FCC SAR TEST REPORT

FCC ID	:	**PKRISGM2000B**
Equipment	:	**Wireless Hotspot Modem**
Brand Name	:	**Inseego**
Model Name	:	**M2000B** **M2000E**
Marketing Name	:	**M2000**
Applicant	:	**Inseego Corporation** **9710 Scranton Road Suite 200, San Diego, CA 92121**
Manufacturer	:	**Inseego Corporation** **9710 Scranton Road Suite 200, San Diego, CA 92121**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on Feb. 22, 2021 and testing was started from Feb. 22, 2021 and completed on Apr. 20, 2021. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. EMC & Wireless Communications Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA041658-02	01	Initial issue of report	Apr. 30, 2021
FA041658-02	02	Remove 5G NR n78 information	May 24, 2021

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Inseego Corporation, Wireless Hotspot Modem, M2000B M2000E, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary Body (Separation 10mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA II	0.80	1.52
	WCDMA IV	0.99	
	WCDMA V	0.91	
	LTE Band 2	0.91	
	LTE Band 7	1.00	
	LTE Band 12 / 17	0.85	
	LTE Band 13	0.81	
	LTE Band 14	0.82	
	LTE Band 2 / 25	0.91	
	LTE Band 5 / 26	0.87	
	LTE Band 30	0.88	
	LTE Band 38 / 41	0.99	
	LTE Band 43	0.46	
	LTE Band 48	0.64	
	LTE Band 4 / 66	0.97	
	LTE Band 71	0.77	
	FR1 n2	0.94	
	FR1 n5	0.75	
	FR1 n7	0.99	
	FR1 n12	0.83	
	FR1 n25	0.86	
	FR1 n38	0.99	
	FR1 n41	0.94	
	FR1 n66	0.94	
	FR1 n71	0.87	
Date of Testing:		2021/2/22 ~ 2021/4/20	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No.TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) 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.

Reviewed by: Jason Wang
Report Producer: Paula Chen

2. Equipment Under Test (EUT) Information

2.1 General Information

Product Feature & Specification	
Equipment Name	Wireless Hotspot Modem
Brand Name	Inseego
Model Name	M2000B M2000E
Marketing Name	M2000
FCC ID	PKRISGM2000B
IMEI Code	990016570004877
Tx Frequency	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 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 n25 : 1850 MHz ~ 1915 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz
Rx Frequency	WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band IV: 2110 MHz ~ 2155 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 2: 1930 MHz ~ 1990 MHz LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 5: 869 MHz ~ 894 MHz LTE Band 7: 2620MHz ~ 2690 MHz LTE Band 12: 729 MHz ~ 746 MHz LTE Band 13: 746 MHz ~ 756 MHz LTE Band 14: 758 MHz ~ 768 MHz LTE Band 17: 734 MHz ~ 746 MHz LTE Band 25: 1930MHz ~ 1995 MHz LTE Band 26: 859MHz ~ 894MHz LTE Band 30: 2350 MHz ~ 2360 MHz LTE Band 38: 2570MHz ~ 2620MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 43: 3600 MHz ~ 3700 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 2110 MHz ~ 2180 MHz LTE Band 71: 617 MHz ~ 652 MHz 5G NR n2: 1930 MHz ~ 1990 MHz 5G NR n5 : 869 MHz ~ 894 MHz 5G NR n7 : 2620 MHz~ 2690 MHz 5G NR n12 : 729 MHz ~ 746 MHz

	5G NR n25 : 1930 MHz ~ 1995 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66: 2110 MHz ~ 2200 MHz 5G NR n71: 668 MHz ~ 693 MHz WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz
Mode	RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
EUT Stage	Production Unit

Remark:
1. Based on original filing FCC ID: PKRISGM2000B, Sporton SAR report No.: FA041658-01A to enable LTE B7/43, 5G NR n2/n5/n7/n12/n38, UL CA of B7/B38, inter-band UL CA and EN-DC refer to section12 and 13 for additional combination, the detail refer to operational description.
2. There are two batteries selected battery 1 as the main testing and battery 2 will select worst case found in battery 1 performs.
3. The WLAN SAR result is referring to RF exposure lab SAR evaluation report, report no.: SAR.20200804.

Battery Information				
Battery 1	Brand Name	Inseego		
	Manufacturer	Ningbo Veken Battery Co., Ltd	Model Name	160007
Battery 2	Brand Name	Inseego		
	Manufacturer	Ningbo Veken Battery Co., Ltd	Model Name	160006

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- 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 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

3.1 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	PKRISGM2000B
Equipment Name	WIRELESS Hotspot Modem
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 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 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	Data only
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**
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.
LTE Carrier Aggregation Combinations	Intra-Band possible combinations and the detail power measurement please referred to section 12.
LTE Carrier Aggregation Additional Information	This device supports LTE Carrier Aggregation (CA) in the uplink for LTE B7/B38/B41/B48 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance.

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 7

	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

LTE Band 12

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 13

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 14

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Channel #	Channel #	Freq.(MHz)
L	23305	790.5	23330	793
M	23330	793		
H	23355	795.5		

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 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 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 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 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	133297	680.5	133297	680.5	133297	680.5	133297	680.5
H	133447	695.5	133422	693	133397	690.5	133372	688

3.2 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
FCC	PKRISGM2000B
Equipment Name	Wireless Hotspot Modem
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 n25: 1850 MHz ~ 1915 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n71: 663 MHz ~ 698 MHz
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n7: 5MHz, 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 40MHz, 50MHz 5G NR n12: 5MHz, 10MHz, 15MHz 5G NR n25 : 5MHz, 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 40MHz 5G NR n38: 20MHz, 30MHz, 40MHz 5G NR n41: 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz, 30MHz, 40MHz 5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz
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 B5/66
LTE Anchor Bands for n5	LTE B2/66/7
LTE Anchor Bands for n7	LTE B5/12/66
LTE Anchor Bands for n12	LTE B2/66
LTE Anchor Bands for n25	LTE B12
LTE Anchor Bands for n38	LTE B5/12/71
LTE Anchor Bands for n41	LTE B4/25/26
LTE Anchor Bands for n66	LTE B5/7/71
LTE Anchor Bands for n71	LTE B7

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		Bandwidth 50MHz	
	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	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520	505000	2525
M	507000	2535	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	509000	2545

NR Band 12

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

NR Band 25

	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	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	374000	1870
M	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	37900	1895

NR Band 38

	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	516504	2582.52	517002	2585.01	518004	519996
M	519000	2595	519000	2595	519000	2595
H	521496	2607.48	520998	2604.99	2590.02	2599.98

NR Band 41

	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		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)
L	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	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
H	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	529998	2649.99	528996	2644.98	528000	2640

NR Band 66

	Bandwidth 5MHz		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)	Ch. #	Freq. (MHz)
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720	345000	1725	346000	1730
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	353000	1765	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	13410	670.5	134600	673
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5
H	139100	695.5	138600	693	13810	690.5	137600	688

4. Smart Transmit feature for RF Exposure compliance

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target or PD_design_target, below the predefined time-averaged power limit (i.e., input.power.limit for 5G mmW NR), for each characterized technology and band (refer to RF exposure part0 report)

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

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

Band	Antenna	Plimit*	Pmax * (dBm)
WCDMA II	0	23.1	23.0
WCDMA IV	0	17.6	23.0
WCDMA V	0	23.4	23.0
LTE Band 7	0	18.0	23.0
LTE Band 7	8	19.4	20.0
LTE Band 12/17	0	23.8	23.0
LTE Band 13	0	23.3	23.0
LTE Band 14	0	23.5	23.0
LTE Band 25/2	0	21.8	23.0
LTE Band 26/5	0	23.6	23.0
LTE Band 30	0	21.8	20.0
LTE Band 41/38(PC3)**	0	18.1	21.0
LTE Band 41 (PC2)**	0	18.1	21.9
LTE Band 42**	4	20.0	16.5
LTE B43**	4	19.8	18.5
LTE Band 48**	4	20.0	16.5
LTE Band 66/4	0	16.7	23.0
LTE Band 71	0	23.7	23.0
LTE Band 2	8	21.3	23.0
LTE Band 66	8	22.8	23.0
FR1 n2	0	23.1	23.0
FR1 n25/2	8	21.1	23.0
FR1 n5	0	24.2	23.0
FR1 n7	0	22.5	23.0
FR1 n7	8	18.7	23.0
FR1 n12	0	23.7	23.0
FR1 n38(PC3)	0	23.2	23.0
FR1 n38(PC3)	8	21.2	23.0
FR1 n41(PC3)	8	19.4	23.0
FR1 n66	0	23.2	23.0
FR1 n66	8	22.4	23.0
FR1 n71	0	23.3	23.0

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + 1dB uncertainty.

**All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The max allowed output power is the P_{limit} + 1dB device uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.

5. RF Exposure Limits

5.1 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.

5.2 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

1. 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.

6. Specific Absorption Rate (SAR)

6.1 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.

6.2 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:

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

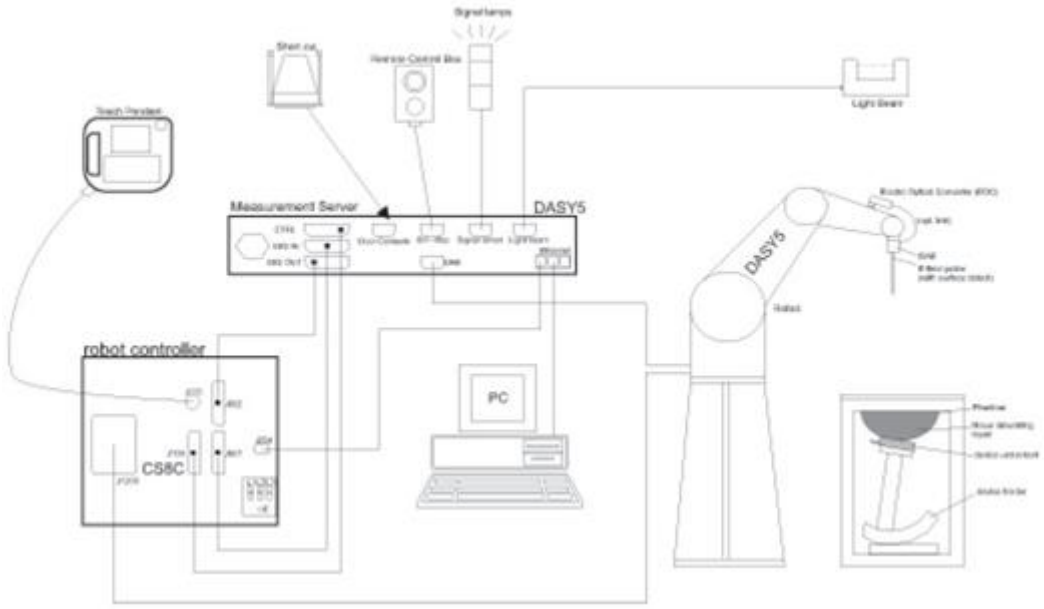
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. 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 WinXP or 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.

7.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No.TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	EMC & Wireless Communications Laboratory		Wensan Laboratory		
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan		
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	

7.2 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.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<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	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 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	

7.3 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.

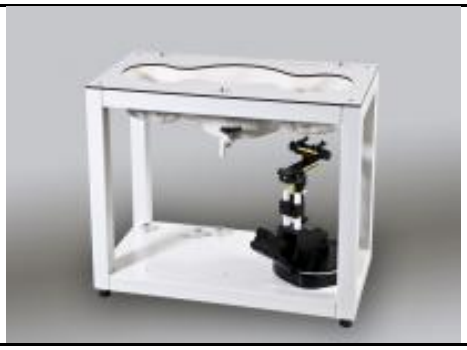
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.4 Phantom

<SAM Twin Phantom>

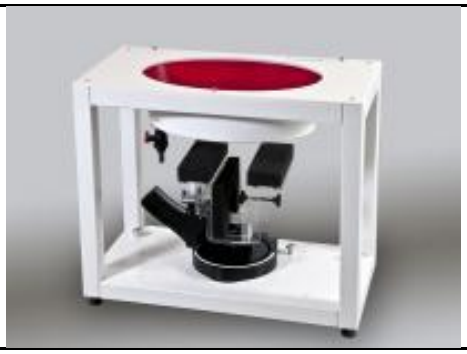
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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 in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.5 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

8. 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

8.1 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 form 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

8.2 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.

8.3 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	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used 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 shoes 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 1st 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 *reported* SAR from the *area scan based 1-g SAR estimation* 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.

8.5 Volume Scan Procedures

The volume scan is used for 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.

8.6 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.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit(2)	D750V3	1107	Mar. 08, 2019	Mar. 05, 2022
SPEAG	835MHz System Validation Kit(2)	D835V2	4d167	Nov. 25, 2019	Nov. 23, 2021
SPEAG	1900MHz System Validation Kit(2)	D1900V2	5d041	Sep. 11, 2018	Sep. 08, 2021
SPEAG	2600MHz System Validation Kit(2)	D2600V2	1008	Aug. 31, 2018	Aug. 28, 2021
SPEAG	2600MHz System Validation Kit(2)	D2600V2	1078	Mar. 06, 2019	Mar. 03, 2022
SPEAG	3500MHz System Validation Kit(2)	D3500V2	1014	Jan. 29, 2019	Jan. 26, 2022
SPEAG	3700MHz System Validation Kit(2)	D3700V2	1006	Mar. 05, 2019	Mar. 02, 2022
SPEAG	Data Acquisition Electronics	DAE4	376	Nov. 23, 2020	Nov. 22, 2021
SPEAG	Data Acquisition Electronics	DAE4	778	Jun. 04, 2020	Jun. 03, 2021
SPEAG	Data Acquisition Electronics	DAE4	913	May. 06, 2020	May. 05, 2021
SPEAG	Data Acquisition Electronics	DAE4	1647	Jan. 07, 2021	Jan. 06, 2022
SPEAG	Dosimetric E-Field Probe	ES3DV3	3184	Sep. 23, 2020	Sep. 22, 2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	3642	Apr. 29, 2020	Apr. 28, 2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Oct. 22, 2020	Oct. 21, 2021
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 10, 2020	Nov. 09, 2021
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 10, 2020	Nov. 09, 2021
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 10, 2020	Nov. 09, 2021
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 11, 2020	Nov. 10, 2021
Keysight	ENA Network Analyzer	E5071C	MY46101588	Jun. 10, 2020	Jun. 09, 2021
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 16, 2020	Sep. 15, 2021
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Nov. 06, 2020	Nov. 05, 2021
Anritsu	Power Meter	ML2495A	1419002	Aug. 19, 2020	Aug. 18, 2021
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2020	Aug. 17, 2021
Anritsu	Power Meter	ML2495A	1804003	Oct. 21, 2020	Oct. 20, 2021
Anritsu	Power Sensor	MA2411B	1726150	Oct. 21, 2020	Oct. 20, 2021
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 30, 2020	Jun. 29, 2021
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Jan. 15, 2021	Jan. 14, 2022
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 21, 2020	Oct. 20, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	479102029	Aug. 26, 2020	Aug. 25, 2021
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General 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 source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

10. System Verification

10.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	22.7	0.905	41.477	0.89	41.90	1.69	-1.01	±5	2021/2/24
835	22.7	0.917	41.772	0.90	41.50	1.89	0.66	±5	2021/2/24
1900	22.5	1.456	40.204	1.40	40.00	4.00	0.51	±5	2021/2/23
2600	22.6	2.017	38.949	1.96	39.00	2.91	-0.13	±5	2021/2/22
2600	22.4	1.961	38.369	1.96	39.00	0.05	-1.62	±5	2021/3/29
2600	22.6	1.969	39.210	1.96	39.00	0.46	0.54	±5	2021/4/6
2600	22.6	1.995	38.039	1.96	39.00	1.79	-2.46	±5	2021/4/20
3500	22.6	2.973	38.113	2.91	37.90	2.16	0.56	±5	2021/2/25
3700	22.6	3.185	37.911	3.12	37.70	2.08	0.56	±5	2021/2/25
3700	22.3	3.182	37.600	3.12	37.70	1.99	-0.27	±5	2021/3/15

10.2 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.

Test Site	Date	Frequency (MHz)	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 (%)
SAR01	2021/2/24	750	250	D750V3-1107	EX3DV4 - SN3931	DAE4 Sn913	1.99	8.32	7.96	-4.33
SAR01	2021/2/24	835	50	D835V2-4d167	EX3DV4 - SN3931	DAE4 Sn913	0.502	9.55	10.04	5.13
SAR01	2021/2/23	1900	50	D1900V2-5d041	EX3DV4 - SN3931	DAE4 Sn913	2.15	40.20	43	6.97
SAR01	2021/2/22	2600	50	D2600V2-1078	EX3DV4 - SN3931	DAE4 Sn913	2.99	57.60	59.8	3.82
SAR06	2021/3/29	2600	250	D2600V2-1078	ES3DV3 - SN3184	DAE4 Sn778	14.90	57.60	59.6	3.47
SAR04	2021/4/6	2600	50	D2600V2-1008	EX3DV4 - SN3642	DAE4 Sn1647	2.69	56.40	53.8	-4.61
SAR06	2021/4/20	2600	250	D2600V2-1078	ES3DV3 - SN3184	DAE4 Sn778	14.00	57.60	56	-2.78
SAR01	2021/2/25	3500	50	D3500V2-1014	EX3DV4 - SN3931	DAE4 Sn913	3.56	67.90	71.2	4.86
SAR01	2021/2/25	3700	50	D3700V2-1006	EX3DV4 - SN3931	DAE4 Sn913	3.42	67.30	68.4	1.63
SAR04	2021/3/15	3700	100	D3700V2-1006	EX3DV4 - SN3642	DAE4 Sn376	7.05	67.30	70.5	4.75

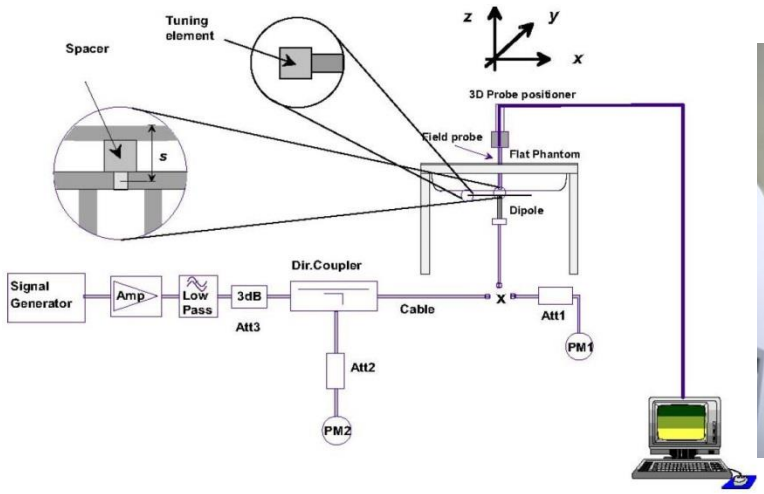


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 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 x W ≥ 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 form 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.

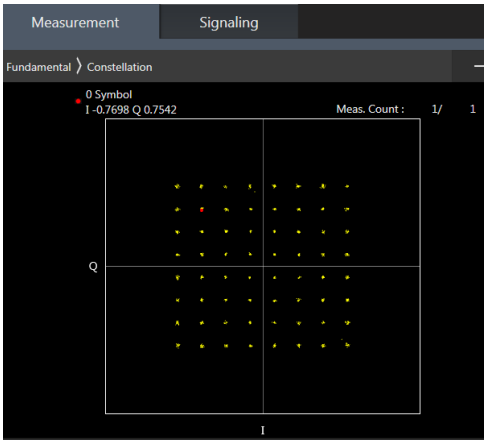
When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for 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.

12. LTE Output Power (Unit: dBm)

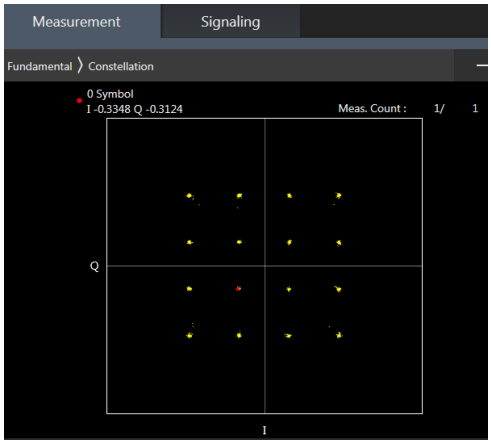
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ 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 SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > 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; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

Ant 8

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	19.92	19.93	19.89	20.4	0
20	QPSK	1	49	19.86	19.90	19.85		
20	QPSK	1	99	19.88	19.92	19.73		
20	QPSK	50	0	19.11	19.92	19.85	20.4	0
20	QPSK	50	24	19.42	19.94	19.86		
20	QPSK	50	50	19.92	20.03	19.87		
20	QPSK	100	0	19.49	19.96	19.95		
20	16QAM	1	0	19.45	20.10	19.98	20.4	0
20	16QAM	1	49	19.54	20.11	20.01		
20	16QAM	1	99	20.01	20.06	19.95		
20	16QAM	50	0	18.14	18.91	18.90	19.4	1
20	16QAM	50	24	18.36	18.92	18.94		
20	16QAM	50	50	18.93	18.95	18.88		
20	16QAM	100	0	18.50	18.95	18.92		
20	64QAM	1	0	17.39	18.98	17.95	19.4	1
20	64QAM	1	49	17.48	19.19	19.09		
20	64QAM	1	99	18.42	18.55	18.91		
20	64QAM	50	0	16.12	17.91	17.88	18.4	2
20	64QAM	50	24	16.31	17.90	17.88		
20	64QAM	50	50	16.92	17.93	17.85		
20	64QAM	100	0	16.47	18.02	17.86		
20	256QAM	1	0	15.82	15.88	15.90	16.4	4
20	256QAM	1	49	15.92	15.93	15.80		
20	256QAM	1	99	15.88	15.92	15.80		
20	256QAM	50	0	15.93	15.97	15.95	16.4	4
20	256QAM	50	24	16.04	15.95	16.02		
20	256QAM	50	50	16.00	15.99	15.91		
20	256QAM	100	0	15.99	15.94	15.92		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.93	19.88	19.79	20.4	0
15	QPSK	1	37	19.78	19.80	19.83		
15	QPSK	1	74	19.84	19.86	19.68		
15	QPSK	36	0	19.02	19.91	19.76	20.4	0
15	QPSK	36	20	19.33	19.92	19.78		
15	QPSK	36	39	19.92	19.97	19.87		
15	QPSK	75	0	19.43	19.93	19.94		
15	16QAM	1	0	19.42	20.01	19.96	20.4	0
15	16QAM	1	37	19.52	20.03	20.01		
15	16QAM	1	74	19.98	19.98	19.87		
15	16QAM	36	0	18.13	18.81	18.86	19.4	1
15	16QAM	36	20	18.27	18.91	18.93		
15	16QAM	36	39	18.85	18.86	18.81		
15	16QAM	75	0	18.40	18.89	18.91		
15	64QAM	1	0	17.36	18.90	17.94	19.4	1
15	64QAM	1	37	17.48	19.11	19.04		
15	64QAM	1	74	18.32	18.45	18.85		
15	64QAM	36	0	16.12	17.83	17.88	18.4	2
15	64QAM	36	20	16.29	17.83	17.82		
15	64QAM	36	39	16.89	17.91	17.77		

15	64QAM	75	0	16.37	18.02	17.79		
15	256QAM	1	0	15.81	15.83	15.80	16.4	4
15	256QAM	1	37	15.86	15.88	15.74		
15	256QAM	1	74	15.80	15.91	15.72		
15	256QAM	36	0	15.89	15.87	15.87	16.4	4
15	256QAM	36	20	15.97	15.92	16.02		
15	256QAM	36	39	15.94	15.89	15.82		
15	256QAM	75	0	15.95	15.85	15.82		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.92	19.89	19.85	20.4	0
10	QPSK	1	25	19.79	19.88	19.79		
10	QPSK	1	49	19.87	19.85	19.64		
10	QPSK	25	0	19.04	19.83	19.79	20.4	0
10	QPSK	25	12	19.36	19.87	19.76		
10	QPSK	25	25	19.91	19.99	19.82		
10	QPSK	50	0	19.49	19.90	19.95		
10	16QAM	1	0	19.37	20.01	19.98	20.4	0
10	16QAM	1	25	19.44	20.03	20.00		
10	16QAM	1	49	19.99	20.01	19.88		
10	16QAM	25	0	18.04	18.91	18.87	19.4	1
10	16QAM	25	12	18.33	18.85	18.92		
10	16QAM	25	25	18.84	18.88	18.84		
10	16QAM	50	0	18.44	18.94	18.89		
10	64QAM	1	0	17.29	18.88	17.95	19.4	1
10	64QAM	1	25	17.44	19.09	19.03		
10	64QAM	1	49	18.42	18.45	18.85		
10	64QAM	25	0	16.03	17.82	17.82	18.4	2
10	64QAM	25	12	16.22	17.90	17.84		
10	64QAM	25	25	16.90	17.90	17.78		
10	64QAM	50	0	16.41	17.94	17.78		
10	256QAM	1	0	15.73	15.88	15.84	16.4	4
10	256QAM	1	25	15.83	15.84	15.70		
10	256QAM	1	49	15.81	15.88	15.74		
10	256QAM	25	0	15.88	15.91	15.93	16.4	4
10	256QAM	25	12	15.94	15.86	15.92		
10	256QAM	25	25	15.92	15.95	15.87		
10	256QAM	50	0	15.96	15.89	15.92		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	19.85	19.90	19.89	20.4	0
5	QPSK	1	12	19.85	19.88	19.78		
5	QPSK	1	24	19.81	19.92	19.71		
5	QPSK	12	0	19.06	19.88	19.77	20.4	0
5	QPSK	12	7	19.35	19.90	19.81		
5	QPSK	12	13	19.85	19.97	19.77		
5	QPSK	25	0	19.43	19.94	19.86		
5	16QAM	1	0	19.41	20.00	19.94	20.4	0
5	16QAM	1	12	19.48	20.02	19.98		
5	16QAM	1	24	19.94	19.98	19.89		
5	16QAM	12	0	18.10	18.87	18.90	19.4	1
5	16QAM	12	7	18.29	18.85	18.84		
5	16QAM	12	13	18.83	18.94	18.82		
5	16QAM	25	0	18.45	18.87	18.86		
5	64QAM	1	0	17.31	18.97	17.95	19.4	1
5	64QAM	1	12	17.47	19.19	19.02		

5	64QAM	1	24	18.34	18.49	18.83		
5	64QAM	12	0	16.09	17.81	17.84	18.4	2
5	64QAM	12	7	16.22	17.88	17.88		
5	64QAM	12	13	16.82	17.89	17.80		
5	64QAM	25	0	16.43	18.01	17.79		
5	256QAM	1	0	15.81	15.83	15.87	16.4	4
5	256QAM	1	12	15.91	15.86	15.78		
5	256QAM	1	24	15.81	15.92	15.76		
5	256QAM	12	0	15.93	15.91	15.85	16.4	4
5	256QAM	12	7	15.94	15.90	15.99		
5	256QAM	12	13	15.92	15.90	15.90		
5	256QAM	25	0	15.92	15.92	15.89		

<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.

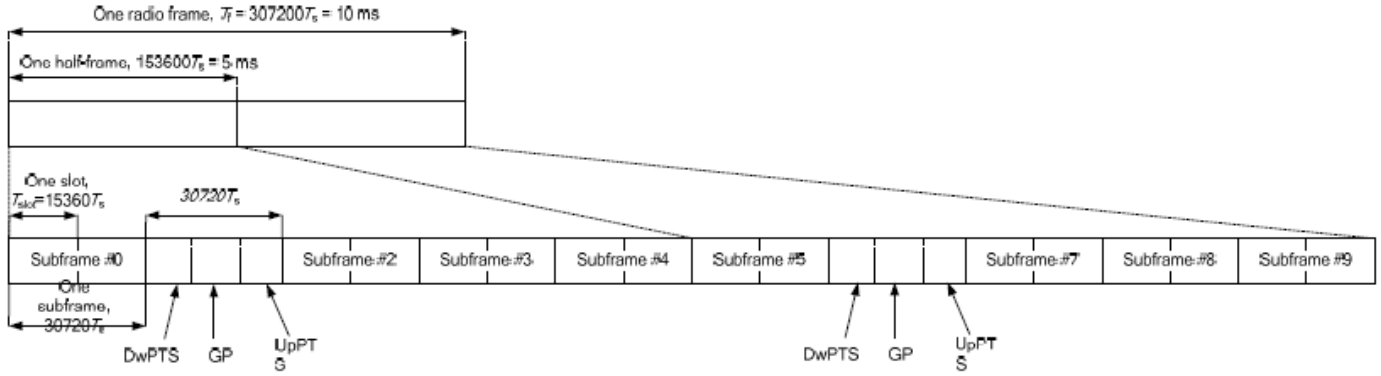


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

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	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

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:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, 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.

vi. The device supports Power Class 3 uplink-downlink configurations 0 and 6, and Power Class 2 uplink-downlink configurations 1 to 5 operations for LTE Band 41.

vii. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1, for Power Class 3 operation is 63.3% using UL-DL configuration 0. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR among all exposure condition.

Ant 4

<LTE Band 43>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				43690	44090	44490		
Frequency (MHz)				3610	3650	3690		
20	QPSK	1	0	19.15	18.90	18.89	19.5	0
20	QPSK	1	49	19.06	18.81	18.81		
20	QPSK	1	99	18.85	18.65	18.69		
20	QPSK	50	0	18.29	18.07	18.04	18.5	1
20	QPSK	50	24	18.23	17.95	17.93		
20	QPSK	50	50	18.07	17.84	17.82		
20	QPSK	100	0	18.13	17.93	17.88		
20	16QAM	1	0	18.29	18.04	18.02	18.5	1
20	16QAM	1	49	18.16	17.90	17.96		
20	16QAM	1	99	17.94	17.76	17.81		
20	16QAM	50	0	17.32	17.11	17.07	17.5	2
20	16QAM	50	24	17.25	16.97	16.93		
20	16QAM	50	50	17.09	16.86	16.85		
20	16QAM	100	0	17.13	16.94	16.91		
20	64QAM	1	0	17.08	16.83	16.82	17.5	2
20	64QAM	1	49	16.88	16.69	16.70		
20	64QAM	1	99	16.69	16.50	16.55		
20	64QAM	50	0	16.35	16.11	16.07	16.5	3
20	64QAM	50	24	16.26	15.98	15.95		
20	64QAM	50	50	16.07	15.89	15.91		
20	64QAM	100	0	16.16	15.96	15.89		
Channel				43665	44090	44515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3607.5	3650	3692.5		
15	QPSK	1	0	19.11	18.82	18.85	19.5	0
15	QPSK	1	37	19.02	18.77	18.77		
15	QPSK	1	74	18.91	18.66	18.69		
15	QPSK	36	0	18.26	18.05	18.01	18.5	1
15	QPSK	36	20	18.18	17.90	17.94		
15	QPSK	36	39	18.10	17.81	17.78		
15	QPSK	75	0	18.21	17.89	17.95		
15	16QAM	1	0	18.24	17.96	17.99	18.5	1
15	16QAM	1	37	18.11	17.82	17.87		
15	16QAM	1	74	18.06	17.78	17.86		
15	16QAM	36	0	17.24	17.01	16.98	17.5	2
15	16QAM	36	20	17.16	16.85	16.90		
15	16QAM	36	39	17.10	16.78	16.76		
15	16QAM	75	0	17.20	16.93	16.96		
15	64QAM	1	0	17.01	16.77	16.73	17.5	2
15	64QAM	1	37	16.90	16.67	16.68		
15	64QAM	1	74	16.80	16.49	16.51		
15	64QAM	36	0	16.28	16.07	16.04	16.5	3
15	64QAM	36	20	16.21	15.90	15.96		
15	64QAM	36	39	16.13	15.83	15.80		
15	64QAM	75	0	16.19	15.93	15.96		
Channel				43640	44090	44540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3605	3650	3695		
10	QPSK	1	0	19.06	18.90	18.86	19.5	0
10	QPSK	1	25	19.04	18.77	18.77		
10	QPSK	1	49	18.75	18.58	18.61		
10	QPSK	25	0	18.22	18.02	17.96	18.5	1

10	QPSK	25	12	18.23	17.93	17.93		
10	QPSK	25	25	18.07	17.84	17.78		
10	QPSK	50	0	18.08	17.85	17.83		
10	16QAM	1	0	18.26	17.96	17.96	18.5	1
10	16QAM	1	25	18.11	17.90	17.94		
10	16QAM	1	49	17.85	17.66	17.72		
10	16QAM	25	0	17.30	17.08	17.07	17.5	2
10	16QAM	25	12	17.24	16.96	16.89		
10	16QAM	25	25	17.02	16.85	16.82		
10	16QAM	50	0	17.07	16.85	16.86		
10	64QAM	1	0	17.07	16.76	16.81	17.5	2
10	64QAM	1	25	16.85	16.63	16.65		
10	64QAM	1	49	16.67	16.46	16.50		
10	64QAM	25	0	16.27	16.10	16.00	16.5	3
10	64QAM	25	12	16.20	15.98	15.87		
10	64QAM	25	25	16.02	15.80	15.90		
10	64QAM	50	0	16.14	15.96	15.86		
Channel				43615	44090	44565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3602.5	3650	3697.5		
5	QPSK	1	0	19.10	18.82	18.88	19.5	0
5	QPSK	1	12	19.06	18.73	18.78		
5	QPSK	1	24	18.84	18.60	18.66		
5	QPSK	12	0	18.19	18.07	18.00	18.5	1
5	QPSK	12	7	18.19	17.85	17.88		
5	QPSK	12	13	17.97	17.83	17.82		
5	QPSK	25	0	18.06	17.90	17.86		
5	16QAM	1	0	18.20	17.95	18.00	18.5	1
5	16QAM	1	12	18.11	17.89	17.91		
5	16QAM	1	24	17.88	17.72	17.81		
5	16QAM	12	0	17.23	17.07	17.06	17.5	2
5	16QAM	12	7	17.23	16.87	16.91		
5	16QAM	12	13	17.04	16.76	16.84		
5	16QAM	25	0	17.06	16.85	16.84		
5	64QAM	1	0	17.05	16.82	16.73	17.5	2
5	64QAM	1	12	16.80	16.67	16.69		
5	64QAM	1	24	16.60	16.41	16.52		
5	64QAM	12	0	16.25	16.10	15.98	16.5	3
5	64QAM	12	7	16.21	15.97	15.92		
5	64QAM	12	13	15.99	15.84	15.87		
5	64QAM	25	0	16.14	15.87	15.83		

<LTE Uplink carrier aggregation>

<Intra-band UL CA>

General Note:

i. The device supports intra-band uplink carrier aggregation for LTE B66/B41/B48 with a maximum of two 20MHz 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 20MHz 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 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. According 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.

v. Additional SAR measurement for LTE UL CA whit 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.

vi. For UL CA38C SAR is not necessary according to KDB 941225D05, due to was cover by UL CA 41C based on original report FCC ID: PKRISGM2000B, Sporton SAR report No.: FA041658-01A.

2CC Uplink Carrier Aggregation	
Number	Combination
1	7C
2	38C

CA_7C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	99	1	0	18.64	18.90
21100	20902	QPSK	1	0	1	99	18.89	18.90
21350	21152	QPSK	1	0	1	99	18.74	18.90

CA_38C								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
37850	38048	QPSK	1	99	1	0	20.77	21.10
37901	38099	QPSK	1	99	1	0	20.84	21.10
38150	37952	QPSK	1	0	1	99	20.90	21.10

<Inter-band UL CA>

Inter-Band Combination				
ULCA	PCC		SCC	
	Band	ANT port	Band	ANT port
2A-4A	2	0	4	8
2A-5A	2	8	5	0
2A-7A	2	8	7	0
2A-12A	2	8	12	0
2A-66A	2	8	66	0
4A-5A	4	8	5	0
4A-7A	4	8	7	0
4A-12A	4	8	12	0
5A-7A	5	0	7	8
5A-66A	5	0	66	8
12A-66A	12	0	66	8

Remark:

1. Ant 8 for transmission only for LTE Inter-Band ULCA, and LTE anchor band of 5GNR EN-DC combination
2. When the inter-band UL CA is active the PCC and SCC power is same as standalone LTE power level and the device implements Qualcomm smart transmit will prove the PCC and SCC TER < 1, the detail verification results are included in the Part2 RF exposure report

13. 5G NR Output Power (Unit: dBm)

General Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-OFDM output power measurement reduction, full measurement on Pi/2 BPSK and QPSK, for16QAM/64QMA/256QAM spot check 1RB 1offset configuration to ensure the output power will not ½ dB higher than Pi/2 BPSK and QPSK, for smaller bandwidth output power will spot check 1RB 1offset configuration at Pi/2 BPSK to ensure output power will not ½ dB higher than largest supported bandwidth.
   b. The high order modulations for CP-OFDM maximum power according to tune-up document will not ½ dB higher than DFT-OFDM mode, also DFT-OFDM mode reported SAR is ≤ 1.45 W/kg for this device, for CP-OFDM mode output power and SAR measurement is not necessary.
   c. SAR testing start with the largest channel bandwidth and measure SAR for PI/2 BPSK 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 PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   e. PI/2 BPSK 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. QPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/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
2. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.

<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	≤ 3.5[1]	≤ 1.2[1]	≤ 0.2[1]
		≤ 0.5[2]	≤ 0.5[2]	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 and combine Total Power>

FR1 (NSA) UL EN-DC	
ANT/RF	Band
0 + 8	5A-n2A
0 + 8	66A-n2A
0 + 8	12A-n2A
0 + 8	5A-n7A
0 + 8	12A-n7A
0 + 8	12A-n25A
0 + 8	66A-n25A
0 + 8	5A-n38A
0 + 8	12A-n38A
0 + 8	71A-n38A
0 + 8	4A-n41A
0 + 8	25A-n41A
0 + 8	26A-n41A
0 + 8	2A-n41A
0 + 8	2C-n41A
0 + 8	41A-n41A
0 + 8	41C-n41A
0 + 8	66A-n41A
0 + 8	5A-n66A
0 + 8	71A-n66A
0 + 8	12A-n66A
8 + 0	2A-n5A
8 + 0	7A-n5A
8 + 0	66A-n5A
8 + 0	66A-n7A
8 + 0	2A-n12A
8 + 0	66A-n12A
8 + 0	7A-n66A
8 + 0	7C-n66A
8 + 0	2A-n66A
8 + 0	7A-n71A
8 + 0	2A-n71A
8 + 0	2C-n71A
8 + 0	66A-n71A
8 + 0	66C-n71A

Ant 0

<n2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376000	380000		
Frequency (MHz)				1860	1880	1900		
20	PI/2 BPSK	1	1	22.99	22.84	22.61	24.0	0.0
20	PI/2 BPSK	1	53	22.93	22.83	22.40		
20	PI/2 BPSK	1	104	22.92	22.69	22.41		
20	PI/2 BPSK	50	0	22.45	22.23	21.97	23.5	0.5
20	PI/2 BPSK	50	28	22.95	22.78	22.37	24.0	0.0
20	PI/2 BPSK	50	56	22.44	22.19	21.87	23.5	0.5
20	PI/2 BPSK	100	0	22.43	22.25	21.86		
20	QPSK	1	1	22.98	22.76	22.51	24.0	0.0
20	QPSK	1	53	22.98	22.77	22.37		
20	QPSK	1	104	22.89	22.60	22.32		
20	QPSK	50	0	21.97	21.82	21.42	23.0	1.0
20	QPSK	50	28	22.97	22.86	22.40	24.0	0.0
20	QPSK	50	56	21.95	21.72	21.36	23.0	1.0
20	QPSK	100	0	21.98	21.83	21.38		
20	16QAM	1	1	21.90	21.64	21.36	23.0	1.0
20	64QAM	1	1	20.47	20.38	20.08	21.5	2.5
20	256QAM	1	1	18.46	18.44	18.31	19.5	4.5
Channel				371500	376000	380500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	PI/2 BPSK	1	1	22.95	22.81	22.60	24.0	0.0
Channel				371000	376000	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	PI/2 BPSK	1	1	22.91	22.80	22.51	24.0	0.0
Channel				370500	376000	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	PI/2 BPSK	1	1	22.98	22.72	22.58	24.0	0.0

<n5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				166800	167300	167800		
Frequency (MHz)				834	836.5	839		
20	PI/2 BPSK	1	1	22.00	22.35	22.03	24.0	0.0
20	PI/2 BPSK	1	53	22.04	22.84	21.97		
20	PI/2 BPSK	1	104	21.05	21.26	20.83		
20	PI/2 BPSK	50	0	22.05	22.20	22.04	23.5	0.5
20	PI/2 BPSK	50	28	22.00	22.26	21.97	24.0	0.0
20	PI/2 BPSK	50	56	21.96	21.84	21.66	23.5	0.5
20	PI/2 BPSK	100	0	21.99	21.90	21.56		
20	QPSK	1	1	21.94	22.29	21.97	24.0	0.0
20	QPSK	1	53	22.01	22.77	21.92		
20	QPSK	1	104	21.00	21.21	20.79		
20	QPSK	50	0	21.94	22.01	21.98	23.0	1.0
20	QPSK	50	28	22.04	22.58	21.96	24.0	0.0
20	QPSK	50	56	21.85	21.65	21.32	23.0	1.0
20	QPSK	100	0	21.56	21.52	21.29		
20	16QAM	1	1	20.75	21.13	20.78	23.0	1.0
20	64QAM	1	1	20.56	20.91	20.58	21.5	2.5
20	256QAM	1	1	19.31	19.33	19.32	19.5	4.5
Channel				166300	167300	168300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				831.5	836.5	841.5		
15	PI/2 BPSK	1	1	21.93	22.25	22.01	24.0	0.0
Channel				165800	167300	168800	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				829	836.5	844		
10	PI/2 BPSK	1	1	21.93	22.26	21.99	24.0	0.0
Channel				165300	167300	169300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	PI/2 BPSK	1	1	21.90	22.28	21.95	24.0	0.0

<n7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				502000	507000	512000		
Frequency (MHz)				2510	2535	2560		
20	PI/2 BPSK	1	1	23.10	23.28	23.37	23.5	0.0
20	PI/2 BPSK	1	53	23.22	23.26	23.45		
20	PI/2 BPSK	1	104	23.21	23.31	22.92		
20	PI/2 BPSK	50	0	22.82	23.20	23.27	23.5	0.0
20	PI/2 BPSK	50	28	23.32	23.31	23.33	23.5	0.0
20	PI/2 BPSK	50	56	22.70	23.19	23.28	23.5	0.0
20	PI/2 BPSK	100	0	23.13	23.20	23.09		
20	QPSK	1	1	23.29	23.21	23.31	23.5	0.0
20	QPSK	1	53	23.19	23.27	23.38		
20	QPSK	1	104	23.20	23.25	23.34		
20	QPSK	50	0	22.69	23.00	22.92	23.0	0.5
20	QPSK	50	28	23.20	23.27	23.33	23.5	0.0
20	QPSK	50	56	22.76	22.70	22.83	23.0	0.5
20	QPSK	100	0	22.68	22.76	22.85		
20	16QAM	1	1	22.81	22.71	22.81	23.0	0.5
20	64QAM	1	1	21.42	21.38	21.49	21.5	2.0
20	256QAM	1	1	19.25	19.25	19.32	19.5	4.0
Channel				501500	507000	512500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	PI/2 BPSK	1	1	23.10	23.26	23.37	23.5	0.0
Channel				501000	507000	513000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	PI/2 BPSK	1	1	23.04	23.17	23.32	23.5	0.0
Channel				500500	507000	513500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	PI/2 BPSK	1	1	22.96	23.10	23.29	23.5	0.0

<n12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				141300	141500	141700		
Frequency (MHz)				706.5	707.5	708.5		
15	PI/2 BPSK	1	1	23.21	23.25	23.15	24.0	0.0
15	PI/2 BPSK	1	40	23.07	23.07	23.09		
15	PI/2 BPSK	1	77	22.99	22.94	22.95		
15	PI/2 BPSK	36	0	23.15	23.12	23.12	24.0	0.0
15	PI/2 BPSK	36	22	23.04	22.97	23.02	24.0	0.0
15	PI/2 BPSK	36	43	23.02	22.99	22.94	24.0	0.0
15	PI/2 BPSK	75	0	23.10	23.04	23.07		
15	QPSK	1	1	23.23	23.22	23.24	24.0	0.0
15	QPSK	1	40	23.13	23.09	23.08		
15	QPSK	1	77	23.04	23.00	22.97		
15	QPSK	36	0	23.11	23.13	23.15	24.0	0.0
15	QPSK	36	22	23.03	22.99	23.01	24.0	0.0
15	QPSK	36	43	23.02	22.97	22.96	24.0	0.0
15	QPSK	75	0	23.09	23.10	23.05		
15	16QAM	1	1	23.22	23.21	23.22	24.0	0.0
15	64QAM	1	1	22.35	22.31	22.36	23.0	1.0
15	256QAM	1	1	20.29	20.25	20.24	21.0	3.0
Channel				140800	141500	142200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				704	707.5	711		
10	PI/2 BPSK	1	1	23.20	23.11	23.07	24.0	0.0
Channel				140300	141500	142700	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	PI/2 BPSK	1	1	23.18	23.13	23.05	24.0	0.0

<n38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				516000	519000	522000		MPR (dB)
Frequency (MHz)				2580	2595	2610		
20	PI/2 BPSK	1	1	22.85	22.88	22.95	24.0	0.0
20	PI/2 BPSK	1	26	22.68	22.83	22.80		
20	PI/2 BPSK	1	49	22.69	22.81	22.79		
20	PI/2 BPSK	25	0	22.34	22.49	22.34	23.5	0.5
20	PI/2 BPSK	25	13	22.70	22.68	22.80	24.0	0.0
20	PI/2 BPSK	25	26	22.33	22.32	22.28	23.5	0.5
20	PI/2 BPSK	50	0	22.23	22.25	22.19		
20	QPSK	1	1	22.76	22.78	22.94	24.0	0.0
20	QPSK	1	26	22.94	22.83	22.90		
20	QPSK	1	49	22.86	22.83	22.89		
20	QPSK	25	0	21.80	21.84	21.84	23.0	1.0
20	QPSK	25	13	22.89	22.74	22.80	24.0	0.0
20	QPSK	25	26	21.79	21.97	21.75	23.0	1.0
20	QPSK	50	0	21.81	21.83	21.67		
20	16QAM	1	1	22.00	21.76	21.90	23.0	1.0
20	64QAM	1	1	20.47	20.32	20.50	21.5	2.5
20	256QAM	1	1	18.58	18.31	18.61	19.5	4.5

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   c. 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 Reported TDD LTE SAR = 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 only when the measured SAR is ≥0.8W/kg.

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 output power for each RB allocation configuration is > not ½ 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 SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > 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; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.

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 PI/2 BPSK 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 PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   c. PI/2 BPSK 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. QPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   e. 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

14.1 Body SAR

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7C_Ant 0	20M	BPSK	1	0	Right Side	10mm	Battery 1	21100	2535	18.89	18.90	1.002	-0.17	0.905	0.907
	LTE Band 7_Ant 8	20M	QPSK	1	0	Front	10mm	Battery 1	21100	2535	19.93	20.40	1.114	0.02	0.258	0.287
	LTE Band 7_Ant 8	20M	QPSK	50	50	Front	10mm	Battery 1	21100	2535	20.03	20.40	1.089	-0.01	0.246	0.268
	LTE Band 7_Ant 8	20M	QPSK	1	0	Back	10mm	Battery 1	21100	2535	19.93	20.40	1.114	0	0.204	0.227
	LTE Band 7_Ant 8	20M	QPSK	50	50	Back	10mm	Battery 1	21100	2535	20.03	20.40	1.089	0.05	0.201	0.219
	LTE Band 7_Ant 8	20M	QPSK	1	0	Top Side	10mm	Battery 1	21100	2535	19.93	20.40	1.114	-0.08	0.811	0.904
	LTE Band 7_Ant 8	20M	QPSK	1	0	Top Side	10mm	Battery 1	20850	2510	19.92	20.40	1.117	-0.06	0.773	0.863
	LTE Band 7_Ant 8	20M	QPSK	1	0	Top Side	10mm	Battery 1	21350	2560	19.89	20.40	1.125	0.1	0.686	0.771
	LTE Band 7_Ant 8	20M	QPSK	50	50	Top Side	10mm	Battery 1	21100	2535	20.03	20.40	1.089	0.08	0.805	0.877
01	LTE Band 7_Ant 8	20M	QPSK	50	50	Top Side	10mm	Battery 1	20850	2510	19.92	20.40	1.117	-0.09	0.871	0.973
	LTE Band 7_Ant 8	20M	QPSK	50	50	Top Side	10mm	Battery 1	21350	2560	19.87	20.40	1.130	-0.11	0.607	0.686
	LTE Band 7_Ant 8	20M	QPSK	100	0	Top Side	10mm	Battery 1	21100	2535	19.96	20.40	1.107	-0.02	0.824	0.912
	LTE Band 7_Ant 8	20M	QPSK	50	50	Top Side	10mm	Battery 2	20850	2510	19.92	20.40	1.117	0.07	0.846	0.945

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 43_Ant 4	20M	QPSK	1	0	Front	10mm	Battery 1	43690	3610	19.15	19.50	1.084	62.9	1.006	-0.16	0.394	0.430
	LTE Band 43_Ant 4	20M	QPSK	50	0	Front	10mm	Battery 1	43690	3610	18.29	18.50	1.050	62.9	1.006	-0.11	0.326	0.344
	LTE Band 43_Ant 4	20M	QPSK	1	0	Back	10mm	Battery 1	43690	3610	19.15	19.50	1.084	62.9	1.006	-0.17	0.228	0.249
	LTE Band 43_Ant 4	20M	QPSK	50	0	Back	10mm	Battery 1	43690	3610	18.29	18.50	1.050	62.9	1.006	-0.14	0.183	0.193
	LTE Band 43_Ant 4	20M	QPSK	1	0	Right Side	10mm	Battery 1	43690	3610	19.15	19.50	1.084	62.9	1.006	-0.17	0.151	0.165
	LTE Band 43_Ant 4	20M	QPSK	50	0	Right Side	10mm	Battery 1	43690	3610	18.29	18.50	1.050	62.9	1.006	-0.18	0.136	0.144
	LTE Band 43_Ant 4	20M	QPSK	1	0	Top Side	10mm	Battery 1	43690	3610	19.15	19.50	1.084	62.9	1.006	-0.16	0.115	0.125
	LTE Band 43_Ant 4	20M	QPSK	50	0	Top Side	10mm	Battery 1	43690	3610	18.29	18.50	1.050	62.9	1.006	-0.16	0.092	0.097
	LTE Band 43_Ant 4	20M	QPSK	1	0	Bottom Side	10mm	Battery 1	43690	3610	19.15	19.50	1.084	62.9	1.006	-0.11	0.103	0.112
	LTE Band 43_Ant 4	20M	QPSK	50	0	Bottom Side	10mm	Battery 1	43690	3610	18.29	18.50	1.050	62.9	1.006	-0.17	0.044	0.046
02	LTE Band 43_Ant 4	20M	QPSK	1	0	Front	10mm	Battery 2	43690	3610	19.15	19.50	1.084	62.9	1.006	0.01	0.423	0.461

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n2_Ant 0	20M	BPSK	1	1	Front	10mm	Battery 1	372000	1860	22.99	24.00	1.262	0.03	0.729	0.920
	FR1 n2_Ant 0	20M	BPSK	1	1	Front	10mm	Battery 1	376000	1880	22.84	24.00	1.306	-0.14	0.680	0.888
	FR1 n2_Ant 0	20M	BPSK	1	1	Front	10mm	Battery 1	380000	1900	22.61	24.00	1.377	-0.04	0.637	0.877
03	FR1 n2_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	372000	1860	22.95	24.00	1.274	-0.03	0.736	0.937
	FR1 n2_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	376000	1880	22.78	24.00	1.324	0.02	0.684	0.906
	FR1 n2_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	380000	1900	22.37	24.00	1.455	-0.05	0.596	0.867
	FR1 n2_Ant 0	20M	BPSK	100	0	Front	10mm	Battery 1	372000	1860	22.43	23.50	1.279	-0.07	0.726	0.929
	FR1 n2_Ant 0	20M	BPSK	1	1	Back	10mm	Battery 1	372000	1860	22.99	24.00	1.262	0.06	0.735	0.927
	FR1 n2_Ant 0	20M	BPSK	1	1	Back	10mm	Battery 1	376000	1880	22.84	24.00	1.306	-0.05	0.692	0.904
	FR1 n2_Ant 0	20M	BPSK	1	1	Back	10mm	Battery 1	380000	1900	22.61	24.00	1.377	-0.05	0.651	0.897
	FR1 n2_Ant 0	20M	BPSK	50	28	Back	10mm	Battery 1	372000	1860	22.95	24.00	1.274	-0.06	0.717	0.913
	FR1 n2_Ant 0	20M	BPSK	50	28	Back	10mm	Battery 1	376000	1880	22.78	24.00	1.324	-0.05	0.672	0.890
	FR1 n2_Ant 0	20M	BPSK	50	28	Back	10mm	Battery 1	380000	1900	22.37	24.00	1.455	-0.11	0.611	0.889
	FR1 n2_Ant 0	20M	BPSK	100	0	Back	10mm	Battery 1	372000	1860	22.43	23.50	1.279	-0.04	0.713	0.912
	FR1 n2_Ant 0	20M	BPSK	1	1	Right Side	10mm	Battery 1	372000	1860	22.99	24.00	1.262	-0.1	0.202	0.255
	FR1 n2_Ant 0	20M	BPSK	50	28	Right Side	10mm	Battery 1	372000	1860	22.95	24.00	1.274	-0.11	0.191	0.243
	FR1 n2_Ant 0	20M	BPSK	1	1	Top Side	10mm	Battery 1	372000	1860	22.99	24.00	1.262	-0.08	0.111	0.140
	FR1 n2_Ant 0	20M	BPSK	50	28	Top Side	10mm	Battery 1	372000	1860	22.95	24.00	1.274	-0.06	0.107	0.136
	FR1 n2_Ant 0	20M	BPSK	1	1	Bottom Side	10mm	Battery 1	372000	1860	22.99	24.00	1.262	0.03	0.482	0.608
	FR1 n2_Ant 0	20M	BPSK	50	28	Bottom Side	10mm	Battery 1	372000	1860	22.95	24.00	1.274	0.06	0.469	0.597
	FR1 n2_Ant 0	20M	BPSK	1	1	Back	10mm	Battery 2	372000	1860	22.99	24.00	1.262	0	0.696	0.878
	FR1 n5_Ant 0	20M	BPSK	1	53	Front	10mm	Battery 1	167300	836.5	22.84	24.00	1.306	-0.09	0.503	0.657
04	FR1 n5_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	167300	836.5	22.26	24.00	1.493	-0.11	0.503	0.751
	FR1 n5_Ant 0	20M	BPSK	1	53	Back	10mm	Battery 1	167300	836.5	22.84	24.00	1.306	-0.1	0.488	0.637
	FR1 n5_Ant 0	20M	BPSK	50	28	Back	10mm	Battery 1	167300	836.5	22.26	24.00	1.493	-0.15	0.486	0.725
	FR1 n5_Ant 0	20M	BPSK	1	53	Right Side	10mm	Battery 1	167300	836.5	22.84	24.00	1.306	-0.14	0.086	0.112
	FR1 n5_Ant 0	20M	BPSK	50	28	Right Side	10mm	Battery 1	167300	836.5	22.26	24.00	1.493	-0.17	0.095	0.142
	FR1 n5_Ant 0	20M	BPSK	1	53	Top Side	10mm	Battery 1	167300	836.5	22.84	24.00	1.306	-0.13	0.360	0.470
	FR1 n5_Ant 0	20M	BPSK	50	28	Top Side	10mm	Battery 1	167300	836.5	22.26	24.00	1.493	-0.13	0.352	0.525
	FR1 n5_Ant 0	20M	BPSK	1	53	Bottom Side	10mm	Battery 1	167300	836.5	22.84	24.00	1.306	-0.14	0.310	0.405
	FR1 n5_Ant 0	20M	BPSK	50	28	Bottom Side	10mm	Battery 1	167300	836.5	22.26	24.00	1.493	-0.19	0.314	0.469
	FR1 n5_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 2	167300	836.5	22.26	24.00	1.493	-0.15	0.482	0.720

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n7_Ant 0	20M	BPSK	1	53	Front	10mm	Battery 1	512000	2560	23.45	23.50	1.012	-0.07	0.695	0.703
	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	512000	2560	23.33	23.50	1.040	-0.03	0.852	0.886
	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	502000	2510	23.32	23.50	1.042	-0.01	0.830	0.865
	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 1	507000	2535	23.31	23.50	1.045	-0.1	0.918	0.959
	FR1 n7_Ant 0	20M	BPSK	100	0	Front	10mm	Battery 1	507000	2535	23.20	23.50	1.072	-0.1	0.825	0.884
	FR1 n7_Ant 0	20M	BPSK	1	53	Back	10mm	Battery 1	512000	2560	23.45	23.50	1.012	-0.11	0.401	0.406
	FR1 n7_Ant 0	20M	BPSK	50	28	Back	10mm	Battery 1	512000	2560	23.33	23.50	1.040	-0.03	0.633	0.658
	FR1 n7_Ant 0	20M	BPSK	1	53	Right Side	10mm	Battery 1	512000	2560	23.45	23.50	1.012	0.02	0.470	0.475
	FR1 n7_Ant 0	20M	BPSK	50	28	Right Side	10mm	Battery 1	512000	2560	23.33	23.50	1.040	0.04	0.546	0.568
	FR1 n7_Ant 0	20M	BPSK	1	53	Top Side	10mm	Battery 1	512000	2560	23.45	23.50	1.012	-0.11	0.056	0.057
	FR1 n7_Ant 0	20M	BPSK	50	28	Top Side	10mm	Battery 1	512000	2560	23.33	23.50	1.040	-0.19	0.067	0.070
	FR1 n7_Ant 0	20M	BPSK	1	53	Bottom Side	10mm	Battery 1	512000	2560	23.45	23.50	1.012	-0.03	0.649	0.657
	FR1 n7_Ant 0	20M	BPSK	50	28	Bottom Side	10mm	Battery 1	512000	2560	23.33	23.50	1.040	-0.08	0.675	0.702
05	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 2	507000	2535	23.31	23.50	1.045	-0.12	0.950	0.992
	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 2	512000	2560	23.33	23.50	1.040	-0.07	0.940	0.978
	FR1 n7_Ant 0	20M	BPSK	50	28	Front	10mm	Battery 2	502000	2510	23.32	23.50	1.042	-0.04	0.943	0.983
	FR1 n7_Ant 8	20M	BPSK	1	1	Front	10mm	Battery 1	502000	2510	18.88	19.70	1.208	-0.13	0.223	0.269
	FR1 n7_Ant 8	20M	BPSK	50	28	Front	10mm	Battery 1	502000	2510	18.86	19.70	1.213	-0.13	0.232	0.282
	FR1 n7_Ant 8	20M	BPSK	1	1	Back	10mm	Battery 1	502000	2510	18.88	19.70	1.208	-0.01	0.234	0.283
	FR1 n7_Ant 8	20M	BPSK	50	28	Back	10mm	Battery 1	502000	2510	18.86	19.70	1.213	-0.07	0.228	0.277
	FR1 n7_Ant 8	20M	BPSK	1	1	Top Side	10mm	Battery 1	502000	2510	18.88	19.70	1.208	0.02	0.582	0.703
	FR1 n7_Ant 8	20M	BPSK	50	28	Top Side	10mm	Battery 1	502000	2510	18.86	19.70	1.213	0.01	0.720	0.874
	FR1 n7_Ant 8	20M	BPSK	50	28	Top Side	10mm	Battery 1	507000	2535	18.79	19.70	1.233	-0.06	0.769	0.948
	FR1 n7_Ant 8	20M	BPSK	50	28	Top Side	10mm	Battery 1	512000	2560	18.60	19.70	1.288	-0.07	0.666	0.858
	FR1 n7_Ant 8	20M	BPSK	100	0	Top Side	10mm	Battery 1	502000	2510	18.79	19.70	1.233	-0.09	0.644	0.794
	FR1 n7_Ant 8	20M	BPSK	50	28	Top Side	10mm	Battery 2	507000	2535	18.79	19.70	1.233	-0.05	0.751	0.926
06	FR1 n12_Ant 0	15M	BPSK	1	1	Front	10mm	Battery 1	141500	707.5	23.25	24.00	1.189	-0.06	0.698	0.830
	FR1 n12_Ant 0	15M	BPSK	36	0	Front	10mm	Battery 1	141500	707.5	23.12	24.00	1.225	-0.12	0.607	0.743
	FR1 n12_Ant 0	15M	BPSK	75	0	Front	10mm	Battery 1	141500	707.5	23.04	24.00	1.247	-0.06	0.604	0.753
	FR1 n12_Ant 0	15M	BPSK	1	1	Back	10mm	Battery 1	141500	707.5	23.25	24.00	1.189	-0.05	0.661	0.786
	FR1 n12_Ant 0	15M	BPSK	36	0	Back	10mm	Battery 1	141500	707.5	23.12	24.00	1.225	-0.18	0.575	0.704
	FR1 n12_Ant 0	15M	BPSK	1	1	Right Side	10mm	Battery 1	141500	707.5	23.25	24.00	1.189	-0.11	0.119	0.141
	FR1 n12_Ant 0	15M	BPSK	36	0	Right Side	10mm	Battery 1	141500	707.5	23.12	24.00	1.225	-0.06	0.101	0.124
	FR1 n12_Ant 0	15M	BPSK	1	1	Top Side	10mm	Battery 1	141500	707.5	23.25	24.00	1.189	-0.15	0.253	0.301
	FR1 n12_Ant 0	15M	BPSK	36	0	Top Side	10mm	Battery 1	141500	707.5	23.12	24.00	1.225	-0.08	0.239	0.293
	FR1 n12_Ant 0	15M	BPSK	1	1	Bottom Side	10mm	Battery 1	141500	707.5	23.25	24.00	1.189	-0.11	0.324	0.385
	FR1 n12_Ant 0	15M	BPSK	36	0	Bottom Side	10mm	Battery 1	141500	707.5	23.12	24.00	1.225	-0.06	0.297	0.364
	FR1 n12_Ant 0	15M	BPSK	1	1	Front	10mm	Battery 2	141500	707.5	23.25	24.00	1.189	-0.07	0.679	0.807

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n38_Ant 0	20M	BPSK	1	1	Front	10mm	Battery 1	519000	2595	22.88	24.00	1.294	-0.13	0.686	0.888
	FR1 n38_Ant 0	20M	BPSK	25	13	Front	10mm	Battery 1	519000	2595	22.68	24.00	1.355	-0.13	0.654	0.886
	FR1 n38_Ant 0	20M	BPSK	50	0	Front	10mm	Battery 1	519000	2595	22.25	23.50	1.334	-0.15	0.661	0.881
	FR1 n38_Ant 0	20M	BPSK	1	1	Back	10mm	Battery 1	519000	2595	22.88	24.00	1.294	-0.17	0.443	0.573
	FR1 n38_Ant 0	20M	BPSK	25	13	Back	10mm	Battery 1	519000	2595	22.68	24.00	1.355	-0.14	0.397	0.538
	FR1 n38_Ant 0	20M	BPSK	1	1	Right Side	10mm	Battery 1	519000	2595	22.88	24.00	1.294	-0.03	0.293	0.379
	FR1 n38_Ant 0	20M	BPSK	25	13	Right Side	10mm	Battery 1	519000	2595	22.68	24.00	1.355	-0.13	0.273	0.370
	FR1 n38_Ant 0	20M	BPSK	1	1	Top Side	10mm	Battery 1	519000	2595	22.88	24.00	1.294	-0.13	0.060	0.078
	FR1 n38_Ant 0	20M	BPSK	25	13	Top Side	10mm	Battery 1	519000	2595	22.68	24.00	1.355	-0.15	0.054	0.073
	FR1 n38_Ant 0	20M	BPSK	1	1	Bottom Side	10mm	Battery 1	519000	2595	22.88	24.00	1.294	0.01	0.485	0.628
	FR1 n38_Ant 0	20M	BPSK	25	13	Bottom Side	10mm	Battery 1	519000	2595	22.68	24.00	1.355	-0.02	0.462	0.626
	FR1 n38_Ant 0	20M	BPSK	1	1	Front	10mm	Battery 2	519000	2595	22.88	24.00	1.294	-0.15	0.707	0.915
	FR1 n38_Ant 0	20M	BPSK	25	13	Front	10mm	Battery 2	519000	2595	22.68	24.00	1.355	-0.1	0.694	0.941
	FR1 n38_Ant 0	20M	BPSK	50	0	Front	10mm	Battery 2	519000	2595	22.25	23.50	1.334	-0.03	0.683	0.911
	FR1 n38_Ant 8	20M	BPSK	1	1	Front	10mm	Battery 1	519000	2595	21.59	22.20	1.151	0.01	0.302	0.348
	FR1 n38_Ant 8	20M	BPSK	25	13	Front	10mm	Battery 1	519000	2595	21.36	22.20	1.213	0.09	0.259	0.314
	FR1 n38_Ant 8	20M	BPSK	1	1	Back	10mm	Battery 1	519000	2595	21.59	22.20	1.151	-0.16	0.338	0.389
	FR1 n38_Ant 8	20M	BPSK	25	13	Back	10mm	Battery 1	519000	2595	21.36	22.20	1.213	-0.11	0.307	0.373
	FR1 n38_Ant 8	20M	BPSK	1	1	Top Side	10mm	Battery 1	519000	2595	21.59	22.20	1.151	-0.19	0.856	0.985
	FR1 n38_Ant 8	20M	BPSK	25	13	Top Side	10mm	Battery 1	519000	2595	21.36	22.20	1.213	-0.15	0.764	0.927
	FR1 n38_Ant 8	20M	BPSK	50	0	Top Side	10mm	Battery 1	519000	2595	21.27	22.20	1.239	-0.16	0.776	0.961
07	FR1 n38_Ant 8	20M	BPSK	1	1	Top Side	10mm	Battery 2	519000	2595	21.59	22.20	1.151	-0.18	0.861	0.991
	FR1 n38_Ant 8	20M	BPSK	25	13	Top Side	10mm	Battery 2	519000	2595	21.36	22.20	1.213	-0.15	0.741	0.899
	FR1 n38_Ant 8	20M	BPSK	50	0	Top Side	10mm	Battery 2	519000	2595	21.27	22.20	1.239	-0.14	0.751	0.930

14.2 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Battery	Power Reduction	Ch.	Freq. (MHz)	Power Setting	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	FR1 n7_Ant 0	20M_BPSK_50_28	Front	10mm	Battery 2	ON	507000	2535	225	23.31	23.50	1.045	-0.12	0.950	-	0.992
2nd	FR1 n7_Ant 0	20M_BPSK_50_28	Front	10mm	Battery 2	ON	507000	2535	225	23.31	23.50	1.045	0.03	0.941	1.01	0.983

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. 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.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

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

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.
Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.
Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

*x% * A + (100-x)% * B ≤ 1.0,*

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

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,
*x% * A + (100-x)% * B + C ≤ 1.0* (1)

x% * A + (100-x)% * B ≤ x% * max(A, B) + (100-x)% * max(A, B) ≤ max(A, B)

*x% * A + (100-x)% * B + C ≤ max(A, B) + C ≤ 1.0* (2)

if A + C ≤ 1.0 and B + C ≤ 1.0 can be proven, then “x% * A + (100-x)% * B + C ≤ 1.0”. Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

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

15.2 Sim-Tx configuration

NO.	Simultaneous Transmission Configurations	Exposure Positions
		Body
1.	UMTS + 2.4GHz WiFi 0 + 2.4GHz WiFi 1	Yes
2.	UMTS + 5GHz WiFi 0 + 5GHz WiFi 1	Yes
3.	LTE+ 2.4GHz WiFi 0 + 2.4GHz WiFi 1	Yes
4.	LTE + 5GHz WiFi 0 + 5GHz WiFi 1	Yes
5.	LTE + 5G FR1 + 2.4GHz WiFi 0 + 2.4GHz WiFi 1	Yes
6.	LTE + 5G FR1 + 5GHz WiFi 0 + 5GHz WiFi 1	Yes

General Note:

1. The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
2. The Scaled SAR summation is calculated based on the same configuration and test position.
3. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (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 ≤ 0.04 for 1g SAR, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
4. The WLAN SAR results according to RF exposure lab SAR evaluation report, report no.: SAR.20200804, are use performed Sim-Tx analysis, and the Sim-Tx analysis is following step:
   a. For WLAN RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode
   b. If WLAN RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode is > 1.6W/kg, the MIMO SAR result is used.

15.3 Body Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	5	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
		WWAN	2.4GHz Wi-Fi 0	2.4GHz Wi-Fi 1	5GHz Wi-Fi 0	5GHz Wi-Fi 1		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA II_Ant 0	Front	0.640	0.110	0.070	0.200	0.150	**0.820**	**0.990**
	Back	0.795	0.310	0.080	0.440	0.140	**1.185**	**1.375**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.288					**0.288**	**0.288**
	Top side	0.085		0.180		0.270	**0.265**	**0.355**
	Bottom side	0.590	0.460		0.570		**1.050**	**1.160**
WCDMA IV_Ant 0	Front	0.518	0.110	0.070	0.200	0.150	**0.698**	**0.868**
	Back	0.314	0.310	0.080	0.440	0.140	**0.704**	**0.894**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.991					**0.991**	**0.991**
	Top side	0.001		0.180		0.270	**0.181**	**0.271**
	Bottom side	0.145	0.460		0.570		**0.605**	**0.715**
WCDMA V_Ant 0	Front	0.838	0.110	0.070	0.200	0.150	**1.018**	**1.188**
	Back	0.911	0.310	0.080	0.440	0.140	**1.301**	**1.491**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.133					**0.133**	**0.133**
	Top side	0.580		0.180		0.270	**0.760**	**0.850**
	Bottom side	0.504	0.460		0.570		**0.964**	**1.074**
LTE Band 2_Ant 8	Front	0.309	0.110	0.070	0.200	0.150	**0.489**	**0.659**
	Back	0.532	0.310	0.080	0.440	0.140	**0.922**	**1.112**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.914		0.180		0.270	**1.094**	**1.184**
	Bottom side		0.460		0.570		**0.460**	**0.570**
LTE Band 7_Ant 0	Front	0.297	0.110	0.070	0.200	0.150	**0.477**	**0.647**
	Back	0.334	0.310	0.080	0.440	0.140	**0.724**	**0.914**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.995					**0.995**	**0.995**
	Top side	0.086		0.180		0.270	**0.266**	**0.356**
	Bottom side	0.473	0.460		0.570		**0.933**	**1.043**
LTE Band 12_Ant 0	Front	0.838	0.110	0.070	0.200	0.150	**1.018**	**1.188**
	Back	0.850	0.310	0.080	0.440	0.140	**1.240**	**1.430**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.129					**0.129**	**0.129**
	Top side	0.339		0.180		0.270	**0.519**	**0.609**
	Bottom side	0.439	0.460		0.570		**0.899**	**1.009**
LTE Band 13_Ant 0	Front	0.776	0.110	0.070	0.200	0.150	**0.956**	**1.126**
	Back	0.806	0.310	0.080	0.440	0.140	**1.196**	**1.386**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.122					**0.122**	**0.122**
	Top side	0.482		0.180		0.270	**0.662**	**0.752**
	Bottom side	0.463	0.460		0.570		**0.923**	**1.033**
LTE Band 14_Ant 0	Front	0.791	0.110	0.070	0.200	0.150	**0.971**	**1.141**
	Back	0.820	0.310	0.080	0.440	0.140	**1.210**	**1.400**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.128					**0.128**	**0.128**
	Top side	0.448		0.180		0.270	**0.628**	**0.718**
	Bottom side	0.452	0.460		0.570		**0.912**	**1.022**

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz Wi-Fi 0 1g SAR (W/kg)	3 2.4GHz Wi-Fi 1 1g SAR (W/kg)	4 5GHz Wi-Fi 0 1g SAR (W/kg)	5 5GHz Wi-Fi 1 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
LTE Band 25_Ant 0	Front	0.753	0.110	0.070	0.200	0.150	**0.933**	**1.103**
	Back	0.909	0.310	0.080	0.440	0.140	**1.299**	**1.489**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.232					**0.232**	**0.232**
	Top side	0.087		0.180		0.270	**0.267**	**0.357**
	Bottom side	0.593	0.460		0.570		**1.053**	**1.163**
LTE Band 26_Ant 0	Front	0.842	0.110	0.070	0.200	0.150	**1.022**	**1.192**
	Back	0.868	0.310	0.080	0.440	0.140	**1.258**	**1.448**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.140					**0.140**	**0.140**
	Top side	0.544		0.180		0.270	**0.724**	**0.814**
	Bottom side	0.546	0.460		0.570		**1.006**	**1.116**
LTE Band 30_Ant 0	Front	0.475	0.110	0.070	0.200	0.150	**0.655**	**0.825**
	Back	0.643	0.310	0.080	0.440	0.140	**1.033**	**1.223**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.876					**0.876**	**0.876**
	Top side	0.066		0.180		0.270	**0.246**	**0.336**
	Bottom side	0.211	0.460		0.570		**0.671**	**0.781**
LTE Band 41_Ant 0	Front	0.328	0.110	0.070	0.200	0.150	**0.508**	**0.678**
	Back	0.289	0.310	0.080	0.440	0.140	**0.679**	**0.869**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.993					**0.993**	**0.993**
	Top side	0.096		0.180		0.270	**0.276**	**0.366**
	Bottom side	0.276	0.460		0.570		**0.736**	**0.846**
LTE Band 48_Ant 4	Front	0.636	0.110	0.070	0.200	0.150	**0.816**	**0.986**
	Back	0.216	0.310	0.080	0.440	0.140	**0.606**	**0.796**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.233					**0.233**	**0.233**
	Top side	0.101		0.180		0.270	**0.281**	**0.371**
	Bottom side	0.078	0.460		0.570		**0.538**	**0.648**
LTE Band 66_Ant 0	Front	0.438	0.110	0.070	0.200	0.150	**0.618**	**0.788**
	Back	0.281	0.310	0.080	0.440	0.140	**0.671**	**0.861**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.969					**0.969**	**0.969**
	Top side	0.001		0.180		0.270	**0.181**	**0.271**
	Bottom side	0.141	0.460		0.570		**0.601**	**0.711**
LTE Band 66_Ant 8	Front	0.464	0.110	0.070	0.200	0.150	**0.644**	**0.814**
	Back	0.678	0.310	0.080	0.440	0.140	**1.068**	**1.258**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.964		0.180		0.270	**1.144**	**1.234**
	Bottom side		0.460		0.570		**0.460**	**0.570**
LTE Band 71_Ant 0	Front	0.769	0.110	0.070	0.200	0.150	**0.949**	**1.119**
	Back	0.729	0.310	0.080	0.440	0.140	**1.119**	**1.309**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.114					**0.114**	**0.114**
	Top side	0.471		0.180		0.270	**0.651**	**0.741**
	Bottom side	0.554	0.460		0.570		**1.014**	**1.124**

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz Wi-Fi 0 1g SAR (W/kg)	3 2.4GHz Wi-Fi 1 1g SAR (W/kg)	4 5GHz Wi-Fi 0 1g SAR (W/kg)	5 5GHz Wi-Fi 1 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
LTE Band 7_Ant 8	Front	0.287	0.110	0.070	0.200	0.150	**0.467**	**0.637**
	Back	0.227	0.310	0.080	0.440	0.140	**0.617**	**0.807**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.973		0.180		0.270	**1.153**	**1.243**
	Bottom side		0.460		0.570		**0.460**	**0.570**
LTE Band 43_Ant 4	Front	0.461	0.110	0.070	0.200	0.150	**0.641**	**0.811**
	Back	0.249	0.310	0.080	0.440	0.140	**0.639**	**0.829**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.165					**0.165**	**0.165**
	Top side	0.125		0.180		0.270	**0.305**	**0.395**
	Bottom side	0.112	0.460		0.570		**0.572**	**0.682**

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz Wi-Fi 0 1g SAR (W/kg)	3 2.4GHz Wi-Fi 1 1g SAR (W/kg)	4 5GHz Wi-Fi 0 1g SAR (W/kg)	5 5GHz Wi-Fi 1 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
5G FR1 n25_Ant 8	Front	0.239	0.110	0.070	0.200	0.150	**0.419**	**0.589**
	Back	0.432	0.310	0.080	0.440	0.140	**0.822**	**1.012**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.856		0.180		0.270	**1.036**	**1.126**
	Bottom side		0.460		0.570		**0.460**	**0.570**
5G FR1 n41_Ant 8	Front	0.261	0.110	0.070	0.200	0.150	**0.441**	**0.611**
	Back	0.322	0.310	0.080	0.440	0.140	**0.712**	**0.902**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.944		0.180		0.270	**1.124**	**1.214**
	Bottom side		0.460		0.570		**0.460**	**0.570**
5G FR1 n66_Ant 0	Front	0.783	0.110	0.070	0.200	0.150	**0.963**	**1.133**
	Back	0.940	0.310	0.080	0.440	0.140	**1.330**	**1.520**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.935					**0.935**	**0.935**
	Top side	0.003		0.180		0.270	**0.183**	**0.273**
	Bottom side	0.562	0.460		0.570		**1.022**	**1.132**
5G FR1 n66_Ant 8	Front	0.465	0.110	0.070	0.200	0.150	**0.645**	**0.815**
	Back	0.674	0.310	0.080	0.440	0.140	**1.064**	**1.254**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.856		0.180		0.270	**1.036**	**1.126**
	Bottom side		0.460		0.570		**0.460**	**0.570**
5G FR1 n71_Ant 0	Front	0.874	0.110	0.070	0.200	0.150	**1.054**	**1.224**
	Back	0.839	0.310	0.080	0.440	0.140	**1.229**	**1.419**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.088					**0.088**	**0.088**
	Top side	0.536		0.180		0.270	**0.716**	**0.806**
	Bottom side	0.646	0.460		0.570		**1.106**	**1.216**

WWAN Band	Exposure Position	1	2	3	4	5	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
		WWAN	2.4GHz Wi-Fi 0	2.4GHz Wi-Fi 1	5GHz Wi-Fi 0	5GHz Wi-Fi 1		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
FR1 n2_Ant 0	Front	0.937	0.110	0.070	0.200	0.150	**1.117**	**1.287**
	Back	0.927	0.310	0.080	0.440	0.140	**1.317**	**1.507**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.255					**0.255**	**0.255**
	Top side	0.140		0.180		0.270	**0.320**	**0.410**
	Bottom side	0.608	0.460		0.570		**1.068**	**1.178**
FR1 n5_Ant 0	Front	0.751	0.110	0.070	0.200	0.150	**0.931**	**1.101**
	Back	0.725	0.310	0.080	0.440	0.140	**1.115**	**1.305**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.142					**0.142**	**0.142**
	Top side	0.525		0.180		0.270	**0.705**	**0.795**
	Bottom side	0.469	0.460		0.570		**0.929**	**1.039**
FR1 n7_Ant 0	Front	0.992	0.110	0.070	0.200	0.150	**1.172**	**1.342**
	Back	0.658	0.310	0.080	0.440	0.140	**1.048**	**1.238**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.568					**0.568**	**0.568**
	Top side	0.070		0.180		0.270	**0.250**	**0.340**
	Bottom side	0.702	0.460		0.570		**1.162**	**1.272**
FR1 n7_Ant 8	Front	0.282	0.110	0.070	0.200	0.150	**0.462**	**0.632**
	Back	0.283	0.310	0.080	0.440	0.140	**0.673**	**0.863**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.948		0.180		0.270	**1.128**	**1.218**
	Bottom side		0.460		0.570		**0.460**	**0.570**
FR1 n12_Ant 0	Front	0.830	0.110	0.070	0.200	0.150	**1.010**	**1.180**
	Back	0.786	0.310	0.080	0.440	0.140	**1.176**	**1.366**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.141					**0.141**	**0.141**
	Top side	0.301		0.180		0.270	**0.481**	**0.571**
	Bottom side	0.385	0.460		0.570		**0.845**	**0.955**
FR1 n38_Ant 0	Front	0.941	0.110	0.070	0.200	0.150	**1.121**	**1.291**
	Back	0.573	0.310	0.080	0.440	0.140	**0.963**	**1.153**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side	0.379					**0.379**	**0.379**
	Top side	0.078		0.180		0.270	**0.258**	**0.348**
	Bottom side	0.628	0.460		0.570		**1.088**	**1.198**
FR1 n38_Ant 8	Front	0.348	0.110	0.070	0.200	0.150	**0.528**	**0.698**
	Back	0.389	0.310	0.080	0.440	0.140	**0.779**	**0.969**
	Left side		0.090	0.020	0.100	0.060	**0.110**	**0.160**
	Right side						**0.000**	**0.000**
	Top side	0.991		0.180		0.270	**1.171**	**1.261**
	Bottom side		0.460		0.570		**0.460**	**0.570**

Test Engineer：Shane Song, Jeff Tsao, Charles Shen, Willy Yu and Ginger Chiang

16. Uncertainty Assessment

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

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[6] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[7] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[8] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[9] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[10] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[11] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.