LTE Band 12	Yes	Yes	Yes	Yes		
LTE Band 17			Yes	Yes		
LTE Band 38			Yes	Yes	Yes	Yes
LTE Band 41			Yes	Yes	Yes	Yes

2) LTE Bands tune up:

Band	Ant	Full	DSI5	DSI6	DSI7	DSI8	DSI9
		Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit
LTE Band 66/4	Ant 2	24.5	24.5	24.5	23	22	20
LTE Band 66/4	Ant 3	24.5	18.5	18	23	22	22
LTE Band 66/4	Ant 4	24.5	19	18	23	22	21
LTE Band 26/5	Ant 0	25	25	25	25	25	25
LTE Band 26/5	Ant 1	25	22.5	21.5	25	25	25
LTE Band 12/17	Ant 0	25	25	25	25	25	25
LTE Band 12/17	Ant 1	25	23.5	22.5	25	25	23.5
LTE Band 41/38	Ant 2	24.5	24.5	24.5	24.5	24.5	24
LTE Band 41/38	Ant 3	24.5	18.5	17.5	24.5	23.5	21
LTE Band 41/38	Ant 4	24.5	19	18.5	23	22	21

4.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
Operating Frequency Range of each 5G NR transmission band	5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n12: 699 MHz ~ 716 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n48: 3550 MHz ~ 3700 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3550 MHz ~ 3700 MHz, 3700 MHz ~ 3980 MHz
Channel Bandwidth	The detail please refers to section 4.1 5G NR FR1 bands table.
SCS	FDD: SCS15KHz, TDD: SCS30KHz
uplink modulations used	DFT-s-OFDM: Pi/2 BPSK/ QPSK / 16QAM / 64QAM / 256QAM CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM
A-MPR (Additional MPR) disabled for SAR Testing?	Yes
LTE Anchor Bands for n2	LTE B5/12
LTE Anchor Bands for n5	LTE B2/7/66/48
LTE Anchor Bands for n7	LTE B2/4/5/66
LTE Anchor Bands for n41	LTE B2/66
LTE Anchor Bands for n66	LTE B5/7/12
LTE Anchor Bands for n77	LTE B5/12/41

Transmission (H, M, L) channel numbers and frequencies in each 5G NR band								
NR Band 2								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860
M	376000	1880	376000	1880	376000	1880	376000	1880
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900

NR Band 5								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	165300	826.5	165800	829	166300	831.5	166800	834
M	167300	836.5	167300	836.5	167300	836.5	167300	836.5
H	169300	846.5	168800	844	168300	841.5	167800	839

NR Band 7								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510
M	507000	2535	507000	2535	507000	2535	507000	2535
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560

NR Band 12								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	140300	701.5	140800	704	141300	706.5	141800	709
M	141500	707.5	141500	707.5	141500	707.5	141500	707.5
H	142700	713.5	142200	711	141700	708.5	141200	706

	NR Band 66									
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720	345000	1725
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	353000	1765

NR Band 38						
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	516000	2580	517002	2585.01	518004	2590.02
M	519000	2595	519000	2595	519000	2595
H	522000	2610	520998	2604.99	519996	2599.98

NR Band 41																		
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	506202	2531.01	507204	2536.02	508200	2541	509202	2546.01
M	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99
H	535998	2679.99	534996	2674.98	534000	2670	531996	2659.98	531996	2659.98	531000	2655	529998	2649.99	528996	2644.98	528000	2640

NR Band 48				
	Bandwidth 20MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637334	3560.01	638000	3570
M	641666	3624.99	641666	3624.99
H	646000	3690	645332	3679.98

NR Band 77												
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647334	3710.01	647668	3715.02	648000	3720	648668	3730.02	649334	3740.01	650000	3750
M	656000	3840	656000	3840.00	656000	3840	656000	3840	656000	3840	656000	3840
H	664666	3969.99	664332	3964.98	664000	3960	663332	3949.98	662666	3939.99	662000	3930

For Part96

NR Band 77												
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637334	3560.01	637668	3565.02	638000	3570	638668	3580.02	639334	3590.01	640000	3600
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99
H	646000	3690	645666	3684.99	645332	3624.99	644666	3669.99	644000	3660	643332	3649.98

For <3450 MHz ~ 3550 MHz >

NR Band 77												
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630668	3460.02	631000	3465	631334	3470.01	632000	3480	632668	3490.02		
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98
H	636000	3540	635666	3534.99	635332	3529.98	634666	3519.99	634000	3510		

<For NR Overlap Bands Description>

1) NR Bands BW

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
SA	FR1 n38	TDD	30	20, 30, 40
	FR1 n41	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100

2) NR SA Bands Tune up:

Band	Ant	Full	DSI5	DSI6	DSI7	DSI8	DSI9
		Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit
n41/38_PC3	Ant 2	24.5	24.5	24.5	22	21	22
n41/38_PC3	Ant 3	24.5	17	16	22.5	21.5	19.5
n41/38_PC3	Ant 4	24.5	17.5	16.5	21.5	20.5	19.5

5. Smart Transmit feature for RF Exposure compliance

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter to ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency $\leq 6\text{GHz}$). To control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement.

Note that WLAN/BT operations are not enabled with Smart Transmit.

This report describes the procedures for the SAR char generation, and the parameters obtained from SAR characterization (referred to as SAR char, respectively) will be used as input for Smart Transmit. SAR char will be entered via the Embedded File System (EFS) version 20 to enable the Smart Transmit GEN1 Feature.

<Terminologies in this report>

P_{limit}	The time-averaged RF power which corresponds to SAR_design_target.
P_{max}	Maximum target power level
SAR_design_target:	The design target for SAR compliance. It should be less than regulatory SAR limit to account for all device design related uncertainty.
SAR char	P _{limit} for all the technologies/bands for all applicable DSI

<SAR Characterization>

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for $f < 6\text{GHz}$.

<SAR design target>

Item	Uncertainty dB (k=2)
Total uncertainty	1.0

To account for total uncertainty, SAR_design_target should be determined as:

$$SAR_{design_target} < SAR_{regulatory_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$



The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit, for each characterized technology and band.

Smart Transmit allows the device to transmit at higher power instantaneously, as high as Pmax, when needed, but enforces power limiting to maintain time-averaged transmit power to Plimit. Below table shows Plimit EFS settings and maximum tune up output power Pmax configured for this EUT for various transmit conditions (Device State Index DSI).

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

Band	Antenna	DSI5	DSI6	DSI7	DSI8	DSI9	Pmax*
		Head Standalone (Receive on)	Head Simultaneous (Receive on)	Extremity/Body worn Standalone (Receive off)	Extremity/Body worn Simultaneous (Receive off)	Hotspot	
GSM850	ANT 0	32.0	32.0	31.2	31.2	27.9	23.5
GSM850	ANT 1	21.5	20.5	27.7	27.7	21.5	23.5
GSM1900	ANT 2	33.9	33.9	27.8	27.8	19.5	20.5
GSM1900	ANT 3	17.0	16.5	29.2	29.2	23.0	20.5
GSM1900	ANT 4	18.0	17.5	28.1	28.1	21.8	20.5
WCDMA II	ANT 2	34.6	34.6	21.5	20.5	19.5	24.0
WCDMA II	ANT 3	16.5	15.5	22.0	21.0	20.5	24.0
WCDMA II	ANT 4	16.5	15.5	21.5	20.5	19.5	24.0
WCDMA IV	ANT 2	32.3	32.3	22.5	21.5	18.5	24.0
WCDMA IV	ANT 3	17.0	16.0	22.0	20.5	21.0	24.0
WCDMA IV	ANT 4	17.0	16.0	21.5	20.5	20.0	24.0
WCDMA V	ANT 0	30.7	30.7	30.4	30.4	26.9	24.0
WCDMA V	ANT 1	21.5	21.0	27.7	27.7	23.0	24.0
LTE Band 2	ANT 2	34.8	34.8	22.0	21.0	19.5	23.5
LTE Band 2	ANT 3	19.0	18.5	22.5	21.0	20.5	23.5
LTE Band 2	ANT 4	17.5	16.5	22.0	21.0	20.0	23.5
LTE Band 66/4	ANT 2	32.5	32.5	22.0	21.0	19.0	23.5
LTE Band 66/4	ANT 3	17.5	17.0	22.0	21.0	21.0	23.5
LTE Band 66/4	ANT 4	18.0	17.0	22.0	21.0	20.0	23.5
LTE Band 26/5	ANT 0	31.1	31.1	31.4	31.4	28.1	24.0
LTE Band 26/5	ANT 1	21.5	20.5	29.8	29.8	25.1	24.0
LTE Band 7	ANT 2	30.1	30.1	22.0	20.5	22.0	23.5
LTE Band 7	ANT 3	15.5	14.5	20.5	19.5	18.0	23.5
LTE Band 7	ANT 4	16.5	15.5	19.0	18.0	19.0	23.5
LTE Band 12/17	ANT 0	32.6	32.6	32.2	32.2	29.3	24.0
LTE Band 12/17	ANT 1	22.5	21.5	28.4	28.4	22.5	24.0
LTE Band 41/38	ANT 2	29.5	29.5	27.0	27.0	21.0	21.5
LTE Band 41/38	ANT 3	15.5	14.5	27.3	20.5	18.0	21.5
LTE Band 41/38	ANT 4	16.0	15.5	20.0	19.0	18.0	21.5
LTE Band 48	ANT 3	15.0	14.5	18.5	17.5	17.0	21.5
LTE Band 48	ANT 4	16.0	15.5	19.5	18.5	19.5	21.5
LTE Band 48	ANT 5	16.5	15.5	29.7	29.7	25.4	20.5
LTE Band 48	ANT 6	18.0	17.0	21.3	21.3	22.7	19.5
n2	ANT 2	33.9	33.9	21.0	20.0	19.0	23.5
n2	ANT 3	18.0	17.5	22.5	21.5	21.0	23.5
n2	ANT 4	17.0	16.0	22.0	21.0	19.0	23.5
n5	ANT 0	30.0	30.0	30.3	30.3	27.0	24.0
n5	ANT 1	22.5	22.0	28.1	28.1	23.0	24.0
n7	ANT 2	28.8	28.8	21.5	20.5	21.5	23.5
n7	ANT 3	15.0	14.5	21.0	20.0	19.5	23.5
n7	ANT 4	16.0	15.5	20.5	19.5	18.0	23.5
n12	ANT 0	31.2	31.2	30.8	30.8	28.0	24.0
n12	ANT 1	21.5	21.0	26.6	26.6	22.5	24.0
n66	ANT 2	32.4	32.4	22.5	21.5	19.5	23.5
n66	ANT 3	17.5	17.0	22.5	21.5	22.0	23.5

n66	ANT 4	17.5	17.0	22.0	21.0	21.0	23.5
n41/38_PC3	ANT 2	28.4	28.4	21.0	20.0	21.0	23.5
n41_PC2	ANT 2	28.4	28.4	21.0	20.0	21.0	24.5
n41/38_PC3	ANT 3	16.0	15.0	21.5	20.5	18.5	23.5
n41_PC2	ANT 3	16.0	15.0	21.5	20.5	18.5	24.5
n41/38_PC3	ANT 4	16.5	15.5	20.5	19.5	18.5	23.5
n41_PC2	ANT 4	16.5	15.5	20.5	19.5	18.5	24.5
n48	ANT 3	15.5	15.0	18.0	17.0	17.5	23.5
n48	ANT 4	16.0	15.5	19.5	18.5	20.0	23.5
n48	ANT 5	15.5	15.0	25.9	25.9	22.9	21.5
n48	ANT 6	16.0	15.0	20.0	19.0	18.5	21.5
n77	ANT 3	17.0	16.0	18.5	17.5	18.5	23.5
n77	ANT 4	16.5	16.0	20.0	19.0	20.0	23.5
n77	ANT 5	15.0	14.0	20.0	19.0	21.0	21.5
n77	ANT 6	15.5	15.0	18.0	17.0	17.5	22.5

Note:

1. * P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to P_{max} + total uncertainty.
2. **All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).
3. The max allowed output power is the P_{limit} + total uncertainty, and if P_{limit} is higher than P_{max} , the device output power will be P_{max} instead.

6. RF Exposure Limits

6.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

7. Specific Absorption Rate (SAR)

7.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

7.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

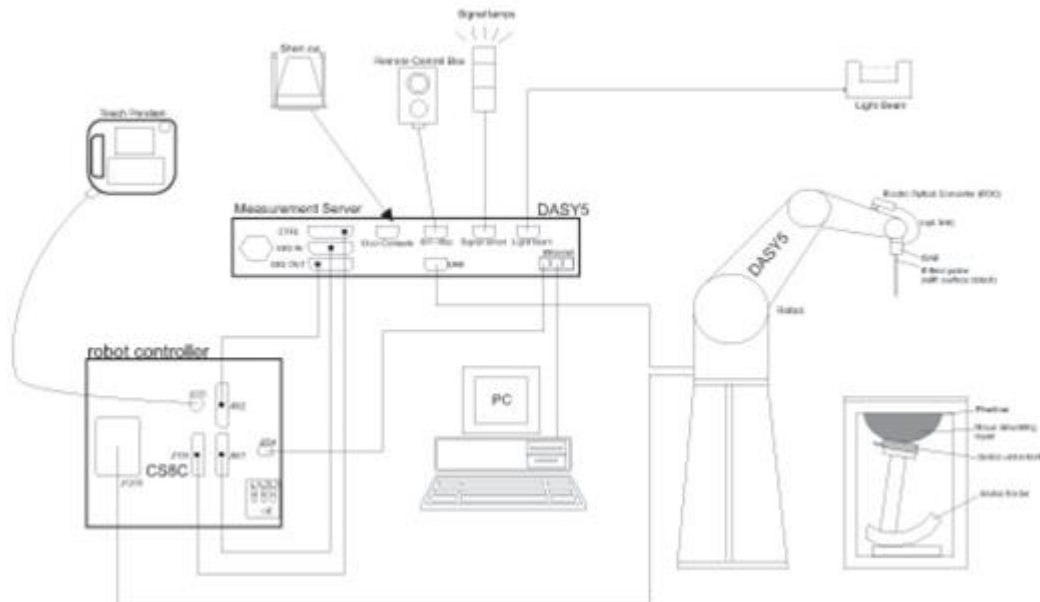
SAR is expressed in units of Watts per kilogram (W/kg)

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

8. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 or Win10 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – 10 GHz Linearity: ± 0.2 dB (30 MHz – 10 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

8.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

9.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

9.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

9.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4 Zoom Scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm *	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

9.5 Volume Scan Procedures

The volume scan is used to assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1099	Dec. 15, 2021	Dec. 13, 2024
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 15, 2024
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Oct. 15, 2024	Oct. 14, 2025
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 18, 2024
SPEAG	2450MHz System Validation Kit	D2450V2	924	Nov. 03, 2023	Nov. 02, 2026
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 20, 2021	Dec. 18, 2024
SPEAG	3500MHz System Validation Kit	D3500V2	1076	May 09, 2022	May 07, 2025
SPEAG	3700MHz System Validation Kit	D3700V2	1037	May 09, 2022	May 07, 2025
SPEAG	3900MHz System Validation Kit	D3900V2	1022	Aug. 18, 2022	Aug. 17, 2025
SPEAG	5000MHz System Validation Kit	D5GHzV2	1341	Dec. 13, 2021	Dec. 11, 2024
SPEAG	Data Acquisition Electronics	DAE4	1437	Mar. 14, 2024	Mar. 13, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7576	Oct. 10, 2024	Oct. 09, 2025
SPEAG	SAM Twin Phantom	QD 000 P40 CD	1671	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201341952	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Radio communication analyzer	MT8820C	6201563813	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Radio communication analyzer	MT8821C	6272416837	Apr. 08, 2024	Apr. 07, 2025
Anritsu	Radio communication analyzer	MT8821C	6272416846	Apr. 08, 2024	Apr. 07, 2025
Anritsu	Radio communication analyzer	MT8821C	6272416863	Apr. 08, 2024	Apr. 07, 2025
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 15, 2024	Oct. 14, 2025
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Feb. 19, 2024	Feb. 18, 2025
Agilent	Signal Generator	N5181A	MY50145381	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Power Sensor	MA2411B	1542004	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Power Meter	ML2495A	1339473	Dec. 28, 2023	Dec. 27, 2024
R&S	Power Sensor	NRP50S	101254	Apr. 08, 2024	Apr. 07, 2025
R&S	Power Sensor	NRP8S	109228	Apr. 08, 2024	Apr. 07, 2025
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 28, 2023	Dec. 27, 2024
R&S	Spectrum Analyzer	FSP7	100818	Jul. 04, 2024	Jul. 03, 2025
TES	Hygrometer	1310	200505600	Jul. 08, 2024	Jul. 07, 2025
Anymetre	Thermo-Hygrometer	JR593	2015030903	Jan. 02, 2024	Jan. 01, 2025
Anymetre	Thermo-Hygrometer	JR593	2015102801	Jan. 02, 2024	Jan. 01, 2025
SPEAG	Device Holder	N/A	N/A	N/A	N/A
AR	Amplifier	5S1G4	0333096	Note 1	
Mini-Circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
Jinkexinhua	Attenuator	10db-8G	N/A	Note 1	

Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

11. System Verification

11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.

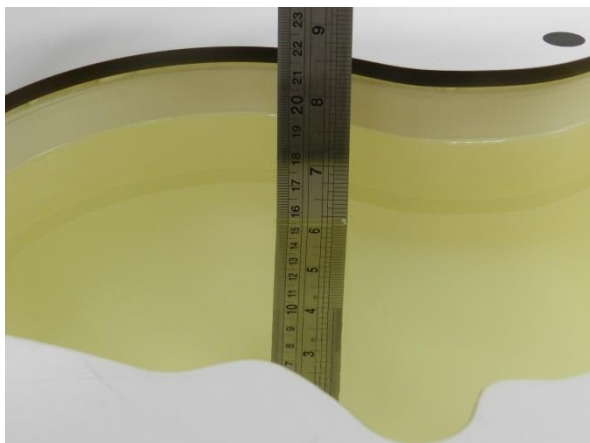


Fig 11.1 Photo of Liquid Height for Head SAR



Fig 11.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ε _r)	Conductivity Target (σ)	Permittivity Target (ε _r)	Delta (σ) (%)	Delta (ε _r) (%)	Limit (%)	Date
750	Head	22.4	0.904	41.768	0.89	41.90	1.57	-0.32	±5	2024/12/7
835	Head	22.7	0.934	41.564	0.90	41.50	3.78	0.15	±5	2024/12/7
1750	Head	22.5	1.354	40.865	1.37	40.10	-1.17	1.91	±5	2024/12/8
1900	Head	22.4	1.434	39.412	1.40	40.00	2.43	-1.47	±5	2024/12/9
2450	Head	22.4	1.782	37.866	1.80	39.20	-1.00	-3.40	±5	2024/12/10
2600	Head	22.4	1.900	37.674	1.96	39.00	-3.06	-3.40	±5	2024/12/12
3500	Head	22.9	2.852	37.167	2.91	37.90	-1.99	-1.93	±5	2024/12/12
3700	Head	22.6	3.008	36.918	3.12	37.70	-3.59	-2.07	±5	2024/12/13
3900	Head	22.5	3.210	36.686	3.33	37.51	-3.60	-2.20	±5	2024/12/15
5250	Head	22.4	4.617	35.683	4.71	35.95	-1.97	-0.74	±5	2024/12/9
5600	Head	22.3	4.970	35.188	5.07	35.50	-1.97	-0.88	±5	2024/12/9
5750	Head	22.4	5.127	34.965	5.22	35.35	-1.78	-1.09	±5	2024/12/9

11.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2024/12/7	750	Head	250	1099	7576	1437	2.070	8.540	8.28	-3.04
2024/12/7	835	Head	250	4d162	7576	1437	2.460	9.640	9.84	2.07
2024/12/8	1750	Head	250	1137	7576	1437	8.850	36.800	35.4	-3.80
2024/12/9	1900	Head	250	5d182	7576	1437	9.790	39.600	39.16	-1.11
2024/12/10	2450	Head	250	924	7576	1437	12.600	52.300	50.4	-3.63
2024/12/12	2600	Head	250	1070	7576	1437	13.100	56.200	52.4	-6.76
2024/12/12	3500	Head	100	1076	7576	1437	6.300	66.200	63	-4.83
2024/12/13	3700	Head	100	1037	7576	1437	6.380	66.700	63.8	-4.35
2024/12/15	3900	Head	100	1022	7576	1437	6.130	66.400	61.3	-7.68
2024/12/9	5250	Head	100	1341	7576	1437	8.010	80.700	80.1	-0.74
2024/12/9	5600	Head	100	1341	7576	1437	8.940	84.500	89.4	5.80
2024/12/9	5750	Head	100	1341	7576	1437	8.470	80.600	84.7	5.09

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2024/12/7	750	Head	250	1099	7576	1437	1.390	5.650	5.56	-1.59
2024/12/7	835	Head	250	4d162	7576	1437	1.610	6.260	6.44	2.88
2024/12/8	1750	Head	250	1137	7576	1437	4.760	19.600	19.04	-2.86
2024/12/9	1900	Head	250	5d182	7576	1437	5.050	20.200	20.2	0.00
2024/12/10	2450	Head	250	924	7576	1437	5.720	24.500	22.88	-6.61
2024/12/12	2600	Head	250	1070	7576	1437	5.700	24.600	22.8	-7.32
2024/12/12	3500	Head	100	1076	7576	1437	2.420	25.500	24.2	-5.10
2024/12/13	3700	Head	100	1037	7576	1437	2.370	24.600	23.7	-3.66
2024/12/15	3900	Head	100	1022	7576	1437	2.210	23.700	22.1	-6.75
2024/12/9	5250	Head	100	1341	7576	1437	2.290	23.100	22.9	-0.87
2024/12/9	5600	Head	100	1341	7576	1437	2.540	24.000	25.4	5.83
2024/12/9	5750	Head	100	1341	7576	1437	2.360	22.700	23.6	3.96

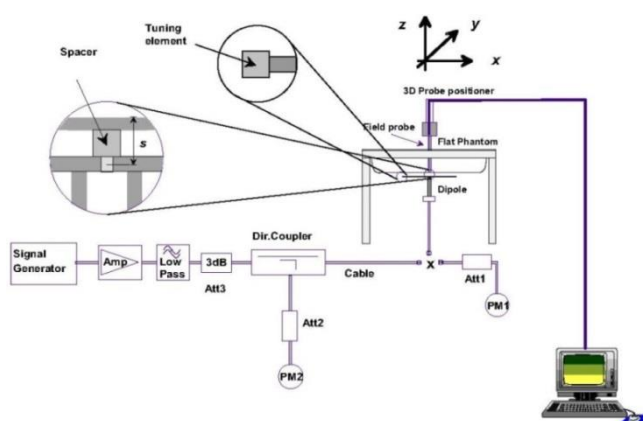


Fig 11.3.1 System Performance Check Setup

Fig 11.3.2 Setup Photo

12. RF Exposure Positions

12.1 Ear and handset reference point

Figure 12.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 12.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 12.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 12.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

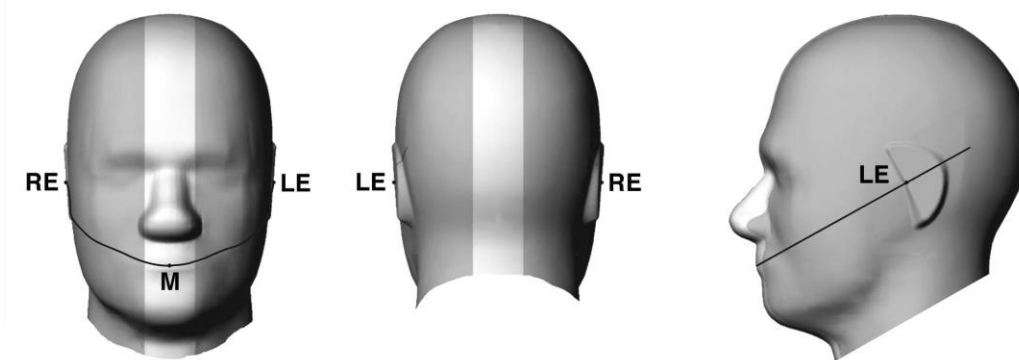


Fig 12.1.1 Front, back, and side views of SAM twin phantom

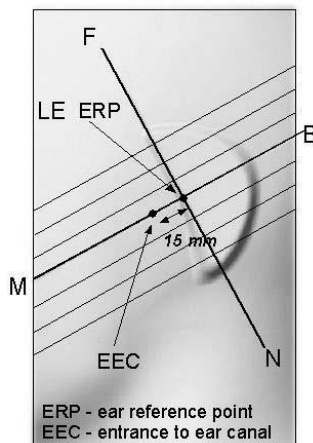


Fig 12.1.2 Close-up side view of phantom showing the ear region.

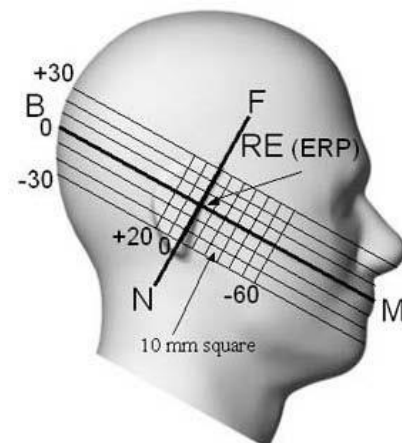


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 12.2.1 and Figure 12.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 12.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 12.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 12.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 12.2.3. The actual rotation angles should be documented in the test report.

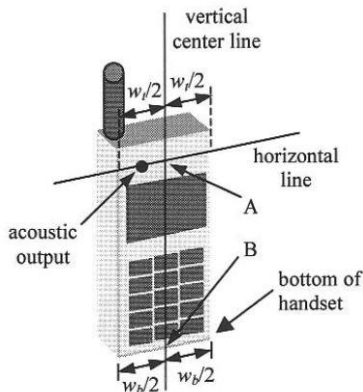


Fig 12.2.1 Handset vertical and horizontal reference lines—"fixed case"

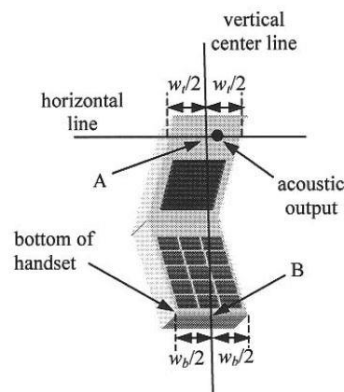


Fig 12.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

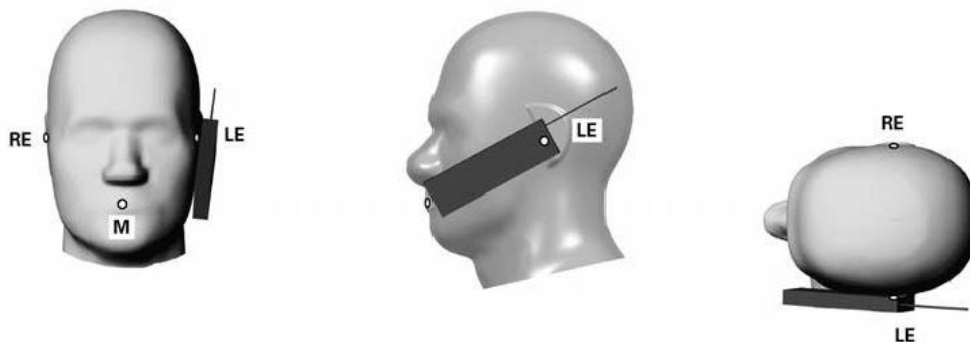


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 12.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

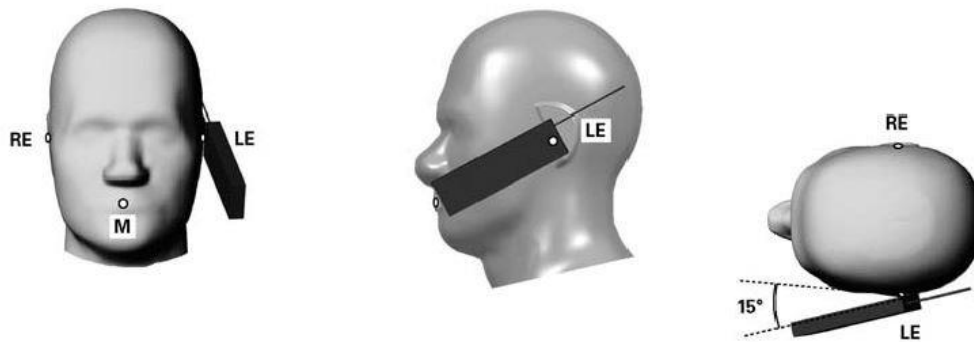


Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 11.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

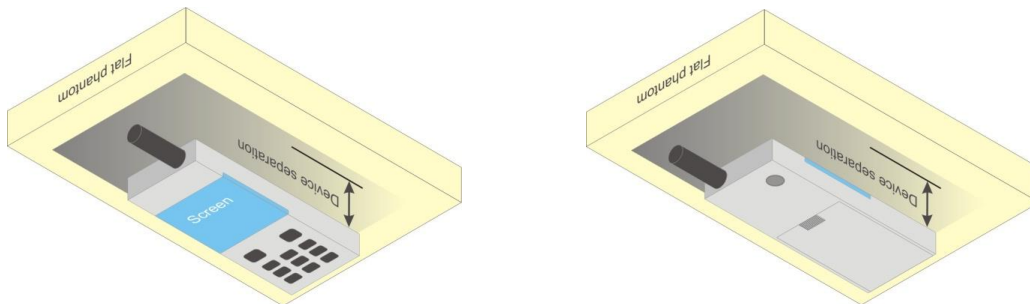


Fig 12.4 Body Worn Position

12.5 Product Specific 10g SAR Exposure

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, that can provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets and support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.⁶ The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

12.6 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

13. Conducted RF Output Power (Unit: dBm)

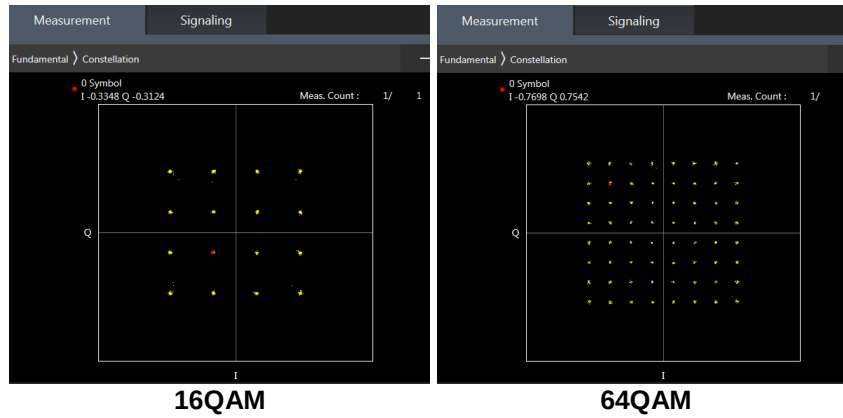
The detailed conducted power table can refer to Appendix E.

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B17 / B26 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE B17 / B5 / B4 / B38 SAR test was covered by B12 / B26 / B66 / B41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

10. According to May 2017 TCB workshop, for 16QAM and 64QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



5G NR Output Power (Unit: dBm)**General Note:**

1. 5G NR n2/n5/n7/n12/n66/n38/n41/n48/n77 is SA mode.
2. 5G NR n2/n5/n7/n66/n41/n77 is NSA mode.
3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
 - a. For DFT-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, the CP-OFDM mode will not higher than DFT-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-s QPSK and the reported SAR for the DFT-s QPSK configuration is ≤ 1.45 W/kg; CP-OFDM testing is not required.
 - b. For DFT-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, for 16QAM/64QAM/256QAM and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the 16QAM/64QAM/256QAM and smaller bandwidth output power will not ½ dB higher than the same configuration in the largest supported bandwidth.
 - c. SAR testing start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel
 - d. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
 - e. QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested
 - f. PI/2 BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, PI/2 BPSK /16QAM/64QAM/256QAM SAR testing are not required.
 - g. Smaller bandwidth output power for each RB allocation configuration for this device will not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
4. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
5. NSA and SA mode should perform SAR separately. For the maximum power of NSA mode is the same as SA total power level, so SA SAR can represent NSA mode SAR.
6. 5G NR NSA mode, the power level is the same as 5G NR SA mode, so 5G NR NSA mode and SA mode power table only show one time.
7. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
8. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
9. This device supports HPUE for 5G NR n41 with higher power, so HPUE mode was chosen to perform full SAR testing and HPUE SAR can represent power class 3 level SAR.

<3GPP 38.101 MPR for EN-DC>

Table 6.2.2-1 Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$	$\leq 0.5^2$	0 ²
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
CP-OFDM	256 QAM	≤ 4.5		
	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0 dB MPR is 26 dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

Table 6.2.2-2 Maximum power reduction (MPR) for power class 2

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5	≤ 0.5	0
	QPSK	≤ 3.5	≤ 1	0
	16 QAM	≤ 3.5	≤ 2	≤ 1
	64 QAM	≤ 3.5	≤ 2.5	
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3.5	≤ 3	≤ 1.5
	16 QAM	≤ 3.5	≤ 3	≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

<EN-DC combination>

Band	LTE TX	NR TX
DC_5A_n7A	ANT 0/1	ANT 3/4/2
DC_12A_n66A	ANT 0/1	ANT 2/3/4
DC_5A_n66A	ANT 0/1	ANT 2/3/4
DC_5A_n2A	ANT 0/1	ANT 2/3/4
DC_12A_n2A	ANT 0/1	ANT 2/3/4
DC_7A_n5A	ANT 3/4/2	ANT 0/1
DC_66A_n5A	ANT 2/3/4	ANT 0/1
DC_2A_n5A	ANT 2/3/4	ANT 0/1
DC_66A_n7A	ANT 2/3/4	ANT 3/4/2
DC_66A_n41A	ANT 2/3/4	ANT 3/4/2
DC_7A_n66A	ANT 2/3/4	ANT 3/4/2
DC_2A_n7A	ANT 2/3/4	ANT 3/4/2
DC_2A_n41A	ANT 2/3/4	ANT 3/4/2
DC_4A_n7A	ANT 2/3/4	ANT 3/4/2
DC_5A_n77A	ANT 0/1	ANT 4/6/3/5
DC_12A_n77A	ANT 0/1	ANT 4/6/3/5
DC_41A_n77A	ANT 2/4/3	ANT 4/6/3/5
DC_48A_n5A	ANT 4/6/3/5	ANT 0/1

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN/Bluetooth signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement of power class 3, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The reported TDD LTE SAR (W/kg) = Measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device implements the receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity) and the Qualcomm smart transmit will manage to ensure the power level not exceeding the associated power table. It uses the receiver to indicate whether the user is making a call in head scenario or not. The selection between head and body power levels is based on the receiver detection mechanism. The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to power table at appendix E.
5. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
6. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
 - a. For this device SAR for WWAN transmitter scaled to maximum output power mode for product specific 10g SAR is higher than 1.2W/kg of GSM850/GSM1900, WCDMA Band II/IV/V, LTE Band 2/4/7/12/17/38/41/48/66, 5GNR n2/n5/n7 /n12/n38/n41/n48/n66 therefore product specific 10g SAR is necessary.
 - b. WLAN 5.3/5.5GHz tested the product specific 10g SAR since it has no hotspot mode.
 - c. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.
7. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hotspot SAR.
8. For Phablet devices, when hotspot mode is not supported, Product specific 10-g SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $> \text{not } \frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $> \text{not } \frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 / B17 / B26 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE B17 / B5 / B4 / B38 SAR test was covered by B12 / B26 / B66 / B41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

5G NR Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
 - a. SAR testing start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
 - b. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
 - c. QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
 - d. $\text{PI}/2$ BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not $\frac{1}{2}$ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, $\text{PI}/2$ BPSK /16QAM/64QAM/256QAM SAR testing are not required.
 - e. Smaller bandwidth output power for each RB allocation configuration for this device will not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
 - f. For 5G FR1 n2/n5/n12/n66/n38/n41/n77 the maximum bandwidth does not support three non-overlapping channels, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.



14.1 Head SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz																				
01	LTE Band 12	10M	QPSK	1	0	-	Left Cheek	0mm	Ant 0	DSI 5	23095	707.5	24.17	25.00	1.211	-	-	0.12	0.188	0.228
	LTE Band 12	10M	QPSK	1	0	-	Left Cheek	0mm	Ant 1	DSI 5	23095	707.5	22.58	23.50	1.236	-	-	0.07	0.881	1.089
02	FR1 n12	15M	QPSK	18	10	DFT-15	Left Cheek	0mm	Ant 0	DSI 5	141500	707.5	23.51	25.00	1.409	-	-	0.09	0.215	0.303
	FR1 n12	15M	QPSK	1	1	DFT-15	Left Cheek	0mm	Ant 1	DSI 5	141500	707.5	21.08	22.50	1.387	-	-	0.05	0.552	0.765
835MHz																				
03	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 0	DSI 5	251	848.8	25.87	27.50	1.455	-	-	-0.03	0.158	0.230
	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 1	DSI 5	251	848.8	23.88	25.50	1.452	-	-	0.02	0.712	1.034
04	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI 5	4182	836.4	24.05	25.00	1.245	-	-	0.05	0.266	0.331
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 5	4233	846.6	21.66	22.50	1.213	-	-	0.13	0.920	1.116
05	LTE Band 26	15M	QPSK	1	0	-	Left Cheek	0mm	Ant 0	DSI 5	26865	831.5	24.21	25.00	1.199	-	-	-0.04	0.232	0.278
	LTE Band 26	15M	QPSK	36	0	-	Left Cheek	0mm	Ant 1	DSI 5	26865	831.5	21.58	22.50	1.236	-	-	-0.1	0.565	0.698
06	FR1 n5	20M	QPSK	1	1	DFT-15	Left Cheek	0mm	Ant 0	DSI 5	167300	836.5	23.63	25.00	1.371	-	-	-0.05	0.258	0.354
	FR1 n5	20M	QPSK	1	1	DFT-15	Left Cheek	0mm	Ant 1	DSI 5	167300	836.5	22.20	23.50	1.349	-	-	-0.09	0.536	0.723
1750MHz																				
07	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 2	DSI 5	1413	1732.6	24.27	25.00	1.183	-	-	-0.15	0.158	0.187
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 5	1413	1732.6	17.20	18.00	1.202	-	-	0.03	0.858	1.032
08	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 4	DSI 5	1513	1752.6	17.15	18.00	1.216	-	-	0.14	0.789	0.960
	LTE Band 66	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 5	132322	1745	23.45	24.50	1.274	-	-	-0.09	0.155	0.197
09	LTE Band 66	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 5	132572	1770	17.33	18.50	1.309	-	-	-0.07	0.893	1.169
	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	132572	1770	17.99	19.00	1.262	-	-	-0.08	0.919	1.160
10	FR1 n66	30M	QPSK	36	21	DFT-15	Left Cheek	0mm	Ant 2	DSI 5	349000	1745	23.40	24.50	1.288	-	-	0.06	0.167	0.215
	FR1 n66	30M	QPSK	1	1	DFT-15	Right Cheek	0mm	Ant 3	DSI 5	349000	1745	17.52	18.50	1.253	-	-	-0.16	0.819	1.026
11	FR1 n66	30M	QPSK	1	1	DFT-15	Right Cheek	0mm	Ant 4	DSI 5	349000	1745	17.52	18.50	1.253	-	-	0.04	0.834	1.045
	LTE Band 2	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 5	18900	1880	23.55	24.50	1.245	-	-	0.11	0.090	0.112
12	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 5	19100	1900	18.70	20.00	1.349	-	-	0.11	0.756	1.020
	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 5	18900	1880	17.53	18.50	1.250	-	-	-0.13	0.858	1.073
13	LTE Band 2	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	18900	1880	17.53	18.50	1.250	-	-	0.04	0.786	0.983
	LTE Band 2	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 4	DSI 5	18900	1880	17.53	18.50	1.250	-	-	0.05	0.411	0.514
14	LTE Band 2	20M	QPSK	1	0	-	Left Tilted	0mm	Ant 4	DSI 5	18900	1880	17.53	18.50	1.250	-	-	-0.02	0.522	0.653
	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 5	18700	1860	17.49	18.50	1.262	-	-	-0.05	0.929	1.172
15	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 5	19100	1900	17.42	18.50	1.282	-	-	0.1	0.797	1.022
	LTE Band 2	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	18700	1860	17.49	18.50	1.262	-	-	0.12	0.882	1.113
16	LTE Band 2	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	19100	1900	17.42	18.50	1.282	-	-	-0.12	0.755	0.968
	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 6	18700	1860	16.45	17.50	1.274	-	-	0.11	0.699	0.890
17	LTE Band 2	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	18900	1880	17.50	18.50	1.259	-	-	0.12	0.801	1.008
	LTE Band 2	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI 5	18900	1880	17.50	18.50	1.259	-	-	-0.02	0.745	0.938
18	LTE Band 2	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 4	DSI 5	18900	1880	17.50	18.50	1.259	-	-	-0.1	0.395	0.497
	LTE Band 2	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 4	DSI 5	18900	1880	17.50	18.50	1.259	-	-	-0.02	0.497	0.626
19	LTE Band 2	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	18700	1860	17.40	18.50	1.288	-	-	0.05	0.860	1.108
	LTE Band 2	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	19100	1900	17.45	18.50	1.274	-	-	0.1	0.766	0.976
20	LTE Band 2	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI 5	18700	1860	17.40	18.50	1.288	-	-	0.12	0.831	1.071
	LTE Band 2	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI 5	19100	1900	17.45	18.50	1.274	-	-	0.02	0.724	0.922
21	LTE Band 2	20M	QPSK	100	0	-	Right Cheek	0mm	Ant 4	DSI 5	18900	1880	17.48	18.50	1.265	-	-	-0.01	0.768	0.971



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	LTE Band 2	20M	QPSK	100	0	-	Right Tilted	0mm	Ant 4	DSI 5	18900	1880	17.48	18.50	1.265	-	-	-0.08	0.692	0.875
	FR1 n2	20M	QPSK	1	1	DFT-15	Left Cheek	0mm	Ant 2	DSI 5	376000	1880	23.40	24.50	1.288	-	-	0.01	0.097	0.125
	FR1 n2	20M	QPSK	1	1	DFT-15	Right Cheek	0mm	Ant 3	DSI 5	380000	1900	18.05	19.00	1.245	-	-	-0.01	0.778	0.968
13	FR1 n2	20M	QPSK	1	1	DFT-15	Right Cheek	0mm	Ant 4	DSI 5	372000	1860	16.69	18.00	1.352	-	-	-0.16	0.862	1.165
2600MHz																				
	LTE Band 7	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 5	21100	2535	23.78	24.50	1.180	-	-	0.01	0.255	0.301
	LTE Band 7	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 5	21100	2535	15.83	16.50	1.167	-	-	0.05	0.781	0.911
14	LTE Band 7	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	21100	2535	17.25	17.50	1.059	-	-	-0.11	0.968	1.025
	LTE Band 41	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 5	39750	2506	23.80	24.50	1.175	62.9	1.006	0.02	0.196	0.232
15	LTE Band 41	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 5	41055	2636.5	18.02	18.50	1.117	62.9	1.006	0.11	0.865	0.972
	LTE Band 41	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	41055	2636.5	18.66	19.00	1.081	62.9	1.006	0.07	0.810	0.881
	FR1 n7	20M	QPSK	50	28	DFT-15	Right Cheek	0mm	Ant 2	DSI 5	507000	2535	23.62	24.50	1.225	-	-	0.14	0.340	0.416
	FR1 n7	20M	QPSK	1	1	DFT-15	Right Cheek	0mm	Ant 3	DSI 5	512000	2560	15.35	16.00	1.161	-	-	-0.12	0.720	0.836
16	FR1 n7	20M	QPSK	1	1	DFT-15	Right Tilted	0mm	Ant 4	DSI 5	507000	2535	16.45	17.00	1.135	-	-	-0.15	0.935	1.061
	FR1 n41	100M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 2	DSI 5	518598	2592.99	24.53	25.50	1.250	-	-	0.15	0.405	0.506
	FR1 n41	100M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 3	DSI 5	518598	2592.99	15.76	17.00	1.330	-	-	-0.06	0.741	0.986
17	FR1 n41	100M	QPSK	1	1	DFT-30	Right Tilted	0mm	Ant 4	DSI 5	518598	2592.99	16.42	17.50	1.282	-	-	0.15	0.774	0.993
3000MHz-4000MHz																				
	LTE Band 48	20M	QPSK	50	0	DFT-30	Right Cheek	0mm	Ant 3	DSI 5	55340	3560	17.48	18.00	1.127	62.9	1.006	0.1	0.867	0.983
	LTE Band 48	20M	QPSK	1	0	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	56640	3690	18.61	19.00	1.094	62.9	1.006	-0.1	0.822	0.905
18	LTE Band 48	20M	QPSK	1	0	DFT-30	Left Cheek	0mm	Ant 5	DSI 5	55340	3560	18.13	19.50	1.371	62.9	1.006	-0.03	0.844	1.164
	LTE Band 48	20M	QPSK	50	0	DFT-30	Left Cheek	0mm	Ant 6	DSI 5	56640	3690	19.93	21.00	1.279	62.9	1.006	-0.07	0.883	1.136
	FR1 n48	40M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 3	DSI 5	638000	3570	15.72	16.50	1.197	-	-	0.08	0.820	0.981
19	FR1 n48	40M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	645332	3679.98	16.02	17.00	1.253	-	-	0.15	0.930	1.165
	FR1 n48	40M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 5	DSI 5	638000	3570	15.65	16.50	1.216	-	-	0.09	0.807	0.981
	FR1 n48	40M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 6	DSI 5	638000	3570	15.86	17.00	1.300	-	-	0.06	0.738	0.960
20	FR1 n77 Part27Q	100M	QPSK	135	69	DFT-30	Right Cheek	0mm	Ant 3	DSI 5	633332	3499.98	16.95	18.00	1.274	-	-	0.05	0.892	1.136
	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	656000	3840	16.90	17.50	1.148	-	-	0.06	0.869	0.998
	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 5	DSI 5	633332	3499.98	15.40	16.00	1.148	-	-	0.02	0.961	1.103
	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 6	DSI 5	656000	3840	15.82	16.50	1.169	-	-	-0.13	0.768	0.898

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN2.4GHz&BT																
21	Bluetooth	DH5 1Mbps	Left Cheek	0mm	Ant 6	Power level 1	78	2480	15.60	16.50	1.230	76.53	1.307	0.12	0.729	1.172
	Bluetooth	DH5 1Mbps	Left Cheek	0mm	Ant 7	Power level 1	0	2402	16.80	18.00	1.318	76.53	1.307	-0.03	0.475	0.818
22	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 6+7	Power level 1	11	2462	16.83	18.00	1.309	98.53	1.015	-0.14	0.730	0.970
WLAN5GHz																
23	WLAN5.3GHz	802.11ac-VHT160 MCS0	Left Cheek	0mm	Ant 5+6	Power level 1	50	5250	15.13	16.50	1.371	99.54	1.005	-0.11	0.497	0.685
24	WLAN5.5GHz	802.11ac-VHT160 MCS0	Left Cheek	0mm	Ant 5+6	Power level 1	114	5570	15.68	17.50	1.521	99.54	1.005	0.04	0.739	1.129
25	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 5+6	Power level 1	155	5775	14.78	16.50	1.486	99.63	1.004	-0.1	0.644	0.961



14.2 Hotspot SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz																				
26	LTE Band 12	10M	QPSK	1	0	-	Back	10mm	Ant 0	DSI 9	23095	707.5	24.17	25.00	1.211	-	-	-0.02	0.349	0.422
	LTE Band 12	10M	QPSK	1	0	-	Left Side	10mm	Ant 1	DSI 9	23095	707.5	22.58	23.50	1.236	-	-	-0.01	0.643	0.795
27	FR1 n12	15M	QPSK	1	1	DFT-15	Back	10mm	Ant 0	DSI 9	141500	707.5	23.55	25.00	1.396	-	-	-0.04	0.363	0.507
	FR1 n12	15M	QPSK	1	1	DFT-15	Left Side	10mm	Ant 1	DSI 9	141500	707.5	22.05	23.50	1.396	-	-	0.03	0.620	0.866
835MHz																				
28	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 0	DSI 9	251	848.8	25.87	27.50	1.455	-	-	-0.05	0.472	0.687
	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Side	10mm	Ant 1	DSI 9	128	824.2	23.69	25.50	1.517	-	-	-0.14	0.532	0.807
29	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 9	4182	836.4	24.05	25.00	1.245	-	-	-0.1	0.597	0.743
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Side	10mm	Ant 1	DSI 9	4233	846.6	23.10	24.00	1.230	-	-	0.02	0.657	0.808
30	LTE Band 26	15M	QPSK	1	0	-	Back	10mm	Ant 0	DSI 9	26865	831.5	24.21	25.00	1.199	-	-	0.03	0.423	0.507
	LTE Band 26	15M	QPSK	1	0	-	Left Side	10mm	Ant 1	DSI 9	26865	831.5	24.17	25.00	1.211	-	-	0.09	0.594	0.719
31	FR1 n5	20M	QPSK	1	1	DFT-15	Back	10mm	Ant 0	DSI 9	167300	836.5	23.63	25.00	1.371	-	-	0.05	0.450	0.617
	FR1 n5	20M	QPSK	50	28	DFT-15	Left Side	10mm	Ant 1	DSI 9	167300	836.5	22.72	24.00	1.343	-	-	-0.06	0.593	0.796
1750MHz																				
32	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 2	DSI 9	1513	1752.6	18.71	19.50	1.199	-	-	0.16	0.678	0.813
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Side	10mm	Ant 3	DSI 9	1513	1752.6	21.10	22.00	1.230	-	-	-0.12	0.784	0.965
33	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Top Side	10mm	Ant 4	DSI 9	1513	1752.6	19.95	21.00	1.274	-	-	0.11	0.670	0.853
	LTE Band 66	20M	QPSK	1	0	-	Bottom Side	10mm	Ant 2	DSI 9	132572	1770	18.86	20.00	1.300	-	-	-0.16	0.693	0.901
34	LTE Band 66	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 9	132572	1770	20.88	22.00	1.294	-	-	0.11	0.714	0.924
	LTE Band 66	20M	QPSK	1	0	-	Top Side	10mm	Ant 4	DSI 9	132572	1770	20.00	21.00	1.259	-	-	0.13	0.659	0.830
34	FR1 n66	30M	QPSK	1	1	DFT-15	Bottom Side	10mm	Ant 2	DSI 9	349000	1745	19.60	20.50	1.230	-	-	0.08	0.798	0.982
	FR1 n66	30M	QPSK	1	1	DFT-15	Left Side	10mm	Ant 3	DSI 9	349000	1745	22.19	23.00	1.205	-	-	0.13	0.816	0.983
	FR1 n66	30M	QPSK	1	1	DFT-15	Top Side	10mm	Ant 4	DSI 9	349000	1745	21.65	22.00	1.084	-	-	0.16	0.829	0.899
1900MHz																				
35	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	10mm	Ant 2	DSI 9	661	1880	21.80	23.50	1.479	-	-	-0.06	0.639	0.945
	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Left Side	10mm	Ant 3	DSI 9	810	1909.8	23.35	24.50	1.303	-	-	0.11	0.421	0.549
36	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Top Side	10mm	Ant 4	DSI 9	512	1850.2	22.86	24.50	1.459	-	-	-0.1	0.668	0.974
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 2	DSI 9	9538	1907.6	19.72	20.50	1.197	-	-	0.11	0.788	0.943
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Side	10mm	Ant 3	DSI 9	9262	1852.4	20.50	21.50	1.259	-	-	-0.07	0.638	0.803
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Top Side	10mm	Ant 4	DSI 9	9262	1852.4	19.27	20.50	1.327	-	-	0.16	0.699	0.928
	LTE Band 2	20M	QPSK	1	0	-	Bottom Side	10mm	Ant 2	DSI 9	19100	1900	19.43	20.50	1.279	-	-	0.04	0.664	0.850
	LTE Band 2	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 9	18700	1860	20.33	21.50	1.309	-	-	-0.04	0.616	0.806
37	LTE Band 2	20M	QPSK	1	0	-	Top Side	10mm	Ant 4	DSI 9	18700	1860	19.60	21.00	1.380	-	-	-0.02	0.711	0.981
	FR1 n2	20M	QPSK	50	28	DFT-15	Bottom Side	10mm	Ant 2	DSI 9	380000	1900	18.84	20.00	1.306	-	-	-0.07	0.632	0.826
	FR1 n2	20M	QPSK	50	28	DFT-15	Left Side	10mm	Ant 3	DSI 9	372000	1860	20.85	22.00	1.303	-	-	0.16	0.526	0.685
	FR1 n2	20M	QPSK	50	28	DFT-15	Top Side	10mm	Ant 4	DSI 9	372000	1860	18.60	20.00	1.380	-	-	0.07	0.504	0.696
2600MHz																				
39	LTE Band 7	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 9	20850	2510	22.25	23.00	1.189	-	-	0.16	0.676	0.803
	LTE Band 7	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 9	21100	2535	18.25	19.00	1.189	-	-	0.02	0.546	0.649
40	LTE Band 7	20M	QPSK	1	0	-	Top Side	10mm	Ant 4	DSI 9	21100	2535	19.70	20.00	1.072	-	-	0.09	0.754	0.808
	LTE Band 41	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 9	41055	2636.5	23.08	24.00	1.236	62.9	1.006	-0.07	0.565	0.703
	LTE Band 41	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 9	41055	2636.5	20.77	21.00	1.054	62.9	1.006	0.03	0.626	0.664
	LTE Band 41	20M	QPSK	1	0	-	Top Side	10mm	Ant 4	DSI 9	41490	2680	20.50	21.00	1.122	62.9	1.006	0.01	0.593	0.669
41	FR1 n7	20M	QPSK	1	1	DFT-15	Back	10mm	Ant 2	DSI 9	507000	2535	21.84	22.50	1.164	-	-	0.1	0.812	0.945
	FR1 n7	20M	QPSK	50	28	DFT-15	Left Side	10mm	Ant 3	DSI 9	512000	2560	19.97	20.50	1.130	-	-	-0.04	0.666	0.752
	FR1 n7	20M	QPSK	1	1	DFT-15	Top Side	10mm	Ant 4	DSI 9	507000	2535	18.47	19.00	1.130	-	-	0	0.684	0.773
	FR1 n41	100M	QPSK	135	69	DFT-30	Back	10mm	Ant 2	DSI 9	518598	2592.99	20.99	22.00	1.262	-	-	-0.11	0.539	0.680
42	FR1 n41	100M	QPSK	135	69	DFT-30	Left Side	10mm	Ant 3	DSI 9	518598	2592.99	18.18	19.50	1.355	-	-	-0.13	0.581	0.787
	FR1 n41	100M	QPSK	1	1	DFT-30	Top Side	10mm	Ant 4	DSI 9	518598	2592.99	18.39	19.50	1.291	-	-	0.08	0.612	0.790



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3000MHz-4000MHz																				
	LTE Band 48	20M	QPSK	50	0	DFT-30	Left Side	10mm	Ant 3	DSI 9	55340	3560	19.45	20.00	1.135	62.9	1.006	0.13	0.633	0.723
43	LTE Band 48	20M	QPSK	1	0	DFT-30	Back	10mm	Ant 4	DSI 9	55340	3560	22.08	22.50	1.102	62.9	1.006	0.08	0.752	0.833
	LTE Band 48	20M	QPSK	1	0	DFT-30	Back	10mm	Ant 5	DSI 9	55830	3609	22.82	23.50	1.169	62.9	1.006	-0.04	0.481	0.566
	LTE Band 48	20M	QPSK	1	0	DFT-30	Right Side	10mm	Ant 6	DSI 9	56150	3641	21.90	22.50	1.148	62.9	1.006	-0.06	0.520	0.601
	FR1 n48	40M	QPSK	50	28	DFT-30	Left Side	10mm	Ant 3	DSI 9	638000	3570	17.69	18.50	1.205	-	-	-0.16	0.708	0.853
44	FR1 n48	40M	QPSK	1	1	DFT-30	Back	10mm	Ant 4	DSI 9	638000	3570	20.12	21.00	1.225	-	-	-0.16	0.796	0.975
	FR1 n48	40M	QPSK	100	0	DFT-30	Back	10mm	Ant 5	DSI 9	641666	3624.99	21.00	22.50	1.413	-	-	-0.04	0.611	0.863
	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	10mm	Ant 6	DSI 9	645332	3679.98	18.35	19.50	1.303	-	-	0.04	0.665	0.867
	FR1 n77 Part27Q	100M	QPSK	135	69	DFT-30	Left Side	10mm	Ant 3	DSI 9	633332	3499.98	18.48	19.50	1.265	-	-	0.11	0.675	0.854
	FR1 n77 Part27Q	100M	QPSK	135	69	DFT-30	Back	10mm	Ant 4	DSI 9	633332	3499.98	20.32	21.00	1.169	-	-	0	0.750	0.877
45	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Back	10mm	Ant 5	DSI 9	633332	3499.98	21.42	22.00	1.143	-	-	0.08	0.861	0.984
	FR1 n77 Part27O	100M	QPSK	1	1	DFT-30	Right Side	10mm	Ant 6	DSI 9	656000	3840	17.80	18.50	1.175	-	-	-0.12	0.488	0.573

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN2.4GHz&BT																
46	Bluetooth	DH5 1Mbps	Right Side	10mm	Ant 6	Power level 1	39	2441	17.80	18.00	1.047	76.53	1.307	0.1	0.480	0.657
	Bluetooth	DH5 1Mbps	Back	10mm	Ant 7	Power level 1/2	39	2441	17.10	18.00	1.230	76.53	1.307	0.09	0.152	0.244
47	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 6+7	Power level 1	6	2437	19.81	21.00	1.315	98.53	1.015	-0.14	0.886	1.183
WLAN5GHz																
48	WLAN5.2GHz	802.11n-HT40 MCS0	Back	10mm	Ant 5+6	Power level 1	46	5230	19.54	20.50	1.246	99.63	1.004	-0.06	0.578	0.723
49	WLAN5.8GHz	802.11a 6Mbps	Back	10mm	Ant 5+6	Power level 1	149	5745	19.44	20.50	1.276	99.06	1.009	0	0.745	0.960



14.3 Body Worn Accessory SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz																				
50	LTE Band 12	10M	QPSK	1	0	-	Back	15mm	Ant 0	DSI 7	23095	707.5	24.17	25.00	1.211	-	-	0.09	0.167	0.202
	LTE Band 12	10M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 7	23095	707.5	24.15	25.00	1.216	-	-	0.08	0.413	0.502
51	FR1 n12	15M	QPSK	1	1	DFT-15	Back	15mm	Ant 0	DSI 7	141500	707.5	23.55	25.00	1.396	-	-	-0.01	0.212	0.296
	FR1 n12	15M	QPSK	1	1	DFT-15	Back	15mm	Ant 1	DSI 7	141500	707.5	23.48	25.00	1.419	-	-	0.05	0.412	0.585
835MHz																				
52	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 7	251	848.8	25.87	27.50	1.455	-	-	-0.07	0.216	0.314
	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 1	DSI 7	251	848.8	25.80	27.50	1.479	-	-	-0.03	0.410	0.606
53	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 7	4182	836.4	24.05	25.00	1.245	-	-	-0.11	0.287	0.357
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 7	4182	836.4	24.11	25.00	1.227	-	-	0.04	0.479	0.588
54	LTE Band 26	15M	QPSK	1	0	-	Back	15mm	Ant 0	DSI 7	26865	831.5	24.21	25.00	1.199	-	-	-0.07	0.230	0.276
	LTE Band 26	15M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 7	26865	831.5	24.17	25.00	1.211	-	-	0.06	0.282	0.341
55	FR1 n5	20M	QPSK	1	1	DFT-15	Back	15mm	Ant 0	DSI 7	167300	836.5	23.63	25.00	1.371	-	-	-0.09	0.294	0.403
	FR1 n5	20M	QPSK	1	1	DFT-15	Back	15mm	Ant 1	DSI 7	167300	836.5	23.74	25.00	1.337	-	-	-0.01	0.303	0.405
1750MHz																				
56	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 2	DSI 7	1413	1732.6	22.84	23.50	1.164	-	-	0.11	0.658	0.766
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 7	1413	1732.6	22.18	23.00	1.208	-	-	-0.06	0.417	0.504
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 7	1413	1732.6	21.69	22.50	1.205	-	-	0.1	0.392	0.472
	LTE Band 66	20M	QPSK	1	0	-	Front	15mm	Ant 2	DSI 7	132322	1745	22.05	23.00	1.245	-	-	0.02	0.492	0.612
	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 2	DSI 7	132322	1745	22.05	23.00	1.245	-	-	-0.08	0.718	0.894
	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 2	DSI 7	132072	1720	21.95	23.00	1.274	-	-	0.09	0.672	0.856
	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 2	DSI 7	132572	1770	21.90	23.00	1.288	-	-	0.15	0.688	0.886
	LTE Band 66	20M	QPSK	50	0	-	Front	15mm	Ant 2	DSI 7	132322	1745	21.98	23.00	1.265	-	-	0.12	0.476	0.602
	LTE Band 66	20M	QPSK	50	0	-	Back	15mm	Ant 2	DSI 7	132322	1745	21.98	23.00	1.265	-	-	0.05	0.677	0.856
	LTE Band 66	20M	QPSK	50	0	-	Back	15mm	Ant 2	DSI 7	132072	1720	21.93	23.00	1.279	-	-	-0.15	0.638	0.816
	LTE Band 66	20M	QPSK	50	0	-	Back	15mm	Ant 2	DSI 7	132572	1770	21.89	23.00	1.291	-	-	0.09	0.666	0.860
	LTE Band 66	20M	QPSK	100	0	-	Back	15mm	Ant 2	DSI 7	132322	1745	21.95	23.00	1.274	-	-	0.09	0.666	0.848
	LTE Band 66	20M	QPSK	50	0	-	Back	15mm	Ant 3	DSI 7	132322	1745	21.95	23.00	1.274	-	-	-0.05	0.427	0.544
	LTE Band 66	20M	QPSK	50	0	-	Back	15mm	Ant 4	DSI 7	132322	1745	22.08	23.00	1.236	-	-	0.08	0.447	0.552
	FR1 n66	30M	QPSK	1	1	DFT-15	Back	15mm	Ant 2	DSI 7	349000	1745	22.61	23.50	1.227	-	-	0.09	0.699	0.858
	FR1 n66	30M	QPSK	36	21	DFT-15	Back	15mm	Ant 3	DSI 7	349000	1745	22.61	23.50	1.227	-	-	0.01	0.333	0.409
	FR1 n66	30M	QPSK	1	1	DFT-15	Front	15mm	Ant 4	DSI 7	349000	1745	22.10	23.00	1.230	-	-	0.05	0.222	0.273
	FR1 n66	30M	QPSK	1	1	DFT-15	Back	15mm	Ant 4	DSI 7	349000	1745	22.10	23.00	1.230	-	-	0.12	0.379	0.466
	FR1 n66	30M	QPSK	36	21	DFT-15	Front	15mm	Ant 4	DSI 7	349000	1745	22.08	23.00	1.236	-	-	0.03	0.212	0.262
	FR1 n66	30M	QPSK	36	21	DFT-15	Back	15mm	Ant 4	DSI 7	349000	1745	22.08	23.00	1.236	-	-	0.08	0.355	0.439
1900MHz																				
59	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 2	DSI 7	810	1909.8	23.32	24.50	1.312	-	-	-0.03	0.391	0.513
	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 3	DSI 7	810	1909.8	23.35	24.50	1.303	-	-	0.01	0.191	0.249
	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 4	DSI 7	810	1909.8	23.12	24.50	1.374	-	-	0.09	0.121	0.166
60	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 2	DSI 7	9400	1880	21.88	22.50	1.153	-	-	-0.12	0.435	0.502
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 7	9400	1880	22.09	23.00	1.233	-	-	-0.01	0.240	0.296
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 7	9400	1880	21.43	22.50	1.279	-	-	-0.01	0.259	0.331
61	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 2	DSI 7	18900	1880	22.10	23.00	1.230	-	-	-0.02	0.598	0.736
	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 3	DSI 7	18900	1880	22.40	23.50	1.288	-	-	0.07	0.305	0.393
	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 7	18900	1880	21.77	23.00	1.327	-	-	0.07	0.241	0.320
	FR1 n2	20M	QPSK	50	28	DFT-15	Back	15mm	Ant 2	DSI 7	376000	1880	20.95	22.00	1.274	-	-	0.11	0.346	0.441
	FR1 n2	20M	QPSK	50	28	DFT-15	Back	15mm	Ant 3	DSI 7	376000	1880	22.44	23.50	1.276	-	-	-0.05	0.254	0.324
62	FR1 n2	20M	QPSK	1	1	DFT-15	Back	15mm	Ant 4	DSI 7	376000	1880	21.68	23.00	1.355	-	-	0.06	0.423	0.573
2600MHz																				
63	LTE Band 7	20M	QPSK	50	0	-	Back	15mm	Ant 2	DSI 7	21100	2535	22.29	23.00	1.178	-	-	0.05	0.522	0.615
	LTE Band 7	20M	QPSK	50	0	-	Back	15mm	Ant 3	DSI 7	21100	2535	20.75	21.50	1.189	-	-	-0.06	0.308	0.366



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	LTE Band 7	20M	QPSK	50	0	-	Back	15mm	Ant 4	DSI 7	21100	2535	19.65	20.00	1.084	-	-	-0.11	0.333	0.361
64	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 2	DSI 7	39750	2506	23.80	24.50	1.175	62.9	1.006	0.06	0.308	0.364
	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 3	DSI 7	39750	2506	24.13	24.50	1.089	62.9	1.006	0.05	0.317	0.347
	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 7	39750	2506	22.80	23.00	1.047	62.9	1.006	-0.11	0.271	0.285
	FR1 n7	20M	QPSK	50	28	DFT-15	Back	15mm	Ant 2	DSI 7	507000	2535	21.80	22.50	1.175	-	-	0.02	0.357	0.419
	FR1 n7	20M	QPSK	50	28	DFT-15	Back	15mm	Ant 3	DSI 7	507000	2535	21.56	22.00	1.107	-	-	-0.11	0.463	0.512
65	FR1 n7	20M	QPSK	1	1	DFT-15	Back	15mm	Ant 4	DSI 7	507000	2535	20.98	21.50	1.127	-	-	-0.03	0.518	0.584
	FR1 n41	100M	QPSK	135	69	DFT-30	Back	15mm	Ant 2	DSI 7	518598	2592.99	20.99	22.00	1.262	-	-	0.07	0.279	0.352
66	FR1 n41	100M	QPSK	135	69	DFT-30	Back	15mm	Ant 3	DSI 7	518598	2592.99	21.15	22.50	1.365	-	-	0.04	0.446	0.609
	FR1 n41	100M	QPSK	1	1	DFT-30	Back	15mm	Ant 4	DSI 7	518598	2592.99	20.43	21.50	1.279	-	-	-0.06	0.379	0.485
3000MHz-4000MHz																				
	LTE Band 48	20M	QPSK	50	0	DFT-30	Back	15mm	Ant 3	DSI 7	55830	3609	21.32	21.50	1.042	62.9	1.006	0.06	0.238	0.250
	LTE Band 48	20M	QPSK	50	0	DFT-30	Back	15mm	Ant 4	DSI 7	55830	3609	22.18	22.50	1.076	62.9	1.006	-0.06	0.334	0.362
	LTE Band 48	20M	QPSK	50	0	DFT-30	Back	15mm	Ant 5	DSI 7	55830	3609	22.01	22.50	1.119	62.9	1.006	-0.03	0.094	0.106
67	LTE Band 48	20M	QPSK	1	0	DFT-30	Back	15mm	Ant 6	DSI 7	55830	3609	21.98	22.50	1.127	62.9	1.006	-0.08	0.359	0.407
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	15mm	Ant 3	DSI 7	641666	3624.99	18.30	19.00	1.175	-	-	-0.12	0.216	0.254
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	15mm	Ant 4	DSI 7	641666	3624.99	19.69	20.50	1.205	-	-	-0.08	0.282	0.340
	FR1 n48	40M	QPSK	50	28	DFT-30	Back	15mm	Ant 5	DSI 7	641666	3624.99	21.28	22.50	1.324	-	-	0.09	0.287	0.380
	FR1 n48	40M	QPSK	1	1	DFT-30	Front	15mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	-0.05	0.235	0.299
68	FR1 n48	40M	QPSK	1	1	DFT-30	Back	15mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	0.09	0.352	0.448
	FR1 n48	40M	QPSK	50	28	DFT-30	Front	15mm	Ant 6	DSI 7	641666	3624.99	19.88	21.00	1.294	-	-	-0.17	0.288	0.373
	FR1 n48	40M	QPSK	50	28	DFT-30	Back	15mm	Ant 6	DSI 7	641666	3624.99	19.88	21.00	1.294	-	-	-0.06	0.322	0.417
	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Back	15mm	Ant 3	DSI 7	633332	3499.98	18.50	19.50	1.259	-	-	0.06	0.197	0.248
69	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Back	15mm	Ant 4	DSI 7	633332	3499.98	20.35	21.00	1.161	-	-	-0.08	0.433	0.503
	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Back	15mm	Ant 5	DSI 7	633332	3499.98	20.40	21.00	1.148	-	-	-0.06	0.374	0.429
	FR1 n77 Part96	100M	QPSK	135	69	DFT-30	Back	15mm	Ant 6	DSI 7	641666	3624.99	18.28	19.00	1.180	-	-	0.05	0.245	0.289

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN2.4GHz																
70	Bluetooth	DH5 1Mbps	Back	15mm	Ant 6	Power level 1/2/3	39	2441	17.80	18.00	1.047	76.53	1.307	-0.01	0.174	0.238
	Bluetooth	DH5 1Mbps	Back	15mm	Ant 7	Power level 1/2/3	39	2441	17.10	18.00	1.230	76.53	1.307	0.12	0.071	0.114
71	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 6+7	Power level 1/2	1	2412	19.91	21.00	1.285	98.53	1.015	0.07	0.272	0.355
WLAN5GHz																
72	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	15mm	Ant 5+6	Power level 1	58	5290	19.06	20.50	1.395	99.63	1.004	0.06	0.359	0.503
73	WLAN5.5GHz	802.11n-HT40 MCS0	Back	15mm	Ant 5+6	Power level 1	142	5710	18.85	20.30	1.397	99.63	1.004	-0.04	0.518	0.727
74	WLAN5.8GHz	802.11a 6Mbps	Back	15mm	Ant 5+6	Power level 1	149	5745	19.44	20.50	1.276	99.06	1.009	-0.08	0.523	0.674



14.4 Product specific 10g SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
750MHz																				
75	LTE Band 12	10M	QPSK	1	0	-	Left Side	0mm	Ant 1	DSI 7	23095	707.5	24.15	25.00	1.216	-	-	-0.09	1.000	1.216
76	FR1 n12	15M	QPSK	1	1	DFT-15	Left Side	0mm	Ant 1	DSI 7	141500	707.5	23.48	25.00	1.419	-	-	0.03	1.060	1.504
835MHz																				
77	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Side	0mm	Ant 1	DSI 7	251	848.8	25.80	27.50	1.479	-	-	0.05	0.760	1.124
78	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Side	0mm	Ant 1	DSI 7	4182	836.4	24.11	25.00	1.227	-	-	0.04	1.460	1.792
79	FR1 n5	20M	QPSK	1	1	DFT-15	Left Side	0mm	Ant 1	DSI 7	167300	836.5	23.74	25.00	1.337	-	-	0.08	1.190	1.591
1750MHz																				
80	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant 2	DSI 7	1413	1732.6	22.84	23.50	1.164	-	-	0	2.300	2.677
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant 3	DSI 7	1513	1752.6	22.12	23.00	1.225	-	-	0.07	2.350	2.878
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Top Side	0mm	Ant 4	DSI 7	1513	1752.6	21.66	22.50	1.213	-	-	-0.1	2.280	2.767
	LTE Band 66	20M	QPSK	1	0	-	Back	0mm	Ant 2	DSI 7	132322	1745	22.05	23.00	1.245	-	-	0.15	1.970	2.452
	LTE Band 66	20M	QPSK	1	0	-	Bottom Side	0mm	Ant 2	DSI 7	132322	1745	22.05	23.00	1.245	-	-	-0.05	0.906	1.128
	LTE Band 66	20M	QPSK	1	0	-	Back	0mm	Ant 2	DSI 7	132072	1720	21.95	23.00	1.274	-	-	-0.09	2.020	2.572
81	LTE Band 66	20M	QPSK	1	0	-	Back	0mm	Ant 2	DSI 7	132572	1770	21.90	23.00	1.288	-	-	-0.06	2.150	2.770
	LTE Band 66	20M	QPSK	1	0	-	Back	0mm	Ant 2	DSI 8	132572	1770	20.97	22.00	1.268	-	-	0.05	1.740	2.206
	LTE Band 66	20M	QPSK	50	0	-	Back	0mm	Ant 2	DSI 7	132322	1745	21.98	23.00	1.265	-	-	0.16	1.890	2.390
	LTE Band 66	20M	QPSK	50	0	-	Bottom Side	0mm	Ant 2	DSI 7	132322	1745	21.98	23.00	1.265	-	-	0.05	0.889	1.124
	LTE Band 66	20M	QPSK	50	0	-	Back	0mm	Ant 2	DSI 7	132072	1720	21.93	23.00	1.279	-	-	-0.14	1.920	2.456
	LTE Band 66	20M	QPSK	50	0	-	Back	0mm	Ant 2	DSI 7	132572	1770	21.89	23.00	1.291	-	-	-0.03	2.010	2.595
	LTE Band 66	20M	QPSK	100	0	-	Back	0mm	Ant 2	DSI 7	132322	1745	21.95	23.00	1.274	-	-	-0.14	1.810	2.305
	LTE Band 66	20M	QPSK	1	0	-	Back	0mm	Ant 3	DSI 7	132572	1770	21.90	23.00	1.288	-	-	-0.06	1.370	1.765
	LTE Band 66	20M	QPSK	1	0	-	Top Side	0mm	Ant 4	DSI 7	132572	1770	22.05	23.00	1.245	-	-	0.07	2.220	2.763
	FR1 n66	30M	QPSK	36	21	DFT-15	Back	0mm	Ant 2	DSI 7	349000	1745	22.58	23.50	1.236	-	-	0.16	2.320	2.867
	FR1 n66	30M	QPSK	1	1	DFT-15	Top Side	0mm	Ant 4	DSI 7	349000	1745	22.10	23.00	1.230	-	-	0.14	2.280	2.805
82	FR1 n66	30M	QPSK	36	21	DFT-15	Top Side	0mm	Ant 4	DSI 7	349000	1745	22.08	23.00	1.236	-	-	-0.03	2.400	2.966
	FR1 n66	30M	QPSK	36	21	DFT-15	Top Side	0mm	Ant 4	DSI 8	349000	1745	21.10	22.00	1.230	-	-	0.04	1.900	2.338
	FR1 n66	30M	QPSK	75	0	DFT-15	Top Side	0mm	Ant 4	DSI 7	349000	1745	22.05	23.00	1.245			-0.03	2.150	2.676
1900MHz																				
83	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	0mm	Ant 2	DSI 7	810	1909.8	23.32	24.50	1.312	-	-	-0.07	0.946	1.241
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	0mm	Ant 2	DSI 7	9538	1907.6	21.80	22.50	1.175	-	-	-0.03	1.970	2.315
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Side	0mm	Ant 3	DSI 7	9262	1852.4	22.00	23.00	1.259	-	-	0.09	2.180	2.744
84	WCDMA II	-	-	-	-	RMC 12.2Kbps	Top Side	0mm	Ant 4	DSI 7	9262	1852.4	21.39	22.50	1.291	-	-	-0.02	2.250	2.905
	LTE Band 2	20M	QPSK	1	0		Bottom Side	0mm	Ant 2	DSI 7	19100	1900	22.04	23.00	1.247	-	-	-0.07	1.850	2.308
	LTE Band 2	20M	QPSK	1	0		Left Side	0mm	Ant 3	DSI 7	18700	1860	22.30	23.50	1.318	-	-	-0.02	2.260	2.979
85	LTE Band 2	20M	QPSK	1	0		Top Side	0mm	Ant 4	DSI 7	18700	1860	21.69	23.00	1.352	-	-	-0.01	2.310	3.123
	FR1 n2	20M	QPSK	50	28	DFT-15	Bottom Side	0mm	Ant 2	DSI 7	380000	1900	20.83	22.00	1.309	-	-	0.16	1.780	2.330
86	FR1 n2	20M	QPSK	50	28	DFT-15	Left Side	0mm	Ant 3	DSI 7	372000	1860	22.39	23.50	1.291	-	-	-0.03	2.340	3.021
	FR1 n2	20M	QPSK	50	28	DFT-15	Top Side	0mm	Ant 4	DSI 7	372000	1860	21.49	23.00	1.416	-	-	-0.07	1.950	2.761
2600MHz																				
87	LTE Band 7	20M	QPSK	1	0	-	Left Side	0mm	Ant 3	DSI 7	21100	2535	20.78	21.50	1.180	-	-	-0.01	1.800	2.125
88	LTE Band 41	20M	QPSK	1	0	-	Left Side	0mm	Ant 3	DSI 7	40185	2549.5	23.86	24.50	1.159	62.9	1.006	-0.12	2.180	2.541
	LTE Band 41	20M	QPSK	1	0	-	Top Side	0mm	Ant 4	DSI 7	40185	2549.5	22.77	23.00	1.054	62.9	1.006	0.06	2.190	2.323
	FR1 n7	20M	QPSK	1	1	DFT-15	Left Side	0mm	Ant 3	DSI 7	507000	2535	21.58	22.00	1.102	-	-	0	2.420	2.666
89	FR1 n7	20M	QPSK	1	1	DFT-15	Top Side	0mm	Ant 4	DSI 7	502000	2510	20.91	21.50	1.146	-	-	0.11	2.760	3.162
	FR1 n41	100M	QPSK	1	1	DFT-30	Left Side	0mm	Ant 3	DSI 7	518598	2592.99	21.19	22.50	1.352	-	-	0.02	2.100	2.839
90	FR1 n41	100M	QPSK	1	1	DFT-30	Top Side	0mm	Ant 4	DSI 7	518598	2592.99	20.43	21.50	1.279	-	-	0.02	2.270	2.904
3000MHz-4000MHz																				
91	LTE Band 48	20M	QPSK	1	0	DFT-30	Left Side	0mm	Ant 3	DSI 7	55340	3560	21.27	21.50	1.054	62.9	1.006	-0.14	2.070	2.196
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	0mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	-0.07	1.720	2.190



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92	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	0.16	2.440	3.107
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	0mm	Ant 6	DSI 7	638000	3570	19.93	21.00	1.279	-	-	0	1.670	2.137
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	0mm	Ant 6	DSI 7	645332	3679.98	19.84	21.00	1.306	-	-	0.15	1.650	2.155
	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	638000	3570	19.93	21.00	1.279	-	-	0.08	2.290	2.930
	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	645332	3679.98	19.84	21.00	1.306	-	-	0.11	2.330	3.043
	FR1 n48	40M	QPSK	1	1	DFT-30	Back	0mm	Ant 6	DSI 8	641666	3624.99	18.88	20.00	1.294	-	-	0.05	1.510	1.954
	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 8	641666	3624.99	18.88	20.00	1.294	-	-	-0.01	1.860	2.407
	FR1 n48	40M	QPSK	50	28	DFT-30	Back	0mm	Ant 6	DSI 7	641666	3624.99	19.88	21.00	1.294	-	-	0.14	1.630	2.110
	FR1 n48	40M	QPSK	50	28	DFT-30	Right Side	0mm	Ant 6	DSI 7	641666	3624.99	19.88	21.00	1.294	-	-	-0.04	2.270	2.938
	FR1 n48	40M	QPSK	50	28	DFT-30	Back	0mm	Ant 6	DSI 7	638000	3570	19.85	21.00	1.303	-	-	-0.03	1.620	2.111
	FR1 n48	40M	QPSK	50	28	DFT-30	Back	0mm	Ant 6	DSI 7	645332	3679.98	19.82	21.00	1.312	-	-	-0.02	1.590	2.086
	FR1 n48	40M	QPSK	50	28	DFT-30	Right Side	0mm	Ant 6	DSI 7	638000	3570	19.85	21.00	1.303	-	-	-0.08	2.210	2.880
	FR1 n48	40M	QPSK	50	28	DFT-30	Right Side	0mm	Ant 6	DSI 7	645332	3679.98	19.82	21.00	1.312	-	-	-0.13	2.100	2.756
	FR1 n48	40M	QPSK	100	0	DFT-30	Back	0mm	Ant 6	DSI 7	641666	3624.99	19.90	21.00	1.288	-	-	0	1.600	2.061
	FR1 n48	40M	QPSK	100	0	DFT-30	Right Side	0mm	Ant 6	DSI 7	641666	3624.99	19.90	21.00	1.288	-	-	0.06	2.200	2.834

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
WLAN5GHz																
93	WLAN5.3GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Ant 5+6	Power level 1	58	5290	19.06	20.50	1.395	99.63	1.004	-0.08	1.280	1.792
94	WLAN5.5GHz	802.11n-HT40 MCS0	Top Side	0mm	Ant 5+6	Power level 1	142	5710	18.85	20.30	1.397	99.63	1.004	-0.14	2.040	2.861



14.5 Repeated SAR Measurement

<1g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 12	10M	QPSK	1	0	-	Left Cheek	0mm	Ant 1	DSI 5	23095	707.5	22.58	23.50	1.236	-	-	0.07	0.881	1	1.089
2nd	LTE Band 12	10M	QPSK	1	0	-	Left Cheek	0mm	Ant 1	DSI 5	23095	707.5	22.58	23.50	1.236	-	-	0.01	0.873	1.009	1.079
1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 5	4233	846.6	21.66	22.50	1.213	-	-	0.13	0.920	1	1.116
2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 5	4233	846.6	21.66	22.50	1.213	-	-	0.01	0.905	1.017	1.098
1st	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	132572	1770	17.99	19.00	1.262	-	-	-0.08	0.919	1	1.160
2nd	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI 5	132572	1770	17.99	19.00	1.262	-	-	0.07	0.908	1.012	1.146
1st	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 5	18700	1860	17.49	18.50	1.262	-	-	-0.05	0.929	1	1.172
2nd	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 5	18700	1860	17.49	18.50	1.262	-	-	0.07	0.911	1.020	1.150
1st	LTE Band 7	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	21100	2535	17.25	17.50	1.059	-	-	-0.11	0.968	1	1.025
2nd	LTE Band 7	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 5	21100	2535	17.25	17.50	1.059	-	-	0.07	0.959	1.009	1.016
1st	FR1 n48	40M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	645332	3679.98	16.02	17.00	1.253	-	-	0.15	0.930	1	1.165
2nd	FR1 n48	40M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	645332	3679.98	16.02	17.00	1.253	-	-	0.05	0.924	1.006	1.158
1st	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	656000	3840	16.90	17.50	1.148	-	-	0.06	0.869	1	0.998
2nd	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Right Cheek	0mm	Ant 4	DSI 5	656000	3840	16.90	17.50	1.148	-	-	0.05	0.851	1.021	0.977
1st	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 5	DSI 5	633332	3499.98	15.40	16.00	1.148	-	-	0.02	0.961	1	1.103
2nd	FR1 n77 Part27Q	100M	QPSK	1	1	DFT-30	Left Cheek	0mm	Ant 5	DSI 5	633332	3499.98	15.40	16.00	1.148	-	-	0.08	0.957	1.004	1.099
1st	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Right Side	10mm	Ant 6+7	Power level 1	6	2437	19.81	21.00	1.315	98.53	1.015	-0.14	0.886	1	1.183
2nd	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Right Side	10mm	Ant 6+7	Power level 1	6	2437	19.81	21.00	1.315	98.53	1.015	0.05	0.881	1.006	1.176

<10g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	FR1 n66	30M	QPSK	36	21	DFT-15	Top Side	0mm	Ant 4	DSI 7	349000	1745	22.08	23.00	1.236	-	-	-0.03	2.400	1	2.966
2nd	FR1 n66	30M	QPSK	36	21	DFT-15	Top Side	0mm	Ant 4	DSI 7	349000	1745	22.08	23.00	1.236	-	-	0.05	2.350	1.021	2.904
1st	FR1 n2	20M	QPSK	50	28	DFT-15	Left Side	0mm	Ant 3	DSI 7	372000	1860	22.39	23.50	1.291	-	-	-0.03	2.340	1	3.021
2nd	FR1 n2	20M	QPSK	50	28	DFT-15	Left Side	0mm	Ant 3	DSI 7	372000	1860	22.39	23.50	1.291	-	-	0.02	2.270	1.031	2.931
1st	FR1 n7	20M	QPSK	1	1	DFT-15	Top Side	0mm	Ant 4	DSI 7	502000	2510	20.91	21.50	1.146	-	-	0.11	2.760	1	3.162
2nd	FR1 n7	20M	QPSK	1	1	DFT-15	Top Side	0mm	Ant 4	DSI 7	502000	2510	20.91	21.50	1.146	-	-	0.06	2.710	1.018	3.104
1st	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	0.16	2.440	1	3.107
2nd	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	641666	3624.99	19.95	21.00	1.274	-	-	0.06	2.380	1.025	3.031
1st	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	638000	3570	19.93	21.00	1.279	-	-	0.08	2.290	1	2.930
2nd	FR1 n48	40M	QPSK	1	1	DFT-30	Right Side	0mm	Ant 6	DSI 7	638000	3570	19.93	21.00	1.279	-	-	0.06	2.210	1.036	2.827
1st	WLAN5.5GHz	-	-	-	-	802.11n-HT40 MCS0	Top Side	0mm	Ant 5+6	Power level 1	142	5710	18.85	20.30	1.397	99.63	1.004	-0.14	2.040	1	2.861
2nd	WLAN5.5GHz	-	-	-	-	802.11n-HT40 MCS0	Top Side	0mm	Ant 5+6	Power level 1	142	5710	18.85	20.30	1.397	99.63	1.004	0.05	1.990	1.025	2.791

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR < 1.45 W/kg, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured* SAR.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific 10g SAR
1.	WWAN + 2.4GHz WLAN	Yes	Yes	Yes	Yes
2.	WWAN + 5GHz WLAN	Yes	Yes	Yes	Yes
3.	WWAN + Bluetooth	Yes	Yes	Yes	Yes
4.	5GHz WLAN + Bluetooth	Yes	Yes	Yes	Yes
5.	WWAN + 5GHz WLAN + Bluetooth	Yes	Yes	Yes	Yes
6.	WWAN + 2.4GHz WLAN + NFC				Yes
7.	WWAN + 5GHz WLAN + NFC				Yes
8.	WWAN + Bluetooth + NFC				Yes
9.	5GHz WLAN + Bluetooth+ NFC				Yes
10.	WWAN +5GHz WLAN + Bluetooth + NFC				Yes

General Note:

- Simultaneous transmission analysis for all bands and all position are based on max SAR results chosen between the original filing and variant Verification Data.
- This device supports VoIP in GPRS, EGPRS, WCDMA, LTE and 5GNR (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- EUT will choose each GSM, WCDMA, LTE and 5GNR according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- WWAN above includes 5G NR bands and EN-DC combination.
- For EN-DC mode, Qualcomm Smart Transmit algorithm in WWAN adds directly the time-averaged RF exposure from 4G(LTE) and time-averaged RF exposure from 5G NR. Smart Transmit algorithm controls the total RF exposure from both 4G and 5G NR to not exceed FCC limit. Therefore, simultaneous transmission compliance between 4G+5G NR operation is demonstrated in the Part 2 Report during algorithm validation. In Part 1 Report, simultaneous transmission compliance was evaluated individually with other Radios (WLAN or BT) using one of 4G or 5G NR.
- This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
- This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
- WLAN2.4GHz/WLAN5GHz MIMO SAR can represent SISO SAR to do co-located SAR analysis.
- According to the EUT characteristic, WLAN 5GHz and Bluetooth can transmit simultaneously.
- According to the EUT characteristic, WLAN 5GHz and WLAN 2.4GHz can't transmit simultaneously.
- According to the EUT characteristic, WLAN 2.4GHz and Bluetooth can't transmit simultaneously.
- NFC can transmit simultaneously with other Radios in extremity exposure condition.
- The maximum SAR summation is calculated based on the same configuration and test position.
- All licensed modes share the same antenna part and cannot transmit simultaneously.
- For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
- For standalone WWAN, always choose the highest SAR among all WWAN bands within the selected antenna for each exposure position to perform simultaneous transmission analysis with WLAN/BT. This is the worst co-located analysis and can represent each bands.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - If $SPLSR \leq 0.04$ for 1g SAR and $SPLSR \leq 0.10$ for 10g SAR, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.

15.1 5G NR + LTE + WLAN + BT Sim-Tx analysis

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \leq 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and $A \leq 1.0$; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for 5G FR2 or SAR exposure for 5G FR1), and $B \leq 1.0$.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \leq 1.0 \quad (1)$$

$$x\% * A + (100-x)\% * B \leq x\% * \max(A, B) + (100-x)\% * \max(A, B) \leq \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \leq \max(A, B) + C \leq 1.0 \quad (2)$$

If $A + C \leq 1.0$ and $B + C \leq 1.0$ can be proven, then " $x\% * A + (100-x)\% * B + C \leq 1.0$ ". Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1

Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

Else, if $A + C > 1.0$ and/or $B + C > 1.0$, then the followings need to hold true for compliance:

i. A and C are decoupled based on the SPLSR criteria, and

ii. $(100-x)\% * B + C \leq 1.0$, and

iii. $x\% * A + (100-x)\% * B \leq 1.0$

Note iii. is covered in Part 2 report; i. and ii. should be addressed in Part 2 report.

**15.2 Head Exposure Conditions**

WWAN Band	Exposure Position	1	3	4	5	6	1+3	1+4	1+5	1+6	4+5	4+6
		WWAN	WLAN2.4GHz Ant 6+7	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed	Summed	Summed	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands Ant 0	Right Cheek	0.243	0.316	0.342	0.127	0.431	0.56	0.59	0.37	0.67	0.47	0.77
	Right Tilted	0.155	0.337	0.402	0.088	0.420	0.49	0.56	0.24	0.58	0.49	0.82
	Left Cheek	0.376	0.532	0.580	0.524	0.513	0.91	0.96	0.90	0.89	1.10	1.09
	Left Tilted	0.226	0.354	0.520	0.176	0.446	0.58	0.75	0.40	0.67	0.70	0.97
All Bands Ant 1	Right Cheek	0.701	0.316	0.342	0.127	0.431	1.02	1.04	0.83	1.13	0.47	0.77
	Right Tilted	0.147	0.337	0.402	0.088	0.420	0.48	0.55	0.24	0.57	0.49	0.82
	Left Cheek	0.967	0.532	0.580	0.524	0.513	1.50	1.55	1.49	1.48	1.10	1.09
	Left Tilted	0.180	0.354	0.520	0.176	0.446	0.53	0.70	0.36	0.63	0.70	0.97
All Bands Ant 2	Right Cheek	0.604	0.316	0.342	0.127	0.431	0.92	0.95	0.73	1.04	0.47	0.77
	Right Tilted	0.206	0.337	0.402	0.088	0.420	0.54	0.61	0.29	0.63	0.49	0.82
	Left Cheek	0.403	0.532	0.580	0.524	0.513	0.94	0.98	0.93	0.92	1.10	1.09
	Left Tilted	0.153	0.354	0.520	0.176	0.446	0.51	0.67	0.33	0.60	0.70	0.97
All Bands Ant 3	Right Cheek	0.950	0.316	0.342	0.127	0.431	1.27	1.29	1.08	1.38	0.47	0.77
	Right Tilted	0.554	0.337	0.402	0.088	0.420	0.89	0.96	0.64	0.97	0.49	0.82
	Left Cheek	0.371	0.532	0.580	0.524	0.513	0.90	0.95	0.90	0.88	1.10	1.09
	Left Tilted	0.228	0.354	0.520	0.176	0.446	0.58	0.75	0.40	0.67	0.70	0.97
All Bands Ant 4	Right Cheek	1.039	0.316	0.342	0.127	0.431	1.36	1.38	1.17	1.47	0.47	0.77
	Right Tilted	1.118	0.337	0.402	0.088	0.420	1.46	1.52	1.21	1.54	0.49	0.82
	Left Cheek	0.578	0.532	0.580	0.524	0.513	1.11	1.16	1.10	1.09	1.10	1.09
	Left Tilted	0.673	0.354	0.520	0.176	0.446	1.03	1.19	0.85	1.12	0.70	0.97
All Bands Ant 5	Right Cheek	0.517	0.316	0.342	0.127	0.431	0.83	0.86	0.64	0.95	0.47	0.77
	Right Tilted	0.540	0.337	0.402	0.088	0.420	0.88	0.94	0.63	0.96	0.49	0.82
	Left Cheek	0.916	0.532	0.580	0.524	0.513	1.45	1.50	1.44	1.43	1.10	1.09
	Left Tilted	1.015	0.354	0.520	0.176	0.446	1.37	1.54	1.19	1.46	0.70	0.97
All Bands Ant 6	Right Cheek	0.428	0.316	0.342	0.127	0.431	0.74	0.77	0.56	0.86	0.47	0.77
	Right Tilted	0.397	0.337	0.402	0.088	0.420	0.73	0.80	0.49	0.82	0.49	0.82
	Left Cheek	0.927	0.532	0.580	0.524	0.513	1.46	1.51	1.45	1.44	1.10	1.09
	Left Tilted	0.972	0.354	0.520	0.176	0.446	1.33	1.49	1.15	1.42	0.70	0.97



WWAN Band	Exposure Position	1	4	5	6	1+4+5	1+4+6
		WWAN	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands Ant 0	Right Cheek	0.243	0.193	0.063	0.243	0.50	0.68
	Right Tilted	0.155	0.221	0.047	0.240	0.42	0.62
	Left Cheek	0.376	0.300	0.254	0.269	0.93	0.95
	Left Tilted	0.226	0.260	0.089	0.244	0.58	0.73
All Bands Ant 1	Right Cheek	0.701	0.193	0.063	0.243	0.96	1.14
	Right Tilted	0.147	0.221	0.047	0.240	0.42	0.61
	Left Cheek	0.967	0.300	0.254	0.269	1.52	1.54
	Left Tilted	0.180	0.260	0.089	0.244	0.53	0.68
All Bands Ant 2	Right Cheek	0.604	0.193	0.063	0.243	0.86	1.04
	Right Tilted	0.206	0.221	0.047	0.240	0.47	0.67
	Left Cheek	0.403	0.300	0.254	0.269	0.96	0.97
	Left Tilted	0.153	0.260	0.089	0.244	0.50	0.66
All Bands Ant 3	Right Cheek	0.950	0.193	0.063	0.243	1.21	1.39
	Right Tilted	0.554	0.221	0.047	0.240	0.82	1.02
	Left Cheek	0.371	0.300	0.254	0.269	0.93	0.94
	Left Tilted	0.228	0.260	0.089	0.244	0.58	0.73
All Bands Ant 4	Right Cheek	1.039	0.193	0.063	0.243	1.30	1.48
	Right Tilted	1.118	0.221	0.047	0.240	1.39	1.58
	Left Cheek	0.578	0.300	0.254	0.269	1.13	1.15
	Left Tilted	0.673	0.260	0.089	0.244	1.02	1.18
All Bands Ant 5	Right Cheek	0.517	0.193	0.063	0.243	0.77	0.95
	Right Tilted	0.540	0.221	0.047	0.240	0.81	1.00
	Left Cheek	0.916	0.300	0.254	0.269	1.47	1.49
	Left Tilted	1.015	0.260	0.089	0.244	1.36	1.52
All Bands Ant 6	Right Cheek	0.428	0.193	0.063	0.243	0.68	0.86
	Right Tilted	0.397	0.221	0.047	0.240	0.67	0.86
	Left Cheek	0.927	0.300	0.254	0.269	1.48	1.50
	Left Tilted	0.972	0.260	0.089	0.244	1.32	1.48



15.3 Hotspot Exposure Conditions

WWAN Band	Exposure Position	1	3	4	5	6	1+3	1+4	1+5	1+6	4+5	4+6
		WWAN	WLAN2.4GHz Ant 6+7	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed	Summed	Summed	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Band Ant 0	Front	0.443	0.262	0.315	0.264	0.244	0.71	0.76	0.71	0.69	0.58	0.56
	Back	0.743	0.406	0.609	0.373	0.323	1.15	1.35	1.12	1.07	0.98	0.93
	Left side	0.551	0.043			0.029	0.59	0.55	0.55	0.58	0.00	0.03
	Right side		0.566	0.571	0.567	0.137	0.57	0.57	0.57	0.14	1.14	0.71
	Top side		0.255	0.479	0.021	0.315	0.26	0.48	0.02	0.32	0.50	0.79
	Bottom side	0.366					0.37	0.37	0.37	0.37	0.00	0.00
All Band Ant 1	Front	0.700	0.262	0.315	0.264	0.244	0.96	1.02	0.96	0.94	0.58	0.56
	Back	0.838	0.406	0.609	0.373	0.323	1.24	1.45	1.21	1.16	0.98	0.93
	Left side	0.976	0.043			0.029	1.02	0.98	0.98	1.01	0.00	0.03
	Right side		0.566	0.571	0.567	0.137	0.57	0.57	0.57	0.14	1.14	0.71
	Top side		0.255	0.479	0.021	0.315	0.26	0.48	0.02	0.32	0.50	0.79
	Bottom side						0.00	0.00	0.00	0.00	0.00	0.00
All Band Ant 2	Front	0.514	0.262	0.315	0.264	0.244	0.78	0.83	0.78	0.76	0.58	0.56
	Back	0.945	0.406	0.609	0.373	0.323	1.35	1.55	1.32	1.27	0.98	0.93
	Left side	0.125	0.043			0.029	0.17	0.13	0.13	0.15	0.00	0.03
	Right side	0.315	0.566	0.571	0.567	0.137	0.88	0.89	0.88	0.45	1.14	0.71
	Top side		0.255	0.479	0.021	0.315	0.26	0.48	0.02	0.32	0.50	0.79
	Bottom side	0.985					0.99	0.99	0.99	0.99	0.00	0.00
All Band Ant 3	Front	0.559	0.262	0.315	0.264	0.244	0.82	0.87	0.82	0.80	0.58	0.56
	Back	0.954	0.406	0.609	0.373	0.323	1.36	1.56	1.33	1.28	0.98	0.93
	Left side	0.985	0.043			0.029	1.03	0.99	0.99	1.01	0.00	0.03
	Right side		0.566	0.571	0.567	0.137	0.57	0.57	0.57	0.14	1.14	0.71
	Top side	0.720	0.255	0.479	0.021	0.315	0.98	1.20	0.74	1.04	0.50	0.79
	Bottom side						0.00	0.00	0.00	0.00	0.00	0.00
All Band Ant 4	Front	0.474	0.262	0.315	0.264	0.244	0.74	0.79	0.74	0.72	0.58	0.56
	Back	0.975	0.406	0.609	0.373	0.323	1.38	1.58	1.35	1.30	0.98	0.93
	Left side	0.417	0.043			0.029	0.46	0.42	0.42	0.45	0.00	0.03
	Right side		0.566	0.571	0.567	0.137	0.57	0.57	0.57	0.14	1.14	0.71
	Top side	0.981	0.255	0.479	0.021	0.315	1.24	1.46	1.00	1.30	0.50	0.79
	Bottom side						0.00	0.00	0.00	0.00	0.00	0.00
All Band Ant 5	Front	0.519	0.262	0.315	0.264	0.244	0.78	0.83	0.78	0.76	0.58	0.56
	Back	0.984	0.406	0.609	0.373	0.323	1.39	1.59	1.36	1.31	0.98	0.93
	Left side		0.043			0.029	0.04	0.00	0.00	0.03	0.00	0.03
	Right side	0.492	0.566	0.571	0.567	0.137	1.06	1.06	1.06	0.63	1.14	0.71
	Top side	0.832	0.255	0.479	0.021	0.315	1.09	1.31	0.85	1.15	0.50	0.79
	Bottom side						0.00	0.00	0.00	0.00	0.00	0.00
All Band Ant 6	Front	0.439	0.262	0.315	0.264	0.244	0.70	0.75	0.70	0.68	0.58	0.56
	Back	0.751	0.406	0.609	0.373	0.323	1.16	1.36	1.12	1.07	0.98	0.93
	Left side		0.043			0.029	0.04	0.00	0.00	0.03	0.00	0.03
	Right side	0.984	0.566	0.571	0.567	0.137	1.55	1.56	1.55	1.12	1.14	0.71
	Top side	0.211	0.255	0.479	0.021	0.315	0.47	0.69	0.23	0.53	0.50	0.79
	Bottom side						0.00	0.00	0.00	0.00	0.00	0.00



WWAN Band	Exposure Position	1	3	4	5	6	1+4+5	1+4+6
		WWAN	WLAN2.4GHz Ant 6+7	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Band Ant 0	Front	0.443	0.144	0.144	0.142	0.201	0.73	0.79
	Back	0.743	0.214	0.310	0.220	0.260	1.27	1.31
	Left side	0.551	0.024			0.026	0.55	0.58
	Right side		0.295	0.282	0.308	0.111	0.59	0.39
	Top side		0.134	0.242	0.012	0.252	0.25	0.49
	Bottom side	0.366					0.37	0.37
All Band Ant 1	Front	0.700	0.144	0.144	0.142	0.201	0.99	1.05
	Back	0.838	0.214	0.310	0.220	0.260	1.37	1.41
	Left side	0.976	0.024			0.026	0.98	1.00
	Right side		0.295	0.282	0.308	0.111	0.59	0.39
	Top side		0.134	0.242	0.012	0.252	0.25	0.49
	Bottom side						0.00	0.00
All Band Ant 2	Front	0.514	0.144	0.144	0.142	0.201	0.80	0.86
	Back	0.945	0.214	0.310	0.220	0.260	1.48	1.52
	Left side	0.125	0.024			0.026	0.13	0.15
	Right side	0.315	0.295	0.282	0.308	0.111	0.91	0.71
	Top side		0.134	0.242	0.012	0.252	0.25	0.49
	Bottom side	0.985					0.99	0.99
All Band Ant 3	Front	0.559	0.144	0.144	0.142	0.201	0.85	0.90
	Back	0.954	0.214	0.310	0.220	0.260	1.48	1.52
	Left side	0.985	0.024			0.026	0.99	1.01
	Right side		0.295	0.282	0.308	0.111	0.59	0.39
	Top side	0.720	0.134	0.242	0.012	0.252	0.97	1.21
	Bottom side						0.00	0.00
All Band Ant 4	Front	0.474	0.144	0.144	0.142	0.201	0.76	0.82
	Back	0.975	0.214	0.310	0.220	0.260	1.51	1.55
	Left side	0.417	0.024			0.026	0.42	0.44
	Right side		0.295	0.282	0.308	0.111	0.59	0.39
	Top side	0.981	0.134	0.242	0.012	0.252	1.24	1.48
	Bottom side						0.00	0.00
All Band Ant 5	Front	0.519	0.144	0.144	0.142	0.201	0.81	0.86
	Back	0.984	0.214	0.310	0.220	0.260	1.51	1.55
	Left side		0.024			0.026	0.00	0.03
	Right side	0.492	0.295	0.282	0.308	0.111	1.08	0.89
	Top side	0.832	0.134	0.242	0.012	0.252	1.09	1.33
	Bottom side						0.00	0.00
All Band Ant 6	Front	0.439	0.144	0.144	0.142	0.201	0.73	0.78
	Back	0.751	0.214	0.310	0.220	0.260	1.28	1.32
	Left side		0.024			0.026	0.00	0.03
	Right side	0.984	0.295	0.282	0.308	0.111	1.57	1.38
	Top side	0.211	0.134	0.242	0.012	0.252	0.47	0.71
	Bottom side						0.00	0.00

**15.4 Body-Worn Accessory Exposure Conditions**

WWAN Band	Exposure Position	1	3	4	5	6	1+3	1+4	1+5	1+6	4+5	4+6
		WWAN	WLAN2.4GHz Ant 6+7	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed	Summed	Summed	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands Ant 0	Front	0.292	0.264	0.310	0.144	0.129	0.56	0.60	0.44	0.42	0.45	0.44
	Back	0.403	0.509	0.596	0.246	0.177	0.91	1.00	0.65	0.58	0.84	0.77
All Bands Ant 1	Front	0.582	0.264	0.310	0.144	0.129	0.85	0.89	0.73	0.71	0.45	0.44
	Back	0.813	0.509	0.596	0.246	0.177	1.32	1.41	1.06	0.99	0.84	0.77
All Bands Ant 2	Front	0.702	0.264	0.310	0.144	0.129	0.97	1.01	0.85	0.83	0.45	0.44
	Back	0.992	0.509	0.596	0.246	0.177	1.50	1.59	1.24	1.17	0.84	0.77
All Bands Ant 3	Front	0.427	0.264	0.310	0.144	0.129	0.69	0.74	0.57	0.56	0.45	0.44
	Back	0.711	0.509	0.596	0.246	0.177	1.22	1.31	0.96	0.89	0.84	0.77
All Bands Ant 4	Front	0.384	0.264	0.310	0.144	0.129	0.65	0.69	0.53	0.51	0.45	0.44
	Back	0.621	0.509	0.596	0.246	0.177	1.13	1.22	0.87	0.80	0.84	0.77
All Bands Ant 5	Front	0.263	0.264	0.310	0.144	0.129	0.53	0.57	0.41	0.39	0.45	0.44
	Back	0.489	0.509	0.596	0.246	0.177	1.00	1.09	0.74	0.67	0.84	0.77
All Bands Ant 6	Front	0.518	0.264	0.310	0.144	0.129	0.78	0.83	0.66	0.65	0.45	0.44
	Back	0.901	0.509	0.596	0.246	0.177	1.41	1.50	1.15	1.08	0.84	0.77

WWAN Band	Exposure Position	1	4	5	6	1+4+5	1+4+6
		WWAN	WLAN5GHz Ant 5+6	Bluetooth Ant 6	Bluetooth Ant 7	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands Ant 0	Front	0.292	0.183	0.144	0.129	0.62	0.60
	Back	0.403	0.247	0.292	0.246	0.177	0.94
All Bands Ant 1	Front	0.582	0.183	0.144	0.129	0.91	0.89
	Back	0.813	0.292	0.246	0.177	1.35	1.28
All Bands Ant 2	Front	0.702	0.183	0.144	0.129	1.03	1.01
	Back	0.992	0.292	0.246	0.177	1.53	1.46
All Bands Ant 3	Front	0.427	0.183	0.144	0.129	0.75	0.74
	Back	0.711	0.292	0.246	0.177	1.25	1.18
All Bands Ant 4	Front	0.384	0.183	0.144	0.129	0.71	0.70
	Back	0.621	0.292	0.246	0.177	1.16	1.09
All Bands Ant 5	Front	0.263	0.183	0.144	0.129	0.59	0.58
	Back	0.489	0.292	0.246	0.177	1.03	0.96
All Bands Ant 6	Front	0.518	0.183	0.144	0.129	0.85	0.83
	Back	0.901	0.292	0.246	0.177	1.44	1.37

15.5 Product specific 10g SAR Exposure Conditions

Remark:

- For WLAN2.4G/Bluetooth Product specific 10g stand-alone SAR is not required for a transmitter or antenna, due to 1g hotspot SAR is <1.2W/kg.
- The unit of SAR evaluation is W/kg.

WWAN Band	Exposure Position	1	4	7	1+4+7
		WWAN	WLAN5GHz Ant 5+6	NFC	Summed
		10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
All Band Ant 0	Front		0.852		0.85
	Back		1.107	0.022	1.13
	Left side				0.00
	Right side		1.154		1.15
	Top side		1.460		1.46
	Bottom side				0.00
All Band Ant 1	Front		0.852		0.85
	Back		1.107	0.022	1.13
	Left side	1.792			1.79
	Right side		1.154		1.15
	Top side		1.460		1.46
	Bottom side				0.00
All Band Ant 2	Front	2.654	0.852		3.51
	Back	2.445	1.107	0.022	3.57
	Left side				0.00
	Right side		1.154		1.15
	Top side		1.460		1.46
	Bottom side	2.456			2.46
All Band Ant 3	Front		0.852		0.85
	Back	2.704	1.107	0.022	3.83
	Left side	3.112			3.11
	Right side		1.154		1.15
	Top side		1.460		1.46
	Bottom side				0.00
All Band Ant 4	Front		0.852		0.85
	Back	2.222	1.107	0.022	3.35
	Left side				0.00
	Right side		1.154		1.15
	Top side	2.382	1.460		3.84
	Bottom side				0.00
All Band Ant 5	Front		0.852		0.85
	Back		1.107	0.022	1.13
	Left side				0.00
	Right side		1.154		1.15
	Top side		1.460		1.46
	Bottom side				0.00
All Band Ant 6	Front		0.852		0.85
	Back	2.110	1.107	0.022	3.24
	Left side				0.00
	Right side	2.424	1.154		3.58
	Top side		1.460		1.46
	Bottom side				0.00

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16. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

17. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [6] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.
- [7] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [9] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [10] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [11] FCC KDB 941225 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [12] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [13] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015

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