

FCC SAR Test Report

APPLICANT : Honeywell International Inc
EQUIPMENT : mobile computer
BRAND NAME : Honeywell
MODEL NAME : CT37X1N
FCC ID : HD5-CT37X1N
STANDARD : FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Kunshan), 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. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang



Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA461912	Rev. 01	Initial issue of report.	Nov. 15, 2024



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Honeywell International Inc, mobile computer, CT37X1N**, are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 10mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)			
Licensed	WCDMA	WCDMA II	0.53	1.08	1.06	1.59
		WCDMA IV	0.54	1.12	1.12	
		WCDMA V	0.51	0.40	0.40	
	LTE	LTE Band 7	0.52	0.79	0.79	
		LTE Band 12/17	0.47	0.23	0.23	
		LTE Band 13	0.50	0.28	0.28	
		LTE Band 14	0.52	0.24	0.24	
		LTE Band 25/2	0.49	0.93	0.89	
		LTE Band 26/5	0.50	0.40	0.40	
		LTE Band 30	0.51	1.14	1.14	
		LTE Band 66/4	0.55	1.16	1.16	
		LTE Band 71	0.50	0.28	0.28	
		LTE Band 41/38	0.52	0.68	0.59	
		LTE Band 42	0.56	0.56	0.56	
		LTE Band 48/43	0.55	0.53	0.53	
		5G NR	FR1 n7	0.50	0.74	
	FR1 n12		0.48	0.17	0.18	
	FR1 n13		0.55	0.23	0.23	
	FR1 n14		0.46	0.20	0.20	
	FR1 n25/n2		0.54	0.75	0.75	
	FR1 n26/n5		0.48	0.36	0.36	
	FR1 n30		0.52	1.27	1.27	
	FR1 n66		0.61	1.09	1.09	
FR1 n71	0.39		0.22	0.22		
FR1 n41/n38	0.52		1.10	0.85		
FR1 n48	0.57	0.55	0.55			
FR1 n77/n78	0.49	0.53	0.53			
DTS	WLAN	2.4GHz WLAN	1.18	0.39	0.59	1.59
NII		5GHz WLAN	1.19	0.39	1.18	1.59
DSS	Bluetooth	2.4GHz Bluetooth	<0.10	<0.10	<0.10	1.59

Highest 10g SAR Summary				
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)	Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	5G NR	FR1 n30	2.14	2.56
NII	WLAN	5GHz WLAN	1.34	2.56
Date of Testing:			2024/9/27 ~ 2024/11/5	



Remark:

1. This device supports LTE B2 / B4 / B5 / B17 / B38 / B42(3550-3600MHz)/B43 and B25 / B66 / B26 / B12 / B41 / B48. Since the supported frequency span for LTE B4 / B5 / B17 / B38 / B42(3550-3600MHz)/B43 falls completely within the supports frequency span for LTE B25 / B66 / B26 / B12 / B41 / B48, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B25 / B66 / B26 / B12 / B41 / B48.
2. This device supports 5G NR n2/n38/n5/n78 and n25/n41/n26/n77. Since the supported frequency span for 5G NR n38/n5/n78 falls completely within the supports frequency span for n41/n26/n77, both 5G NR bands have the same target power, and both 5G NR bands share the same transmission path; therefore, SAR was only assessed for n41/n26/n77.

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. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS SAR03-KS	CN1257	314309

Applicant	
Company Name	Honeywell International Inc
Address	9680 Old Bailes Rd, Fort Mill, SC 29707

Manufacturer	
Company Name	Honeywell International Inc
Address	9680 Old Bailes Rd, Fort Mill, SC 29707

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 616217 D04 SAR for laptop and tablets v01r02
- 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	mobile computer
Brand Name	Honeywell
Model Name	CT37X1N
FCC ID	HD5-CT37X1N
IMEI Code	Sample 1: IMEI1: 990021480036167 IMEI2: 990021480036175 Sample 2: IMEI1: 990021480041126 IMEI2: 990021480041134 Sample 3: IMEI1: 990021480039666 IMEI2: 990021480039674 Sample 4: IMEI1: 990021480039260 IMEI2: 990021480039278 Sample 5: IMEI1: 990021480029527 IMEI2: 990021480029535
Wireless Technology and Frequency Range	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 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3600MHz LTE Band 43: 3600 MHz ~ 3700 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 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 n13 : 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 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 n71 : 663 MHz ~ 698 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz



	<p>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 WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz</p>
Mode	<p>RMC/AMR 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 WLAN 6GHz 802.11a/ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE NFC: ASK</p>
HW Version	V1.0
SW Version	OS.31.001-HON.31.001
EUT Stage	Identical Prototype
<p>Remark:</p> <ol style="list-style-type: none"> 1. This device supports VoIP in 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). WLAN 6GHz has no hotspot function. 4. The 2.4GHz/5GHz/6GHz WLAN can transmit in MIMO/SISO antenna mode. 5. This device 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 proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity). And 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 when transmit simultaneous with WWAN, power reduction will be activated to head. For WLAN when transmit simultaneous with WWAN and Proximity sensors trigger, power reduction will be activated to body and Handheld exposure conditions. 8. For some WWAN bands, sensor on power level is higher than hotspot power level, so front/back sensor on SAR can represent hotspot conservatively. 9. This device supports HPUE for LTE Band 41 with class 2 level, HPUE power has been measured separately. For HPUE power is higher than power class 3 but with lower duty cycle, the maximum average power for class 2 and class 3 is almost the same, so we chose power class 3 full SAR testing and power class 2 verify the worst case of power class 3 SAR. 10. For 5G NR bands test, using FTM (Factory Test Mode) with default 100% duty cycle transmission to perform SAR testing. 11. Bluetooth LE has two States for normal state (Module 1) and switch OFF state (Module 2). Bluetooth LE (Module 2) is to ensure it sends beacons and beep when the device is switch OFF and cannot be transmitted simultaneously with other wireless modes. And Bluetooth LE (Module 2) has no voice function. 12. This device supports HPUE mode for 5G NR n41/n77/n78 with higher power, so HPUE SAR has been performed full SAR testing and power class 2 SAR can represent power class 3 SAR. 13. The device support DBS (Dual Band Simultaneous) function, when the device 2.4GHz and 5GHz or 6GHz transmit at the same time the device will limit different output power for simultaneous transmission compliance. 14. There are six samples, the different between them refer to the CT37X1N_Operational Description of Product Equality Declaration which is exhibit separately. According to the differences, sample 1 was chosen to perform full SAR testing and sample 2/3/4/5 to verify the worst case of sample 1. For sample 6, only memory is different, the differences do not affect the test, so sample 6 is not tested. 15. SAR and Power density test report for WLAN 6GHz U-NII-5/6/7/8 will be separately submitted. About co-located SAR with WWAN/Bluetooth always chose higher SAR of WLAN5G U-NII-1/2A/2C/3 and WLAN 6GHz U-NII-5/6/7/8. 16. This device has NFC function and the NFC SAR report will be separately submitted. 	



17. This device supports 5G NR 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, 25, 30, 40
	n12	FDD	15	5, 10, 15
	n25	FDD	15	5, 10, 15, 20, 25, 30, 35, 40
	n30	FDD	15	5, 10
	n66	FDD	15	5, 10, 15, 20, 25, 30, 35, 40
	n71	FDD	15	5, 10, 15, 20
	n38	TDD	30	10, 15, 20, 30, 40
	n41	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100
	n77	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100
n78	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100	
SA	n2	FDD	15	5, 10, 15, 20
	n5	FDD	15	5, 10, 15, 20
	n7	FDD	15	5, 10, 15, 20, 25, 30, 40
	n12	FDD	15	5, 10, 15
	n13	FDD	15	5, 10
	n14	FDD	15	5, 10
	n25	FDD	15	5, 10, 15, 20, 25, 30, 35, 40
	n26	FDD	15	5, 10, 15, 20
	n30	FDD	15	5, 10
	n66	FDD	15	5, 10, 15, 20, 25, 30, 35, 40
	n71	FDD	15	5, 10, 15, 20
	n38	TDD	30	10, 15, 20, 30, 40
	n41	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100
	n48	TDD	30	10, 15, 20, 30, 40
n77	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100	
n78	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100	



4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	HD5-CT37X1N																																																														
Equipment Name	mobile computer																																																														
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 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3600MHz LTE Band 43: 3600 MHz ~ 3700 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 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 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 30: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 43: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz																																																														
uplink modulations used	QPSK / 16QAM / 64QAM / 256QAM																																																														
LTE Voice / Data requirements	Voice and Data																																																														
LTE Release Version	R16																																																														
CA Support	Supported, Uplink and Downlink																																																														
LTE MPR permanently built-in by design	<p>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <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> </thead> <tbody> <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>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>256 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></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></td> <td colspan="6" style="text-align: center;">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	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	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	256 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2		> 5	> 4	> 8	> 12	> 16	> 18	≤ 3		≥ 1						≤ 5
Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)																																																								
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	≥ 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 Proximity sensors/receiver/hotspot detect mechanism, head/body -worn /hotspot/extremity will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to section 13.																																																														
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power verification please referred to section 13.																																																														



LTE Carrier Aggregation Additional Information
 1. This device supports LTE Carrier Aggregation (CA) in the uplink for intra-band and inter-band with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance.
 2. This device supports maximum of 4 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	20450	829	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	20600	844	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	20850	2510	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	21350	2560	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	23060	704	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	23130	711	23130	711
LTE Band 13												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23205		779.5		23230		782		23230		782	
M	23230		782		23230		782		23230		782	
H	23255		784.5		23230		782		23230		782	
LTE Band 14												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Channel #		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23305		790.5		23330		793		23330		793	
M	23330		793		23330		793		23330		793	
H	23355		795.5		23330		793		23330		793	
LTE Band 17												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)		Channel #		Freq. (MHz)	
L	23755		706.5		23780		709		23780		709	
M	23790		710		23790		710		23790		710	
H	23825		713.5		23800		711		23800		711	
LTE Band 25												
	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	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905



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 30					
	Bandwidth 5 MHz			Bandwidth 10 MHz	
	Channel #	Freq.(MHz)		Channel #	Freq.(MHz)
L	27685	2307.5		27710	2310
M	27710	2310			
H	27735	2312.5			

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)	
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580	
M	38000	2595	38000	2595	38000	2595	38000	2595	
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610	

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)	
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506	
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5	
M	40620	2593	40620	2593	40620	2593	40620	2593	
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5	
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680	

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 42									
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	42115	3452.5	42140	3455	42165	3457.5	42190	3460	
M	42590	3500	42590	3500	42590	3500	42590	3500	
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540	

LTE Band 42									
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	43115	3552.5	43140	3555	43165	3557.5	43190	3560	
M	43340	3575	43340	3575	43340	3575	43340	3575	
H	43565	3597.5	43540	3595	43515	3592.5	43490	3590	

LTE Band 43									
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	43615	3602.5	43640	3605	43665	3607.5	43690	3610	
M	44090	3650	44090	3650	44090	3650	44090	3650	
H	44565	3697.5	44540	3695	44515	3692.5	44490	3690	

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)	
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560	
LM	55810	3607	55815	3607.5	55820	3608	55830	3609	
MH	56170	3643	56165	3642.5	56160	3642	56150	3641	
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690	

LTE Band 71									
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	133147	665.5	133172	668	133197	670.5	133222	673	
M	133247	675.5	133272	678	133297	680.5	133322	683	
H	133447	695.5	133422	693	133397	690.5	133372	688	



<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 2	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 25	Yes	Yes	Yes	Yes	Yes	Yes
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
LTE Band 43			Yes	Yes	Yes	Yes
LTE Band 48			Yes	Yes	Yes	Yes

2) LTE Bands tune up:

Band	Antenna	Head Receiver on Tune-up Limit	Body-worn Sensor on Tune-up Limit	Hotspot Tune-up Limit	Extremity Sensor on Tune-up Limit	Default Tune-up Limit
LTE Band 25(2)	Ant 0	24	24	24	24	24
LTE Band 25(2)	Ant 1	20.5	24	24	24	24
LTE Band 66(4)	Ant 0	23	23	23	23	24
LTE Band 66(4)	Ant 1	23	24	24	24	24
LTE Band 66(4)	Ant 5	17.5	21	20	21	24
LTE Band 26(5)	Ant 1	22.5	25	25	25	25
LTE Band 12(17)	Ant 1	23.5	25	25	25	25
LTE Band 41(38)	Ant 0	23	23	23	23	23
LTE Band 41_HPUE	Ant 0	26	26	26	26	26
LTE Band 41(38)	Ant 1	15.5	23	23	23	23
LTE Band 41_HPUE	Ant 1	18.5	26	26	26	26
LTE Band 41(38)	Ant 2	24	24	24	24	24
LTE Band 41_HPUE	Ant 2	27	27	27	27	27
LTE Band 42 Part 96	Ant 2	24	20	20	20	25
LTE Band 43 Part 96	Ant 2	24	20	20	20	25
LTE Band 48 Part 96	Ant 2	24	20	20	20	25

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 n13 : 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 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 n71 : 663 MHz ~ 698 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 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 B5/7/12/13/14/30/66
LTE Anchor Bands for n5	LTE B2/7/30/66/48
LTE Anchor Bands for n7	LTE B5/12
LTE Anchor Bands for n12	LTE B2/66
LTE Anchor Bands for n25	LTE B12/66
LTE Anchor Bands for n30	LTE B14
LTE Anchor Bands for n66	LTE B2/5/7/12/13/14/30/48/71
LTE Anchor Bands for n71	LTE B2/7/66
LTE Anchor Bands for n38	LTE B12/71
LTE Anchor Bands for n41	LTE B2/12/25/26/66
LTE Anchor Bands for n77	LTE B2/4/5/7/12/13/14/25/30/66
LTE Anchor Bands for n78	LTE B2/4/5/7/12/25/38/66/41/71

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		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520
M	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560	511500	2557.5	511000	2555	510000	2550

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

NR Band 14					
	Bandwidth 5MHz		Bandwidth 10MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Freq. (MHz)
L	158100	790.5	158600	793	793



M	158600	793		
H	159100	795.5		

NR Band 25																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz	
	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	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	373500	1867.5	374000	1870
M	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379500	1897.5	379000	1895

NR Band 26								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	163300	816.5	163800	819	164300	821.5	164800	824
M	166300	831.5	166300	831.5	166300	831.5	166300	831.5
H	169300	846.5	168800	844	168300	841.5	167800	839

NR Band 30				
	Bandwidth 5MHz		Bandwidth 10MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	461500	2307.5		
M	462000	2310		
H	462500	2312.5		

NR Band 66																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz	
	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	342500	1712.5	343000	1715	343500	1717.5	344000	1720	344500	1722.5	345000	1725	345500	1727.5	346000	1730
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	353500	1767.5	353000	1765	352500	1762.5	352000	1760

NR Band 71								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	133100	665.5	133600	668	134100	670.5	134600	673
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5
H	139100	695.5	138600	693	138100	690.5	137600	688

NR Band 38										
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	515004	2575.02	515502	2577.51	516000	2580	517002	2585.01	518004	2590.02
M	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595
H	522996	2614.98	522498	2612.49	522000	2610	520998	2604.99	519996	2599.98

NR Band 41																						
	Bandwidth 10MHz		Bandwidth 15MHz		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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500202	2501.01	500700	2503.5	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	518598	2592.99	518598	2592.99
H	537000	2685	536496	2682.48	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	531000	2655	529998	2649.99	528996	2644.98	528000	2640

NR Band 77																						
	Bandwidth 10MHz		Bandwidth 15MHz		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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	665000	3975	664834	3972.51	664666	3970.02	664332	3965.01	664000	3960	663668	3955.02	663332	3950.01	663000	3945	662666	3940.02	662332	3935.01	662000	3930

NR Band 78																						
	Bandwidth 10MHz		Bandwidth 15MHz		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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02		
M	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750
H	653000	3795	652834	3792.51	652668	3790.02	652334	3785.01	652000	3780	651668	3775.02	651334	3770.01	651000	3765	650668	3760.02	650334	3755.01		



NR Band 48										
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637000	3555	637168	3557.52	637334	3560.01	637668	3565.02	638000	3570
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99
H	646332	3694.98	646166	3692.49	646000	3690	645666	3684.99	645332	3679.98

NR Band 77																						
	Bandwidth 10MHz		Bandwidth 15MHz		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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495		
M	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01
H	636334	3545.01	636168	3542.52	636000	3540	635668	3535.02	635334	3530.01	635000	3525	634668	3520.02	634334	3515.01	634000	3510	633668	3505.02		

NR Band 78																						
	Bandwidth 10MHz		Bandwidth 15MHz		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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495		
M	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01
H	636334	3545.01	636168	3542.52	636000	3540	635668	3535.02	635334	3530.01	635000	3525	634668	3520.02	634334	3515.01	634000	3510	633668	3505.02		

<For NR Overlap Bands Description>

1) NR Bands BW

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
SA/NSA	n2	FDD	15	5, 10, 15, 20
	n25	FDD	15	5, 10, 15, 20,25,30,40
	n5	FDD	15	5,10,15,20
	n26	FDD	15	5,10,15,20
	n38	TDD	30	10,15,20,30,40
	n41	TDD	30	10,15,20, 30, 40, 50, 60, 70, 80, 90, 100
	n77	TDD	30	10,15,20, 30, 40, 50, 60, 70, 80, 90, 100
	n78	TDD	30	10,15,20, 30, 40, 50, 60, 70, 80, 90, 100

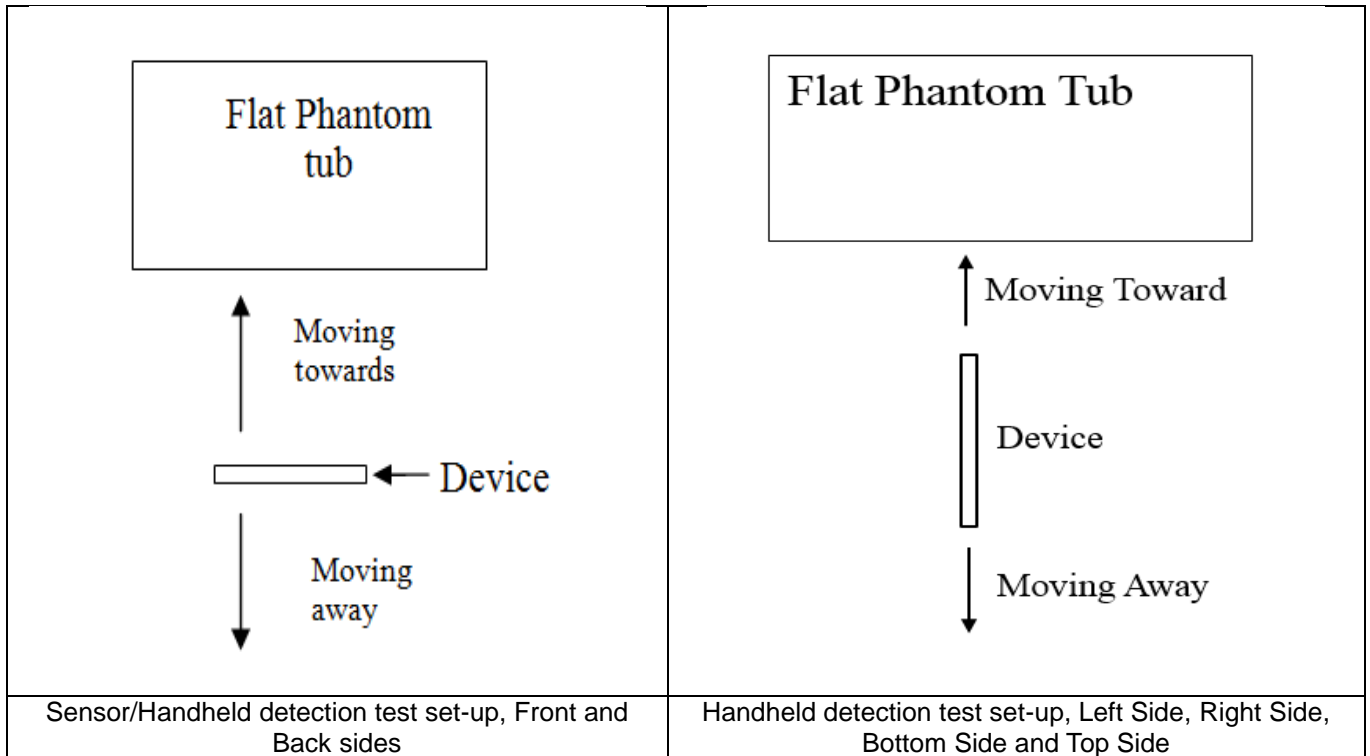
2) NR Bands Tune up:

Band	Antenna	Head Receiver on Tune-up Limit	Body-worn Sensor on Tune-up Limit	Hotspot Tune-up Limit	Extremity Sensor on Tune-up Limit	Default Tune-up Limit
5G NR n25(2)	Ant 0	24	24	24	24	24
5G NR n25(2)	Ant 1	21.5	24	24	24	24
5G NR n25(2)	Ant 5	19	21.5	21.5	21.5	24
5G NR n26(5)	Ant 1	22	24	24	24	24
5G NR n41(38) PC3	Ant 0	24	24	24	24	24
5G NR n41 PC2	Ant 0	25	25	25	25	27
5G NR n41(38) PC3	Ant 1	15	23	23	23	23
5G NR n41 PC2	Ant 1	15	26	26	26	26
5G NR n41(38) PC3	Ant 2	24	24	24	24	24
5G NR n41 PC2	Ant 2	25	25	25	25	25
5G NR n41(38) PC3	Ant 3	23	23	23	23	23
5G NR n41 PC2	Ant 3	26	26	26	26	26
5G NR n77(78) PC3 Part27O&27Q	Ant 2	19.5	18	18	18	24
5G NR n77(78) PC2 Part27O&27Q	Ant 2	19.5	18	18	18	26
5G NR n77(78) PC3 Part27O&27Q	Ant 3	22	21.5	21.5	21.5	22
5G NR n77(78) PC2 Part27O&27Q	Ant 3	25	21.5	21.5	21.5	25
5G NR n77(78) PC3 Part27O&27Q	Ant 4	17.5	20	20	20	24
5G NR n77(78) PC2 Part27O&27Q	Ant 4	17.5	20	20	20	26
5G NR n77(78) PC3 Part27O&27Q	Ant 5	16.5	21	20.5	21	21
5G NR n77(78) PC2 Part27O&27Q	Ant 5	16.5	23	20.5	23	23

5. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance>:

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (7125MHz) and lowest (1750MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body at the front or back of the device.
3. The output power will reduce to body worn power level when top and bottom sensor pad be detected.
4. The sensors used to detect the proximity of the user's body at the front or back surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s). When front or back body worn condition is detected reduced power will be active.
5. The device employs proximity sensors also can detect the presence of the user's a finger or hand when handheld state at the front/back/top/bottom/left/right sides of the device. When front/back/top/bottom/left/right sides of handheld condition is detected reduced power will be active.
6. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance -1mm was performed:



<P-Sensor>

Proximity Sensor Triggering Distance (mm)				
Position	Front		Back	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	15	17	30	31

<Handheld for ANT 0>

Proximity Sensor Triggering Distance (mm)										
Position	Front		Back		Left Side		Right Side		Bottom Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	17	20	30	31	11	13	16	22	24	32

<Handheld for ANT2>

Proximity Sensor Triggering Distance (mm)				
Position	Back		Left Side	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	13	17	11	13

<Handheld for ANT3>

Proximity Sensor Triggering Distance (mm)				
Position	Back		Left Side	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	7	11	11	13

<Handheld for ANT4>

Proximity Sensor Triggering Distance (mm)				
Position	Back		Right Side	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	5	8	5	9

< Sensor for ANT5>

Proximity Sensor Triggering Distance (mm)				
Position	Front		Back	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	3	6	17	19

< Sensor for ANT6/7/6+7>

Proximity Sensor Triggering Distance (mm)								
Position	Front		Back		Right Side		Top Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	3	6	17	19	17	20	9	15

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:

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

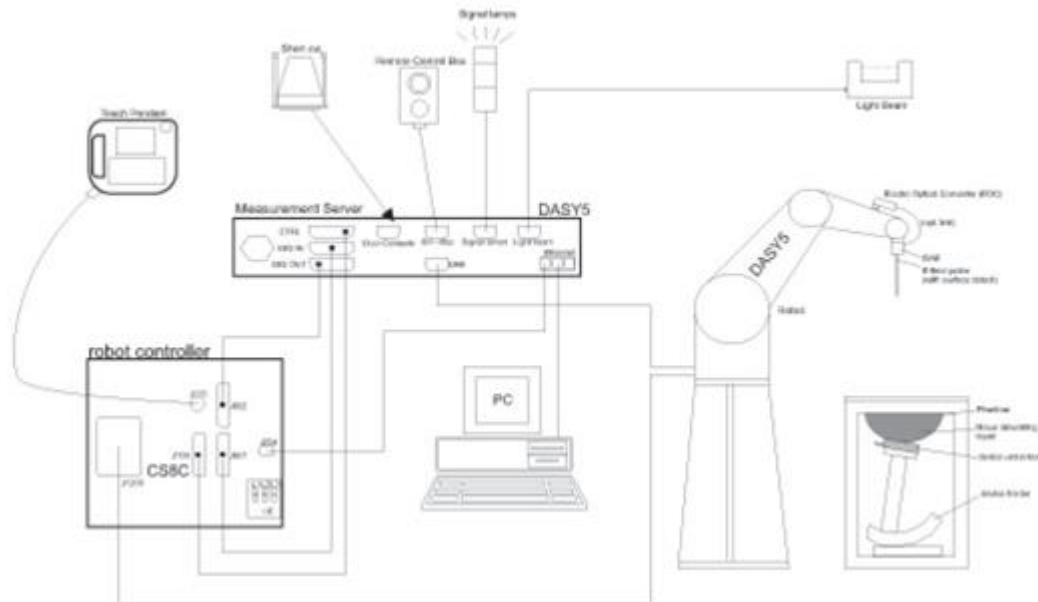
SAR is expressed in units of Watts per kilogram (W/kg)

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

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 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 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/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

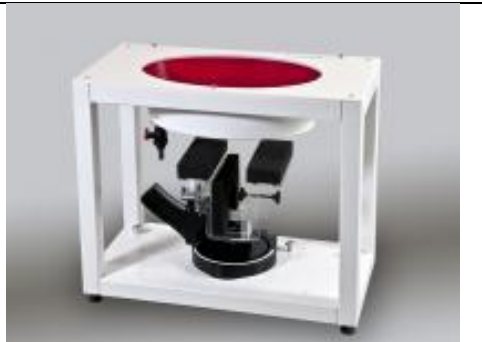
8.3 Phantom

<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 dB0 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: Δx_{Area} , Δy_{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: Δx_{Zoom} , Δy_{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: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm	
	graded grid	$\Delta z_{Zoom}(1)$: 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
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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	1087	2022/2/24	2025/2/22
SPEAG	835MHz System Validation Kit	D835V2	4d298	2024/1/26	2025/1/25
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2022/2/24	2025/2/22
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	2022/3/30	2025/3/28
SPEAG	2300MHz System Validation Kit	D2300V2	1055	2023/8/21	2026/8/20
SPEAG	2450MHz System Validation Kit	D2450V2	1095	2024/2/8	2025/2/7
SPEAG	2600MHz System Validation Kit	D2600V2	1112	2023/12/18	2024/12/17
SPEAG	3500MHz System Validation Kit	D3500V2	1037	2023/11/20	2024/11/19
SPEAG	3700MHz System Validation Kit	D3700V2	1008	2023/11/20	2024/11/19
SPEAG	3900MHz System Validation Kit	D3900V2	1048	2023/3/9	2026/3/8
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2022/9/23	2025/9/21
SPEAG	Data Acquisition Electronics	DAE4	1303	2023/11/20	2024/11/19
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	2024/1/22	2025/1/21
SPEAG	SAM Twin Phantom	SAM Twin	TP-1697	NCR	NCR
Testo	Thermo-Hygrometer	HTC-1	55011	2024/1/4	2025/1/3
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio Communication Analyzer	MT8821C	6262306175	2024/7/4	2025/7/3
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	2024/7/4	2025/7/3
SPEAG	Dielectric Probe Kit	DAK-3.5	1071	2024/2/19	2025/2/18
Anritsu	Vector Signal Generator	MG3710A	6201682672	2024/1/2	2025/1/1
Rohde & Schwarz	Power Meter	NRVD	102081	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2024/7/4	2025/7/3
R&S	BLUETOOTH TESTER	CBT	101246	2024/7/4	2025/7/3
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2023/10/11	2024/10/10
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2024/10/11	2025/10/10
TES	DIGITAC THERMOMETER	TYPE-K	220305411	2024/1/4	2025/1/3
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	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.

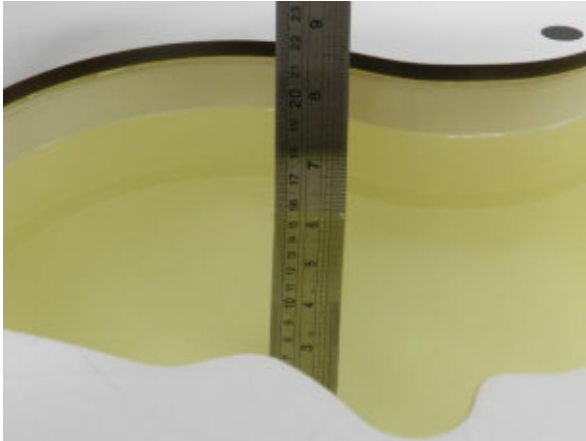


Fig 11.1 Photo of Liquid Height for Head SAR

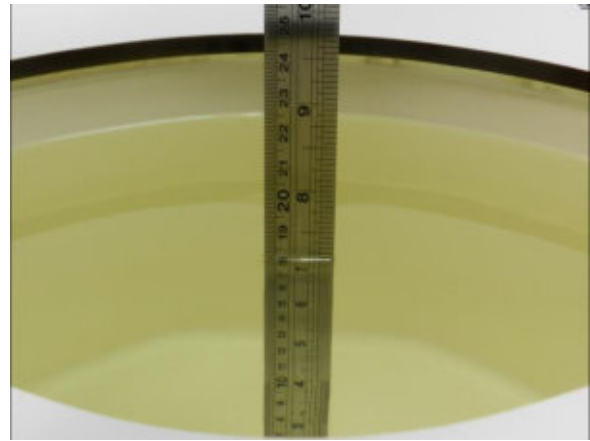


Fig 11.2 Photo of Liquid Height for Body SAR

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
900	40.3	57.9	0.2	1.4	0.2	0	0.97	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	22.8	0.887	42.282	0.89	41.90	-0.34	0.91	±5	2024/9/27
835	Head	22.9	0.913	41.936	0.90	41.50	1.44	1.05	±5	2024/9/28
1750	Head	22.7	1.319	40.225	1.37	40.10	-3.72	0.31	±5	2024/9/29
1900	Head	22.8	1.406	40.215	1.40	40.00	0.43	0.54	±5	2024/9/30
2300	Head	22.8	1.651	39.657	1.67	39.50	-1.14	0.40	±5	2024/10/1
2600	Head	22.6	2.040	40.355	1.96	39.00	4.08	3.47	±5	2024/10/2
3500	Head	22.9	2.813	38.735	2.91	37.90	-3.33	2.20	±5	2024/10/3
3700	Head	22.7	2.991	38.382	3.12	37.70	-4.13	1.81	±5	2024/10/4
3900	Head	22.6	3.175	38.058	3.32	37.50	-4.37	1.49	±5	2024/10/5
750	Head	22.9	0.889	42.281	0.89	41.90	-0.11	0.91	±5	2024/10/6
835	Head	22.6	0.912	41.949	0.90	41.50	1.33	1.08	±5	2024/10/7
1750	Head	22.9	1.317	40.224	1.37	40.10	-3.87	0.31	±5	2024/10/8
1900	Head	22.9	1.407	40.212	1.40	40.00	0.50	0.53	±5	2024/10/9
2300	Head	22.7	1.653	39.655	1.67	39.50	-1.02	0.39	±5	2024/10/10
2600	Head	22.8	2.030	40.344	1.96	39.00	3.57	3.45	±5	2024/10/11
3500	Head	22.6	2.810	38.711	2.91	37.90	-3.44	2.14	±5	2024/10/12
3700	Head	22.7	2.988	38.359	3.12	37.70	-4.23	1.75	±5	2024/10/13
3900	Head	22.6	3.171	38.036	3.32	37.50	-4.49	1.43	±5	2024/10/14
2450	Head	22.7	1.744	39.267	1.80	39.20	-3.11	0.17	±5	2024/10/15
5250	Head	22.9	4.573	35.720	4.71	35.90	-2.91	-0.50	±5	2024/10/16
5600	Head	22.6	4.997	35.371	5.07	35.50	-1.44	-0.36	±5	2024/10/17
5750	Head	22.6	5.105	34.869	5.22	35.40	-2.20	-1.50	±5	2024/10/18
1900	Head	22.7	1.424	41.794	1.40	40.00	1.71	4.48	±5	2024/11/5

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 (%)
2024/9/27	750	Head	50	1087	3857	1303	0.462	8.58	9.24	7.69
2024/9/28	835	Head	50	4d298	3857	1303	0.477	9.89	9.54	-3.54
2024/9/29	1750	Head	50	1090	3857	1303	1.770	37.00	35.4	-4.32
2024/9/30	1900	Head	50	5d118	3857	1303	1.850	39.30	37	-5.85
2024/10/1	2300	Head	50	1055	3857	1303	2.290	48.40	45.8	-5.37
2024/10/2	2600	Head	50	1112	3857	1303	2.690	55.10	53.8	-2.36
2024/10/3	3500	Head	50	1037	3857	1303	3.120	65.40	62.4	-4.59
2024/10/4	3700	Head	50	1008	3857	1303	3.170	67.20	63.4	-5.65
2024/10/5	3900	Head	50	1048	3857	1303	3.650	69.10	73	5.64
2024/10/6	750	Head	50	1087	3857	1303	0.447	8.58	8.94	4.20
2024/10/7	835	Head	50	4d298	3857	1303	0.486	9.89	9.72	-1.72
2024/10/8	1750	Head	50	1090	3857	1303	1.930	37.00	38.6	4.32
2024/10/9	1900	Head	50	5d118	3857	1303	1.960	39.30	39.2	-0.25
2024/10/10	2300	Head	50	1055	3857	1303	2.290	48.40	45.8	-5.37
2024/10/11	2600	Head	50	1112	3857	1303	2.870	55.10	57.4	4.17
2024/10/12	3500	Head	50	1037	3857	1303	3.350	65.40	67	2.45
2024/10/13	3700	Head	50	1008	3857	1303	3.500	67.20	70	4.17
2024/10/14	3900	Head	50	1048	3857	1303	3.260	69.10	65.2	-5.64
2024/10/15	2450	Head	50	1095	3857	1303	2.670	52.60	53.4	1.52
2024/10/16	5250	Head	50	1113	3857	1303	4.170	81.50	83.4	2.33
2024/10/17	5600	Head	50	1113	3857	1303	4.420	82.60	88.4	7.02
2024/10/18	5750	Head	50	1113	3857	1303	4.080	80.80	81.6	0.99
2024/11/5	1900	Head	50	5d118	3857	1303	1.920	39.30	38.4	-2.29

<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 (%)
2024/9/27	750	Head	50	1087	3857	1303	0.298	5.65	5.96	5.49
2024/9/28	835	Head	50	4d298	3857	1303	0.313	6.45	6.26	-2.95
2024/9/29	1750	Head	50	1090	3857	1303	0.946	19.50	18.92	-2.97
2024/9/30	1900	Head	50	5d118	3857	1303	0.956	20.40	19.12	-6.27
2024/10/1	2300	Head	50	1055	3857	1303	1.100	23.70	22	-7.17
2024/10/2	2600	Head	50	1112	3857	1303	1.240	24.80	24.8	0.00
2024/10/3	3500	Head	50	1037	3857	1303	1.200	24.70	24	-2.83
2024/10/4	3700	Head	50	1008	3857	1303	1.190	24.40	23.8	-2.46
2024/10/5	3900	Head	50	1048	3857	1303	1.230	24.10	24.6	2.07
2024/10/6	750	Head	50	1087	3857	1303	0.302	5.65	6.04	6.90
2024/10/7	835	Head	50	4d298	3857	1303	0.326	6.45	6.52	1.09
2024/10/8	1750	Head	50	1090	3857	1303	1.010	19.50	20.2	3.59
2024/10/9	1900	Head	50	5d118	3857	1303	1.060	20.40	21.2	3.92
2024/10/10	2300	Head	50	1055	3857	1303	1.100	23.70	22	-7.17
2024/10/11	2600	Head	50	1112	3857	1303	1.320	24.80	26.4	6.45
2024/10/12	3500	Head	50	1037	3857	1303	1.310	24.70	26.2	6.07
2024/10/13	3700	Head	50	1008	3857	1303	1.280	24.40	25.6	4.92
2024/10/14	3900	Head	50	1048	3857	1303	1.130	24.10	22.6	-6.22
2024/10/15	2450	Head	50	1095	3857	1303	1.260	24.70	25.2	2.02
2024/10/16	5250	Head	50	1113	3857	1303	1.220	23.30	24.4	4.72
2024/10/17	5600	Head	50	1113	3857	1303	1.200	23.70	24	1.27
2024/10/18	5750	Head	50	1113	3857	1303	1.180	23.00	23.6	2.61
2024/11/5	1900	Head	50	5d118	3857	1303	1.010	20.40	20.2	-0.98

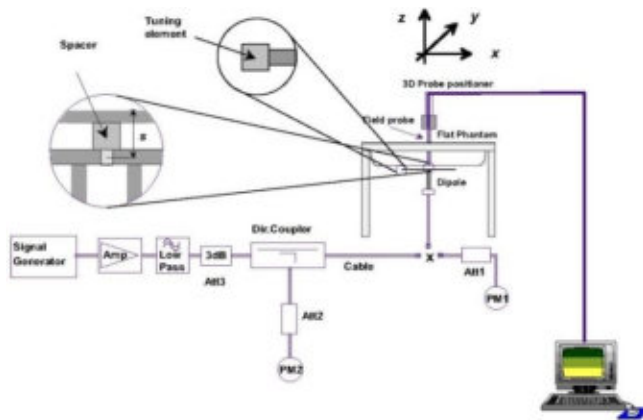


Fig 11.3.1 System Performance Check Setup



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.

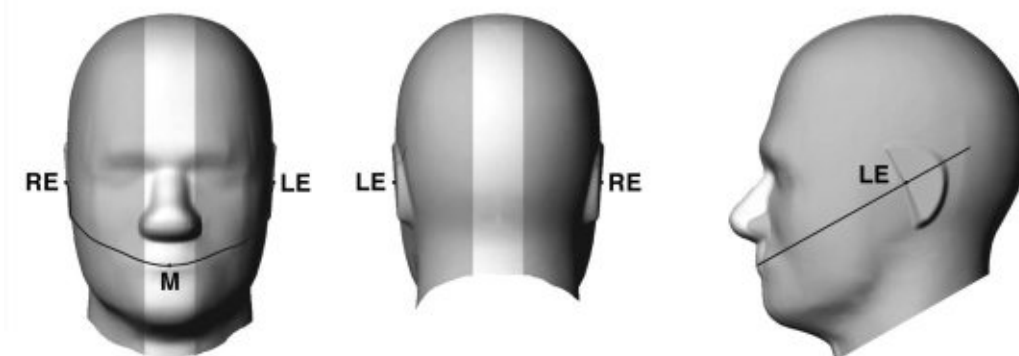


Fig 12.1.1 Front, back, and side views of SAM twin phantom

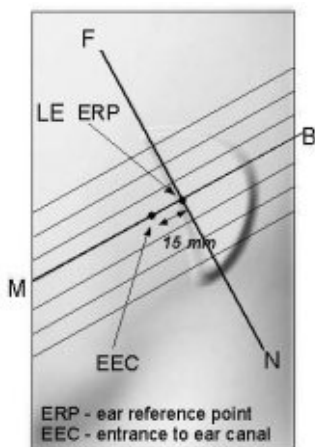


Fig 12.1.2 Close-up side view of phantom showing the ear region.

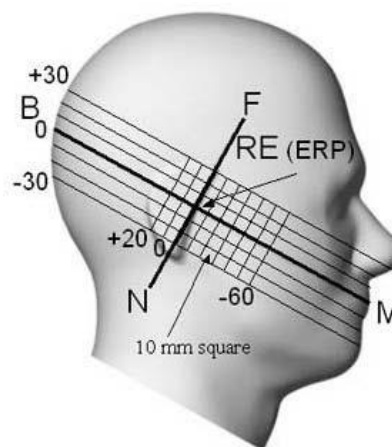


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

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.

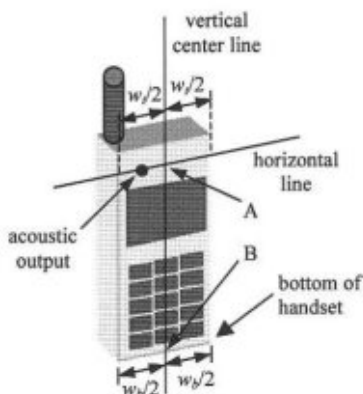


Fig 12.2.1 Handset vertical and horizontal reference lines—“fixed case”

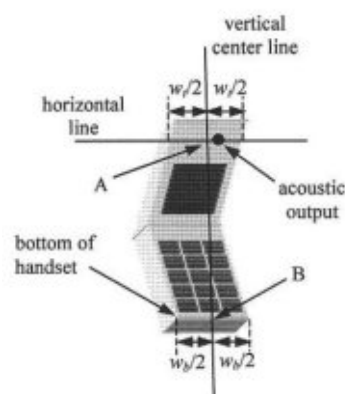


Fig 12.2.2 Handset vertical and horizontal reference lines—“clam-shell case”

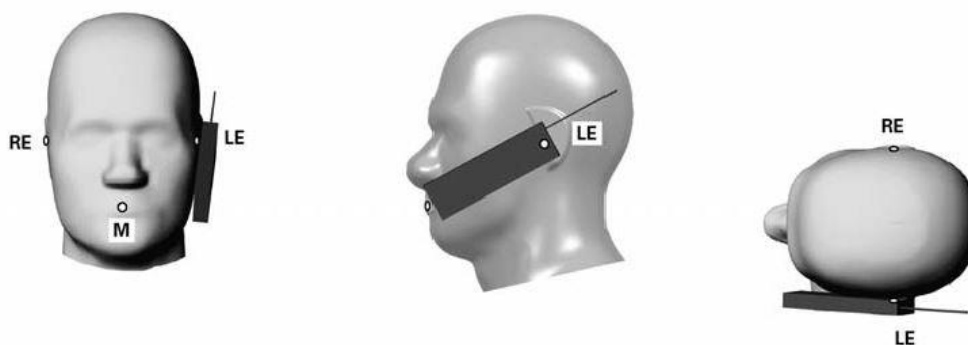


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

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

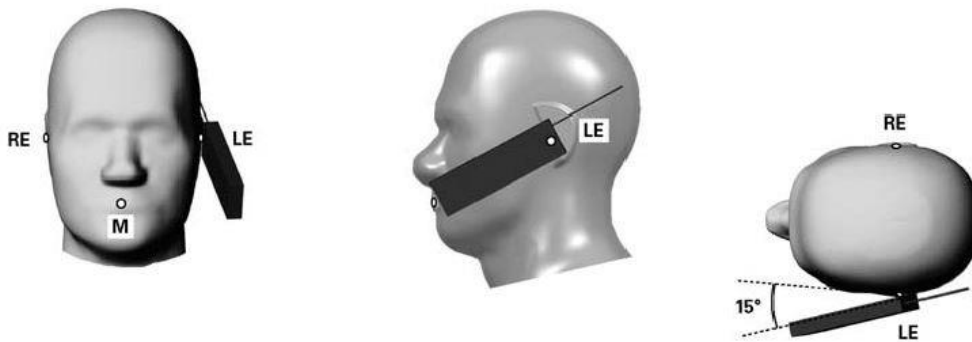


Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

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 headset 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 tested 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.

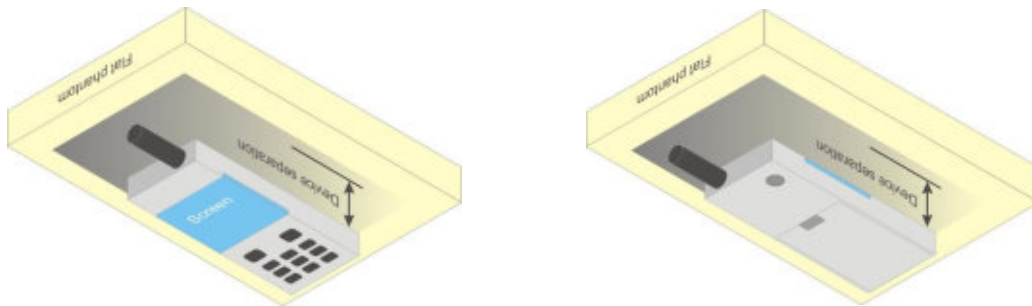


Fig 12.4 Body Worn Position

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 ($L \times W \geq 9$ cm x 5 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.

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCL is equal to the target E-TFCL of 75 for sub-test 1, and other subtest's E-TFCL
- d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCL
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} : 47/15 β_{ed2} : 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d=12/15$, $\beta_{hs}/\beta_c=24/15$. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

<WCDMA Conducted Power>

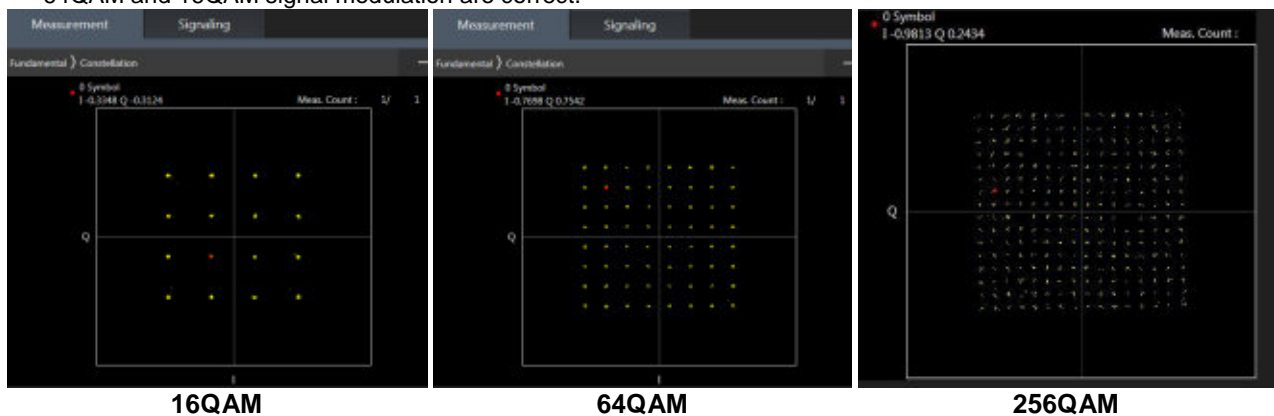
General Note:

- 1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
- 2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is $\leq 1/4$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA) are less than $1/4$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA.

<LTE Conducted Power>

General Note:

1. Anritsu MT8821C 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/256QAM 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/256QAM 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 B2 / B4 / B5 / B17 / B38 / B42(3550-3600MHz)/B43 SAR test was covered by B25 / B66 / B26 / B12 / B41/ B48; 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, 256QAM 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 256QAM, 64QAM and 16QAM signal modulation are correct.



<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

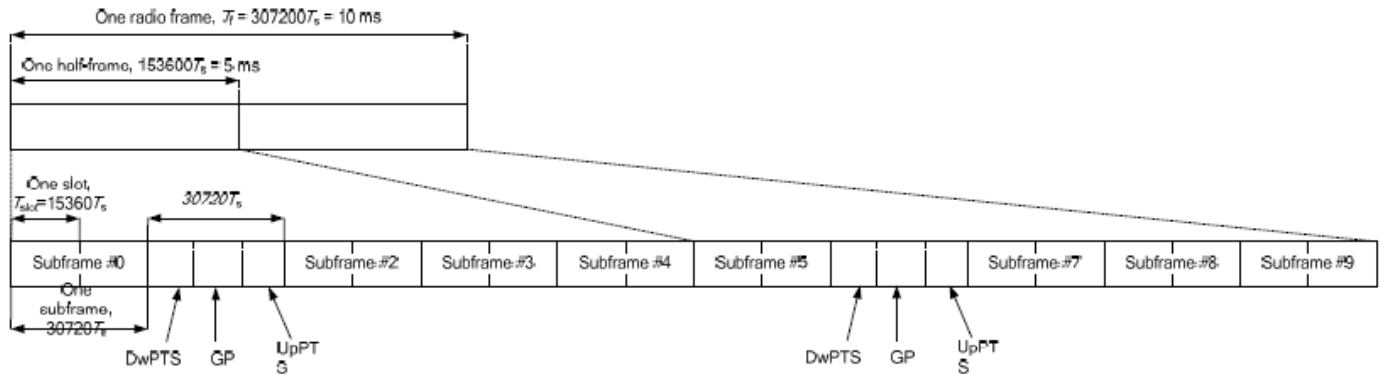


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	6592 · Ts	2192 · Ts	2560 · Ts	7680 · Ts	2192 · Ts	2560 · Ts
1	19760 · Ts			20480 · Ts		
2	21952 · Ts			23040 · Ts		
3	24144 · Ts			25600 · Ts		
4	26336 · Ts	4384 · Ts	5120 · Ts	7680 · Ts	4384 · Ts	5120 · Ts
5	6592 · Ts			20480 · Ts		
6	19760 · Ts			23040 · Ts		
7	21952 · Ts			12800 · Ts		
8	24144 · Ts			-		
9	13168 · Ts	-	-	-	-	-

Special subframe (30720·T _s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T _s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

For LTE TDD Power class 2

- i. Uplink-downlink configuration: 1. In a half-frame consisted of 5 subframes, uplink operation is in 2 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(2+0.167)/5 = 43.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(2+0.143)/5 = 42.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $43.3\%/42.9\% = 1.009$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

For LTE TDD Power class 3

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, 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 scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

The device can adjust uplink/downlink configuration automatically according to the transmitting power class level, as follows:

LTE TDD Band	Power Class level	support uplink/downlink configuration
LTE Band 41	> 23	1,2,3,4,5
	=23	0,1,2,3,4,5,6
	< 23	0,1,2,3,4,5,6



<LTE Carrier Aggregation>

The detailed LTE Carrier Aggregation conducted power table can refer to Appendix F.

General Note:

1. This device supports Carrier Aggregation on downlink for inter and intra band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.
3. The gray color table is covered by other combinations and no need to verify power.

2CC Downlink Carrier Aggregation				3CC Downlink Carrier Aggregation				4CC Downlink Carrier Aggregation			
Number	Combination	4X4 MIMO	Covered by Measurement Superset	Number	Combination	4X4 MIMO	Covered by Measurement Superset	Number	Combination	4X4 MIMO	Covered by Measurement Superset
1	CA_12A-30A	30A	3CC-1	1	CA_12A-30A-66A	30A-66A	4CC-1	1	CA_12A-30A-66A-66A	30A-66A	
2	CA_12A-66A	66A	3CC-1	2	CA_12A-66A-66A	66A	4CC-1	2	CA_13A-48A-66B	48A-66B	
3	CA_13A-48A	48A	3CC-4	3	CA_12A-66C	66A	4CC-9	3	CA_13A-48A-66C	48A-66C	
4	CA_13A-66A	66A	3CC-4	4	CA_13A-48A-66A	48A-66A		4	CA_13A-48C-66A	48C-66A	
5	CA_14A-30A	30A	3CC-9	5	CA_13A-48C	48A	4CC-4	5	CA_13A-48D	48D	
6	CA_14A-66A	66A	3CC-9	6	CA_13A-66A-66A	66A	4CC-11	6	CA_14A-30A-66A-66A	30A-66A	
7	CA_25A-25A	25A		7	CA_13A-66B	66A	4CC-2	7	CA_29A-30A-66A-66A	30A-66A	
8	CA_29A-30A	30A	3CC-18	8	CA_13A-66C	66A	4CC-3	8	CA_2A-12A-66A-66A	2A-66A	
9	CA_29A-66A	66A	4CC-7	9	CA_14A-30A-66A	30A-66A	4CC-6	9	CA_2A-12A-66C	2A-66C	
10	CA_2A-12A	2A	3CC-11	10	CA_14A-66A-66A	66A-66A	4CC-6	10	CA_2A-13A-48C	2A-48C	
11	CA_2A-13A	2A	3CC-14	11	CA_2A-12A-30A	2A-30A	4CC-15	11	CA_2A-13A-66A-66A	2A-66A	
12	CA_2A-14A	2A	3CC-16	12	CA_2A-12A-66A	2A-66A	4CC-16	12	CA_2A-13A-66B	2A-66B	
13	CA_2A-17A	2A		14	CA_2A-13A-48A	2A-48A		13	CA_2A-13A-66C	2A-66C	
14	CA_2A-29A	2A	3CC-18	15	CA_2A-13A-66A	2A-66A	4CC-11	14	CA_2A-14A-66A-66A	2A-66A	
15	CA_2A-2A	2A	3CC-19	16	CA_2A-14A-30A	2A-30A		15	CA_2A-2A-12A-30A	2A-30A	
16	CA_2A-30A	2A-30A	3CC-18	17	CA_2A-14A-66A	2A-66A	4CC-18	16	CA_2A-2A-12A-66A	2A-66A	
17	CA_2A-48A	2A-48A	3CC-26	18	CA_2A-29A-30A	2A-30A	4CC-19	17	CA_2A-2A-13A-66A	2A-66A	
18	CA_2A-4A	2A-4A	3CC-21	19	CA_2A-2A-12A	2A	4CC-16	18	CA_2A-2A-14A-66A	2A-66A	
19	CA_2A-5A	2A	3CC-22	20	CA_2A-2A-13A	2A	4CC-17	19	CA_2A-2A-29A-30A	2A-30A	
20	CA_2A-66A	2A-66A	3CC-23	21	CA_2A-2A-4A	2A-4A	4CC-21	20	CA_2A-2A-30A-66A	2A-30A-66A	
21	CA_2A-71A	2A	3CC-24	22	CA_2A-2A-5A	2A	4CC-25	21	CA_2A-2A-4A-12A	2A-4A	
22	CA_2A-7A	2A-7A		23	CA_2A-2A-66A	2A-66A	4CC-26	22	CA_2A-2A-4A-4A	2A-4A	
23	CA_2C	2A	3CC-41	24	CA_2A-2A-71A	2A	4CC-28	23	CA_2A-2A-4A-5A	2A-4A	
24	CA_30A-66A	30A-66A	3CC-42	25	CA_2A-30A-66A	2A-30A-66A	4CC-31	24	CA_2A-2A-4A-71A	2A-4A	
25	CA_38C	38A		26	CA_2A-48A-48A	2A-48A		25	CA_2A-2A-5A-30A	2A-30A	
26	CA_41A-41A	41A	3CC-69	27	CA_2A-48A-66A	2A-48A-66A		26	CA_2A-2A-5A-66A	2A-66A	
27	CA_41C	41A	3CC-69	28	CA_2A-48C	2A-48C	4CC-32	27	CA_2A-2A-66A-66A	2A-66A	
28	CA_48A-48A	48A	3CC-44	29	CA_2A-4A-12A	2A-4A	4CC-21	28	CA_2A-2A-66A-71A	2A-66A	
29	CA_48A-66A	48A-66A	3CC-44	30	CA_2A-4A-13A	2A-4A		29	CA_2A-2A-66B	2A-66B	
30	CA_48C	48A	3CC-28	31	CA_2A-4A-4A	2A-4A	4CC-34	30	CA_2A-2A-66C	2A-66C	
31	CA_4A-12A	4A	3CC-29	32	CA_2A-4A-5A	2A-4A	4CC-34	31	CA_2A-30A-66A-66A	2A-30A-66A	
32	CA_4A-13A	4A	3CC-30	33	CA_2A-4A-71A	2A-4A	4CC-24	32	CA_2A-48C-66A	2A-48C-66A	
33	CA_4A-17A	4A		34	CA_2A-5A-30A	2A-30A	4CC-25	33	CA_2A-48D	2A-48D	
34	CA_4A-29A	4A	3CC-51	35	CA_2A-5A-48A	2A-48A		34	CA_2A-4A-4A-5A	2A-4A	
35	CA_4A-48A	4A-48A		36	CA_2A-5A-66A	2A-66A	4CC-36	35	CA_2A-5A-48C	2A-48C	
36	CA_4A-4A	4A	3CC-31	37	CA_2A-66A-66A	2A-66A	4CC-36	36	CA_2A-5A-66A-66A	2A-66A	
37	CA_4A-5A	4A	3CC-32	38	CA_2A-66A-71A	2A-66A	4CC-41	37	CA_2A-5A-66B	2A-66B	
38	CA_4A-71A	4A	3CC-33	39	CA_2A-66B	2A-66A	4CC-37	38	CA_2A-5A-66C	2A-66C	
39	CA_5A-13A		3CC-71	40	CA_2A-66C	2A-66A	4CC-38	39	CA_2A-5B-66A	2A-66A	
40	CA_5A-30A	30A	3CC-58	41	CA_2C-66A	2A-66A	4CC-43	40	CA_2A-66A-66A-66A	2A-66A	
41	CA_5A-48A	48A	3CC-59	42	CA_30A-66A-66A	30A-66A	4CC-31	41	CA_2A-66A-66A-71A	2A-66A	



42	CA_5A-5A			43	CA_41D	41D	4CC-55	42	CA_2A-66C-71A	2A-66C	
43	CA_5A-66A	66A	3CC-61	44	CA_48A-48A-66A	48A-66A		43	CA_2C-66A-66A	2C-66A	
44	CA_5A-7A	7A		45	CA_48A-66A-66A	48A-66A		44	CA_48C-66A-66A	48C-66A	
45	CA_5B		4CC-53	46	CA_48A-66B	48A-66A	4CC-2	45	CA_48C-66B	48C-66B	
46	CA_66A-66A	66A	3CC-64	47	CA_48A-66C	48A-66A	4CC-3	46	CA_48C-66C	48C-66C	
47	CA_66A-71A	66A	3CC-65	48	CA_48C-66A	48A-66A	4CC-44	47	CA_48D-66A	48D-66A	
48	CA_66B	66A	3CC-62	49	CA_48D	48D	4CC-47	48	CA_48E	48E	
49	CA_66C	66A	3CC-63	50	CA_4A-12A-30A	4A-30A		49	CA_4A-48D	4A-48D	
50	CA_7A-7A	7A		51	CA_4A-29A-30A	4A-30A		50	CA_5A-30A-66A-66A	30A-66A	
51	CA_7C	7A		52	CA_4A-48C	4A-48C		51	CA_5A-48C-66A	48C-66A	
52	CA_4A_30A	4A_30A	3CC-57	53	CA_4A-4A-12A	4A	4CC-54	52	CA_5A-48D	48D	
53	CA_5A-13A		3CC-71	54	CA_4A-4A-13A	4A		53	CA_5B-66A-66A	66A	
				55	CA_4A-4A-5A	4A	4CC-34	54	CA_2A-4A-4A-12A	2A-4A	
				56	CA_4A-4A-71A	4A		55	CA_25A-41D	25A-41D	
				57	CA_4A-5A-30A	4A-30A					
				58	CA_5A-30A-66A	30A-66A	4CC-50				
				59	CA_5A-48A-66A	48A-66A					
				60	CA_5A-48C	48C	4CC-51				
				61	CA_5A-66A-66A	66A	4CC-50				
				62	CA_5A-66B	66A	4CC-37				
				63	CA_5A-66C	66A	4CC-38				
				64	CA_66A-66A-66A	66A	4CC-40				
				65	CA_66A-66A-71A	66A	4CC-41				
				66	CA_66A-66C	66A					
				67	CA_66C-71A	66A	4CC-42				
				68	CA_66D	66A					
				69	CA_41C-41A	41A					
				70	CA_48C-48A	48A					
				71	CA_2A-5A-13A	2A					
				72	CA_4A-5A-13A	4A					



LTE Carrier Aggregation Conducted Power (Downlink)

- i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. The device supports downlink three carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.
- vi. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.
- vii. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

LTE 4x4 MIMO (Downlink)

This device supports downlink 4x4 MIMO operations for LTE Band 2/4/7/25/30/38/41/42/48/66 only. Uplink transmission is limited to a single output stream. Power measurements were performed with downlink 4x4 MIMO active for the configuration with highest measured maximum conducted power with 4x4 downlink MIMO inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive. When carrier aggregation is applicable, power measurements were performed with the downlink carrier aggregation and 4x4 DL MIMO active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

4X4 MIMO	Band
	LTE Band 2/4/7/25/30/38/41/42/48/66



LTE Carrier Aggregation Conducted Power (Uplink)

LTE Uplink CA	2CC Uplink Carrier Aggregation
Intra-band	Antenna Tx
CA_7C	Ant 0
CA_66C	Ant 0
CA_66B	Ant 0
CA_38C	Ant 0
CA_41C	Ant 0
CA_48C	Ant 2

<Intra-band>

General Note:

- i. The device supports intra-band uplink carrier aggregation for LTE B7/66/48/41/38 with a maximum of two uplink component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.
- ii. The device supports uplink carrier aggregation with a maximum of two uplink component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.
- iii. According Nov. 2017 TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- iv. Additional SAR measurement for LTE UL CA with other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.
- v. LTE CA_66B test was covered by CA_66C; therefore, SAR was only assessed for CA_66C.



<Inter-band uplink carrier aggregation consideration>

LTE Uplink CA	2CC Uplink Carrier Aggregation	
Inter-band	Main Antenna Tx	
CA_12A-30A	ANT1	ANT0
CA_12A-66A	ANT1	ANT0
CA_13A-66A	ANT1	ANT0
CA_14A-30A	ANT1	ANT0
CA_14A-66A	ANT1	ANT0
CA_2A-12A	ANT0	ANT1
CA_2A-13A	ANT0	ANT1
CA_2A-14A	ANT0	ANT1
CA_2A-66A	ANT0	ANT5
CA_2A-4A	ANT0	ANT5
CA_2A-5A	ANT0	ANT1
CA_4A-5A	ANT0	ANT1
CA_4A-12A	ANT0	ANT1
CA_4A-13A	ANT0	ANT1
CA_4A-17A	ANT0	ANT1
CA_5A-30A	ANT1	ANT0
CA_5A-66A	ANT1	ANT0
CA_5A-7A	ANT1	ANT0

General Note:

1. The single carrier of inter band CA uplink power level is the same as Non-CA standalone LTE power level.
2. For Inter-band CA co-located SAR analysis is performed using standalone SAR summed together and they are more conservatively for inter band CA.

5G NR Output Power (Unit: dBm)

General Note:

1. 5G NR n2/n5/n7/n12/n13/n14/n25/n26/n30/n66/n38/n41/n48/n71/n77/n78 is SA mode.
2. 5G NR n2/n5/n7/n12/n25/n30/n66/n38/n41/n71/n77/n78 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 bands test, using FTM (Factory Test Mode) with default 100% duty cycle transmission to perform SAR testing.
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 mode for 5G NR n41/n77/n78 with higher power, so HPUE SAR has been performed full SAR testing and power class 2 SAR can represent power class 3 SAR.
10. For 5G NR EN-DC mode, standalone SAR performed for 5G NR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5G NR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.

<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	$\leq 3.5^1$ $\leq 0.5^2$	$\leq 1.2^1$ $\leq 0.5^2$	$\leq 0.2^1$ 0 ²
	QPSK		≤ 1	0
	16 QAM		≤ 2	≤ 1
	64 QAM		≤ 2.5	
	256 QAM		≤ 4.5	
CP-OFDM	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>

ENDC	Main Antenna Tx	
	LTE TX	NR TX
DC_13A_n66A	ANT 1	ANT 0
DC_5A_n2A	ANT 1	ANT 0
DC_14A_n2A	ANT 1	ANT 0
DC_30A_n2A	ANT0	ANT5
DC_30A_n2A	ANT2	ANT0
DC_2A_n5A	ANT0	ANT1
DC_30A_n5A	ANT0	ANT1
DC_66A_n5A	ANT0	ANT1
DC_2A_n12A	ANT0	ANT1
DC_14A_n30A	ANT1	ANT0
DC_2A_n66A	ANT0	ANT5
DC_2A_n66A	ANT5	ANT0
DC_5A_n66A	ANT 1	ANT 0
DC_12A_n66A	ANT 1	ANT 0
DC_14A_n66A	ANT 1	ANT 0
DC_30A_n66A	ANT0	ANT5
DC_30A_n66A	ANT2	ANT0
DC_12A_n2A	ANT 1	ANT 0
DC_66A_n2A	ANT0	ANT5
DC_66A_n2A	ANT 1	ANT 0
DC_2A_n41A	ANT0	ANT2
DC_71A_n66A	ANT 1	ANT 0
DC_2A_n71A	ANT0	ANT1
DC_66A_n71A	ANT0	ANT1
DC_66A_n41A	ANT0	ANT2
DC_25A_n41A	ANT0	ANT2
DC_26A_n41A	ANT1	ANT0



DC_7A_n78A	ANT0	ANT4
DC_38A_n78A	ANT0	ANT4
DC_5A_n78A	ANT1	ANT2
DC_66A_n78A	ANT0	ANT4
DC_2A_n78A	ANT0	ANT4
DC_7A_n71A	ANT0	ANT1
DC_12A_n78A	ANT1	ANT2
DC_5A_n7A	ANT1	ANT0
DC_12A_n7A	ANT1	ANT0
DC_13A_n2A	ANT 1	ANT 0
DC_48A_n5A	ANT2	ANT1
DC_48A_n66A	ANT2	ANT5
DC_7A_n66A	ANT0	ANT5
DC_7A_n66A	ANT2	ANT0
DC_41A_n77A	ANT0	ANT4
DC_41A_n78A	ANT0	ANT4
DC_12A_n38A	ANT1	ANT0
DC_4A_n78A	ANT0	ANT4
DC_12A_n25A	ANT1	ANT0
DC_7A_n77A	ANT0	ANT4
DC_71A_n78A	ANT1	ANT2
DC_71A_n38A	ANT1	ANT0
DC_12A_n41A	ANT1	ANT0
DC_7A_n2A	ANT0	ANT5
DC_2A_n77A	ANT0	ANT4
DC_5A_n77A	ANT1	ANT4
DC_13A_n77A	ANT1	ANT4
DC_66A_n77A	ANT0	ANT4
DC_12A_n77A	ANT1	ANT4
DC_14A_n77A	ANT1	ANT4
DC_30A_n77A	ANT0	ANT4
DC_25A_n78A	ANT0	ANT4
DC_25A_n77A	ANT0	ANT4
DC_66A_n12A	ANT0	ANT1
DC_7A_n5A	ANT0	ANT1
DC_66A_n25A	ANT0	ANT5

<WLAN Conducted Power>

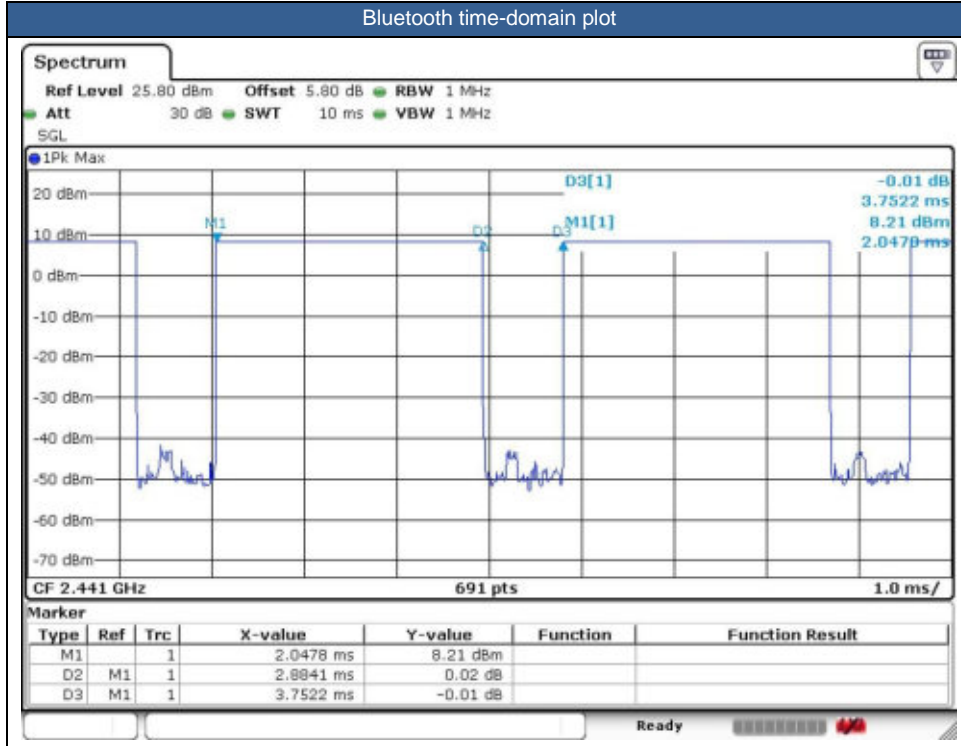
General Note:

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration. Additional output power measurements were not necessary.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closest/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
6. The 2.4GHz/5GHz WLAN can transmit in SISO/MIMO antenna mode.
7. 802.11 ax supports both full tone size mode and partial tone size mode, after verification on partial tone size mode that partial size tone mode power will not be higher than full tone size mode, therefore, full tone mode power was chosen to be measured in this report.
8. For the conducted power measurement is MIMO chains transmitting simultaneously and measured the separately conducted power for both chains and then based on the conducted power of two SISO antennas respectively to calculate sum of the power for MIMO mode.
9. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle are 76.86% as following figure, Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation.



2nd BLE Exclusions Applied:

Mode Band	Max Average power(dBm)
	LE
2.4GHz Bluetooth	4.0

Note:

- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

LE Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
4.0	10	2.48	0.4
	0	2.48	0.8

Note:

- Per KDB 447498 D01v06, since Bluetooth LE (Module 2) has no voice function, so the minimum test separation distance is 10 mm for 1g SAR and 0mm for 10g SAR. When the minimum test separation distance and applied separately to determine SAR test exclusion. The test exclusion threshold at 10mm is 0.4 which is ≤ 3 for 1g SAR and at 0mm is 0.8 which is ≤ 7.5 for 10-g extremity SAR, so SAR testing is not required.
- According to the EUT characteristic, Bluetooth LE (Module 2) cannot be transmitted simultaneously with other wireless modes, so there is no need to consider the transmit simultaneous.



14. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

15. 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 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 SAR testing of Bluetooth signal with 83.3% theoretical duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle) *83.3%".
 - d. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - e. For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - f. 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.
 - g. For TDD LTE SAR measurement of power class 2, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 43.3%/42.9% = 1.009 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 ≥ 0.8W/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 proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity). And 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 bands test, using FTM (Factory Test Mode) with default 100% duty cycle transmission to perform SAR testing.
6. Per KDB648474 D04v01r03, when the EUT is in flip open configuration with 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/WLAN transmitter scaled to maximum output power mode for product specific 10g SAR is higher than 1.2W/kg of 5G NR n30, WLAN2.4 /5.2GHz/5.8GHz, 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. Although the headset SAR is greater than 0.8 W/kg, the headset SAR verified the worst of the non-headset SAR and less than non-headset SAR, so there is no need to be tested other channels.
8. Although the distance 1gSAR is greater than 0.8 W/kg at body-worn exposure conditions, the distance SAR verified the worst of the non-distance SAR and less than non-distance SAR, so there is no need to be tested other channels.
9. According to Nov. 2017 TCB workshop, when the reported 1gSAR for UL CA configuration is <1.2 W/kg, UL CA 1gSAR is not required for all required test channels (PCC based).
10. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hotspot SAR.
11. 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 $\leq 25\text{mm}$ from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.

12. The device for LTE Band 48C/5GNR n48 SAR testing was configured by the 3GPP MPR implementations and in order to more conservative RF exposure assessment to determine SAR compliance, the actual maximum output power in production unit refer to Part 96 report and tune up document.

WCDMA Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA.

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/256QAM 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/256QAM SAR testing is not required.
5. 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.
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 B2 / B4 / B5 / B17 / B38 / B42(3550-3600MHz)/B43 SAR test was covered by B25 / B66 / B26 / B12 / B41 / B48; 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. 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, 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 n5 /n7/n26/n66/n38/n41 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.

WLAN/Bluetooth Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.
6. The 2.4GHz/5GHz WLAN can transmit in SISO/MIMO antenna mode.
7. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.
8. For determination of the scaling factor for report SAR of MIMO mode, if the hot spots are separated the scaling factors are individually determined from each transmit chain. Further simplification chose the worse SAR value and the worst scaling factor from each transmit chain perform reported SAR calculation conservatively. If the hot spots are not spatially separated, the scaling factor is determined from the worst number of each transmit chain.



15.1 Head SAR

Table with columns: Plot No., Band, BW (MHz), Modulation, RB Size, RB offset, Mode, Test Position, Gap (mm), Antenna, Power Reduction, Ch., Freq. (MHz), Sample, 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). Rows include LTE Band 71, LTE Band 12, LTE Band 13, LTE Band 14, FR1 n71, and FR1 n12.



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Table with columns for test parameters (FR1 n13, 10M, QPSK, etc.) and SAR results. Includes sub-sections for 835MHz and 1750MHz. Values range from 0.144 to 0.528.



Table with columns for Band, Power, Modulation, M, F, S, Location, Distance, Antenna, Mode, Frequency, Power Density, E-field, H-field, SAR, and Weighted SAR. Includes rows for LTE Bands 66 and 66C, and FR1 n66.



FCC SAR Test Report

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Table with columns for device model (FR1 n66, WCDMA II, LTE Band 25), power (40M, 20M), modulation (QPSK), frequency (108, 54, 1, 0), channel (DFT-SCS-15KHz, RMC 12.2Kbps), antenna position (Right Cheek, Right Tilted, Left Cheek, Left Tilted), distance (0mm), antenna type (Ant 5), receiver status (Receiver on), and various SAR metrics (e.g., 16.35, 17.00, 1.161, 0.05, 0.328, 0.381).



Table with multiple columns including test configurations, parameters, and results. Includes sections for 3500MHz and rows for FR1 n41_HPUE, LTE Band 42, LTE Band 48, and FR1 n48.



FCC SAR Test Report

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Table with columns for device ID, power, modulation, bandwidth, frequency, location, antenna, status, E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15, E16, E17, E18, E19, E20, E21, E22, E23, E24, E25, E26, E27, E28, E29, E30, E31, E32, E33, E34, E35, E36, E37, E38, E39, E40, E41, E42, E43, E44, E45, E46, E47, E48, E49, E50, E51, E52, E53, E54, E55, E56, E57, E58, E59, E60, E61, E62, E63, E64, E65, E66, E67, E68, E69, E70, E71, E72, E73, E74, E75, E76, E77, E78, E79, E80, E81, E82, E83, E84, E85, E86, E87, E88, E89, E90, E91, E92, E93, E94, E95, E96, E97, E98, E99, E100.



FCC SAR Test Report

Report No. : FA461912

Table with columns for test parameters including frequency, power, modulation, antenna type, and SAR values. The table contains multiple rows of test data, with one cell highlighted in yellow containing the value 0.492.



15.2 Hotspot SAR

Table with columns: Plot No., Band, BW (MHz), Modulation, RB Size, RB offset, Mode, Test Position, Gap (mm), Antenna, Power Reduction, Ch., Freq. (MHz), Sample, 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). Includes rows for 750MHz and various LTE and FR1 bands.



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Report No. : FA461912

Table with columns for Band, Modulation, Power, Frequency, Location, Antenna, Power Level, and SAR values. Includes a section for 1900MHz WCDMA II tests.



FCC SAR Test Report

Report No. : FA461912

Table with columns for Modulation, Power, Frequency, etc. Includes rows for WCDMA II and LTE Band 25 with various antenna orientations and positions. Some cells are highlighted in yellow.



FCC SAR Test Report

Report No. : FA461912

Table with columns for frequency bands, modulation, power, and SAR values. Includes a sub-section for 2600MHz.



FCC SAR Test Report

Report No. : FA461912

Table with columns for LTE Band, Modulation, Power, Frequency, and SAR values. Includes a row with a highlighted value of 0.683.



FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 2	Full Power	518598	2592.99	1	24.07	25.00	1.239	-	-	0.02	0.091	0.113	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 2	Full Power	518598	2592.99	1	24.05	25.00	1.245	-	-	-0.16	0.185	0.230	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	Full Power	518598	2592.99	1	24.07	25.00	1.239	-	-	0.05	0.211	0.261	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 2	Full Power	518598	2592.99	1	24.05	25.00	1.245	-	-	-0.03	0.265	0.330	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.07	25.00	1.239	-	-	-0.03	0.312	0.387	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.05	25.00	1.245	-	-	0.08	0.406	0.505	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	2	24.05	25.00	1.245	-	-	0.07	0.311	0.387	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	3	24.05	25.00	1.245	-	-	-0.13	0.346	0.431	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	4	24.05	25.00	1.245	-	-	0.1	0.358	0.446	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Full Power	518598	2592.99	5	24.05	25.00	1.245	-	-	-0.15	0.376	0.468	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.07	25.00	1.239	-	-	0.17	0.028	0.035	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.05	25.00	1.245	-	-	-0.15	0.046	0.057	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.07	25.00	1.239	-	-	0.16	0.066	0.082	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 2	Full Power	518598	2592.99	1	24.05	25.00	1.245	-	-	0.05	0.174	0.217	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 3	Full Power	518598	2592.99	1	24.56	26.00	1.393	-	-	0.12	0.041	0.057	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 3	Full Power	518598	2592.99	1	24.47	26.00	1.422	-	-	0.07	0.038	0.054	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Full Power	518598	2592.99	1	24.56	26.00	1.393	-	-	0.08	0.084	0.117	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	Full Power	518598	2592.99	1	24.47	26.00	1.422	-	-	0.19	0.065	0.092	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.56	26.00	1.393	-	-	-0.06	0.046	0.064	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.47	26.00	1.422	-	-	0	0.032	0.046	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.56	26.00	1.393	-	-	-0.03	0.026	0.036	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.47	26.00	1.422	-	-	0.07	0.000	0.000	
FR1 n41_HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.56	26.00	1.393	-	-	-0.12	0.040	0.056	
FR1 n41_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Full Power	518598	2592.99	1	24.47	26.00	1.422	-	-	-0.03	0.000	0.000	
3500MHz																					
56	LTE Band 42 Part27Q	20M	QPSK	1	0	-	Front	10mm	Ant 2	Hotspot on	42590	3500	1	18.54	20.00	1.400	62.9	1.006	0.19	0.054	0.076
	LTE Band 42 Part27Q	20M	QPSK	50	0	-	Front	10mm	Ant 2	Hotspot on	42590	3500	1	18.52	20.00	1.406	62.9	1.006	0.07	0.043	0.061
	LTE Band 42 Part27Q	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	42590	3500	1	18.54	20.00	1.400	62.9	1.006	0.04	0.395	0.556
	LTE Band 42 Part27Q	20M	QPSK	50	0	-	Back	10mm	Ant 2	Hotspot on	42590	3500	1	18.52	20.00	1.406	62.9	1.006	-0.15	0.306	0.433
	LTE Band 42 Part27Q	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	Hotspot on	42590	3500	1	18.54	20.00	1.400	62.9	1.006	-0.08	0.252	0.355
	LTE Band 42 Part27Q	20M	QPSK	50	0	-	Left Side	10mm	Ant 2	Hotspot on	42590	3500	1	18.52	20.00	1.406	62.9	1.006	0.17	0.186	0.263
	LTE Band 42 Part27Q	20M	QPSK	1	0	-	Top Side	10mm	Ant 2	Hotspot on	42590	3500	1	18.54	20.00	1.400	62.9	1.006	-0.13	0.104	0.146
	LTE Band 42 Part27Q	20M	QPSK	50	0	-	Top Side	10mm	Ant 2	Hotspot on	42590	3500	1	18.52	20.00	1.406	62.9	1.006	-0.13	0.086	0.122
	LTE Band 48	20M	QPSK	1	0	-	Front	10mm	Ant 2	Hotspot on	55830	3609	1	19.06	20.00	1.242	62.9	1.006	0.1	0.054	0.067
	LTE Band 48	20M	QPSK	50	0	-	Front	10mm	Ant 2	Hotspot on	55830	3609	1	19.04	20.00	1.247	62.9	1.006	0.13	0.046	0.058
57	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	55830	3609	1	19.06	20.00	1.242	62.9	1.006	-0.04	0.423	0.528
	LTE Band 48C	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	55830+3609+56028	3609+3628.8	1	18.87	20.00	1.297	62.9	1.006	0.08	0.391	0.510
	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	55340	3560	1	18.94	20.00	1.276	62.9	1.006	-0.07	0.398	0.511
	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	56150	3641	1	19.03	20.00	1.250	62.9	1.006	-0.05	0.406	0.511
	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	Hotspot on	56640	3690	1	19.01	20.00	1.256	62.9	1.006	-0.04	0.409	0.517
	LTE Band 48	20M	QPSK	50	0	-	Back	10mm	Ant 2	Hotspot on	55830	3609	1	19.04	20.00	1.247	62.9	1.006	0.13	0.339	0.425
	LTE Band 48	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	Hotspot on	55830	3609	1	19.06	20.00	1.242	62.9	1.006	0	0.288	0.360
	LTE Band 48	20M	QPSK	50	0	-	Left Side	10mm	Ant 2	Hotspot on	55830	3609	1	19.04	20.00	1.247	62.9	1.006	-0.19	0.241	0.302
	LTE Band 48	20M	QPSK	1	0	-	Top Side	10mm	Ant 2	Hotspot on	55830	3609	1	19.06	20.00	1.242	62.9	1.006	0.12	0.099	0.124
	LTE Band 48	20M	QPSK	50	0	-	Top Side	10mm	Ant 2	Hotspot on	55830	3609	1	19.04	20.00	1.247	62.9	1.006	-0.12	0.080	0.100
FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.87	20.00	1.297	-	-	0.17	0.050	0.065	
FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Front	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.83	20.00	1.309	-	-	-0.05	0.041	0.054	
FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.87	20.00	1.297	-	-	-0.06	0.392	0.508	
FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.83	20.00	1.309	-	-	0.1	0.340	0.445	
FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.87	20.00	1.297	-	-	0.04	0.262	0.340	
FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Left Side	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.83	20.00	1.309	-	-	-0.01	0.210	0.275	
FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.87	20.00	1.297	-	-	0.05	0.011	0.014	
FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Right Side	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.83	20.00	1.309	-	-	0.06	0.009	0.012	
FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 2	Hotspot on	641666	3624.99	1	18.87	20.00	1.297	-	-	-0.09	0.099	0.128	



Table with 20 columns: Device ID, Power, Modulation, Channels, Frequency, Direction, Antenna, Power Level, E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12. Row 58 is highlighted in yellow.



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	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 2	Hotspot on	633332	3499.98	1	17.43	18.00	1.140	-	-	0.06	0.004	0.005
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 2	Hotspot on	633332	3499.98	1	17.51	18.00	1.119	-	-	0.02	0.098	0.110
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 2	Hotspot on	633332	3499.98	1	17.43	18.00	1.140	-	-	0.12	0.091	0.104
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 3	Hotspot on	656000	3840	1	20.27	21.50	1.327	-	-	0.07	0.061	0.081
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 3	Hotspot on	656000	3840	1	20.22	21.50	1.343	-	-	-0.12	0.053	0.071
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	656000	3840	1	20.27	21.50	1.327	-	-	0.02	0.170	0.226
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	656000	3840	1	20.22	21.50	1.343	-	-	0.02	0.155	0.208
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.27	21.50	1.327	-	-	0.12	0.158	0.210
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.22	21.50	1.343	-	-	0.02	0.123	0.165
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.27	21.50	1.327	-	-	-0.03	0.018	0.024
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.22	21.50	1.343	-	-	0	0.000	0.000
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.27	21.50	1.327	-	-	-0.1	0.074	0.098
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Hotspot on	656000	3840	1	20.22	21.50	1.343	-	-	0.05	0.072	0.097
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.47	21.50	1.268	-	-	0.07	0.138	0.175
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.42	21.50	1.282	-	-	0.15	0.127	0.163
59	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.47	21.50	1.268	-	-	-0.02	0.421	0.534
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	2	20.47	21.50	1.268	-	-	-0.11	0.388	0.492
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	3	20.47	21.50	1.268	-	-	0	0.401	0.508
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	4	20.47	21.50	1.268	-	-	0.08	0.404	0.512
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	5	20.47	21.50	1.268	-	-	-0.08	0.398	0.505
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.42	21.50	1.282	-	-	-0.08	0.391	0.501
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.47	21.50	1.268	-	-	-0.08	0.282	0.357
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.42	21.50	1.282	-	-	-0.13	0.260	0.333
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.47	21.50	1.268	-	-	0.01	0.029	0.037
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.42	21.50	1.282	-	-	-0.11	0.000	0.000
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.47	21.50	1.268	-	-	0.03	0.271	0.344
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Side	10mm	Ant 3	Hotspot on	633332	3499.98	1	20.42	21.50	1.282	-	-	-0.05	0.231	0.296
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 4	Hotspot on	656000	3840	1	19.68	20.00	1.076	-	-	0.08	0.182	0.196
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 4	Hotspot on	656000	3840	1	19.66	20.00	1.081	-	-	0.01	0.191	0.207
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 4	Hotspot on	656000	3840	1	19.68	20.00	1.076	-	-	-0.04	0.318	0.342
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 4	Hotspot on	656000	3840	1	19.66	20.00	1.081	-	-	-0.01	0.299	0.323
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.68	20.00	1.076	-	-	0.1	0.003	0.003
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.66	20.00	1.081	-	-	-0.04	0.026	0.028
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.68	20.00	1.076	-	-	0.15	0.162	0.174
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.66	20.00	1.081	-	-	0.09	0.166	0.180
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.68	20.00	1.076	-	-	0.05	0.143	0.154
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 4	Hotspot on	656000	3840	1	19.66	20.00	1.081	-	-	0.08	0.141	0.152
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.51	20.00	1.119	-	-	0.18	0.150	0.168
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.34	20.00	1.164	-	-	0.11	0.134	0.156
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.51	20.00	1.119	-	-	0.07	0.212	0.237
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.34	20.00	1.164	-	-	0.01	0.258	0.300
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.51	20.00	1.119	-	-	-0.08	0.019	0.021
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.34	20.00	1.164	-	-	-0.05	0.015	0.017
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.51	20.00	1.119	-	-	-0.03	0.152	0.170
	FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.34	20.00	1.164	-	-	0.17	0.169	0.197
	FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.51	20.00	1.119	-	-	0.06	0.118	0.132
	FR1 n77_HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 4	Hotspot on	633332	3499.98	1	19.34	20.00	1.164	-	-	-0.06	0.124	0.144



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Part 27Q																				
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 5	Hotspot on	656000	3840	1	20.13	20.50	1.089	-	-	0.07	0.167	0.182
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 5	Hotspot on	656000	3840	1	20.10	20.50	1.096	-	-	-0.09	0.156	0.171
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 5	Hotspot on	656000	3840	1	20.13	20.50	1.089	-	-	-0.17	0.141	0.154
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 5	Hotspot on	656000	3840	1	20.10	20.50	1.096	-	-	0.1	0.094	0.103
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.13	20.50	1.089	-	-	0.08	0.066	0.072
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.10	20.50	1.096	-	-	0	0.042	0.046
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.13	20.50	1.089	-	-	-0.13	0.118	0.128
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.10	20.50	1.096	-	-	-0.1	0.118	0.129
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.13	20.50	1.089	-	-	-0.18	0.262	0.285
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 5	Hotspot on	656000	3840	1	20.10	20.50	1.096	-	-	-0.07	0.247	0.271
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.29	20.50	1.050	-	-	-0.04	0.182	0.191
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.27	20.50	1.054	-	-	-0.17	0.180	0.190
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.29	20.50	1.050	-	-	0.01	0.120	0.126
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.27	20.50	1.054	-	-	0.1	0.145	0.153
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.29	20.50	1.050	-	-	0.11	0.088	0.092
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.27	20.50	1.054	-	-	-0.07	0.090	0.095
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.29	20.50	1.050	-	-	0.18	0.050	0.052
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.27	20.50	1.054	-	-	0.12	0.059	0.062
FR1 n77_HPUE Part 27Q	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.29	20.50	1.050	-	-	0.07	0.360	0.378
FR1 n77_HPUE Part 27Q	100M	QPSK	135	69	DFT-SCS-30KHz	Top Side	10mm	Ant 5	Hotspot on	633332	3499.98	1	20.27	20.50	1.054	-	-	-0.04	0.371	0.391

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
2450MHz																	
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 6+7(6)	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	-0.03	0.147	0.235
60	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	0.08	0.243	0.388
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	DBS	1	2412	1	13.93	15.50	1.435	99.1	1.009	-0.07	0.112	0.162
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Ant 6+7(6)	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	0.05	0.028	0.045
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 6+7(6)	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	0.06	0.177	0.282
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 6+7(6)	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	-0.11	0.086	0.137
	Bluetooth	1Mbps	Front	10mm	Ant 6	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.12	0.000	0.000
	Bluetooth	1Mbps	Back	10mm	Ant 6	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.04	0.005	0.006
	Bluetooth	1Mbps	Left Side	10mm	Ant 6	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	0.03	0.000	0.000
61	Bluetooth	1Mbps	Right Side	10mm	Ant 6	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.09	0.006	0.007
	Bluetooth	1Mbps	Right Side	10mm	Ant 6	Full Power	0	2402	1	8.33	9.00	1.166	76.86	1.084	0.09	0.003	0.004
	Bluetooth	1Mbps	Right Side	10mm	Ant 6	Full Power	78	2480	1	7.62	9.00	1.373	76.86	1.084	0.04	0.004	0.006
	Bluetooth	1Mbps	Top Side	10mm	Ant 6	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.16	0.000	0.000
5000MHz																	
	WLAN5.2GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 6+7(6)	Non DBS	42	5210	1	9.93	11.50	1.435	100	1.000	-0.02	0.096	0.138
62	WLAN5.2GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	Non DBS	42	5210	1	9.93	11.50	1.435	100	1.000	0.04	0.266	0.382
	WLAN5.2GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	DBS	42	5210	1	7.07	8.50	1.390	100	1.000	0.15	0.122	0.170
	WLAN5.2GHz	802.11ac-VHT80 MCS0	Left Side	10mm	Ant 6+7(6)	Non DBS	46	5230	1	9.93	11.50	1.435	100	1.000	-0.09	0.000	0.000
	WLAN5.2GHz	802.11ac-VHT80 MCS0	Right Side	10mm	Ant 6+7(6)	Non DBS	46	5230	1	9.93	11.50	1.435	100	1.000	0.11	0.174	0.250
	WLAN5.2GHz	802.11ac-VHT80 MCS0	Top Side	10mm	Ant 6+7(6)	Non DBS	46	5230	1	9.93	11.50	1.435	100	1.000	-0.05	0.109	0.156
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	-0.08	0.052	0.073
63	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	0.01	0.279	0.391
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	DBS	155	5775	1	4.72	6.50	1.507	100	1.000	0.11	0.132	0.199
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Side	10mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	0	0.007	0.010
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Right Side	10mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	-0.13	0.127	0.178
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Top Side	10mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	-0.01	0.058	0.081



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Table with columns for test parameters (Modulation, Power, Frequency, etc.) and SAR results. Includes rows for WCDMA IV, LTE Band 66, and FR1 n66, with a sub-section for 1900MHz. Some cells are highlighted in yellow (e.g., 1.164, 1.091, 1.061).



FCC SAR Test Report

Report No. : FA461912

Table with 23 columns: Band, Modulation, Power, Frequency, etc. Rows include LTE Band 25, FR1 n25, and FR1 n30 with various antenna configurations and SAR values.



FCC SAR Test Report

Report No. : FA461912

Table with columns for device model (FR1 n30, LTE Band 7, etc.), modulation (QPSK), power (10M, 20M, 40M), and SAR values. Includes a '2600MHz' section and a highlighted row with SAR 0.787.



FCC SAR Test Report

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Table with columns for test parameters (FR1 n7, 40M, QPSK, 108, 54, DFT-SCS-15KHz, Back, 10mm, Ant 1, etc.) and SAR values. Includes a 3500MHz section and rows for FR1 n41_HPUE, LTE Band 42, LTE Band 48, and FR1 n48.



Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Headset	Power State	Ch.	Freq. (MHz)	Sample	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)	
2450MHz																			
91	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 6+7(6)	-	Full Power	1	2412	1	18.68	20.50	1.521	99.1	1.009	0.04	0.233	0.357	
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	-	Full Power	1	2412	1	18.68	20.50	1.521	99.1	1.009	0.04	0.386	0.592	
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	-	Full Power	6	2437	1	18.79	20.50	1.483	99.1	1.009	-0.04	0.224	0.335	
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	-	Full Power	11	2462	1	18.68	20.50	1.521	99.1	1.009	-0.08	0.224	0.344	
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	-	Non DBS	1	2412	1	17.01	19.00	1.581	99.1	1.009	-0.01	0.246	0.392	
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6+7(6)	-	DBS	1	2412	1	13.93	15.50	1.435	99.1	1.009	-0.08	0.124	0.180	
	WLAN2.4GHz	802.11b 1Mbps	Front	14mm	Ant 6+7(6)	-	Full Power	1	2412	1	18.68	20.50	1.521	99.1	1.009	-0.04	0.140	0.215	
	WLAN2.4GHz	802.11b 1Mbps	Back	29mm	Ant 6+7(6)	-	Full Power	1	2412	1	18.68	20.50	1.521	99.1	1.009	-0.09	0.090	0.138	
	Bluetooth	1Mbps	Front	10mm	Ant 6	-	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.17	0.000	0.000	
92	Bluetooth	1Mbps	Back	10mm	Ant 6	-	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.04	0.005	0.006	
	Bluetooth	1Mbps	Back	10mm	Ant 6	-	Full Power	0	2402	1	8.33	9.00	1.166	76.86	1.084	0.03	0.001	0.001	
	Bluetooth	1Mbps	Back	10mm	Ant 6	-	Full Power	78	2480	1	7.62	9.00	1.373	76.86	1.084	0.01	0.002	0.003	
	Bluetooth	1Mbps	Front	14mm	Ant 6	-	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.17	0.001	0.001	
	Bluetooth	1Mbps	Back	29mm	Ant 6	-	Full Power	39	2441	1	8.72	9.00	1.066	76.86	1.084	-0.1	0.001	0.001	
5000MHz																			
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 6+7(6)	-	Standalone	58	5290	1	16.88	18.50	1.452	100	1.000	0.13	0.311	0.452	
93	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	-	Standalone	58	5290	1	16.88	18.50	1.452	100	1.000	-0.02	0.813	1.181	
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	-	Standalone	58	5290	2	16.88	18.50	1.452	100	1.000	-0.02	0.751	1.091	
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	-	Standalone	58	5290	3	16.88	18.50	1.452	100	1.000	0.04	0.762	1.107	
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7 (6)	-	Standalone	58	5290	4	16.88	18.50	1.452	100	1.000	0.08	0.745	1.082	
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7 (6)	-	Standalone	58	5290	5	16.88	18.50	1.452	100	1.000	0.08	0.685	0.995	
	WLAN5.3GHz	802.11ac-VHT160 MCS0	Back	10mm	Ant 6+7(7)	-	Non DBS	50	5250	1	9.53	11.00	1.403	100	1.000	0.17	0.260	0.365	
	WLAN5.3GHz	802.11ac-VHT160 MCS0	Back	10mm	Ant 6+7(7)	-	DBS	50	5250	1	6.89	8.50	1.449	100	1.000	0.18	0.121	0.175	
	WLAN5.3GHz	802.11ax-HE40 MCS0	Front	14mm	Ant 6+7(6)	-	Full Power	54	5270	1	20.16	22.00	1.528	100	1.000	0.18	0.255	0.390	
	WLAN5.3GHz	802.11ax-HE40 MCS0	Back	29mm	Ant 6+7(6)	-	Full Power	54	5270	1	20.16	22.00	1.528	100	1.000	-0.17	0.466	0.712	
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 6+7(7)	-	Standalone	122	5610	1	14.67	16.00	1.358	100	1.000	0.05	0.166	0.225	
94	WLAN5.5GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	-	Standalone	122	5610	1	14.67	16.00	1.358	100	1.000	-0.08	0.792	1.076	
	WLAN5.5GHz	802.11ac-VHT160 MCS0	Back	10mm	Ant 6+7(6)	-	Non DBS	114	5570	1	8.71	10.00	1.346	100	1.000	-0.04	0.295	0.397	
	WLAN5.5GHz	802.11ac-VHT160 MCS0	Back	10mm	Ant 6+7(7)	-	DBS	114	5570	1	6.04	7.50	1.400	100	1.000	-0.08	0.123	0.172	
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	-	Standalone	106	5530	1	14.68	16.00	1.355	100	1.000	-0.13	0.623	0.844	
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	-	Standalone	138	5690	1	14.61	16.00	1.377	100	1.000	-0.13	0.609	0.839	
	WLAN5.5GHz	802.11ax-HE40 MCS0	Front	14mm	Ant 6+7(7)	-	Full Power	126	5630	1	19.82	21.50	1.472	100	1.000	-0.04	0.116	0.171	
	WLAN5.5GHz	802.11ax-HE40 MCS0	Back	29mm	Ant 6+7(7)	-	Full Power	126	5630	1	19.82	21.50	1.472	100	1.000	-0.06	0.644	0.948	
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 6+7(7)	-	Standalone	155	5775	1	13.76	15.50	1.493	100	1.000	-0.01	0.170	0.254	
95	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	-	Standalone	155	5775	1	13.76	15.50	1.493	100	1.000	-0.05	0.784	1.170	
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	-	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	0.06	0.269	0.377	
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(7)	-	DBS	155	5775	1	4.72	6.50	1.507	100	1.000	-0.03	0.132	0.199	
	WLAN5.8GHz	802.11ac-VHT40 MCS0	Front	14mm	Ant 6+7(7)	-	Full Power	151	5755	1	19.42	21.00	1.439	100	1.000	0	0.143	0.206	
	WLAN5.8GHz	802.11ac-VHT40 MCS0	Back	29mm	Ant 6+7(7)	-	Full Power	151	5755	1	19.42	21.00	1.439	100	1.000	-0.03	0.616	0.886	



	WLAN5.5GHz	802.11ax-HE40 MCS0	Back	16mm	Ant 6+7(7)	Full Power	126	5630	1	19.82	21.50	1.472	100	1.000	-0.04	0.770	1.134
	WLAN5.5GHz	802.11ax-HE40 MCS0	Right Side	16mm	Ant 6+7(7)	Full Power	126	5630	1	19.82	21.50	1.472	100	1.000	-0.15	0.421	0.620
	WLAN5.5GHz	802.11ax-HE40 MCS0	Top Side	8mm	Ant 6+7(7)	Full Power	126	5630	1	19.82	21.50	1.472	100	1.000	0.01	0.305	0.449
100	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Standalone	155	5775	1	13.76	15.50	1.493	100	1.000	0.04	0.896	1.338
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Standalone	155	5775	2	13.76	15.50	1.493	100	1.000	0.16	0.852	1.272
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Standalone	155	5775	3	13.76	15.50	1.493	100	1.000	-0.18	0.837	1.249
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Standalone	155	5775	4	13.76	15.50	1.493	100	1.000	0.18	0.688	1.027
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Standalone	155	5775	5	13.76	15.50	1.493	100	1.000	0.18	0.571	0.852
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	Non DBS	155	5775	1	8.03	9.50	1.403	100	1.000	0.14	0.259	0.363
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 6+7(7)	DBS	155	5775	1	4.72	6.50	1.507	100	1.000	-0.15	0.162	0.244
	WLAN5.8GHz	802.11ac-VHT40 MCS0	Back	16mm	Ant 6+7(7)	Full Power	151	5755	1	19.42	21.00	1.439	100	1.000	0.11	0.672	0.967



15.5 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 66	20M	QPSK	1	0	-	Back	10mm	Ant 0	Hotspot on	132322	1745	22.51	23.00	1.119	-	-	-0.02	1.040	1	1.164
2nd	LTE Band 66	20M	QPSK	1	0	-	Back	10mm	Ant 0	Hotspot on	132322	1745	22.51	23.00	1.119	-	-	0.03	1.010	1.030	1.131
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 0	Full Power	9262	1852.4	23.71	25.00	1.346	-	-	0.07	0.805	1	1.083
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 0	Full Power	9262	1852.4	23.71	25.00	1.346	-	-	0.09	0.796	1.011	1.071
1st	LTE Band 30	10M	QPSK	1	0	-	Back	10mm	Ant 0	Hotspot on	27710	2310	21.19	21.50	1.074	-	-	0.07	1.060	1	1.138
2nd	LTE Band 30	10M	QPSK	1	0	-	Back	10mm	Ant 0	Hotspot on	27710	2310	21.19	21.50	1.074	-	-	0.09	1.020	1.039	1.095
1st	WLAN5.3GHz	-	-	-	-	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	Standalone	58	5290	16.88	18.50	1.452	100	1.000	-0.02	0.813	1	1.181
2nd	WLAN5.3GHz	-	-	-	-	802.11ac-VHT80 MCS0	Back	10mm	Ant 6+7(6)	Standalone	58	5290	16.88	18.50	1.452	100	1.000	0.09	0.797	1.020	1.157

General Note:

- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8W/kg$.
- Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45W/kg$, only one repeated measurement is required.
- 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.
- The ratio is the difference in percentage between original and repeated *measured SAR*.
- All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.



15.6 TDD LTE Linearity Data Analysis

General Note:

This device support Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each LTE configuration and exposure condition combination, according to the highest time averaged power for all applicable uplink-downlink configurations in Power Class 2. When the reported SAR vs. output power is linearly scaled with < 10% discrepancy between power classes and all reported SAR are < 1.4 W/kg for 1g and < 3.5 W/kg for 10g, Separate SAR testing for Power Class 2 is not required.

LTE B41-Linearity Data for Head Ant 0		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	23.00	26.00
Reported 1g SAR (W/kg)	0.120	0.151
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	172.38
Linearity SAR (W/kg)	0.164	
% deviation from expected linearity		-7.80%
LTE B41-Linearity Data for Head Ant 1		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	15.50	18.50
Reported 1g SAR (W/kg)	0.393	0.517
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	22.46	30.65
Linearity SAR (W/kg)	0.536	
% deviation from expected linearity		-3.61%
LTE B41-Linearity Data for Head Ant 2		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	24.00	27.00
Reported 1g SAR (W/kg)	0.297	0.402
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	159.00	217.01
Linearity SAR (W/kg)	0.405	
% deviation from expected linearity		-0.83%
LTE B41-Linearity Data for Hotspot Ant 0		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	23.00	26.00
Reported 1g SAR (W/kg)	0.472	0.683
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	172.38
Linearity SAR (W/kg)	0.644	
% deviation from expected linearity		6.02%
LTE B41-Linearity Data for Hotspot Ant 1		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	23.00	26.00
Reported 1g SAR (W/kg)	0.360	0.482
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	172.38
Linearity SAR (W/kg)	0.491	
% deviation from expected linearity		-1.90%
LTE B41-Linearity Data for Hotspot Ant 2		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	24.00	27.00
Reported 1g SAR (W/kg)	0.263	0.387



Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	159.00	217.01
Linearity SAR (W/kg)	0.359	
% deviation from expected linearity		7.81%

LTE B41-Linearity Data for Body worn Ant 0		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	23.00	26.00
Reported 1g SAR (W/kg)	0.409	0.589
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	172.38
Linearity SAR (W/kg)	0.558	
% deviation from expected linearity		5.51%

LTE B41-Linearity Data for Body wornAnt 1		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	23.00	26.00
Reported 1g SAR (W/kg)	0.360	0.482
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	126.30	172.38
Linearity SAR (W/kg)	0.491	
% deviation from expected linearity		-1.90%

LTE B41-Linearity Data for Body worn Ant 2		
	LTE B41 (Power Class 3)	LTE B41 (Power Class 2)
Maximum Tune up Power (dBm)	24.00	27.00
Reported 1g SAR (W/kg)	0.177	0.230
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	159.00	217.01
Linearity SAR (W/kg)	0.242	
% deviation from expected linearity		-4.79%

16. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific 10g SAR
1.	WWAN + WLAN2.4GHz	Yes	Yes	Yes	Yes
2.	WWAN + WLAN5GHz	Yes	Yes	Yes	Yes
3.	WWAN + WLAN6GHz	Yes	Yes		Yes
4.	WWAN + Bluetooth	Yes	Yes	Yes	Yes
5.	WLAN2.4GHz + WLAN5GHz	Yes	Yes	Yes	Yes
6.	WLAN2.4GHz + WLAN6GHz	Yes	Yes		Yes
7.	WLAN2.4GHz+ Bluetooth	Yes	Yes	Yes	Yes
8.	WLAN5GHz+ Bluetooth	Yes	Yes	Yes	Yes
9.	WLAN6GHz+ Bluetooth	Yes	Yes		Yes
10.	WWAN + WLAN2.4GHz + WLAN5GHz	Yes	Yes	Yes	Yes
11.	WWAN + WLAN2.4GHz + WLAN6GHz	Yes	Yes		Yes
12.	WWAN + WLAN2.4GHz+ Bluetooth	Yes	Yes	Yes	Yes
13.	WWAN + WLAN5GHz+ Bluetooth	Yes	Yes	Yes	Yes
14.	WWAN + WLAN6GHz+ Bluetooth	Yes	Yes		Yes
15.	WWAN + WLAN2.4GHz+NFC				Yes
16.	WWAN + WLAN5GHz+NFC				Yes
17.	WWAN + WLAN6GHz+NFC				Yes
18.	WWAN + Bluetooth+NFC				Yes
19.	WLAN2.4GHz + WLAN5GHz+NFC				Yes
20.	WLAN2.4GHz + WLAN6GHz+NFC				Yes
21.	WLAN2.4GHz+ Bluetooth+NFC				Yes
22.	WLAN5GHz+ Bluetooth+NFC				Yes
23.	WLAN6GHz+ Bluetooth+NFC				Yes
24.	WWAN + WLAN2.4GHz + WLAN5GHz+NFC				Yes
25.	WWAN + WLAN2.4GHz + WLAN6GHz+NFC				Yes
26.	WWAN + WLAN2.4GHz+ Bluetooth+NFC				Yes
27.	WWAN + WLAN5GHz+ Bluetooth+NFC				Yes
28.	WWAN + WLAN6GHz+ Bluetooth+NFC				Yes

General Note:

- This device supports VoIP in WCDMA, LTE and 5GNR (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- WWAN above includes 5G NR bands and EN-DC combination.
- The 2.4GHz/5GHz/6GHz WLAN can transmit in SISO/MIMO antenna mode.
- EUT will choose each WCDMA, LTE and 5GNR according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- 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). WLAN 6GHz has no hotspot function.
- The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
- WLAN 2.4GHz and Bluetooth share the same antenna path and cannot transmit simultaneously. WLAN2.4GHz and Bluetooth are located on different antennas, they can transmit simultaneously.
- According to the EUT characteristic, WLAN 5GHz/6GHz and Bluetooth can transmit simultaneously.
- According to the EUT characteristic, WLAN 5GHz/6GHz (Ant 7) and WLAN 2.4GHz (Ant 6) can transmit simultaneously.
- According to the EUT characteristic, WLAN 5GHz and WLAN 6GHz can't transmit simultaneously.
- NFC can transmit simultaneously with other Radios in extremity exposure condition.
- For Headset SAR and non-Headset SAR always chose higher SAR to do co-located analysis.
- For standalone WWAN, always choose the highest SAR among the selected 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 band.
- For inter-band ULCA SAR co-located with WLAN/Bluetooth, chose the worst SAR among the selected LTE bands within the selected antenna per each test position to do co-located with WLAN/Bluetooth. This is the worst



- co-located analysis and can represent each LTE bands.
16. For EN-DC SAR co-located with WLAN/Bluetooth, chose the worst SAR among the selected LTE bands within the selected antenna per each test position and also the worst SAR of the selected 5GNR Bands within the selected antenna to do co-located with WLAN/Bluetooth. This is the worst co-located analysis and can represent each LTE bands and each 5GNR band.
 17. The maximum SAR summation is calculated based on the same configuration and test position.
 18. 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.
 19. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, 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.
 - iii) If $SPLSR \leq 0.04$ for 1g SAR and $SPLSR \leq 0.10$ for 10g SAR, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
 - v) The SPLSR calculated results please refer to section 16.6.
 20. The WLAN6GHz Sim-Tx analysis guidance with other transmitters was based on SAR test results. The simultaneous transmission and test exemption analysis was compliance with KDB 447498 D01, and the device does not support FR2 or another MPE field measurement, therefore SAR report in section 16 has no include TER analysis requirement according to KDB 987594.



16.1 Head Exposure Conditions

Exposure Position	1	2	3	1+3	2+3
	WLAN5GHz Ant 6+7	WLAN6GHz Ant 6+7	Bluetooth Ant 6	Summed	Summed
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
Right Cheek	0.508	0.119	0.001	0.51	0.12
Right Tilted	0.474	0.110	0.001	0.48	0.11
Left Cheek	1.192	0.299	0.047	1.24	0.35
Left Tilted	0.739	0.157	0.001	0.74	0.16

WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	1+2	1+4+8	1+6+8	1+3+5	1+3+7
		WWAN	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	WLAN6GHz Ant 6+7 Non DBS	WLAN6GHz Ant 6+7 DBS	Bluetooth Ant 6	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)	1g SAR (W/kg)	1g SAR (W/kg)
All Ant0	Right Cheek	0.321	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.67	0.70	0.44	0.69	0.69
	Right Tilted	0.186	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.54	0.57	0.30	0.55	0.56
	Left Cheek	0.328	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.68	0.76	0.67	0.70	0.70
	Left Tilted	0.114	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.47	0.50	0.27	0.48	0.48
All Ant1	Right Cheek	0.613	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.97	1.00	0.73	0.98	0.98
	Right Tilted	0.394	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.75	0.78	0.51	0.76	0.76
	Left Cheek	0.330	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.68	0.76	0.68	0.70	0.70
	Left Tilted	0.279	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.63	0.66	0.44	0.65	0.65
All Ant2	Right Cheek	0.574	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.93	0.96	0.69	0.94	0.94
	Right Tilted	0.443	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.80	0.83	0.55	0.81	0.81
	Left Cheek	0.377	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.73	0.81	0.72	0.75	0.75
	Left Tilted	0.360	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.71	0.74	0.52	0.73	0.73
All Ant3	Right Cheek	0.068	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.42	0.45	0.19	0.44	0.44
	Right Tilted	0.096	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.45	0.48	0.21	0.46	0.47
	Left Cheek	0.100	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.45	0.53	0.45	0.47	0.47
	Left Tilted	0.093	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.45	0.48	0.25	0.46	0.46
All Ant4	Right Cheek	0.213	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.57	0.60	0.33	0.58	0.58
	Right Tilted	0.110	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.46	0.49	0.22	0.48	0.48
	Left Cheek	0.511	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.86	0.94	0.86	0.88	0.88
	Left Tilted	0.263	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.62	0.65	0.42	0.63	0.63
All Ant5	Right Cheek	0.424	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.78	0.81	0.54	0.79	0.79
	Right Tilted	0.481	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.83	0.86	0.59	0.85	0.85
	Left Cheek	0.505	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.86	0.93	0.85	0.87	0.87
	Left Tilted	0.546	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.90	0.93	0.70	0.91	0.92



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WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	9	1+2+3	1+2+5+9	1+2+7+9	1+2+4+6	1+2+4+8	
		WWAN	WWAN	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	WLAN6GHz Ant 6+7 Non DBS	WLAN6GHz Ant 6+7 DBS	Bluetooth Ant 6	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)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
Ant0 (B2,4)	Ant1 (B5,12, 13,14,17)	Right Cheek	0.107	0.522	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.98	1.01	0.75	1.00	1.00
		Right Tilted	0.075	0.374	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.80	0.83	0.56	0.82	0.82
		Left Cheek	0.135	0.330	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.82	0.89	0.81	0.83	0.83
		Left Tilted	0.074	0.236	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.66	0.69	0.47	0.68	0.68
Ant1 (B5,12, 13,14)	Ant0 (B7,30, 66)	Right Cheek	0.522	0.522	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.40	1.43	1.16	1.41	1.41
		Right Tilted	0.374	0.374	0.352	0.171	0.382	0.197	0.110	0.198	0.001	1.10	1.13	0.86	1.12	1.12
		Left Cheek	0.330	0.330	0.352	0.171	0.382	0.197	0.299	0.198	0.047	1.01	1.09	1.01	1.03	1.03
		Left Tilted	0.236	0.236	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.82	0.86	0.63	0.84	0.84
Ant0 (B2)	Ant5 (B4,66)	Right Cheek	0.084	0.522	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.96	0.99	0.73	0.97	0.98
		Right Tilted	0.075	0.374	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.80	0.83	0.56	0.82	0.82
		Left Cheek	0.133	0.330	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.82	0.89	0.81	0.83	0.83
		Left Tilted	0.074	0.236	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.66	0.69	0.47	0.68	0.68

<EN-DC>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	9	1+2+3	1+2+5+9	1+2+7+9	1+2+4+6	1+2+4+8	
		WWAN	FR1	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	WLAN6GHz Ant 6+7 Non DBS	WLAN6GHz Ant 6+7 DBS	Bluetooth Ant 6	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)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
Ant1 (B5,12, 13,14, 26,66,71)	Ant0 (n2,7,25, 30,66, 38,41)	Right Cheek	0.522	0.321	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.20	1.23	0.96	1.21	1.21
		Right Tilted	0.374	0.186	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.91	0.94	0.67	0.93	0.93
		Left Cheek	0.330	0.328	0.352	0.171	0.382	0.197	0.299	0.198	0.047	1.01	1.09	1.00	1.03	1.03
		Left Tilted	0.236	0.114	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.70	0.73	0.51	0.72	0.72
Ant1 (B5,12,71)	Ant2 (n78)	Right Cheek	0.502	0.476	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.33	1.36	1.10	1.35	1.35
		Right Tilted	0.374	0.273	0.352	0.171	0.382	0.197	0.110	0.198	0.001	1.00	1.03	0.76	1.02	1.02
		Left Cheek	0.315	0.361	0.352	0.171	0.382	0.197	0.299	0.198	0.047	1.03	1.11	1.02	1.04	1.05
		Left Tilted	0.234	0.160	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.75	0.78	0.55	0.76	0.76
Ant1 (B5,12, 13,14)	Ant4 (n77)	Right Cheek	0.522	0.175	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.05	1.08	0.82	1.07	1.07
		Right Tilted	0.374	0.108	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.83	0.87	0.59	0.85	0.85
		Left Cheek	0.330	0.492	0.352	0.171	0.382	0.197	0.299	0.198	0.047	1.17	1.25	1.17	1.19	1.19
		Left Tilted	0.236	0.263	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.85	0.88	0.66	0.87	0.87
Ant0 (B2,7,30,66)	Ant1 (n5,12,71)	Right Cheek	0.114	0.535	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.00	1.03	0.77	1.02	1.02
		Right Tilted	0.075	0.333	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.76	0.79	0.52	0.78	0.78
		Left Cheek	0.135	0.273	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.76	0.84	0.75	0.78	0.78
		Left Tilted	0.074	0.187	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.61	0.64	0.42	0.63	0.63
Ant0 (B2,25,66)	Ant2 (n41)	Right Cheek	0.107	0.439	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.90	0.93	0.67	0.91	0.92
		Right Tilted	0.075	0.307	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.73	0.77	0.49	0.75	0.75
		Left Cheek	0.135	0.374	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.86	0.94	0.86	0.88	0.88
		Left Tilted	0.074	0.357	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.78	0.81	0.59	0.80	0.80
Ant0 (B2,4,7, 25,30,66, 38,41)	Ant4 (n77,78)	Right Cheek	0.114	0.175	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.64	0.67	0.41	0.66	0.66
		Right Tilted	0.075	0.108	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.54	0.57	0.29	0.55	0.55
		Left Cheek	0.135	0.492	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.98	1.06	0.97	1.00	1.00
		Left Tilted	0.074	0.263	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.69	0.72	0.50	0.71	0.71
Ant0 (B2,7,30, 66)	Ant5 (n2,25, 66)	Right Cheek	0.114	0.402	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.87	0.90	0.64	0.88	0.89
		Right Tilted	0.075	0.457	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.88	0.92	0.64	0.90	0.90
		Left Cheek	0.135	0.456	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.94	1.02	0.94	0.96	0.96
		Left Tilted	0.074	0.447	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.87	0.90	0.68	0.89	0.89
Ant2 (B7,30)	Ant0 (n2,66)	Right Cheek	0.510	0.089	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.95	0.98	0.72	0.97	0.97
		Right Tilted	0.210	0.062	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.62	0.66	0.38	0.64	0.64



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		Left Cheek	0.297	0.122	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.77	0.85	0.77	0.79	0.79
		Left Tilted	0.237	0.053	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.64	0.67	0.45	0.66	0.66
Ant2 (B48)	Ant1 (n5)	Right Cheek	0.553	0.535	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.44	1.47	1.21	1.46	1.46
		Right Tilted	0.367	0.275	0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.99	1.03	0.75	1.01	1.01
Ant2 (B48)	Ant5 (n66)	Left Cheek	0.256	0.231	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.84	0.92	0.83	0.86	0.86
		Left Tilted	0.202	0.143	0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.70	0.73	0.50	0.71	0.71
Ant2 (B48)	Ant5 (n66)	Right Cheek	0.553	0.402	0.352	0.171	0.382	0.197	0.119	0.198	0.001	1.31	1.34	1.08	1.32	1.32
		Right Tilted	0.367	0.457	0.352	0.171	0.382	0.197	0.110	0.198	0.001	1.18	1.21	0.94	1.19	1.19
Ant5 (B2)	Ant0 (n66)	Left Cheek	0.256	0.456	0.352	0.171	0.382	0.197	0.299	0.198	0.047	1.06	1.14	1.06	1.08	1.08
		Left Tilted	0.202	0.447	0.352	0.171	0.382	0.197	0.157	0.198	0.001	1.00	1.03	0.81	1.02	1.02
Ant5 (B2)	Ant0 (n66)	Right Cheek	0.373	0.089	0.352	0.171	0.382	0.197	0.119	0.198	0.001	0.81	0.85	0.58	0.83	0.83
		Right Tilted	0.396		0.352	0.171	0.382	0.197	0.110	0.198	0.001	0.75	0.78	0.51	0.76	0.77
Ant5 (B2)	Ant0 (n66)	Left Cheek	0.473	0.111	0.352	0.171	0.382	0.197	0.299	0.198	0.047	0.94	1.01	0.93	0.95	0.95
		Left Tilted	0.387		0.352	0.171	0.382	0.197	0.157	0.198	0.001	0.74	0.77	0.55	0.76	0.76



16.2 Hotspot Exposure Conditions

Exposure Position	1	2	1+2
	WLAN5GHz Ant 6+7 Non DBS	Bluetooth Ant 6	Summed
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
Front	0.138		0.14
Back	0.391	0.006	0.40
Left side	0.010		0.01
Right side	0.250	0.007	0.26
Top side	0.156		0.16
Bottom side			0.00

WWAN Band	Exposure Position	1	2	3	4	5	8	1+2	1+4+8	1+3+5	SPLSR
		WWAN	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	Bluetooth Ant 6	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)	
All Ant1	Front	0.735	0.388	0.162	0.391	0.199		1.12	1.13	1.10	
	Back	0.792	0.388	0.162	0.391	0.199	0.006	1.18	1.19	1.15	
	Left side	0.566	0.388	0.162	0.391	0.199		0.95	0.96	0.93	
	Right side	0.165	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.53	
	Top side	0.397	0.388	0.162	0.391	0.199		0.79	0.79	0.76	
	Bottom side							0.00	0.00	0.00	
All Ant2	Front	0.230	0.388	0.162	0.391	0.199		0.62	0.62	0.59	
	Back	0.556	0.388	0.162	0.391	0.199	0.006	0.94	0.95	0.92	
	Left side	0.505	0.388	0.162	0.391	0.199		0.89	0.90	0.87	
	Right side	0.057	0.388	0.162	0.391	0.199	0.007	0.45	0.46	0.42	
	Top side	0.217	0.388	0.162	0.391	0.199		0.61	0.61	0.58	
	Bottom side							0.00	0.00	0.00	
All Ant3	Front	0.175	0.388	0.162	0.391	0.199		0.56	0.57	0.54	
	Back	0.534	0.388	0.162	0.391	0.199	0.006	0.92	0.93	0.90	
	Left side	0.357	0.388	0.162	0.391	0.199		0.75	0.75	0.72	
	Right side	0.059	0.388	0.162	0.391	0.199	0.007	0.45	0.46	0.42	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.344						0.34	0.34	0.34	
All Ant4	Front	0.215	0.388	0.162	0.391	0.199		0.60	0.61	0.58	
	Back	0.551	0.388	0.162	0.391	0.199	0.006	0.94	0.95	0.91	
	Left side	0.049	0.388	0.162	0.391	0.199		0.44	0.44	0.41	
	Right side	0.271	0.388	0.162	0.391	0.199	0.007	0.66	0.67	0.63	
	Top side	0.203	0.388	0.162	0.391	0.199		0.59	0.59	0.56	
	Bottom side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
All Ant5	Front	0.352	0.388	0.162	0.391	0.199		0.74	0.74	0.71	
	Back	0.470	0.388	0.162	0.391	0.199	0.006	0.86	0.87	0.83	
	Left side	0.117	0.388	0.162	0.391	0.199		0.51	0.51	0.48	
	Right side	0.129	0.388	0.162	0.391	0.199	0.007	0.52	0.53	0.49	
	Top side	0.505	0.388	0.162	0.391	0.199		0.89	0.90	0.87	
	Bottom side							0.00	0.00	0.00	
WCDMA IV Ant 0	Front	0.593	0.388	0.162	0.391	0.199		0.98	0.98	0.95	
	Back	1.061	0.388	0.162	0.391	0.199	0.006	1.45	1.46	1.42	
	Left side	0.151	0.388	0.162	0.391	0.199		0.54	0.54	0.51	
	Right side	0.107	0.388	0.162	0.391	0.199	0.007	0.50	0.51	0.47	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	1.083						1.08	1.08	1.08	
WCDMA II Ant 0	Front	0.593	0.388	0.162	0.391	0.199		0.98	0.98	0.95	
	Back	1.061	0.388	0.162	0.391	0.199	0.006	1.45	1.46	1.42	
	Left side	0.151	0.388	0.162	0.391	0.199		0.54	0.54	0.51	



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	Right side	0.107	0.388	0.162	0.391	0.199	0.007	0.50	0.51	0.47	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	1.083						1.08	1.08	1.08	
LTE Band 66 Ant 0	Front	0.557	0.388	0.162	0.391	0.199		0.95	0.95	0.92	
	Back	1.164	0.388	0.162	0.391	0.199	0.006	1.55	1.56	1.53	
	Left side	0.130	0.388	0.162	0.391	0.199		0.52	0.52	0.49	
	Right side	0.119	0.388	0.162	0.391	0.199	0.007	0.51	0.52	0.48	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	1.050						1.05	1.05	1.05	
LTE Band 25 Ant 0	Front	0.460	0.388	0.162	0.391	0.199		0.85	0.85	0.82	
	Back	0.894	0.388	0.162	0.391	0.199	0.006	1.28	1.29	1.26	
	Left side	0.142	0.388	0.162	0.391	0.199		0.53	0.53	0.50	
	Right side	0.109	0.388	0.162	0.391	0.199	0.007	0.50	0.51	0.47	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.933						0.93	0.93	0.93	
LTE Band 30 Ant 0	Front	0.223	0.388	0.162	0.391	0.199		0.61	0.61	0.58	
	Back	1.138	0.388	0.162	0.391	0.199	0.006	1.53	1.54	1.50	
	Left side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Right side	0.112	0.388	0.162	0.391	0.199	0.007	0.50	0.51	0.47	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.736						0.74	0.74	0.74	
LTE Band 7 Ant 0	Front	0.439	0.388	0.162	0.391	0.199		0.83	0.83	0.80	
	Back	0.787	0.388	0.162	0.391	0.199	0.006	1.18	1.18	1.15	
	Left side	0.152	0.388	0.162	0.391	0.199		0.54	0.54	0.51	
	Right side	0.145	0.388	0.162	0.391	0.199	0.007	0.53	0.54	0.51	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.708						0.71	0.71	0.71	
LTE Band 41 Ant 0	Front	0.292	0.388	0.162	0.391	0.199		0.68	0.68	0.65	
	Back	0.409	0.388	0.162	0.391	0.199	0.006	0.80	0.81	0.77	
	Left side	0.103	0.388	0.162	0.391	0.199		0.49	0.49	0.46	
	Right side	0.088	0.388	0.162	0.391	0.199	0.007	0.48	0.49	0.45	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.683						0.68	0.68	0.68	
FR1 n7 Ant 0	Front	0.389	0.388	0.162	0.391	0.199		0.78	0.78	0.75	
	Back	0.738	0.388	0.162	0.391	0.199	0.006	1.13	1.14	1.10	
	Left side	0.168	0.388	0.162	0.391	0.199		0.56	0.56	0.53	
	Right side	0.103	0.388	0.162	0.391	0.199	0.007	0.49	0.50	0.46	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.679						0.68	0.68	0.68	
FR1 n25 Ant 0	Front	0.388	0.388	0.162	0.391	0.199		0.78	0.78	0.75	
	Back	0.754	0.388	0.162	0.391	0.199	0.006	1.14	1.15	1.12	
	Left side	0.164	0.388	0.162	0.391	0.199		0.55	0.56	0.53	
	Right side	0.719	0.388	0.162	0.391	0.199	0.007	1.11	1.12	1.08	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	0.733						0.73	0.73	0.73	
FR1 n66 Ant 0	Front	0.491	0.388	0.162	0.391	0.199		0.88	0.88	0.85	
	Back	1.091	0.388	0.162	0.391	0.199	0.006	1.48	1.49	1.45	
	Left side	0.134	0.388	0.162	0.391	0.199		0.52	0.53	0.50	
	Right side	0.061	0.388	0.162	0.391	0.199	0.007	0.45	0.46	0.42	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
	Bottom side	1.084						1.08	1.08	1.08	
FR1 n30 Ant 0	Front	0.279	0.388	0.162	0.391	0.199		0.67	0.67	0.64	
	Back	1.273	0.388	0.162	0.391	0.199	0.006	1.66	1.67	1.63	1.2.3
	Left side	0.044	0.388	0.162	0.391	0.199		0.43	0.44	0.41	
	Right side	0.082	0.388	0.162	0.391	0.199	0.007	0.47	0.48	0.44	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	



FR1 n41 HPUE Ant 0	Bottom side	0.857						0.86	0.86	0.86	
	Front	0.501	0.388	0.162	0.391	0.199		0.89	0.89	0.86	
	Back	0.853	0.388	0.162	0.391	0.199	0.006	1.24	1.25	1.21	
	Left side	0.325	0.388	0.162	0.391	0.199		0.71	0.72	0.69	
	Right side	0.029	0.388	0.162	0.391	0.199	0.007	0.42	0.43	0.39	
	Top side		0.388	0.162	0.391	0.199		0.39	0.39	0.36	
Bottom side	1.102						1.10	1.10	1.10		

<UL CA>

WWAN Band	Exposure Position	1	2	3	4	5	6	9	1+2+3	1+2+5+9	1+2+4+6	SPLSR	
		WWAN	WWAN	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	Bluetooth Ant 6	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)		
LTE Band 2 Ant 0	LTE Band 5 Ant 1	Front	0.460	0.263	0.388	0.162	0.391	0.199		1.11	1.11	1.08	
		Back	0.894	0.398	0.388	0.162	0.391	0.199	0.006	1.68	1.69	1.65	4,5,6
		Left side	0.142	0.103	0.388	0.162	0.391	0.199		0.63	0.64	0.61	
		Right side	0.109	0.088	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.56	
		Top side		0.272	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side	0.933		0.388	0.162	0.391	0.199		1.32	1.32	1.29	
LTE Band 2 Ant 0	LTE Band 12(17) Ant 1	Front	0.460	0.199	0.388	0.162	0.391	0.199		1.05	1.05	1.02	
		Back	0.894	0.226	0.388	0.162	0.391	0.199	0.006	1.51	1.52	1.48	
		Left side	0.142	0.216	0.388	0.162	0.391	0.199		0.75	0.75	0.72	
		Right side	0.109	0.140	0.388	0.162	0.391	0.199	0.007	0.64	0.65	0.61	
		Top side		0.158	0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side	0.933		0.388	0.162	0.391	0.199		1.32	1.32	1.29	
LTE Band 2 Ant 0	LTE Band 13 Ant 1	Front	0.460	0.224	0.388	0.162	0.391	0.199		1.07	1.08	1.05	
		Back	0.894	0.277	0.388	0.162	0.391	0.199	0.006	1.56	1.57	1.53	
		Left side	0.142	0.155	0.388	0.162	0.391	0.199		0.69	0.69	0.66	
		Right side	0.109	0.119	0.388	0.162	0.391	0.199	0.007	0.62	0.63	0.59	
		Top side		0.218	0.388	0.162	0.391	0.199		0.61	0.61	0.58	
		Bottom side	0.933		0.388	0.162	0.391	0.199		1.32	1.32	1.29	
LTE Band 2 Ant 0	LTE Band 14 Ant 1	Front	0.460	0.192	0.388	0.162	0.391	0.199		1.04	1.04	1.01	
		Back	0.894	0.236	0.388	0.162	0.391	0.199	0.006	1.52	1.53	1.49	
		Left side	0.142	0.111	0.388	0.162	0.391	0.199		0.64	0.64	0.61	
		Right side	0.109	0.094	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.56	
		Top side		0.186	0.388	0.162	0.391	0.199		0.57	0.58	0.55	
		Bottom side	0.933		0.388	0.162	0.391	0.199		1.32	1.32	1.29	
LTE Band 4 Ant 0	LTE Band 5 Ant 1	Front	0.557	0.263	0.388	0.162	0.391	0.199		1.21	1.21	1.18	
		Back	1.164	0.398	0.388	0.162	0.391	0.199	0.006	1.95	1.96	1.92	7,8,9
		Left side	0.130	0.103	0.388	0.162	0.391	0.199		0.62	0.62	0.59	
		Right side	0.119	0.088	0.388	0.162	0.391	0.199	0.007	0.60	0.61	0.57	
		Top side		0.272	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side	1.050		0.388	0.162	0.391	0.199		1.44	1.44	1.41	
LTE Band 4 Ant 0	LTE Band 12(17) Ant 1	Front	0.557	0.199	0.388	0.162	0.391	0.199		1.14	1.15	1.12	
		Back	1.164	0.226	0.388	0.162	0.391	0.199	0.006	1.78	1.79	1.75	10,11,12
		Left side	0.130	0.216	0.388	0.162	0.391	0.199		0.73	0.74	0.71	
		Right side	0.119	0.140	0.388	0.162	0.391	0.199	0.007	0.65	0.66	0.62	
		Top side		0.158	0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side	1.050		0.388	0.162	0.391	0.199		1.44	1.44	1.41	
LTE Band 4 Ant 0	LTE Band 13 Ant 1	Front	0.557	0.224	0.388	0.162	0.391	0.199		1.17	1.17	1.14	
		Back	1.164	0.277	0.388	0.162	0.391	0.199	0.006	1.83	1.84	1.80	13,14,15
		Left side	0.130	0.155	0.388	0.162	0.391	0.199		0.67	0.68	0.65	
		Right side	0.119	0.119	0.388	0.162	0.391	0.199	0.007	0.63	0.64	0.60	
		Top side		0.218	0.388	0.162	0.391	0.199		0.61	0.61	0.58	
		Bottom side	1.050		0.388	0.162	0.391	0.199		1.44	1.44	1.41	



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LTE Band 5 Ant 1	LTE Band 7 Ant 0	Bottom side	1.050		0.388	0.162	0.391	0.199		1.44	1.44	1.41	
		Front	0.263	0.439	0.388	0.162	0.391	0.199		1.09	1.09	1.06	
		Back	0.398	0.787	0.388	0.162	0.391	0.199	0.006	1.57	1.58	1.55	
		Left side	0.103	0.152	0.388	0.162	0.391	0.199		0.64	0.65	0.62	
		Right side	0.088	0.145	0.388	0.162	0.391	0.199	0.007	0.62	0.63	0.59	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
LTE Band 5 Ant 1	LTE Band 30 Ant 0	Bottom side		0.708	0.388	0.162	0.391	0.199		1.10	1.10	1.07	
		Front	0.263	0.223	0.388	0.162	0.391	0.199		0.87	0.88	0.85	
		Back	0.398	1.138	0.388	0.162	0.391	0.199	0.006	1.92	1.93	1.90	16,17,18
		Left side	0.103		0.388	0.162	0.391	0.199		0.49	0.49	0.46	
		Right side	0.088	0.112	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.56	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
LTE Band 5 Ant 1	LTE Band 66 Ant 0	Bottom side		0.736	0.388	0.162	0.391	0.199		1.12	1.13	1.10	
		Front	0.263	0.557	0.388	0.162	0.391	0.199		1.21	1.21	1.18	
		Back	0.398	1.164	0.388	0.162	0.391	0.199	0.006	1.95	1.96	1.92	19,20,21
		Left side	0.103	0.130	0.388	0.162	0.391	0.199		0.62	0.62	0.59	
		Right side	0.088	0.119	0.388	0.162	0.391	0.199	0.007	0.60	0.61	0.57	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
LTE Band 12 Ant 1	LTE Band 30 Ant 0	Bottom side		1.050	0.388	0.162	0.391	0.199		1.44	1.44	1.41	
		Front	0.199	0.223	0.388	0.162	0.391	0.199		0.81	0.81	0.78	
		Back	0.226	1.138	0.388	0.162	0.391	0.199	0.006	1.75	1.76	1.73	22,23,24
		Left side	0.216		0.388	0.162	0.391	0.199		0.60	0.61	0.58	
		Right side	0.140	0.112	0.388	0.162	0.391	0.199	0.007	0.64	0.65	0.61	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
LTE Band 12 Ant 1	LTE Band 66 Ant 0	Bottom side		0.736	0.388	0.162	0.391	0.199		1.12	1.13	1.10	
		Front	0.199	0.557	0.388	0.162	0.391	0.199		1.14	1.15	1.12	
		Back	0.226	1.164	0.388	0.162	0.391	0.199	0.006	1.78	1.79	1.75	25,26,27
		Left side	0.216	0.130	0.388	0.162	0.391	0.199		0.73	0.74	0.71	
		Right side	0.140	0.119	0.388	0.162	0.391	0.199	0.007	0.65	0.66	0.62	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
LTE Band 13 Ant 1	LTE Band 66 Ant 0	Bottom side		1.050	0.388	0.162	0.391	0.199		1.44	1.44	1.41	
		Front	0.224	0.557	0.388	0.162	0.391	0.199		1.17	1.17	1.14	
		Back	0.277	1.164	0.388	0.162	0.391	0.199	0.006	1.83	1.84	1.80	28,29,30
		Left side	0.155	0.130	0.388	0.162	0.391	0.199		0.67	0.68	0.65	
		Right side	0.119	0.119	0.388	0.162	0.391	0.199	0.007	0.63	0.64	0.60	
		Top side	0.218		0.388	0.162	0.391	0.199		0.61	0.61	0.58	
LTE Band 14 Ant 1	LTE Band 30 Ant 0	Bottom side		0.736	0.388	0.162	0.391	0.199		1.12	1.13	1.10	
		Front	0.192	0.223	0.388	0.162	0.391	0.199		0.80	0.81	0.78	
		Back	0.236	1.138	0.388	0.162	0.391	0.199	0.006	1.76	1.77	1.74	31,32,33
		Left side	0.111		0.388	0.162	0.391	0.199		0.50	0.50	0.47	
		Right side	0.094	0.112	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.57	
		Top side	0.186		0.388	0.162	0.391	0.199		0.57	0.58	0.55	
LTE Band 14 Ant 1	LTE Band 66 Ant 0	Bottom side		1.050	0.388	0.162	0.391	0.199		1.44	1.44	1.41	
		Front	0.192	0.557	0.388	0.162	0.391	0.199		1.14	1.14	1.11	
		Back	0.236	1.164	0.388	0.162	0.391	0.199	0.006	1.79	1.80	1.76	34,35,36
		Left side	0.111	0.130	0.388	0.162	0.391	0.199		0.63	0.63	0.60	
		Right side	0.094	0.119	0.388	0.162	0.391	0.199	0.007	0.60	0.61	0.57	
		Top side	0.186		0.388	0.162	0.391	0.199		0.57	0.58	0.55	



<EN-DC>

WWAN Band	FR1 Band	Exposure Position	1	2	3	4	5	6	9	1+2+3	1+2+5+9	1+2+4+6	SPLSR
			WWAN	FR1	WLAN2.4GHz Ant 6+7 Non DBS	WLAN2.4GHz Ant 6+7 DBS	WLAN5GHz Ant 6+7 Non DBS	WLAN5GHz Ant 6+7 DBS	Bluetooth Ant 6	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)	
LTE Band 13 Ant 1	FR1 n66 Ant 0	Front	0.224	0.491	0.388	0.162	0.391	0.199		1.10	1.11	1.08	
		Back	0.277	1.091	0.388	0.162	0.391	0.199	0.006	1.76	1.77	1.73	37,38,39
		Left side	0.155	0.134	0.388	0.162	0.391	0.199		0.68	0.68	0.65	
		Right side	0.119	0.061	0.388	0.162	0.391	0.199	0.007	0.57	0.58	0.54	
		Top side	0.218		0.388	0.162	0.391	0.199		0.61	0.61	0.58	
		Bottom side		1.084						1.08	1.08	1.08	
LTE Band 5 Ant 1	FR1 n2 Ant 0	Front	0.263	0.388	0.388	0.162	0.391	0.199		1.04	1.04	1.01	
		Back	0.398	0.754	0.388	0.162	0.391	0.199	0.006	1.54	1.55	1.51	
		Left side	0.103	0.164	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Right side	0.088	0.719	0.388	0.162	0.391	0.199	0.007	1.20	1.21	1.17	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side		0.733						0.73	0.73	0.73	
LTE Band 14 Ant 1	FR1 n2 Ant 0	Front	0.192	0.388	0.388	0.162	0.391	0.199		0.97	0.97	0.94	
		Back	0.236	0.754	0.388	0.162	0.391	0.199	0.006	1.38	1.39	1.35	
		Left side	0.111	0.164	0.388	0.162	0.391	0.199		0.66	0.67	0.64	
		Right side	0.094	0.719	0.388	0.162	0.391	0.199	0.007	1.20	1.21	1.17	
		Top side	0.186		0.388	0.162	0.391	0.199		0.57	0.58	0.55	
		Bottom side		0.733						0.73	0.73	0.73	
LTE Band 30 Ant 0	FR1 n2 Ant 5	Front	0.223	0.263	0.388	0.162	0.391	0.199		0.87	0.88	0.85	
		Back	1.138	0.470	0.388	0.162	0.391	0.199	0.006	2.00	2.01	1.97	40,41,42
		Left side		0.047	0.388	0.162	0.391	0.199		0.44	0.44	0.41	
		Right side	0.112	0.062	0.388	0.162	0.391	0.199	0.007	0.56	0.57	0.54	
		Top side		0.505	0.388	0.162	0.391	0.199		0.89	0.90	0.87	
		Bottom side	0.736							0.74	0.74	0.74	
LTE Band 30 Ant 2	FR1 n2 Ant 0	Front	0.152	0.388	0.388	0.162	0.391	0.199		0.93	0.93	0.90	
		Back	0.182	0.754	0.388	0.162	0.391	0.199	0.006	1.32	1.33	1.30	
		Left side	0.231	0.164	0.388	0.162	0.391	0.199		0.78	0.79	0.76	
		Right side	0.019	0.719	0.388	0.162	0.391	0.199	0.007	1.13	1.14	1.10	
		Top side	0.016		0.388	0.162	0.391	0.199		0.40	0.41	0.38	
		Bottom side		0.733						0.73	0.73	0.73	
LTE Band 2 Ant 0	FR1 n5 Ant 1	Front	0.460	0.246	0.388	0.162	0.391	0.199		1.09	1.10	1.07	
		Back	0.894	0.360	0.388	0.162	0.391	0.199	0.006	1.64	1.65	1.62	43,44,45
		Left side	0.142	0.156	0.388	0.162	0.391	0.199		0.69	0.69	0.66	
		Right side	0.109	0.082	0.388	0.162	0.391	0.199	0.007	0.58	0.59	0.55	
		Top side		0.267	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side	0.933							0.93	0.93	0.93	
LTE Band 30 Ant 0	FR1 n5 Ant 1	Front	0.223	0.246	0.388	0.162	0.391	0.199		0.86	0.86	0.83	
		Back	1.138	0.360	0.388	0.162	0.391	0.199	0.006	1.89	1.90	1.86	46,47,48
		Left side		0.156	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Right side	0.112	0.082	0.388	0.162	0.391	0.199	0.007	0.58	0.59	0.56	
		Top side		0.267	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side	0.736							0.74	0.74	0.74	
LTE Band 66 Ant 0	FR1 n5 Ant 1	Front	0.557	0.246	0.388	0.162	0.391	0.199		1.19	1.19	1.16	
		Back	1.164	0.360	0.388	0.162	0.391	0.199	0.006	1.91	1.92	1.89	49,50,51
		Left side	0.130	0.156	0.388	0.162	0.391	0.199		0.67	0.68	0.65	
		Right side	0.119	0.082	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.56	
		Top side		0.267	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side	1.050							1.05	1.05	1.05	
LTE Band 2 Ant 0	FR1 n12 Ant 1	Front	0.460	0.140	0.388	0.162	0.391	0.199		0.99	0.99	0.96	



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		Back	0.894	0.174	0.388	0.162	0.391	0.199	0.006	1.46	1.47	1.43	
		Left side	0.142	0.104	0.388	0.162	0.391	0.199		0.63	0.64	0.61	
		Right side	0.109	0.059	0.388	0.162	0.391	0.199	0.007	0.56	0.57	0.53	
		Top side		0.124	0.388	0.162	0.391	0.199		0.51	0.52	0.49	
		Bottom side	0.933							0.93	0.93	0.93	
LTE Band 14 Ant 1	FR1 n30 Ant 0	Front	0.192	0.279	0.388	0.162	0.391	0.199		0.86	0.86	0.83	
		Back	0.236	1.273	0.388	0.162	0.391	0.199	0.006	1.90	1.91	1.87	52,53,54
		Left side	0.111	0.044	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Right side	0.094	0.082	0.388	0.162	0.391	0.199	0.007	0.56	0.57	0.54	
		Top side	0.186		0.388	0.162	0.391	0.199		0.57	0.58	0.55	
		Bottom side		0.857					0.86	0.86	0.86		
LTE Band 2 Ant 0	FR1 n66 Ant 5	Front	0.460	0.329	0.388	0.162	0.391	0.199		1.18	1.18	1.15	
		Back	0.894	0.394	0.388	0.162	0.391	0.199	0.006	1.68	1.69	1.65	55,56,57
		Left side	0.142	0.066	0.388	0.162	0.391	0.199		0.60	0.60	0.57	
		Right side	0.109	0.050	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.52	
		Top side		0.481	0.388	0.162	0.391	0.199		0.87	0.87	0.84	
		Bottom side	0.933						0.93	0.93	0.93		
LTE Band 2 Ant 5	FR1 n66 Ant 0	Front	0.286	0.491	0.388	0.162	0.391	0.199		1.17	1.17	1.14	
		Back	0.376	1.091	0.388	0.162	0.391	0.199	0.006	1.86	1.86	1.83	58,59,60
		Left side	0.064	0.134	0.388	0.162	0.391	0.199		0.59	0.59	0.56	
		Right side	0.084	0.061	0.388	0.162	0.391	0.199	0.007	0.53	0.54	0.51	
		Top side	0.486		0.388	0.162	0.391	0.199		0.87	0.88	0.85	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 5 Ant 1	FR1 n66 Ant 0	Front	0.263	0.491	0.388	0.162	0.391	0.199		1.14	1.15	1.12	
		Back	0.398	1.091	0.388	0.162	0.391	0.199	0.006	1.88	1.89	1.85	61,62,63
		Left side	0.103	0.134	0.388	0.162	0.391	0.199		0.63	0.63	0.60	
		Right side	0.088	0.061	0.388	0.162	0.391	0.199	0.007	0.54	0.55	0.51	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 12 Ant 1	FR1 n66 Ant 0	Front	0.199	0.491	0.388	0.162	0.391	0.199		1.08	1.08	1.05	
		Back	0.226	1.091	0.388	0.162	0.391	0.199	0.006	1.71	1.71	1.68	64,65,66
		Left side	0.216	0.134	0.388	0.162	0.391	0.199		0.74	0.74	0.71	
		Right side	0.140	0.061	0.388	0.162	0.391	0.199	0.007	0.59	0.60	0.56	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 14 Ant 1	FR1 n66 Ant 0	Front	0.192	0.491	0.388	0.162	0.391	0.199		1.07	1.07	1.04	
		Back	0.236	1.091	0.388	0.162	0.391	0.199	0.006	1.72	1.72	1.69	67,68,69
		Left side	0.111	0.134	0.388	0.162	0.391	0.199		0.63	0.64	0.61	
		Right side	0.094	0.061	0.388	0.162	0.391	0.199	0.007	0.54	0.55	0.52	
		Top side	0.186		0.388	0.162	0.391	0.199		0.57	0.58	0.55	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 30 Ant 0	FR1 n66 Ant 5	Front	0.223	0.329	0.388	0.162	0.391	0.199		0.94	0.94	0.91	
		Back	1.138	0.394	0.388	0.162	0.391	0.199	0.006	1.92	1.93	1.89	70,71,72
		Left side		0.066	0.388	0.162	0.391	0.199		0.45	0.46	0.43	
		Right side	0.112	0.050	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.52	
		Top side		0.481	0.388	0.162	0.391	0.199		0.87	0.87	0.84	
		Bottom side	0.736						0.74	0.74	0.74		
LTE Band 30 Ant 2	FR1 n66 Ant 0	Front	0.152	0.491	0.388	0.162	0.391	0.199		1.03	1.03	1.00	
		Back	0.182	1.091	0.388	0.162	0.391	0.199	0.006	1.66	1.67	1.63	73,74,75
		Left side	0.231	0.134	0.388	0.162	0.391	0.199		0.75	0.76	0.73	
		Right side	0.019	0.061	0.388	0.162	0.391	0.199	0.007	0.47	0.48	0.44	
		Top side	0.016		0.388	0.162	0.391	0.199		0.40	0.41	0.38	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 12 Ant 1	FR1 n2 Ant 0	Front	0.199	0.388	0.388	0.162	0.391	0.199		0.98	0.98	0.95	
		Back	0.226	0.754	0.388	0.162	0.391	0.199	0.006	1.37	1.38	1.34	
		Left side	0.216	0.164	0.388	0.162	0.391	0.199		0.77	0.77	0.74	



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		Right side	0.140	0.719	0.388	0.162	0.391	0.199	0.007	1.25	1.26	1.22		
		Top side	0.158		0.388	0.162	0.391	0.199			0.55	0.55	0.52	
		Bottom side		0.733							0.73	0.73	0.73	
LTE Band 66 Ant 1	FR1 n2 Ant 0	Front	0.159	0.388	0.388	0.162	0.391	0.199		0.94	0.94	0.91		
		Back	0.183	0.754	0.388	0.162	0.391	0.199	0.006	1.33	1.33	1.30		
		Left side	0.083	0.164	0.388	0.162	0.391	0.199		0.64	0.64	0.61		
		Right side		0.719	0.388	0.162	0.391	0.199	0.007	1.11	1.12	1.08		
		Top side	0.234		0.388	0.162	0.391	0.199		0.62	0.63	0.60		
		Bottom side		0.733						0.73	0.73	0.73		
LTE Band 2 Ant 0	FR1 n41 Ant 2	Front	0.460	0.230	0.388	0.162	0.391	0.199		1.08	1.08	1.05		
		Back	0.894	0.330	0.388	0.162	0.391	0.199	0.006	1.61	1.62	1.59	76,77	
		Left side	0.142	0.505	0.388	0.162	0.391	0.199		1.04	1.04	1.01		
		Right side	0.109	0.057	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.53		
		Top side		0.217	0.388	0.162	0.391	0.199		0.61	0.61	0.58		
		Bottom side	0.933							0.93	0.93	0.93		
LTE Band 71 Ant 1	FR1 n66 Ant 0	Front	0.225	0.491	0.388	0.162	0.391	0.199		1.10	1.11	1.08		
		Back	0.282	1.091	0.388	0.162	0.391	0.199	0.006	1.76	1.77	1.73	78,79,80	
		Left side	0.281	0.134	0.388	0.162	0.391	0.199		0.80	0.81	0.78		
		Right side	0.165	0.061	0.388	0.162	0.391	0.199	0.007	0.61	0.62	0.59		
		Top side	0.150		0.388	0.162	0.391	0.199		0.54	0.54	0.51		
		Bottom side		1.084						1.08	1.08	1.08		
LTE Band 2 Ant 0	FR1 n71 Ant 1	Front	0.460	0.178	0.388	0.162	0.391	0.199		1.03	1.03	1.00		
		Back	0.894	0.217	0.388	0.162	0.391	0.199	0.006	1.50	1.51	1.47		
		Left side	0.142	0.208	0.388	0.162	0.391	0.199		0.74	0.74	0.71		
		Right side	0.109	0.122	0.388	0.162	0.391	0.199	0.007	0.62	0.63	0.59		
		Top side		0.121	0.388	0.162	0.391	0.199		0.51	0.51	0.48		
		Bottom side	0.933							0.93	0.93	0.93		
LTE Band 66 Ant 0	FR1 n71 Ant 1	Front	0.557	0.178	0.388	0.162	0.391	0.199		1.12	1.13	1.10		
		Back	1.164	0.217	0.388	0.162	0.391	0.199	0.006	1.77	1.78	1.74	81,82,83	
		Left side	0.130	0.208	0.388	0.162	0.391	0.199		0.73	0.73	0.70		
		Right side	0.119	0.122	0.388	0.162	0.391	0.199	0.007	0.63	0.64	0.60		
		Top side		0.121	0.388	0.162	0.391	0.199		0.51	0.51	0.48		
		Bottom side	1.050							1.05	1.05	1.05		
LTE Band 66 Ant 0	FR1 n41 Ant 2	Front	0.557	0.230	0.388	0.162	0.391	0.199		1.18	1.18	1.15		
		Back	1.164	0.330	0.388	0.162	0.391	0.199	0.006	1.88	1.89	1.86	84,85,86	
		Left side	0.130	0.505	0.388	0.162	0.391	0.199		1.02	1.03	1.00		
		Right side	0.119	0.057	0.388	0.162	0.391	0.199	0.007	0.56	0.57	0.54		
		Top side		0.217	0.388	0.162	0.391	0.199		0.61	0.61	0.58		
		Bottom side	1.050							1.05	1.05	1.05		
LTE Band 25 Ant 0	FR1 n41 Ant 2	Front	0.460	0.230	0.388	0.162	0.391	0.199		1.08	1.08	1.05		
		Back	0.894	0.330	0.388	0.162	0.391	0.199	0.006	1.61	1.62	1.59	87,88	
		Left side	0.142	0.505	0.388	0.162	0.391	0.199		1.04	1.04	1.01		
		Right side	0.109	0.057	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.53		
		Top side		0.217	0.388	0.162	0.391	0.199		0.61	0.61	0.58		
		Bottom side	0.933							0.93	0.93	0.93		
LTE Band 26 Ant 1	FR1 n41 Ant 0	Front	0.263	0.501	0.388	0.162	0.391	0.199		1.15	1.16	1.13		
		Back	0.398	0.853	0.388	0.162	0.391	0.199	0.006	1.64	1.65	1.61	89,90,91	
		Left side	0.103	0.325	0.388	0.162	0.391	0.199		0.82	0.82	0.79		
		Right side	0.088	0.029	0.388	0.162	0.391	0.199	0.007	0.51	0.52	0.48		
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63		
		Bottom side		1.102						1.10	1.10	1.10		
LTE Band 38 Ant 0	FR1 n78 Ant 4	Front	0.292	0.207	0.388	0.162	0.391	0.199		0.89	0.89	0.86		
		Back	0.409	0.342	0.388	0.162	0.391	0.199	0.006	1.14	1.15	1.11		
		Left side	0.103	0.028	0.388	0.162	0.391	0.199		0.52	0.52	0.49		
		Right side	0.088	0.197	0.388	0.162	0.391	0.199	0.007	0.67	0.68	0.65		
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52		



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		Bottom side	0.683							0.68	0.68	0.68	
LTE Band 5 Ant 1	FR1 n78 Ant 2	Front	0.263	0.075	0.388	0.162	0.391	0.199		0.73	0.73	0.70	
		Back	0.398	0.496	0.388	0.162	0.391	0.199	0.006	1.28	1.29	1.26	
		Left side	0.103	0.359	0.388	0.162	0.391	0.199		0.85	0.85	0.82	
		Right side	0.088	0.020	0.388	0.162	0.391	0.199	0.007	0.50	0.51	0.47	
		Top side	0.272	0.110	0.388	0.162	0.391	0.199		0.77	0.77	0.74	
		Bottom side									0.00	0.00	0.00
LTE Band 66 Ant 0	FR1 n78 Ant 4	Front	0.557	0.207	0.388	0.162	0.391	0.199		1.15	1.16	1.13	
		Back	1.164	0.342	0.388	0.162	0.391	0.199	0.006	1.89	1.90	1.87	92,93,94
		Left side	0.130	0.028	0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Right side	0.119	0.197	0.388	0.162	0.391	0.199	0.007	0.70	0.71	0.68	
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Bottom side	1.050								1.05	1.05	1.05
LTE Band 2 Ant 0	FR1 n78 Ant 4	Front	0.460	0.207	0.388	0.162	0.391	0.199		1.06	1.06	1.03	
		Back	0.894	0.342	0.388	0.162	0.391	0.199	0.006	1.62	1.63	1.60	95,96,97
		Left side	0.142	0.028	0.388	0.162	0.391	0.199		0.56	0.56	0.53	
		Right side	0.109	0.197	0.388	0.162	0.391	0.199	0.007	0.69	0.70	0.67	
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Bottom side	0.933								0.93	0.93	0.93
LTE Band 7 Ant 0	FR1 n71 Ant 1	Front	0.439	0.178	0.388	0.162	0.391	0.199		1.01	1.01	0.98	
		Back	0.787	0.217	0.388	0.162	0.391	0.199	0.006	1.39	1.40	1.37	
		Left side	0.152	0.208	0.388	0.162	0.391	0.199		0.75	0.75	0.72	
		Right side	0.145	0.122	0.388	0.162	0.391	0.199	0.007	0.66	0.67	0.63	
		Top side		0.121	0.388	0.162	0.391	0.199		0.51	0.51	0.48	
		Bottom side	0.708								0.71	0.71	0.71
LTE Band 12 Ant 1	FR1 n78 Ant 2	Front	0.199	0.075	0.388	0.162	0.391	0.199		0.66	0.67	0.64	
		Back	0.226	0.496	0.388	0.162	0.391	0.199	0.006	1.11	1.12	1.08	
		Left side	0.216	0.359	0.388	0.162	0.391	0.199		0.96	0.97	0.94	
		Right side	0.140	0.020	0.388	0.162	0.391	0.199	0.007	0.55	0.56	0.52	
		Top side	0.158	0.110	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side									0.00	0.00	0.00
LTE Band 5 Ant 1	FR1 n7 Ant 0	Front	0.263	0.389	0.388	0.162	0.391	0.199		1.04	1.04	1.01	
		Back	0.398	0.738	0.388	0.162	0.391	0.199	0.006	1.52	1.53	1.50	
		Left side	0.103	0.168	0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Right side	0.088	0.103	0.388	0.162	0.391	0.199	0.007	0.58	0.59	0.55	
		Top side	0.272		0.388	0.162	0.391	0.199		0.66	0.66	0.63	
		Bottom side		0.679							0.68	0.68	0.68
LTE Band 12 Ant 1	FR1 n7 Ant 0	Front	0.199	0.389	0.388	0.162	0.391	0.199		0.98	0.98	0.95	
		Back	0.226	0.738	0.388	0.162	0.391	0.199	0.006	1.35	1.36	1.33	
		Left side	0.216	0.168	0.388	0.162	0.391	0.199		0.77	0.78	0.75	
		Right side	0.140	0.103	0.388	0.162	0.391	0.199	0.007	0.63	0.64	0.60	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side		0.679							0.68	0.68	0.68
LTE Band 13 Ant 1	FR1 n2 Ant 0	Front	0.224	0.388	0.388	0.162	0.391	0.199		1.00	1.00	0.97	
		Back	0.277	0.754	0.388	0.162	0.391	0.199	0.006	1.42	1.43	1.39	
		Left side	0.155	0.164	0.388	0.162	0.391	0.199		0.71	0.71	0.68	
		Right side	0.119	0.719	0.388	0.162	0.391	0.199	0.007	1.23	1.24	1.20	
		Top side	0.218		0.388	0.162	0.391	0.199		0.61	0.61	0.58	
		Bottom side		0.733							0.73	0.73	0.73
LTE Band 48 Ant 2	FR1 n5 Ant 1	Front	0.067	0.246	0.388	0.162	0.391	0.199		0.70	0.70	0.67	
		Back	0.528	0.360	0.388	0.162	0.391	0.199	0.006	1.28	1.29	1.25	
		Left side	0.360	0.156	0.388	0.162	0.391	0.199		0.90	0.91	0.88	
		Right side		0.082	0.388	0.162	0.391	0.199	0.007	0.47	0.48	0.44	
		Top side	0.124	0.267	0.388	0.162	0.391	0.199		0.78	0.78	0.75	
		Bottom side									0.00	0.00	0.00
LTE Band 48 Ant 2	FR1 n66 Ant 5	Front	0.067	0.329	0.388	0.162	0.391	0.199		0.78	0.79	0.76	



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		Back	0.528	0.394	0.388	0.162	0.391	0.199	0.006	1.31	1.32	1.28	
		Left side	0.360	0.066	0.388	0.162	0.391	0.199		0.81	0.82	0.79	
		Right side		0.050	0.388	0.162	0.391	0.199	0.007	0.44	0.45	0.41	
		Top side	0.124	0.481	0.388	0.162	0.391	0.199		0.99	1.00	0.97	
		Bottom side								0.00	0.00	0.00	
LTE Band 7 Ant 0	FR1 n66 Ant 5	Front	0.439	0.329	0.388	0.162	0.391	0.199		1.16	1.16	1.13	
		Back	0.787	0.394	0.388	0.162	0.391	0.199	0.006	1.57	1.58	1.54	
		Left side	0.152	0.066	0.388	0.162	0.391	0.199		0.61	0.61	0.58	
		Right side	0.145	0.050	0.388	0.162	0.391	0.199	0.007	0.58	0.59	0.56	
		Top side		0.481	0.388	0.162	0.391	0.199		0.87	0.87	0.84	
		Bottom side	0.708						0.71	0.71	0.71		
LTE Band 7 Ant 2	FR1 n66 Ant 0	Front	0.157	0.491	0.388	0.162	0.391	0.199		1.04	1.04	1.01	
		Back	0.328	1.091	0.388	0.162	0.391	0.199	0.006	1.81	1.82	1.78	98,99,100
		Left side	0.437	0.134	0.388	0.162	0.391	0.199		0.96	0.96	0.93	
		Right side		0.061	0.388	0.162	0.391	0.199	0.007	0.45	0.46	0.42	
		Top side	0.079		0.388	0.162	0.391	0.199		0.47	0.47	0.44	
		Bottom side		1.084					1.08	1.08	1.08		
LTE Band 41 Ant 0	FR1 n77 Ant 4	Front	0.292	0.207	0.388	0.162	0.391	0.199		0.89	0.89	0.86	
		Back	0.409	0.342	0.388	0.162	0.391	0.199	0.006	1.14	1.15	1.11	
		Left side	0.103	0.028	0.388	0.162	0.391	0.199		0.52	0.52	0.49	
		Right side	0.088	0.197	0.388	0.162	0.391	0.199	0.007	0.67	0.68	0.65	
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Bottom side	0.683						0.68	0.68	0.68		
LTE Band 12 Ant 1	FR1 n38 Ant 0	Front	0.199	0.501	0.388	0.162	0.391	0.199		1.09	1.09	1.06	
		Back	0.226	0.853	0.388	0.162	0.391	0.199	0.006	1.47	1.48	1.44	
		Left side	0.216	0.325	0.388	0.162	0.391	0.199		0.93	0.93	0.90	
		Right side	0.140	0.029	0.388	0.162	0.391	0.199	0.007	0.56	0.57	0.53	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side		1.102					1.10	1.10	1.10		
LTE Band 4 Ant 0	FR1 n78 Ant 4	Front	0.557	0.207	0.388	0.162	0.391	0.199		1.15	1.16	1.13	
		Back	1.164	0.342	0.388	0.162	0.391	0.199	0.006	1.89	1.90	1.87	101,102,103
		Left side	0.130	0.028	0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Right side	0.119	0.197	0.388	0.162	0.391	0.199	0.007	0.70	0.71	0.68	
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Bottom side	1.050						1.05	1.05	1.05		
LTE Band 12 Ant 1	FR1 n25 Ant 0	Front	0.199	0.388	0.388	0.162	0.391	0.199		0.98	0.98	0.95	
		Back	0.226	0.754	0.388	0.162	0.391	0.199	0.006	1.37	1.38	1.34	
		Left side	0.216	0.164	0.388	0.162	0.391	0.199		0.77	0.77	0.74	
		Right side	0.140	0.719	0.388	0.162	0.391	0.199	0.007	1.25	1.26	1.22	
		Top side	0.158		0.388	0.162	0.391	0.199		0.55	0.55	0.52	
		Bottom side		0.733					0.73	0.73	0.73		
LTE Band 7 Ant 0	FR1 n77 Ant 4	Front	0.439	0.207	0.388	0.162	0.391	0.199		1.03	1.04	1.01	
		Back	0.787	0.342	0.388	0.162	0.391	0.199	0.006	1.52	1.53	1.49	
		Left side	0.152	0.028	0.388	0.162	0.391	0.199		0.57	0.57	0.54	
		Right side	0.145	0.197	0.388	0.162	0.391	0.199	0.007	0.73	0.74	0.70	
		Top side		0.154	0.388	0.162	0.391	0.199		0.54	0.55	0.52	
		Bottom side	0.708						0.71	0.71	0.71		
LTE Band 71 Ant 1	FR1 n78 Ant 2	Front	0.225	0.075	0.388	0.162	0.391	0.199		0.69	0.69	0.66	
		Back	0.282	0.496	0.388	0.162	0.391	0.199	0.006	1.17	1.18	1.14	
		Left side	0.281	0.359	0.388	0.162	0.391	0.199		1.03	1.03	1.00	
		Right side	0.165	0.020	0.388	0.162	0.391	0.199	0.007	0.57	0.58	0.55	
		Top side	0.150	0.110	0.388	0.162	0.391	0.199		0.65	0.65	0.62	
		Bottom side							0.00	0.00	0.00		
LTE Band 71 Ant 1	FR1 n38 Ant 0	Front	0.225	0.501	0.388	0.162	0.391	0.199		1.11	1.12	1.09	
		Back	0.282	0.853	0.388	0.162	0.391	0.199	0.006	1.52	1.53	1.50	
		Left side	0.281	0.325	0.388	0.162	0.391	0.199		0.99	1.00	0.97	