

FCC SAR TEST REPORT

FCC ID : 2AJN7-TP00172A
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00172A, TP00172B
Applicant : LC Future Center Limited Taiwan Branch
7F., No.780, Beian Rd., Zhongshan Dist., Taipei 104, Taiwan
Manufacturer : Lenovo Ireland International Limited
Viscount House, 6/7 Fitzwilliam Square East, Dublin, D02 Y447, Ireland
Standard : FCC 47 CFR Part 2 (2.1093)

Equipment: Foxconn T99W696 and MediaTek MT7925B14L tested inside of Lenovo Notebook Computer.

The product was received on Feb. 02, 2026 and testing was started from Feb. 15, 2026 and completed on Feb. 17, 2026. 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. Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager



Sporton International Inc. Wensan Laboratory



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History of this test report

Report No.	Version	Description	Issued Date
FA5D1722-01	01	Initial issue of report	Apr. 10, 2026

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for LC Future Center Limited Taiwan Branch, Notebook Computer, TP00172A, TP00172B, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	Highest Body Simultaneous Transmission 1g SAR (W/kg)
		Body (Separation 0mm)	
		1g SAR (W/kg)	
Licensed	WCDMA II	1.18	1.20
	WCDMA IV	1.19	
	WCDMA V	0.58	
	LTE Band 7	1.17	
	LTE Band 12/17	0.31	
	LTE Band 13	0.48	
	LTE Band 14	0.49	
	LTE Band 2/25	1.18	
	LTE Band 5/26	0.54	
	LTE Band 30	1.17	
	LTE Band 4/66	1.18	
	LTE Band 71	0.38	
	LTE Band 38/41	1.09	
	LTE Band 48	1.19	
	LTE Band 42	1.08	
	LTE Band 43	1.11	
	FR1 n7	1.19	
	FR1 n12	0.32	
	FR1 n13	0.47	
	FR1 n14	0.51	
	FR1 n2/n25	1.20	
	FR1 n5/n26	0.55	
	FR1 n30	1.18	
	FR1 n66	1.19	
	FR1 n71	0.37	
	FR1 n38/n41	1.18	
	FR1 n48	1.18	
	FR1 n77/n78	1.16	
Date of Testing:		2026/02/15 ~ 2026/02/17	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 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 for Partial-Body 1g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Paula Chen



2. 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 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Notebook Computer
Brand Name	Lenovo
Model Name	TP00172A, TP00172B
FCC ID	2AJN7-TP00172A
Integrated WWAN Module	Brand Name: Foxconn Model Name: T99W696
Integrated WLAN Module	Brand Name: MediaTek Model Name: MT7925B14L
Integrated NFC Module	Brand Name: Foxconn Model Name: T77H747
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 43: 3700 MHz ~ 3800 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13: 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz

	5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450 MHz ~ 3550 MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450 MHz ~ 3550 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz WLAN 6GHz Band: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC: 13.56 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink) 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/ax/be HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160/EHT20/EHT40/EHT80/EHT160 Bluetooth BR/EDR/LE NFC: ASK
Remark: 1. Change CPU platform to spot check worst found in original report, Sporton SAR Report No.: FA5D1722B. 2. Since the Plimit is same as original report No.: FA5D1722B, TAS validation is not necessary. 3. This device has two antenna vendors; RF exposure evaluation selects SPEED as the main test, ATC will spot check worst case found in SPEED. 4. The FCC ID: RAS-MT7925B14L, MediaTek MT7925B14L WLAN/BT module is integrated into this host, and the Sim-Tx compliance include in section 13. 5. NFC module is integrated into this host, and NFC with other transmitters which the maximum of overlapping transmission including network hand-offs is not greater than 30 seconds, therefore NFC with other transmitter for simultaneous transmission analysis and compliance is not required.	

WWAN Antenna Information				
Main Antenna	Manufacturer	Amphenol	Peak gain(dBi)	1.98
	Part number	DC33002BE20	Type	PIFA
	Manufacturer	SPEED	Peak gain(dBi)	1.98
	Part number	DC33002BV20	Type	PIFA
MIMO2 Antenna	Manufacturer	Amphenol	Peak gain(dBi)	1.63
	Part number	DC33002BE50	Type	PIFA
	Manufacturer	SPEED	Peak gain(dBi)	1.63
	Part number	DC33002BV50	Type	PIFA

WLAN Antenna Information					
Antenna 1	Manufacturer	SPEEDWIRE			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BV10		DC33002BV10	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.88 dBi	BT/WLAN(2.4G):	1.76 dBi
		WLAN(5G B1):	2.57 dBi	WLAN(5G B1):	2.55 dBi
		WLAN(5G B2):	2.66 dBi	WLAN(5G B2):	2.41 dBi
		WLAN(5G B3):	3.30 dBi	WLAN(5G B3):	3.48 dBi
		WLAN(5G B4):	3.32 dBi	WLAN(5G B4):	3.67 dBi
		UNII-4	3.13 dBi	UNII-4	3.33 dBi
		UNII-5	2.56 dBi	UNII-5	3.21 dBi
		UNII-6	3.06 dBi	UNII-6	3.72 dBi
		UNII-7	2.41 dBi	UNII-7	3.73 dBi
		UNII-8	1.75 dBi	UNII-8	3.97 dBi
Antenna 2	Manufacturer	Amphenol Taiwan Corporation			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BE10		DC33002BE10	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.88 dBi	BT/WLAN(2.4G):	1.76 dBi
		WLAN(5G B1):	2.57 dBi	WLAN(5G B1):	2.55 dBi
		WLAN(5G B2):	2.66 dBi	WLAN(5G B2):	2.41 dBi
		WLAN(5G B3):	3.30 dBi	WLAN(5G B3):	3.48 dBi

		WLAN(5G B4):	3.32 dBi	WLAN(5G B4):	3.67 dBi
		UNII-4	3.13 dBi	UNII-4	3.33 dBi
		UNII-5	2.56 dBi	UNII-5	3.21 dBi
		UNII-6	3.06 dBi	UNII-6	3.72 dBi
		UNII-7	2.41 dBi	UNII-7	3.73 dBi
		UNII-8	1.75 dBi	UNII-8	3.97 dBi
Antenna 3	Manufacturer	AWAN			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BL10		DC33002BL10	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.88 dBi	BT/WLAN(2.4G):	1.76 dBi
		WLAN(5G B1):	2.57 dBi	WLAN(5G B1):	2.55 dBi
		WLAN(5G B2):	2.66 dBi	WLAN(5G B2):	2.41 dBi
		WLAN(5G B3):	3.30 dBi	WLAN(5G B3):	3.48 dBi
		WLAN(5G B4):	3.32 dBi	WLAN(5G B4):	3.67 dBi
		UNII-4	3.13 dBi	UNII-4	3.33 dBi
		UNII-5	2.56 dBi	UNII-5	3.21 dBi
		UNII-6	3.06 dBi	UNII-6	3.72 dBi
		UNII-7	2.41 dBi	UNII-7	3.73 dBi
		UNII-8	1.75 dBi	UNII-8	3.97 dBi
Antenna 4	Manufacturer	SPEEDWIRE			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BV00		DC33002BV00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.89 dBi	BT/WLAN(2.4G):	1.85 dBi
		WLAN(5G B1):	2.58 dBi	WLAN(5G B1):	2.61 dBi
		WLAN(5G B2):	2.33 dBi	WLAN(5G B2):	2.52 dBi
		WLAN(5G B3):	3.83 dBi	WLAN(5G B3):	3.41 dBi
		WLAN(5G B4):	3.74 dBi	WLAN(5G B4):	3.32 dBi
		UNII-4	2.00 dBi	UNII-4	3.26 dBi
		UNII-5	3.22 dBi	UNII-5	3.21 dBi
		UNII-6	2.15 dBi	UNII-6	3.72 dBi
		UNII-7	1.77 dBi	UNII-7	2.85 dBi
		UNII-8	1.22 dBi	UNII-8	3.97 dBi
Antenna 5	Manufacturer	ATC			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BE00		DC33002BE00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.89 dBi	BT/WLAN(2.4G):	1.85 dBi
		WLAN(5G B1):	2.58 dBi	WLAN(5G B1):	2.61 dBi
		WLAN(5G B2):	2.33 dBi	WLAN(5G B2):	2.52 dBi
		WLAN(5G B3):	3.83 dBi	WLAN(5G B3):	3.41 dBi
		WLAN(5G B4):	3.74 dBi	WLAN(5G B4):	3.32 dBi
		UNII-4	2.00 dBi	UNII-4	3.26 dBi
		UNII-5	3.22 dBi	UNII-5	3.21 dBi
		UNII-6	2.15 dBi	UNII-6	3.72 dBi
		UNII-7	1.77 dBi	UNII-7	2.85 dBi
		UNII-8	1.22 dBi	UNII-8	3.97 dBi
Antenna 6	Manufacturer	AWAN			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BL00		DC33002BL00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.89 dBi	BT/WLAN(2.4G):	1.85 dBi
		WLAN(5G B1):	2.58 dBi	WLAN(5G B1):	2.61 dBi
		WLAN(5G B2):	2.33 dBi	WLAN(5G B2):	2.52 dBi
		WLAN(5G B3):	3.83 dBi	WLAN(5G B3):	3.41 dBi
		WLAN(5G B4):	3.74 dBi	WLAN(5G B4):	3.32 dBi
		UNII-4	2.00 dBi	UNII-4	3.26 dBi
		UNII-5	3.22 dBi	UNII-5	3.21 dBi
		UNII-6	2.15 dBi	UNII-6	3.72 dBi
		UNII-7	1.77 dBi	UNII-7	2.85 dBi
		UNII-8	1.22 dBi	UNII-8	3.97 dBi

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05									
FCC ID		2AJN7-TP00172A							
Equipment Name		Notebook Computer							
Operating Frequency Range of each LTE transmission band		LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 43: 3700 MHz ~ 3800 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz							
Channel Bandwidth		LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 30: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 43: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used		QPSK / 16QAM / 64QAM / 256QAM							
LTE Voice / Data requirements		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							
		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		
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		Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to the original report, report No. FA5D1722 section 12.							
LTE Carrier Aggregation Additional Information		Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.							



Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	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 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	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 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829	20450	829	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844	20600	844	20600	844
LTE Band 7												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 20MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510	20850	2510	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560	21350	2560	21350	2560
LTE Band 12												
	Bandwidth 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704	23060	704	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23115	713.5	23130	711	23130	711	23130	711
LTE Band 13												
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz			
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)	
L	23205		779.5		23230		782		23255		784.5	
M	23230		782		23255		784.5		23280		787	
H	23255		784.5		23280		787		23305		789.5	
LTE Band 14												
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz			
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)	
L	23305		790.5		23330		793		23355		795.5	
M	23330		793		23355		795.5		23380		798	
H	23355		795.5		23380		798		23405		800.5	
LTE Band 17												
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz			
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)	
L	23755		706.5		23780		709		23805		712	
M	23790		710		23815		713		23840		716	
H	23825		713.5		23850		716.5		23875		719.5	
LTE Band 25												
	Bandwidth 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	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 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (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	26790	824
M	26865	831.5	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	26940	838.5
LTE Band 30												
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz			
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)	
L	27685		2307.5		27710		2310		27735		2312.5	
M	27710		2310		27735		2312.5		27760		2315	
H	27735		2312.5		27760		2315		27785		2317.5	



LTE Band 66												
	Bandwidth 1.4MHz		Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	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 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	133147	665.5	133172	668	133197	670.5	133222	673	133222	673	133222	673
M	133297	680.5	133297	680.5	133297	680.5	133297	680.5	133297	680.5	133297	680.5
H	133447	695.5	133422	693	133397	690.5	133372	688	133372	688	133372	688
LTE Band 38												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580	37850	2580	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610	38150	2610	38150	2610
LTE Band 41												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506	39750	2506	39750	2506
LMM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5	40185	2549.5	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593
HMM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5	41055	2636.5	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680	41490	2680	41490	2680
LTE Band 42 (27Q)												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	42115	3452.5	42140	3455	42165	3457.5	42190	3460	42190	3460	42190	3460
M	42590	3500	42590	3500	42590	3500	42590	3500	42590	3500	42590	3500
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540	42990	3540	42990	3540
LTE Band 43 (27Q)												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	44615	3702.5	44640	3705	44665	3707.5	44690	3710	44690	3710	44690	3710
M	45090	3750	45090	3750	45090	3750	45090	3750	45090	3750	45090	3750
H	45565	3797.5	45540	3795	45515	3792.5	45490	3790	45490	3790	45490	3790
LTE Band 48												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560	55340	3560	55340	3560
LMM	55810	3607	55815	3607.5	55820	3608	55830	3609	55830	3609	55830	3609
M	55990	3625	55990	3625	55990	3625	55990	3625	55990	3625	55990	3625
HMM	56170	3643	56165	3642.5	56160	3642	56150	3641	56150	3641	56150	3641
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690	56640	3690	56640	3690



3.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
FCC ID	2AJN7-TP00172A
Equipment Name	Notebook Computer
Operating Frequency Range of each 5G NR transmission band	5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13: 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450 MHz ~ 3550 MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450 MHz ~ 3550 MHz
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n7: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz 5G NR n12: 5MHz, 10MHz, 15MHz 5G NR n13: 5MHz, 10MHz 5G NR n14: 5MHz, 10MHz 5G NR n25: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 35MHz, 40MHz 5G NR n26: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n30: 5MHz, 10MHz 5G NR n38: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz 5G NR n41: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz 5G NR n48: 10MHz, 20MHz, 30MHz, 40MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 35MHz, 40MHz 5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n77/n78: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz
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 B4/5/7/12/13/14/30/48/66/71
LTE Anchor Bands for n5	LTE B2/7/30/48/66
LTE Anchor Bands for n7	LTE B2/4/5/12/13/66/71
LTE Anchor Bands for n12	LTE B2/7/30/38/48/66
LTE Anchor Bands for n13	LTE B2/7/66
LTE Anchor Bands for n14	LTE B2/30/66
LTE Anchor Bands for n25	LTE B5/7/12/26/66/71
LTE Anchor Bands for n26	LTE B7/25
LTE Anchor Bands for n30	LTE B2/5/12/14/66
LTE Anchor Bands for n38	LTE B2/4/5/12/71
LTE Anchor Bands for n41	LTE B2/5/12/25/26/66
LTE Anchor Bands for n48	LTE B2/5/12/66/71
LTE Anchor Bands for n66	LTE B2/5/7/12/13/14/30/48/71
LTE Anchor Bands for n71	LTE B2/5/7/25/38/41/48/66
LTE Anchor Bands for n77	LTE B2/5/7/13/14/25/30/41/66/71
LTE Anchor Bands for n78	LTE B2/4/5/7/12/13/25/26/38/41/66/71



Transmission (H, M, L) channel numbers and frequencies in each FR1 band																		
	FR1 n2																	
	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				
	FR1 n5																	
	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				
	FR1 n7																	
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520				
M	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535				
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560	511500	2557.5	511000	2555	510000	2550				
	FR1 n12																	
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz									
	Ch. #	Freq. (MHz)			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			
	FR1 n13																	
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 10MHz									
	Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)				
L	155900	779.5			782				156400		782							
M	156400	782			784.5													
H	156900	784.5																
	FR1 n14																	
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 10MHz									
	Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)				
L	158100	790.5			793				158600		793							
M	158600	793			795.5													
H	159100	795.5																
	FR1 n25																	
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	373500	1867.5	374000	1870		
M	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5		
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379500	1897.5	379000	1895		
	FR1 n26																	
	Bandwidth 3MHz		Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 20MHz		Bandwidth 20MHz		Bandwidth 20MHz			
	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	163100	815.5	163300	816.5	163800		819		164300		821.5		164800		824			
M	166300	831.5	166300	831.5	166300		831.5		166300		831.5		166300		831.5			
H	169500	847.5	169300	846.5	168800		844		168300		841.5		167800		839			
	FR1 n30																	
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 10MHz				Bandwidth 10MHz					
	Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)				
L	461500	2307.5			2310				462000		2310							
M	462000	2310			2312.5													
H	462500	2312.5																
	FR1 n66																	
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720	344500	1722.5	345000	1725	345500	1727.5	346000	1730		
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745		
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	353500	1767.5	353000	1765	352500	1762.5	352000	1760		
	FR1 n71																	
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz				Bandwidth 20MHz					
	Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)			Ch. #	Freq. (MHz)				
L	133100	665.5			133600				668		134100		670.5		134600		673	
M	136100	680.5			136100				680.5		136100		680.5		136100		680.5	
H	139100	695.5			138600				693		138100		690.5		137600		688	



FR1 n38																						
	Bandwidth 10MHz				Bandwidth 15MHz				Bandwidth 20MHz				Bandwidth 30MHz				Bandwidth 40MHz					
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)			
L	515000		2575		515500		2577.5		516000		2580		517000		2585		518000		2590			
M	519000		2595		519000		2595		519000		2595		519000		2595		519000		2595			
H	523000		2615		522500		2612.5		522000		2610		521000		2605		520000		2600			
FR1 n41																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500202	2501.01	500700	2503.5	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	506202	2531.01	507204	2536.02	508200	2541	509202	2546.01
M	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99
H	537000	2685	536496	2682.48	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	531000	2655	529998	2649.99	528996	2644.98	528000	2640
FR1 n48																						
	Bandwidth 10MHz				Bandwidth 20MHz				Bandwidth 30MHz				Bandwidth 40MHz									
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)							
L	637000		3555		637334		3560.01		637668		3565.02		638000		3570							
M	641666		3624.99		641666		3624.99		641666		3624.99		641666		3624.99							
H	646332		3694.98		646000		3690		645666		3684.99		645332		3679.98							
FR1 n77 (27Q)																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495	633332	3499.98
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98		
H	636332	3544.98	636166	3542.49	636000	3540	635666	3534.99	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99		
FR1 n77 (27Q)																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	665000	3975	664832	3972.48	664666	3969.99	664332	3964.98	664000	3960	663666	3954.99	663332	3949.98	663000	3945	662666	3939.99	662332	3934.98	662000	3930
FR1 n78 (27Q)																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495	633332	3499.98
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98		
H	636332	3544.98	636166	3542.49	636000	3540	635666	3534.99	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99		
FR1 n78 (27Q)																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750		
H	653000	3795	652832	3792.48	652666	3789.99	652332	3784.98	652000	3780	651666	3774.99	651332	3769.98	651000	3765	650666	3759.99	650332	3754.98		

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, below the predefined time-averaged power limit, 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).

< Plimit for supported technologies and bands (Plimit in EFS file) >

Band	Antenna	Duty cycle	1g SAR design target (W/kg)	Plimit	Pmax (dBm)	Tolerance (dB)
WCDMA_B2	Main	100.00%	0.95	17.1	23.5	1
WCDMA_B4	Main	100.00%	0.95	17.9	23.5	1
WCDMA_B5	Main	100.00%	0.95	18	23.5	1
LTE_B2	Main	100.00%	0.95	17.1	23.0	1
LTE_B2	MIMO2	100.00%	0.95	19.3	23.0	1
LTE_B4	Main	100.00%	0.95	17.9	23.0	1
LTE_B4	MIMO2	100.00%	0.95	18.8	23.0	1
LTE_B5	Main	100.00%	0.95	17.9	23.5	1
LTE_B7	Main	100.00%	0.95	16	23.0	1
LTE_B7	MIMO2	100.00%	0.95	17.2	23.0	1
LTE_B12	Main	100.00%	0.95	19.8	23.5	1
LTE_B13	Main	100.00%	0.95	18.7	23.5	1
LTE_B14	Main	100.00%	0.95	18.3	23.5	1
LTE_B17	Main	100.00%	0.95	19.8	23.5	1
LTE_B25	Main	100.00%	0.95	17.1	23.0	1
LTE_B25	MIMO2	100.00%	0.95	19.3	23.0	1
LTE_B26	Main	100.00%	0.95	17.9	23.5	1
LTE_B30	Main	100.00%	0.95	16.5	22.0	1
LTE_B30	MIMO2	100.00%	0.95	18.9	22.0	1
LTE_B38	Main	63.30%	0.95	16.1	21.0	1
LTE_B38	MIMO2	63.30%	0.95	15.6	21.0	1
LTE_B41	Main	63.30%	0.95	16.1	21.0	1
LTE_B41(PC2)	Main	43.30%	0.95		22.4	1
LTE_B41	MIMO2	63.30%	0.95	15.6	21.0	1
LTE_B41(PC2)	MIMO2	43.30%	0.95		22.4	1
LTE_B42	Main	63.30%	0.95	14.6	21.0	1
LTE_B42	MIMO2	63.30%	0.95	15	21.0	1
LTE_B43	Main	63.30%	0.95	13.8	21.0	1
LTE_B43	MIMO2	63.30%	0.95	17.2	21.0	1
LTE_B48	Main	63.30%	0.95	14.6	19.0	1
LTE_B48	MIMO2	63.30%	0.95	17.5	19.0	1
LTE_B66	Main	100.00%	0.95	17.9	23.0	1
LTE_B66	MIMO2	100.00%	0.95	18.8	23.0	1
LTE_B71	Main	100.00%	0.95	20.5	23.5	1
NR5G_N2	Main	100.00%	0.95	17.2	23.0	1
NR5G_N2	MIMO2	100.00%	0.95	19.4	23.0	1
NR5G_N5	Main	100.00%	0.95	18	23.5	1
NR5G_N7	Main	100.00%	0.95	16	23.0	1
NR5G_N7	MIMO2	100.00%	0.95	17.6	23.0	1
NR5G_N12	Main	100.00%	0.95	19.8	23.5	1
NR5G_N13	Main	100.00%	0.95	19	23.5	1
NR5G_N14	Main	100.00%	0.95	18.5	23.5	1
NR5G_N25	Main	100.00%	0.95	17.2	23.0	1

NR5G_N25	MIMO2	100.00%	0.95	19.4	23.0	1
NR5G_N26	Main	100.00%	0.95	18	23.5	1
NR5G_N30	Main	100.00%	0.95	16.8	22.0	1
NR5G_N30	MIMO2	100.00%	0.95	19.2	22.0	1
NR5G_N38	Main	100.00%	0.95	16	23.0	1
NR5G_N38	MIMO2	100.00%	0.95	15.5	23.0	1
NR5G_N41	Main	100.00%	0.95	16	23.0	1
NR5G_N41(PC2)	Main	50.00%	0.95		23.0	1
NR5G_N41(PC1.5)	Main	50.00%	0.95		22.0	1
NR5G_N41	MIMO2	100.00%	0.95	15.5	23.0	1
NR5G_N41(PC2)	MIMO2	50.00%	0.95		23.0	1
NR5G_N41(PC1.5)	MIMO2	50.00%	0.95		22.0	1
NR5G_N41	MIMO1	100.00%	0.95	15	23.0	1
NR5G_N41(PC2)	MIMO1	50.00%	0.95		23.0	1
NR5G_N41(PC1.5)	MIMO1	50.00%	0.95		22.0	1
NR5G_N41	Aux	100.00%	0.95	18.3	23.0	1
NR5G_N41(PC2)	Aux	50.00%	0.95		23.0	1
NR5G_N41(PC1.5)	Aux	50.00%	0.95		22.0	1
NR5G_N48	Main	100.00%	0.95	13.3	21.0	1
NR5G_N48	MIMO2	100.00%	0.95	17.1	21.0	1
NR5G_N66	Main	100.00%	0.95	17.9	23.0	1
NR5G_N66	MIMO2	100.00%	0.95	18.8	23.0	1
NR5G_N71	Main	100.00%	0.95	20.6	23.5	1
NR5G_N77	Main	100.00%	0.95	13.6	23.0	1
NR5G_N77(PC2)	Main	50.00%	0.95		23.0	1
NR5G_N77(PC1.5)	Main	50.00%	0.95		22.0	1
NR5G_N77	MIMO2	100.00%	0.95	15.3	23.0	1
NR5G_N77(PC2)	MIMO2	50.00%	0.95		23.0	1
NR5G_N77(PC1.5)	MIMO2	50.00%	0.95		22.0	1
NR5G_N77	MIMO1	100.00%	0.95	12.6	23.0	1
NR5G_N77(PC2)	MIMO1	50.00%	0.95		23.0	1
NR5G_N77(PC1.5)	MIMO1	50.00%	0.95		22.0	1
NR5G_N77	Aux	100.00%	0.95	16.5	23.0	1
NR5G_N77(PC2)	Aux	50.00%	0.95		23.0	1
NR5G_N77(PC1.5)	Aux	50.00%	0.95		22.0	1
NR5G_N78	Main	100.00%	0.95	13.6	23.0	1
NR5G_N78(PC2)	Main	50.00%	0.95		23.0	1
NR5G_N78(PC1.5)	Main	50.00%	0.95		22.0	1
NR5G_N78	MIMO2	100.00%	0.95	15.3	23.0	1
NR5G_N78(PC2)	MIMO2	50.00%	0.95		23.0	1
NR5G_N78(PC1.5)	MIMO2	50.00%	0.95		22.0	1
NR5G_N78	MIMO1	100.00%	0.95	12.6	23.0	1
NR5G_N78(PC2)	MIMO1	50.00%	0.95		23.0	1
NR5G_N78(PC1.5)	MIMO1	50.00%	0.95		22.0	1
NR5G_N78	Aux	100.00%	0.95	16.5	23.0	1
NR5G_N78(PC2)	Aux	50.00%	0.95		23.0	1
NR5G_N78(PC1.5)	Aux	50.00%	0.95		22.0	1

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

5.3 RF Exposure limit for above 6GHz

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm² per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

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:

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

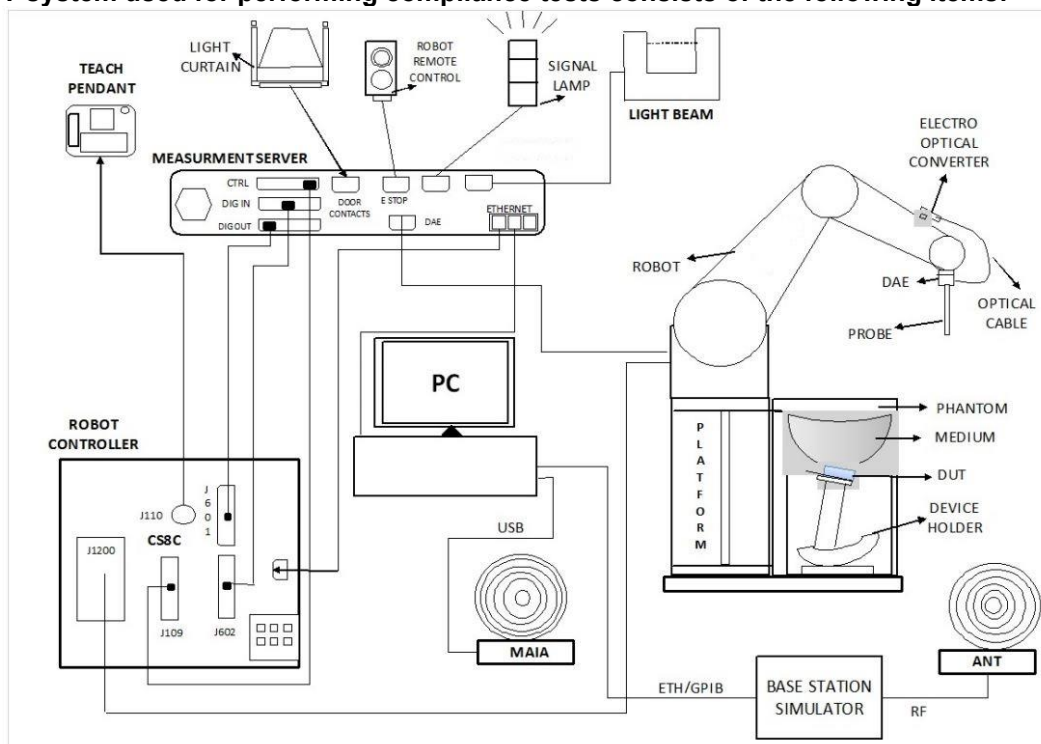
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- The DASY system in SAR Configuration is shown above
- 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 windows software and the DASY 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.

Laboratory	EMC & Wireless Communications Laboratory		Wensan Laboratory				
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	SAR18-HY	SAR21-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY	SAR19-HY	SAR22-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY	SAR20-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	4 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 μ W/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	4 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 μ W/g – > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

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.

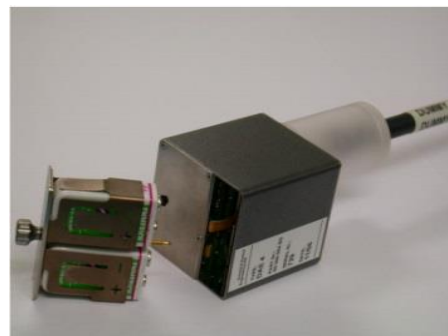


Fig 5.1 Photo of DAE

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:

- (a) Configure the device RF transmitters to be in continuous transmission mode., 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 from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

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

8.4 Zoom Scan

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

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

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

8.5 Volume Scan Procedures

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

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	Last Cal.	Due Date
SPEAG	1750MHz System Validation Kit ⁽²⁾	D1750V2	1112	Feb. 20, 2025	Feb. 19, 2026
SPEAG	1900MHz System Validation Kit ⁽²⁾	D1900V2	5d041	Aug. 15, 2024	Aug. 13, 2026
SPEAG	2300MHz System Validation Kit ⁽²⁾	D2300V2	1006	Jan. 14, 2025	Jan. 12, 2027
SPEAG	2600MHz System Validation Kit ⁽²⁾	D2600V2	1008	Aug. 15, 2024	Aug. 13, 2026
SPEAG	3500MHz System Validation Kit ⁽²⁾	D3500V2	1014	Jan. 15, 2025	Jan. 27, 2027
SPEAG	3700MHz System Validation Kit	D3700V2	1006	Jun. 12, 2025	Jun. 11, 2026
SPEAG	3900MHz System Validation Kit ⁽²⁾	D3900V2	1092	May. 15, 2023	May. 12, 2026
SPEAG	Data Acquisition Electronics	DAE4	661	May. 19, 2025	May. 18, 2026
SPEAG	Dosimetric E-Field Probe	EX3DV4	7970	Jan. 28, 2026	Jan. 27, 2027
SPEAG	Dielectric Probe Kit	DAK-3.5	1270	May. 19, 2025	May. 18, 2026
Testo	Hygro meter	608-H1	45196600	Nov. 04, 2025	Nov. 03, 2026
Testo	Hygro meter	608-H1	45207528	Nov. 04, 2025	Nov. 03, 2026
Anritsu	Radio Communication Analyzer	MT8821C	6201074414	Aug. 19, 2025	Aug. 18, 2026
Keysight	5G Wireless Test Platform	E7515B	MY59321595	Jun. 20, 2025	Jun. 19, 2026
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 24, 2025	Sep. 23, 2026
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 14, 2025	Oct. 13, 2026
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 14, 2025	Aug. 13, 2026
Anritsu	Power Meter	ML2496A	2119003	Jul. 14, 2025	Jul. 13, 2026
Anritsu	Power Sensor	MA2411B	1911334	Jul. 14, 2025	Jul. 13, 2026
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 09, 2025	Jul. 08, 2026
Mini-Circuits	Power Amplifier	ZVE-3W-183+	031302302	Feb. 24, 2025	Feb. 23, 2026
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	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. 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°C to 25°C, 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°C to 25°C and within $\pm 2^\circ\text{C}$ 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

The SPEAG Dasy Measurement system implement a SAR error compensation algorithm as documented in IEEE Std 1528-2013 to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, according to KDB 865664 D01 and IEC/IEEE 62209-1528, the tolerance for “Delta (σ)” and “Delta (ϵ_r)” can be relaxed to $\pm 10\%$

< Tissue Dielectric Parameter Check Results >

Frequency (MHz)	Liquid Temp (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
1750	22.5	1.37	42.3	1.37	40.1	0.00	5.49	± 10.0	2026-02-15
1900	22.5	1.46	42.1	1.4	40.0	4.29	5.25	± 10.0	2026-02-15
2300	22.6	1.73	41.6	1.67	39.5	3.59	5.32	± 10.0	2026-02-16
2600	22.6	1.96	41.1	1.96	39.0	0.00	5.38	± 10.0	2026-02-16
3500	22.7	2.72	39.6	2.91	37.9	-6.53	4.49	± 10.0	2026-02-17
3700	22.7	2.91	39.4	3.12	37.7	-6.73	4.51	± 10.0	2026-02-17
3900	22.7	3.11	39.0	3.33	37.51	-6.61	3.97	± 10.0	2026-02-17

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 (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
SAR13	2026-02-15	1750	251.19	D1750V2 - 1112	EX3DV4 - SN7970	DAE4 Sn661	9.250	36.300	36.825	1.45	4.910	19.300	19.547	1.28
SAR13	2026-02-15	1900	251.19	D1900V2 - 5d041	EX3DV4 - SN7970	DAE4 Sn661	10.000	39.200	39.811	1.56	5.240	20.700	20.861	0.78
SAR13	2026-02-16	2300	251.19	D2300V2 - 1006	EX3DV4 - SN7970	DAE4 Sn661	12.900	48.200	51.356	6.55	6.170	23.200	24.563	5.88
SAR13	2026-02-16	2600	251.19	D2600V2 - 1008	EX3DV4 - SN7970	DAE4 Sn661	14.300	55.700	56.929	2.21	6.330	25.300	25.200	-0.40
SAR13	2026-02-17	3500	100.00	D3500V2 - 1014	EX3DV4 - SN7970	DAE4 Sn661	6.310	65.700	63.100	-3.96	2.380	24.900	23.800	-4.42
SAR13	2026-02-17	3700	100.00	D3700V2 - 1006	EX3DV4 - SN7970	DAE4 Sn661	6.920	69.900	69.200	-1.00	2.510	25.600	25.100	-1.95
SAR13	2026-02-17	3900	100.00	D3900V2 - 1092	EX3DV4 - SN7970	DAE4 Sn661	6.570	67.000	65.700	-1.94	2.290	23.200	22.900	-1.29

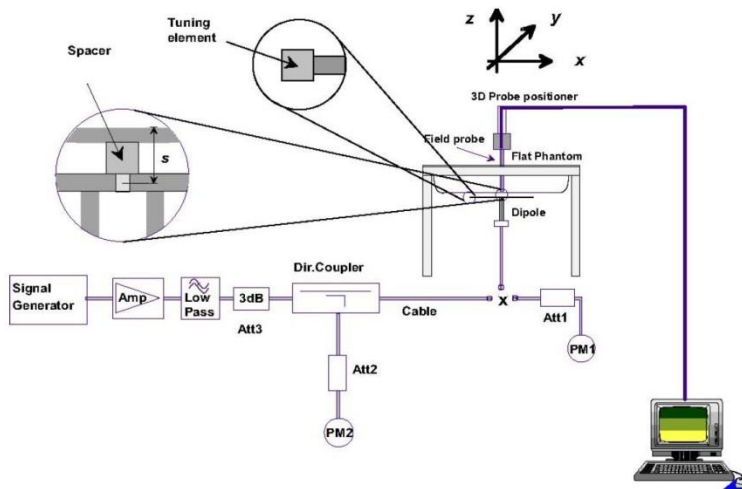


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. 5G NR Output Power (Unit: dBm)

General Note:

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below
 - a. For DFT-OFDM output power measurement, full measurement was done for Pi/2 BPSK and QPSK and for the largest supported bandwidth, repeat test for 16QAM/64QAM/256QAM under 1RB 1Offset configuration. For smaller bandwidth, measure conducted power for Pi/2 BPSK and 1RB 1Offset configuration.
 - b. According to the tune-up, CP-OFDM output power is not ½ dB higher than DFT-OFDM mode, and the reported SAR of DFT-OFDM mode reported SAR is ≤ 1.45 W/kg, SAR test and thus conducted power for CP-OFDM mode is not required.
 - c. To start SAR test for the largest channel bandwidth 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. Also do SAR test for 50% RB allocation for Pi/2 BPSK SAR testing using 1RB Pi/2 BPSK allocation procedure
 - d. For Pi/2 BPSK with 100% RB allocation, SAR test 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.
 - e. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is 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.
 - f. Smaller bandwidth output power for each RB allocation configuration for this device 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, 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. And only for TDD power class2 was performed using Factory Test Mode software to establish the connection and perform SAR with 50% 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	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$	$\leq 0.5^2$	0 ²
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
CP-OFDM	256 QAM	≤ 4.5		
	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

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

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

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

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

【FR1 n7_MIMO2】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				504000	507000	510000	
Frequency (MHz)				2520	2535	2550	
40	PI/2 BPSK	1	1	17.37	17.56	17.54	18.60
40	PI/2 BPSK	1	108	17.36	17.50	17.38	18.60
40	PI/2 BPSK	1	214	17.33	17.44	17.36	18.60
40	PI/2 BPSK	108	0	17.30	17.41	17.42	18.60
40	PI/2 BPSK	108	54	17.36	17.52	17.47	18.60
40	PI/2 BPSK	108	108	17.33	17.50	17.39	18.60
40	PI/2 BPSK	216	0	17.43	17.51	17.46	18.60
40	QPSK	1	1	17.41	17.49	17.26	18.60
40	QPSK	1	108	17.20	17.48	17.38	18.60
40	QPSK	1	214	17.27	17.45	17.31	18.60
40	QPSK	108	0	17.21	17.47	17.34	18.60
40	QPSK	108	54	17.46	17.49	17.28	18.60
40	QPSK	108	108	17.24	17.51	17.47	18.60
40	QPSK	216	0	17.48	17.60	17.36	18.60
40	16QAM	1	1	17.32	17.48	17.35	18.60
40	64QAM	1	1	17.39	17.43	17.35	18.60
40	256QAM	1	1	17.02	17.16	17.06	18.60
Channel				503000	507000	511000	Tune-up limit (dBm)
Frequency (MHz)				2515	2535	2555	
30	PI/2 BPSK	1	1	17.24	17.50	17.40	18.60
Channel				502500	507000	511500	Tune-up limit (dBm)
Frequency (MHz)				2512.5	2535	2557.5	
25	PI/2 BPSK	1	1	17.34	17.53	17.39	18.60
Channel				502000	507000	512000	Tune-up limit (dBm)
Frequency (MHz)				2510	2535	2560	
20	PI/2 BPSK	1	1	17.29	17.50	17.47	18.60
Channel				501500	507000	512500	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	PI/2 BPSK	1	1	17.22	17.52	17.53	18.60
Channel				501000	507000	513000	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	PI/2 BPSK	1	1	17.35	17.44	17.47	18.60
Channel				500500	507000	513500	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	PI/2 BPSK	1	1	17.24	17.47	17.42	18.60

【FR1 n25_Main】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				374000	376500	379000	
Frequency (MHz)				1870	1882.5	1895	
40	PI/2 BPSK	1	1	17.50	17.54	17.49	18.20
40	PI/2 BPSK	1	108	17.20	17.43	17.53	18.20
40	PI/2 BPSK	1	214	17.41	17.39	17.34	18.20
40	PI/2 BPSK	108	0	17.37	17.50	17.34	18.20
40	PI/2 BPSK	108	54	17.46	17.57	17.48	18.20
40	PI/2 BPSK	108	108	17.44	17.52	17.37	18.20
40	PI/2 BPSK	216	0	17.44	17.51	17.41	18.20
40	QPSK	1	1	17.38	17.41	17.39	18.20
40	QPSK	1	108	17.22	17.47	17.48	18.20
40	QPSK	1	214	17.38	17.52	17.29	18.20
40	QPSK	108	0	17.49	17.51	17.38	18.20
40	QPSK	108	54	17.40	17.56	17.35	18.20
40	QPSK	108	108	17.46	17.47	17.43	18.20
40	QPSK	216	0	17.40	17.53	17.35	18.20
40	16QAM	1	1	17.42	17.47	17.38	18.20
40	64QAM	1	1	17.44	17.43	17.49	18.20
40	256QAM	1	1	17.44	17.50	17.31	18.20
Channel				373500	376500	379500	Tune-up limit (dBm)
Frequency (MHz)				1867.5	1882.5	1897.5	
35	PI/2 BPSK	1	1	17.36	17.33	17.44	18.20
Channel				373000	376500	380000	Tune-up limit (dBm)
Frequency (MHz)				1865	1882.5	1900	
30	PI/2 BPSK	1	1	17.39	17.35	17.38	18.20
Channel				372500	376500	380500	Tune-up limit (dBm)
Frequency (MHz)				1862.5	1882.5	1902.5	
25	PI/2 BPSK	1	1	17.41	17.37	17.33	18.20
Channel				372000	376500	381000	Tune-up limit (dBm)
Frequency (MHz)				1860	1882.5	1905	
20	PI/2 BPSK	1	1	17.43	17.37	17.44	18.20
Channel				371500	376500	381500	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1882.5	1907.5	
15	PI/2 BPSK	1	1	17.39	17.39	17.44	18.20
Channel				371000	376500	382000	Tune-up limit (dBm)
Frequency (MHz)				1855	1882.5	1910	
10	PI/2 BPSK	1	1	17.39	17.45	17.45	18.20
Channel				370500	376500	382500	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1882.5	1912.5	
5	PI/2 BPSK	1	1	17.40	17.44	17.39	18.20

【FR1 n30_MIMO2】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					462000		
Frequency (MHz)					2310		
10	PI/2 BPSK	1	1		19.07		20.20
10	PI/2 BPSK	1	26		19.05		20.20
10	PI/2 BPSK	1	50		19.06		20.20
10	PI/2 BPSK	25	0		18.83		20.20
10	PI/2 BPSK	25	14		19.02		20.20
10	PI/2 BPSK	25	27		18.97		20.20
10	PI/2 BPSK	50	0		18.92		20.20
10	QPSK	1	1		18.89		20.20
10	QPSK	1	26		18.85		20.20
10	QPSK	1	50		18.95		20.20
10	QPSK	25	0		18.72		20.20
10	QPSK	25	14		18.82		20.20
10	QPSK	25	27		18.81		20.20
10	QPSK	50	0		18.73		20.20
10	16QAM	1	1		18.74		20.20
10	64QAM	1	1		18.89		20.20
10	256QAM	1	1		17.73		19.20
Channel				461500	462000	462500	Tune-up limit (dBm)
Frequency (MHz)				2307.5	2310	2312.5	
5	PI/2 BPSK	1	1	18.98	19.02	18.99	20.20

【FR1 n41_MIMO1】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				509202	518598	528000	
Frequency (MHz)				2546.01	2592.99	2640	
100	PI/2 BPSK	1	1	15.54	15.43	15.44	16.00
100	PI/2 BPSK	1	137	15.70	15.53	15.54	16.00
100	PI/2 BPSK	1	271	15.81	15.95	15.79	16.00
100	PI/2 BPSK	135	0	15.60	15.49	15.69	16.00
100	PI/2 BPSK	135	69	15.74	15.89	15.88	16.00
100	PI/2 BPSK	135	138	15.70	15.87	15.85	16.00
100	PI/2 BPSK	270	0	15.61	15.86	15.64	16.00
100	QPSK	1	1	15.38	15.32	15.25	16.00
100	QPSK	1	137	15.53	15.36	15.35	16.00
100	QPSK	1	271	15.61	15.75	15.64	16.00
100	QPSK	135	0	15.41	15.31	15.53	16.00
100	QPSK	135	69	15.59	15.74	15.76	16.00
100	QPSK	135	138	15.50	15.69	15.71	16.00
100	QPSK	270	0	15.43	15.53	15.48	16.00
100	16QAM	1	1	15.37	15.54	15.42	16.00
100	64QAM	1	1	15.21	15.10	15.12	16.00
100	256QAM	1	1	15.19	15.18	15.03	16.00
Channel				508200	518598	528996	Tune-up limit (dBm)
Frequency (MHz)				2541	2592.99	2644.98	
90	PI/2 BPSK	1	1	15.48	15.40	15.34	16.00
Channel				507204	518598	529998	Tune-up limit (dBm)
Frequency (MHz)				2536.02	2592.99	2649.99	
80	PI/2 BPSK	1	1	15.41	15.41	15.38	16.00
Channel				506202	518598	531000	Tune-up limit (dBm)
Frequency (MHz)				2531.01	2592.99	2655	
70	PI/2 BPSK	1	1	15.47	15.31	15.39	16.00
Channel				505200	518598	531996	Tune-up limit (dBm)
Frequency (MHz)				2526	2592.99	2659.98	
60	PI/2 BPSK	1	1	15.43	15.38	15.30	16.00
Channel				504204	518598	532998	Tune-up limit (dBm)
Frequency (MHz)				2521.02	2592.99	2664.99	
50	PI/2 BPSK	1	1	15.53	15.39	15.35	16.00
Channel				503202	518598	534000	Tune-up limit (dBm)
Frequency (MHz)				2516.01	2592.99	2670	
40	PI/2 BPSK	1	1	15.51	15.36	15.33	16.00
Channel				502200	518598	534996	Tune-up limit (dBm)
Frequency (MHz)				2511	2592.99	2674.98	
30	PI/2 BPSK	1	1	15.53	15.40	15.32	16.00
Channel				501204	518598	535998	Tune-up limit (dBm)
Frequency (MHz)				2506.02	2592.99	2679.99	
20	PI/2 BPSK	1	1	15.44	15.29	15.36	16.00
Channel				500700	518598	536496	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2592.99	2682.48	
15	PI/2 BPSK	1	1	15.40	15.34	15.40	16.00
Channel				500202	518598	537000	Tune-up limit (dBm)
Frequency (MHz)				2501.01	2592.99	2685	
10	PI/2 BPSK	1	1	15.44	15.32	15.42	16.00

【FR1 n41_HPUE_MIMO1】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				509202	518598	528000	
Frequency (MHz)				2546.01	2592.99	2640	
100	PI/2 BPSK	1	1	18.73	18.77	18.51	19.00
100	PI/2 BPSK	1	137	18.71	18.82	18.73	19.00
100	PI/2 BPSK	1	271	18.79	18.99	18.77	19.00
100	PI/2 BPSK	135	0	18.54	18.73	18.72	19.00
100	PI/2 BPSK	135	69	18.89	18.92	18.83	19.00
100	PI/2 BPSK	135	138	18.63	18.74	18.89	19.00
100	PI/2 BPSK	270	0	18.68	18.85	18.68	19.00
100	QPSK	1	1	18.53	18.60	18.34	19.00
100	QPSK	1	137	18.56	18.69	18.62	19.00
100	QPSK	1	271	18.59	18.87	18.57	19.00
100	QPSK	135	0	18.43	18.60	18.52	19.00
100	QPSK	135	69	18.73	18.76	18.65	19.00
100	QPSK	135	138	18.48	18.60	18.71	19.00
100	QPSK	270	0	18.49	18.68	18.58	19.00
100	16QAM	1	1	18.58	18.62	18.67	19.00
100	64QAM	1	1	18.45	18.41	18.48	19.00
100	256QAM	1	1	18.34	18.38	18.37	19.00
Channel				508200	518598	528996	Tune-up limit (dBm)
Frequency (MHz)				2541	2592.99	2644.98	
90	PI/2 BPSK	1	1	18.68	18.64	18.49	19.00
Channel				507204	518598	529998	Tune-up limit (dBm)
Frequency (MHz)				2536.02	2592.99	2649.99	
80	PI/2 BPSK	1	1	18.69	18.75	18.38	19.00
Channel				506202	518598	531000	Tune-up limit (dBm)
Frequency (MHz)				2531.01	2592.99	2655	
70	PI/2 BPSK	1	1	18.65	18.71	18.42	19.00
Channel				505200	518598	531996	Tune-up limit (dBm)
Frequency (MHz)				2526	2592.99	2659.98	
60	PI/2 BPSK	1	1	18.62	18.70	18.41	19.00
Channel				504204	518598	532998	Tune-up limit (dBm)
Frequency (MHz)				2521.02	2592.99	2664.99	
50	PI/2 BPSK	1	1	18.69	18.66	18.38	19.00
Channel				503202	518598	534000	Tune-up limit (dBm)
Frequency (MHz)				2516.01	2592.99	2670	
40	PI/2 BPSK	1	1	18.60	18.68	18.43	19.00
Channel				502200	518598	534996	Tune-up limit (dBm)
Frequency (MHz)				2511	2592.99	2674.98	
30	PI/2 BPSK	1	1	18.63	18.65	18.46	19.00
Channel				501204	518598	535998	Tune-up limit (dBm)
Frequency (MHz)				2506.02	2592.99	2679.99	
20	PI/2 BPSK	1	1	18.70	18.76	18.44	19.00
Channel				500700	518598	536496	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2592.99	2682.48	
15	PI/2 BPSK	1	1	18.72	18.69	18.44	19.00
Channel				500202	518598	537000	Tune-up limit (dBm)
Frequency (MHz)				2501.01	2592.99	2685	
10	PI/2 BPSK	1	1	18.70	18.73	18.39	19.00

【FR1 n77 (27Q)_Part 27Q (3450~3550MHz)_Aux】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				633000	633332	633666	Tune-up limit
Frequency (MHz)				3495	3499.98	3504.99	(dBm)
100	PI/2 BPSK	1	1	16.34	16.43	16.31	17.50
100	PI/2 BPSK	1	137	16.26	16.26	16.26	17.50
100	PI/2 BPSK	1	271	16.28	16.28	16.28	17.50
100	PI/2 BPSK	135	0	16.26	16.26	16.26	17.50
100	PI/2 BPSK	135	69	16.38	16.38	16.38	17.50
100	PI/2 BPSK	135	138	16.19	16.19	16.19	17.50
100	PI/2 BPSK	270	0	16.28	16.28	16.28	17.50
100	QPSK	1	1	16.36	16.36	16.36	17.50
100	QPSK	1	137	16.41	16.41	16.41	17.50
100	QPSK	1	271	16.36	16.36	16.36	17.50
100	QPSK	135	0	16.44	16.44	16.44	17.50
100	QPSK	135	69	16.22	16.22	16.22	17.50
100	QPSK	135	138	16.33	16.33	16.33	17.50
100	QPSK	270	0	16.24	16.24	16.24	17.50
100	16QAM	1	1	16.36	16.36	16.36	17.50
100	64QAM	1	1	16.24	16.24	16.24	17.50
100	256QAM	1	1	16.24	16.24	16.24	17.50
Channel				633000	633332	633666	Tune-up limit
Frequency (MHz)				3495	3499.98	3504.99	(dBm)
90	PI/2 BPSK	1	1	16.34	16.36	16.31	17.50
Channel				632668	633332	634000	Tune-up limit
Frequency (MHz)				3490.02	3499.98	3510	(dBm)
80	PI/2 BPSK	1	1	16.33	16.35	16.29	17.50
Channel				632334	633332	634332	Tune-up limit
Frequency (MHz)				3485.01	3499.98	3514.98	(dBm)
70	PI/2 BPSK	1	1	16.24	16.22	16.29	17.50
Channel				632000	633332	634666	Tune-up limit
Frequency (MHz)				3480	3499.98	3519.99	(dBm)
60	PI/2 BPSK	1	1	16.33	16.28	16.25	17.50
Channel				631668	633332	635000	Tune-up limit
Frequency (MHz)				3475.02	3499.98	3525	(dBm)
50	PI/2 BPSK	1	1	16.19	16.31	16.20	17.50
Channel				631334	633332	635332	Tune-up limit
Frequency (MHz)				3470.01	3499.98	3529.98	(dBm)
40	PI/2 BPSK	1	1	16.25	16.28	16.24	17.50
Channel				631000	633332	635666	Tune-up limit
Frequency (MHz)				3465	3499.98	3534.99	(dBm)
30	PI/2 BPSK	1	1	16.33	16.23	16.19	17.50
Channel				630668	633332	636000	Tune-up limit
Frequency (MHz)				3460.02	3499.98	3540	(dBm)
20	PI/2 BPSK	1	1	16.24	16.27	16.28	17.50
Channel				630500	633332	636166	Tune-up limit
Frequency (MHz)				3457.5	3499.98	3542.49	(dBm)
15	PI/2 BPSK	1	1	16.29	16.32	16.18	17.50
Channel				630334	633332	636332	Tune-up limit
Frequency (MHz)				3455.01	3499.98	3544.98	(dBm)
10	PI/2 BPSK	1	1	16.22	16.33	16.23	17.50

【FR1 n77 (270)_Part 270 (3700~3980MHz)_Aux】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	Tune-up limit (dBm)
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	16.86	17.41	17.32	17.50
100	PI/2 BPSK	1	137	16.65	16.98	17.43	17.50
100	PI/2 BPSK	1	271	16.58	17.10	17.49	17.50
100	PI/2 BPSK	135	0	16.49	16.96	17.35	17.50
100	PI/2 BPSK	135	69	16.83	17.38	17.32	17.50
100	PI/2 BPSK	135	138	16.52	17.05	17.35	17.50
100	PI/2 BPSK	270	0	16.76	17.35	17.22	17.50
100	QPSK	1	1	16.64	17.02	17.48	17.50
100	QPSK	1	137	16.47	16.94	17.44	17.50
100	QPSK	1	271	16.60	16.90	17.42	17.50
100	QPSK	135	0	16.40	16.90	17.28	17.50
100	QPSK	135	69	16.54	17.09	17.38	17.50
100	QPSK	135	138	16.43	16.89	17.40	17.50
100	QPSK	270	0	16.51	16.96	17.30	17.50
100	16QAM	1	1	16.59	17.11	17.42	17.50
100	64QAM	1	1	16.30	16.80	17.24	17.50
100	256QAM	1	1	16.58	16.93	17.50	17.50
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	16.81	17.28	17.21	17.50
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	16.78	17.28	17.30	17.50
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	16.81	17.34	17.30	17.50
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	16.80	17.26	17.20	17.50
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	16.73	17.31	17.17	17.50
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	16.82	17.27	17.22	17.50
Channel				647668	656000	664332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3840	3964.98	
30	PI/2 BPSK	1	1	16.78	17.29	17.29	17.50
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	16.76	17.35	17.27	17.50
Channel				647168	656000	664832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	16.74	17.21	17.17	17.50
Channel				647000	656000	665000	Tune-up limit (dBm)
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	16.77	17.30	17.22	17.50

【FR1 n77 (27Q)_Part 27Q (3450~3550MHz)_HPUE_Aux】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		19.42		20.50
100	PI/2 BPSK	1	137		19.24		20.50
100	PI/2 BPSK	1	271		19.36		20.50
100	PI/2 BPSK	135	0		19.36		20.50
100	PI/2 BPSK	135	69		19.40		20.50
100	PI/2 BPSK	135	138		19.26		20.50
100	PI/2 BPSK	270	0		19.38		20.50
100	QPSK	1	1		19.35		20.50
100	QPSK	1	137		19.37		20.50
100	QPSK	1	271		19.40		20.50
100	QPSK	135	0		19.40		20.50
100	QPSK	135	69		19.29		20.50
100	QPSK	135	138		19.39		20.50
100	QPSK	270	0		19.34		20.50
100	16QAM	1	1		19.21		20.50
100	64QAM	1	1		19.30		20.50
100	256QAM	1	1		19.37		20.50
Channel				633000	633332	633666	Tune-up limit
Frequency (MHz)				3495	3499.98	3504.99	(dBm)
90	PI/2 BPSK	1	1	19.32	19.34	19.30	20.50
Channel				632668	633332	634000	Tune-up limit
Frequency (MHz)				3490.02	3499.98	3510	(dBm)
80	PI/2 BPSK	1	1	19.25	19.24	19.24	20.50
Channel				632334	633332	634332	Tune-up limit
Frequency (MHz)				3485.01	3499.98	3514.98	(dBm)
70	PI/2 BPSK	1	1	19.27	19.29	19.22	20.50
Channel				632000	633332	634666	Tune-up limit
Frequency (MHz)				3480	3499.98	3519.99	(dBm)
60	PI/2 BPSK	1	1	19.21	19.21	19.25	20.50
Channel				631668	633332	635000	Tune-up limit
Frequency (MHz)				3475.02	3499.98	3525	(dBm)
50	PI/2 BPSK	1	1	19.28	19.25	19.22	20.50
Channel				631334	633332	635332	Tune-up limit
Frequency (MHz)				3470.01	3499.98	3529.98	(dBm)
40	PI/2 BPSK	1	1	19.30	19.26	19.27	20.50
Channel				631000	633332	635666	Tune-up limit
Frequency (MHz)				3465	3499.98	3534.99	(dBm)
30	PI/2 BPSK	1	1	19.18	19.21	19.16	20.50
Channel				630668	633332	636000	Tune-up limit
Frequency (MHz)				3460.02	3499.98	3540	(dBm)
20	PI/2 BPSK	1	1	19.28	19.30	19.29	20.50
Channel				630500	633332	636166	Tune-up limit
Frequency (MHz)				3457.5	3499.98	3542.49	(dBm)
15	PI/2 BPSK	1	1	19.26	19.21	19.26	20.50
Channel				630334	633332	636332	Tune-up limit
Frequency (MHz)				3455.01	3499.98	3544.98	(dBm)
10	PI/2 BPSK	1	1	19.17	19.29	19.22	20.50

【FR1 n77 (270)_Part 270 (3700~3980MHz)_HPUE_Aux】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	Tune-up limit (dBm)
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	19.97	20.35	20.34	20.50
100	PI/2 BPSK	1	137	19.54	19.92	20.39	20.50
100	PI/2 BPSK	1	271	19.61	19.99	20.35	20.50
100	PI/2 BPSK	135	0	19.57	19.99	20.32	20.50
100	PI/2 BPSK	135	69	19.96	20.34	20.33	20.50
100	PI/2 BPSK	135	138	19.65	19.87	20.39	20.50
100	PI/2 BPSK	270	0	19.95	20.33	20.32	20.50
100	QPSK	1	1	19.64	20.08	20.45	20.50
100	QPSK	1	137	19.61	20.09	20.36	20.50
100	QPSK	1	271	19.48	19.89	20.30	20.50
100	QPSK	135	0	19.58	20.11	20.47	20.50
100	QPSK	135	69	19.70	19.99	20.22	20.50
100	QPSK	135	138	19.49	19.92	20.34	20.50
100	QPSK	270	0	19.65	19.92	20.46	20.50
100	16QAM	1	1	19.55	20.04	20.34	20.50
100	64QAM	1	1	19.65	19.88	20.27	20.50
100	256QAM	1	1	19.55	19.94	20.24	20.50
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	19.92	20.34	20.26	20.50
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	19.87	20.29	20.25	20.50
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	19.91	20.31	20.32	20.50
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	19.93	20.23	20.20	20.50
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	19.91	20.28	20.30	20.50
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	19.89	20.29	20.23	20.50
Channel				647668	656000	664332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3840	3964.98	
30	PI/2 BPSK	1	1	19.83	20.20	20.32	20.50
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	19.91	20.29	20.26	20.50
Channel				647168	656000	664832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	19.94	20.29	20.31	20.50
Channel				647000	656000	665000	Tune-up limit (dBm)
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	19.86	20.29	20.26	20.50

12. 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
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 ≥ 0.8 W/kg.

12.1 Body SAR

【FR1 SAR】

Plot No	Band	BW	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Antenna Vendor	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	FR1 n7	40M	BPSK	1	1	Bottom Side	0mm	MIMO2	507000	2535	SPEED	17.56	18.60	1.271	-0.02	0.749	0.952
	FR1 n7	40M	BPSK	108	54	Bottom Side	0mm	MIMO2	507000	2535	SPEED	17.52	18.60	1.282	-0.17	0.737	0.945
	FR1 n7	40M	BPSK	216	0	Bottom Side	0mm	MIMO2	507000	2535	SPEED	17.51	18.60	1.285	-0.05	0.739	0.950
	FR1 n7	40M	BPSK	1	1	Bottom Side	0mm	MIMO2	507000	2535	ATC	17.56	18.60	1.271	-0.16	0.678	0.862
02	FR1 n25	40M	BPSK	1	1	Bottom Side	0mm	Main	376500	1882.5	SPEED	17.54	18.20	1.164	0.05	0.999	1.163
	FR1 n25	40M	BPSK	108	54	Bottom Side	0mm	Main	376500	1882.5	SPEED	17.57	18.20	1.156	0.18	0.996	1.151
	FR1 n25	40M	BPSK	216	0	Bottom Side	0mm	Main	376500	1882.5	SPEED	17.51	18.20	1.172	-0.19	0.981	1.150
	FR1 n25	40M	BPSK	1	1	Bottom Side	0mm	Main	376500	1882.5	ATC	17.54	18.20	1.164	-0.12	0.983	1.144
03	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	518598	2592.99	SPEED	15.95	16.00	1.012	-0.18	1.030	1.042
	FR1 n41	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	518598	2592.99	SPEED	15.89	16.00	1.026	0.10	0.977	1.002
	FR1 n41	100M	BPSK	270	0	Bottom Side	0mm	MIMO1	518598	2592.99	SPEED	15.86	16.00	1.033	0.03	0.977	1.009
	FR1 n41_HPUE	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	518598	2592.99	SPEED	18.99	19.00	1.002	0.07	1.020	1.022
	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	518598	2592.99	ATC	15.95	16.00	1.012	-0.12	0.888	0.899
	FR1 n77	100M	BPSK	1	1	Bottom Side	0mm	Aux	633332	3499.98	SPEED	16.43	17.50	1.279	0.02	0.566	0.724
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Aux	633332	3499.98	SPEED	16.38	17.50	1.294	0.04	0.559	0.723
	FR1 n77_HPUE	100M	BPSK	1	1	Bottom Side	0mm	Aux	633332	3499.98	SPEED	19.42	20.50	1.282	-0.02	0.555	0.712
	FR1 n77	100M	BPSK	1	1	Bottom Side	0mm	Aux	633332	3499.98	ATC	16.43	17.50	1.279	-0.17	0.517	0.661
04	FR1 n77	100M	BPSK	1	1	Bottom Side	0mm	Aux	656000	3840	SPEED	17.41	17.50	1.021	-0.05	1.130	1.154
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Aux	656000	3840	SPEED	17.38	17.50	1.028	0.18	1.120	1.151
	FR1 n77	100M	BPSK	270	0	Bottom Side	0mm	Aux	656000	3840	SPEED	17.35	17.50	1.035	0.06	1.100	1.139
	FR1 n77_HPUE	100M	BPSK	1	1	Bottom Side	0mm	Aux	656000	3840	SPEED	20.35	20.50	1.035	0.18	1.110	1.149
	FR1 n77	100M	BPSK	1	1	Bottom Side	0mm	Aux	656000	3840	ATC	17.41	17.50	1.021	0.18	1.070	1.092

12.2 Power Class 2 and Power Class 3 Linearity

General Note:

This device support Power Class 2 and Power Class 3 operations. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each LTE and FR1 configuration and exposure condition combination, according to the highest time averaged power for Power Class 2. When the reported SAR vs. output power is linearly scaled with < 10% discrepancy between power classes and all reported SAR are < 1.4 W/kg, Separate SAR testing for Power Class 2 is not required. Use PC3 power level and SAR to estimated PC2 SAR linearly, and check if the deviation from the measured PC2 SAR is < 10%

【Body】

FR1 n41_MIMO1	Power Class 3	Power Class 2
Max Tune Up Power (dBm)	16.0	19.0
Reported 1g SAR (W/kg)	1.042	1.022
Duty Cycle (%)	100.0 %	50.0 %
Frame Averaged (mW)	39.81	39.72
Linearity SAR (W/kg)	1.04	
% deviation from Expected Linearity		-1.70 %

FR1 n77 (27Q)_Aux	Power Class 3	Power Class 2
Max Tune Up Power (dBm)	17.5	20.5
Reported 1g SAR (W/kg)	0.724	0.712
Duty Cycle (%)	100.0 %	50.0 %
Frame Averaged (mW)	56.23	56.1
Linearity SAR (W/kg)	0.72	
% deviation from Expected Linearity		-1.43 %

FR1 n77 (27O)_Aux	Power Class 3	Power Class 2
Max Tune Up Power (dBm)	17.5	20.5
Reported 1g SAR (W/kg)	1.154	1.149
Duty Cycle (%)	100.0 %	50.0 %
Frame Averaged (mW)	56.23	56.1
Linearity SAR (W/kg)	1.15	
% deviation from Expected Linearity		-0.20 %

13. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN Main + WWAN MIMO2 + WLAN/BT Main	Yes
2.	WWAN Main + WWAN MIMO2 + WLAN/BT Aux	Yes
3.	WWAN MIMO1 + WLAN/BT Main	Yes
4.	WWAN MIMO1 + WLAN/BT Aux	Yes
5.	WWAN Aux + WLAN/BT Main	Yes
6.	WWAN Aux + WLAN/BT Aux	Yes

General Note:

1. The WiFi/BT SAR of 1.59 W/kg was used conservatively for the purpose of simultaneous transmission analysis.
2. This device is enabled with Qualcomm® Smart Transmit Gen2 with pre-defined antenna groups (AG0 and AG1). Simultaneous transmission analysis is performed per antenna groups. The AG0 as Main/MIMO1 antenna and AG1 as MIMO 2/Aux Antenna.
3. WWAN MIMO1 and Aux antenna only support SRS operation.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation 1g 1.6W/kg or 10g 4.0W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$ for 1g SAR, ≤ 0.1 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR 1.6W/kg or 10g SAR 4.0W/kg.
 - v) Simultaneously transmission SAR measurement, and the reported multi-band SAR $< 1.6W/kg$.
 - vi) The SPLSR calculated results please refer to section 12.2.

Qualcomm Smart Transmit Simultaneous Transmission Guidance

Based on Qualcomm Smart Transmit simultaneous transmission analysis guidance, If all radios are selected to be under Smart Transmit control, then RF exposure from radios are managed by Smart Transmit in the same way. No additional TER analysis is needed

Smart Transmit current implementation assumes hotspots from all active radios are collocated. Therefore, for a total of 100% exposure margin, if primary radio uses x%, then the exposure margin left for secondary radio(s) is capped to (100-x)%. Thus, the compliance equation for simultaneous active radios, such as follow,

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

where, A is normalized time-averaged SAR exposure corresponding to “maximum of {minimum [EFS Plimit + device uncertainty; NV setting Pmax + device uncertainty]; EFS Plimit}” from primary radio, and $A \leq 1.0$; B for secondary radio(s) is

(for legacy radio or sub6 NR): normalized time-averaged SAR exposure corresponding to “maximum of {minimum [EFS Plimit + device uncertainty; NV setting Pmax + device uncertainty]; EFS Plimit }”

and $B \leq 1.0$. As can be seen, A and B by definition is the exposure corresponding to “maximum of {minimum [EFS Plimit + device uncertainty; NV setting Pmax + device uncertainty]; EFS Plimit}”, and it is NOT defined as reported exposure

The total RF exposure in this simultaneous transmission scenario is controlled and managed within Smart Transmit operation, and the compliance is demonstrated in Part 2 test.

13.1 Body Exposure Conditions

Exposure Position	1	2	3	4	1+2+3 Summed 1g SAR (W/kg)	1+2+4 Summed 1g SAR (W/kg)	SPLSR	Case No.
	Maximum WWAN Main 1g SAR (W/kg)	Maximum WWAN MIMO2 1g SAR (W/kg)	WLAN/BT Main 1g SAR (W/kg)	WLAN/BT Aux 1g SAR (W/kg)				
Bottom Side at 0mm	1.195	1.194	1.590	1.590	3.979	3.979	0.020	Case 1

Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No.
	Maximum WWAN MIMO1 1g SAR (W/kg)	WLAN/BT Main 1g SAR (W/kg)	WLAN/BT Aux 1g SAR (W/kg)				
Bottom Side at 0mm	1.179	1.590	1.590	2.769	2.769	0.020	Case 2

Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No.
	Maximum WWAN Aux 1g SAR (W/kg)	WLAN/BT Main 1g SAR (W/kg)	WLAN/BT Aux 1g SAR (W/kg)				
Bottom Side at 0mm	1.162	1.590	1.590	2.752	2.752	0.020	Case 3

13.2 SPLSR Evaluation and Analysis

General Note:

- According to the antenna locations in Appendix D, the minimum distance between each transmit antenna is used for SPLSR analysis.
- $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary

	Band	Position	SAR (W/kg)	Gap (mm)	Min distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 1	Max WWAN Main	Bottom Side	1.195	0mm	216.5	2.39	0.02	Not required
	Max WWAN MIMO2		1.194	0mm				
	Max WWAN Main	Bottom Side	1.195	0mm	225.0	2.79	0.02	Not required
	WLAN/BT Main		1.59	0mm				
	Max WWAN Main	Bottom Side	1.195	0mm	215.0	2.79	0.02	Not required
	WLAN/BT Aux		1.59	0mm				
	Max WWAN MIMO2	Bottom Side	1.194	0mm	195.0	2.78	0.02	Not required
	WLAN/BT Main		1.59	0mm				
Case 2	Max WWAN MIMO2	Bottom Side	1.194	0mm	216.0	2.78	0.02	Not required
	WLAN/BT Aux		1.59	0mm				
	Max WWAN MIMO1	Bottom Side	1.179	0mm	190.0	2.77	0.02	Not required
	WLAN/BT Main		1.59	0mm				
Case 3	Max WWAN MIMO1	Bottom Side	1.179	0mm	185.0	2.77	0.02	Not required
	WLAN/BT Aux		1.59	0mm				
	Max WWAN Aux	Bottom Side	1.162	0mm	215.0	2.75	0.02	Not required
	WLAN/BT Main		1.59	0mm				
	Max WWAN Aux	Bottom Side	1.162	0mm	247.0	2.75	0.02	Not required
	WLAN/BT Aux		1.59	0mm				

Test Engineer : Tony Wu

14. Uncertainty Assessment

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

15. 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 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", 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.