

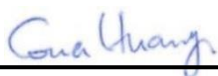
FCC SAR TEST REPORT

FCC ID : 2AJN7-TP00145D
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00145D, TP00145E
Applicant : LC Future Center Limited Taiwan Branch
7F., No.780, Beian Rd., Zhongshan Dist., Taipei 104, Taiwan
Manufacturer : Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry
Bay, Hong Kong, P.R. China
Standard : FCC 47 CFR Part 2 (2.1093)

Equipment: Rolling RW350R-GL tested inside of Lenovo Notebook Computer.

The product was received on Dec. 12, 2024 and testing was started from Dec. 21, 2024 and completed on Jan. 20, 2025. 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
FA4D0659	01	Initial issue of report	Feb. 28, 2025

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for **LC Future Center Limited Taiwan Branch, Notebook Computer, TP00145D, TP00145E**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	Highest Simultaneous Transmission 1g SAR (W/kg)
		Body	
		1g SAR (W/kg)	
Licensed	WCDMA II	1.09	1.19
	WCDMA IV	1.19	
	WCDMA V	0.27	
	LTE Band 7	0.91	
	LTE Band 12/17	0.46	
	LTE Band 13	0.64	
	LTE Band 14	0.55	
	LTE Band 25/2	1.09	
	LTE Band 26/5	0.36	
	LTE Band 30	1.08	
	LTE Band 41/38	0.52	
	LTE Band 42	0.60	
	LTE Band 43	0.92	
	LTE Band 48	1.04	
	LTE Band 66	1.09	
	LTE Band 71	0.36	
	FR1 n5	0.35	
	FR1 n7	1.03	
	FR1 n12	0.29	
	FR1 n14	0.45	
	FR1 n25/2	1.08	
	FR1 n26	0.33	
	FR1 n30	1.08	
	FR1 n41/38	1.14	
	FR1 n48	0.84	
	FR1 n66	1.08	
	FR1 n71	0.29	
	FR1 n77/78	1.00	
Date of Testing:		2024/12/21 ~ 2025/01/20	

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: Daisy Peng



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	TP00145D, TP00145E
FCC ID	2AJN7-TP00145D
Integrated WWAN Module	Brand Name: Rolling Model Name: RW350R-GL
Integrated WLAN Module 1	Brand Name: Intel Model Name: AX211D2W
Integrated WLAN Module 2	Brand Name: Intel Model Name: BE201D2W
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: 3550 MHz ~ 3600 MHz LTE Band 43: 3600 MHz ~ 3700 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR 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, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz 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 UNII4 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/HE320/EHT20/EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE NFC: ASK
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EUT Stage	Production Unit
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Remark:

1. This device has two antenna vendors; RF exposure evaluation selects SPEED as the main test, ATC will spot check worst case found in SPEED.
2. The Intel AX211D2W (FCC ID: PD9AX211D2) may integrated into this host, the Sim-Tx compliance with WWAN operation was addressed in section 14.
3. The Intel BE201D2W (FCC ID: PD9BE201D2) may integrated into this host, the Sim-Tx compliance with WWAN operation was addressed in section 14.
4. The FCC ID: MCLT77H747 NFC module is integrated into this host, and NFC transmitters are considered to be operating simultaneously when there is overlapping transmission with the exception of transmission during network hand-offs with maximum hand-off duration less than 30seconds.

WWAN Antenna Information				
Main Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain(dBi)	1.93
	Part number	DC330025X30	Type	PIFA
	Manufacturer	Speed	Peak gain(dBi)	1.93
	Part number	DC330025Y30	Type	PIFA
MIMO2 Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain(dBi)	1.87
	Part number	DC330025X40	Type	PIFA
	Manufacturer	Speed	Peak gain(dBi)	1.87
	Part number	DC330025Y40	Type	PIFA
Auxiliary Antenna	Manufacturer	Amphenol Taiwan Corporation	Peak gain(dBi)	1.81
	Part number	DC330025X40	Type	PIFA
	Manufacturer	Speed	Peak gain(dBi)	1.81
	Part number	DC330025Y40	Type	PIFA

WLAN Antenna Information					
Antenna 1	Manufacturer	Amphenol Taiwan Corporation			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC330025X00		DC330025X00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.43 dBi	BT/WLAN(2.4G):	1.92 dBi
		WLAN(5G B1):	0.54 dBi	WLAN(5G B1):	2.84 dBi
		WLAN(5G B2):	1.59 dBi	WLAN(5G B2):	2.84 dBi
		WLAN(5G B3):	2.22 dBi	WLAN(5G B3):	2.46 dBi
		WLAN(5G B4):	2.26 dBi	WLAN(5G B4):	2.22 dBi
		UNII-5	2.05 dBi	UNII-5	1.74 dBi
Antenna 2	Manufacturer	SPEEDWIRE			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC330025Y00		DC330025Y00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.43 dBi	BT/WLAN(2.4G):	1.92 dBi
		WLAN(5G B1):	0.54 dBi	WLAN(5G B1):	2.84 dBi
		WLAN(5G B2):	1.59 dBi	WLAN(5G B2):	2.84 dBi
		WLAN(5G B3):	2.22 dBi	WLAN(5G B3):	2.46 dBi
		WLAN(5G B4):	2.26 dBi	WLAN(5G B4):	2.22 dBi
		UNII-5	2.05 dBi	UNII-5	1.74 dBi

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05									
FCC ID		2AJN7-TP00145D							
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: 3550 MHz ~ 3600 MHz LTE Band 43: 3600 MHz ~ 3700 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz							
Channel Bandwidth		LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 30: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 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.							
Power reduction applied to satisfy SAR compliance		Yes, Proximity Sensor.							
LTE Carrier Aggregation Combinations		Intra-Band possible combinations and the detail power measurement please referred to section 11.							
LTE Carrier Aggregation Additional Information		This device supports maximum of 2 carriers in the uplink. 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 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860		
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880		
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900		
LTE Band 4														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720		
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5		
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745		
LTE Band 5														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	20407	824.7	20415	825.5	20425	826.5	20450	829						
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5						
H	20643	848.3	20635	847.5	20625	846.5	20600	844						
LTE Band 7														
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510						
M	21100	2535	21100	2535	21100	2535	21100	2535						
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560						
LTE Band 12														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	23017	699.7	23025	700.5	23035	701.5	23060	704						
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5						
H	23173	715.3	23165	714.5	23155	713.5	23130	711						
LTE Band 13														
	Bandwidth 5 MHz				Bandwidth 10 MHz									
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)							
L	23205		779.5		23230		782							
M	23230		782											
H	23255		784.5											
LTE Band 14														
	Bandwidth 5 MHz				Bandwidth 10 MHz									
	Channel #		Channel #		Channel #		Freq.(MHz)							
L	23305		790.5		23330		793							
M	23330		793											
H	23355		795.5											
LTE Band 17														
	Bandwidth 5 MHz				Bandwidth 10 MHz									
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)							
L	23755		706.5		23780		709							
M	23790		710		23790		710							
H	23825		713.5		23800		711							
LTE Band 25														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860		
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880		
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905		
LTE Band 26														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	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		
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 30												
	Bandwidth 5 MHz					Bandwidth 10 MHz						
	Channel #		Freq.(MHz)			Channel #		Freq.(MHz)				
L	27685		2307.5			27710		2310				
M	27710		2310									
H	27735		2312.5									
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
	40620	2593	40620	2593	40620	2593	40620	2593				
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
	41565	2687.5	41540	2685	41515	2682.5	41490	2680				
LTE Band 42												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	43315	3552.5	43140	3555	43165	3557.5	43190	3560				
M	43340	3575	43340	3575	43340	3575	43340	3575				
H	43565	3597.5	43540	3595	43515	3592.5	43490	3590				
LTE Band 43												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	43615	3602.5	43640	3605	43665	3607.5	43690	3610				
M	44090	3650	44090	3650	44090	3650	44090	3650				
H	44565	3697.5	44540	3695	44515	3692.5	44490	3690				
LTE Band 48												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560				
L M	55810	3607	55815	3607.5	55820	3608	55830	3609				
	56170	3643	56165	3642.5	56160	3642	56150	3641				
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690				
LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770
LTE Band 71												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	133147	665.5	133172	668	133197	670.5	133222	673				
M	133297	680.5	133297	680.5	133297	680.5	133297	680.5				
H	133447	695.5	133422	693	133397	690.5	133372	688				



3.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information												
FCC ID	2AJN7-TP00145D											
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 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, 3450MHz ~ 3550MHz											
	5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz											
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz, 25MHz, 30MHz											
	5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz, 25MHz											
	5G NR n7: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz, 50MHz											
	5G NR n12: 5MHz, 10MHz, 15MHz											
	5G NR n14: 5MHz, 10MHz											
	5G NR n25: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz 30MHz, ,35MHz, 40MHz, 45MHz											
	5G NR n26: 5MHz, 10MHz, 15MHz, 20MHz											
	5G NR n30: 5MHz, 10MHz											
	5G NR n38: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz											
	5G NR n41: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz											
	5G NR n48: 5MHz ,10MHz, 15MHz, 20MHz, 30MHz, 40MHz											
	5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz,30MHz, 35MHz, 40MHz, 45MHz											
	5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz											
	5G NR n77: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz											
	5G NR 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 B2/5/12/13/14/30/66											
LTE Anchor Bands for n5	LTE B2/30/48/66											
LTE Anchor Bands for n25	LTE B66											
LTE Anchor Bands for n41	LTE B2/66/41											
LTE Anchor Bands for n48	LTE B2/66											
LTE Anchor Bands for n66	LTE B5/12/13/48											
LTE Anchor Bands for n71	LTE B2/66											
LTE Anchor Bands for n77	LTE B2/5/12/13/14/30/41/66											
LTE Anchor Bands for n78	LTE B2/5/7/38											
NR Band 2												
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz	
	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
M	376000	1880	376000	1880	376000	1880	376000	1880	376000	1880	376000	1880
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379500	1897.5	379000	1895

NR Band 5																						
	Bandwidth 5MHz			Bandwidth 10MHz			Bandwidth 15MHz			Bandwidth 20MHz			Bandwidth 25MHz									
	Ch. #	Freq. (MHz)		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		167300	836.5								
H	169300	846.5		168800	844		168300	841.5		167800	839											
NR Band 7																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)						
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520	505000	2525						
M	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535						
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560	511500	2557.5	511000	2555	510000	2550	509000	2545						
NR Band 12																						
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz													
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)											
L	140300		701.5		140800		704		141300		706.5											
M	141500		707.5		141500		707.5		141500		707.5											
H	142700		713.5		142200		711		141700		708.5											
NR Band 14																						
	Bandwidth 5MHz						Bandwidth 10MHz															
	Ch. #			Freq. (MHz)			Ch. #			Freq. (MHz)												
L	158100			790.5			158600			793												
M	158600			793																		
H	159100			795.5																		
NR Band 25																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz		Bandwidth 45MHz					
	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	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	373500	1867.5	374000	1870	374500	1872.5				
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	376500	1882.5				
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379500	1897.5	379000	1895	378500	1892.5				
NR Band 26																						
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz				Bandwidth 20MHz									
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)							
L	163300		816.5		163800		819		164300		821.5		164800		824							
M	166300		831.5		166300		831.5		166300		831.5		166300		831.5							
H	169300		846.5		168800		844		168300		841.5		167800		839							
NR Band 30																						
	Bandwidth 5MHz						Bandwidth 10MHz															
	Ch. #			Freq. (MHz)			Ch. #			Freq. (MHz)												
L	461500			2307.5			462000			2310												
M	462000			2310																		
H	462500			2312.5																		
NR Band 38																						
	Bandwidth 5Hz		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	514500	2572.5	515004	2575.02	515502	2577.51	516000	2580	516504	2582.52	517002	2585.01	518004	2590.02								
M	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595								
H	523500	2617.5	522996	2614.98	522498	2612.49	522000	2610	521496	2607.48	520998	2604.99	519996	2599.98								
NR Band 41																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500202	2501.01	500700	2503.5	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	506202	2531.01	507204	2536.02	508200	2541	509202	2546.01
M	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99
H	537000	2685	536496	2682.48	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	531000	2655	529998	2649.99	528996	2644.98	528000	2640



NR Band 48																						
	Bandwidth5MHz		Bandwidth10MHz		Bandwidth 15MHz		Bandwidth20MHz		Bandwidth30MHz		Bandwidth 40MHz											
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)										
L	636834	3552.51	637000	3555	637168	3557.52	637334	3560.01	637668	3565.02	638000	3570										
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99										
H	646500	3697.5	646332	3694.98	646166	3692.49	646000	3690	645666	3684.99	645332	3679.98										
NR Band 66																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 35MHz		Bandwidth 40MHz		Bandwidth 45MHz					
	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	342500	1712.5	343000	1715	343500	1717.5	344000	1720	344500	1722.5	345000	1725	345500	1727.5	342500	1712.5	346500	1732.5				
M	349000	1745	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	355500	1777.5	351500	1757.5				
NR Band 71																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz															
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)														
L	133100	665.5	133600	668	13410	670.5	134600	673														
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5														
H	139100	695.5	138600	693	13810	690.5	137600	688														
NR Band 77_Part 270																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	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
NR Band 78_Part 270																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	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		
NR Band 77/78_Part 27Q																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	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		

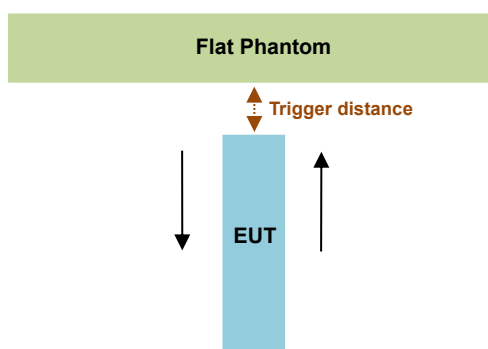
4. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance (KDB 616217 D04 section 6.2)>:

For the device is fully integrated, touch sensing capacitive sensor. It uses a charge transfer capacitive acquisition method that is capable of near range proximity detection. In this device offers a state of the art capacitive sensing engine with an embedded sampling capacitor and voltage regulator allowing the overall solution cost to be reduced and improving system immunity in noisy environments.

Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed. The details are illustrated as following, and the shortest triggering distances were reported and used for SAR assessment.

In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; no other frequency bands tissue-equivalent medium was found to result in shortest triggering distance than that for 1900MHz, and the tissue-equivalent medium for 1900MHz was used for formal proximity sensor triggering testing.



Main		
Proximity Sensor Trigger Distance (mm)		
Position	Bottom side	
	moving toward	moving away
Minimum	41	39

MIMO2		
Proximity Sensor Trigger Distance (mm)		
Position	Bottom side	
	moving toward	moving away
Minimum	23	25

Aux		
Proximity Sensor Trigger Distance (mm)		
Position	Bottom side	
	moving toward	moving away
Minimum	35	33

<Proximity Sensor Triggering Coverage (KDB 616217 D04 section 6.3)>:

Since the antenna and sensor are collocated and all of the peak SAR location is overlapping with the sensor pad for this device, therefore, According to KDB 616217 section6.3, these procedures do not apply and are not required for this device. due to the antenna and sensor are collocated and the peak SAR location is overlapping with the sensor on this device.

Proximity sensor power reduction

Band	Antenna	Bottom Side ⁽¹⁾ (dB)
WCDMA B5	Main	7.5
LTE B5	Main	7
LTE B12	Main	5
LTE B13	Main	6
LTE B14	Main	6.5
LTE B17	Main	5
LTE B26	Main	7
LTE B41 PC3	Main	6.5
LTE B42	Main	5.5
LTE B48	Main	5.5
LTE B71	Main	4.5
FR1 n2	Main	5
FR1 n5	Main	6.5
FR1 n12	Main	5
FR1 n14	Main	6
FR1 n25	Main	5
FR1 n26	Main	6.5
FR1 n41 PC3	Main	8.5
FR1 n41 PC2	Main	8.5
FR1 n48 PC3	Main	8
FR1 n71	Main	4
FR1 n77 PC3	Main	10.5
FR1 n77 PC2	Main	10.5
FR1 n78 PC3	Main	10.5
FR1 n78 PC2	Main	10.5
WCDMA B2	MIMO2	6.5
WCDMA B4	MIMO2	5.5
LTE B2	MIMO2	6.5
LTE B4	MIMO2	5
LTE B7	MIMO2	5
LTE B25	MIMO2	6.5
LTE B30	MIMO2	3.5
LTE B38 PC3	MIMO2	5.5
LTE B41 PC3	MIMO2	5.5
LTE B42	MIMO2	3.5
LTE B43	MIMO2	1.5
LTE B48	MIMO2	1.5
LTE B66	MIMO2	5
FR1 n2	MIMO2	5.5
FR1 n7	MIMO2	4
FR1 n25	MIMO2	5.5
FR1 n30	MIMO2	3
FR1 n38 PC3	MIMO2	7.5
FR1 n41 PC3	MIMO2	7.5
FR1 n41 PC2	MIMO2	7.5
FR1 n48 PC3	MIMO2	3.5
FR1 n66	MIMO2	4
FR1 n77 PC3	MIMO2	8
FR1 n77 PC2	MIMO2	8
FR1 n78 PC3	MIMO2	8
FR1 n78 PC2	MIMO2	8
FR1 n41 PC3	Aux	4.5
FR1 n41 PC2	Aux	4.5
FR1 n77 PC3	Aux	5.5
FR1 n77 PC2	Aux	5.5
FR1 n78 PC3	Aux	5.5
FR1 n78 PC2	Aux	5.5

Remark:

1. ⁽¹⁾: Reduced maximum limit applied by activation of proximity sensor.
2. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown as below.
3. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:

Main:

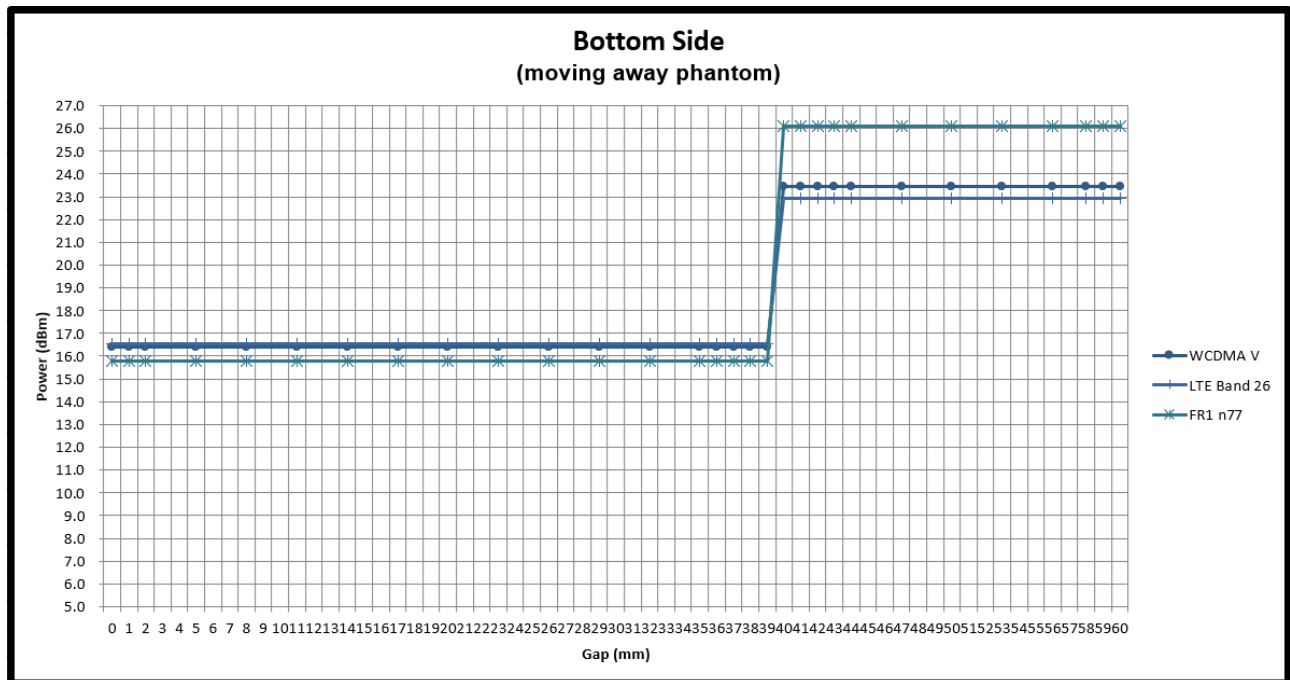
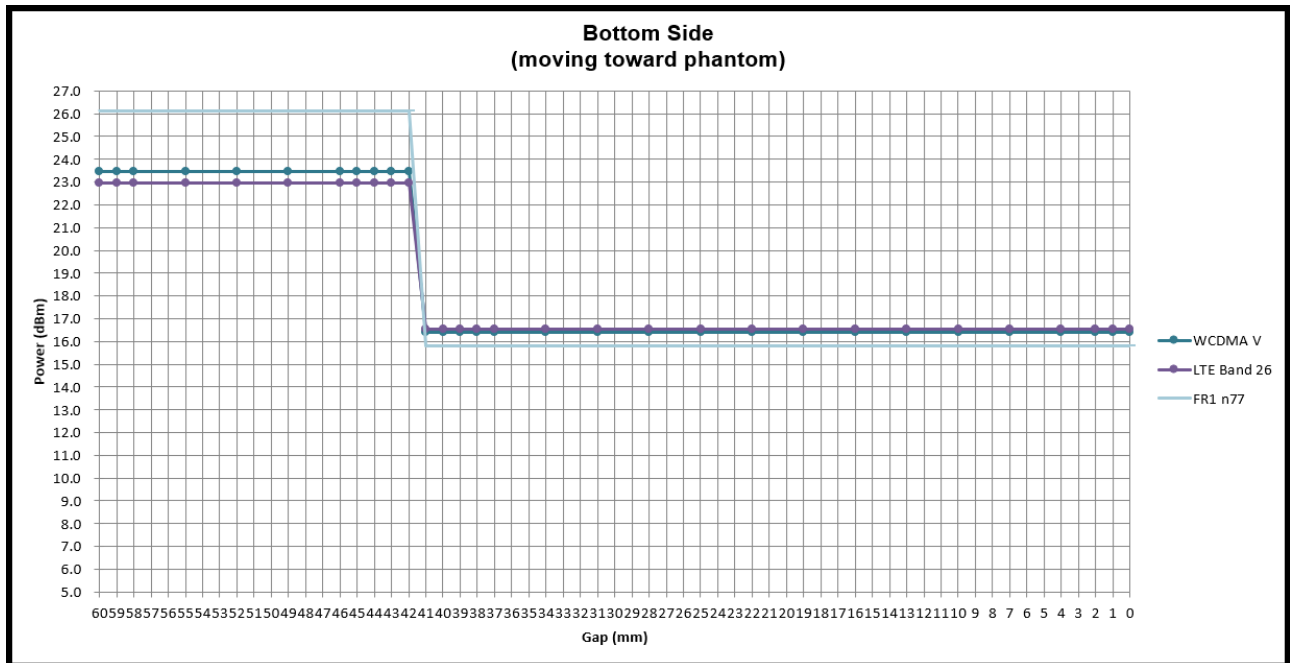
- Bottom Side: [38 mm](#)

MIMO2:

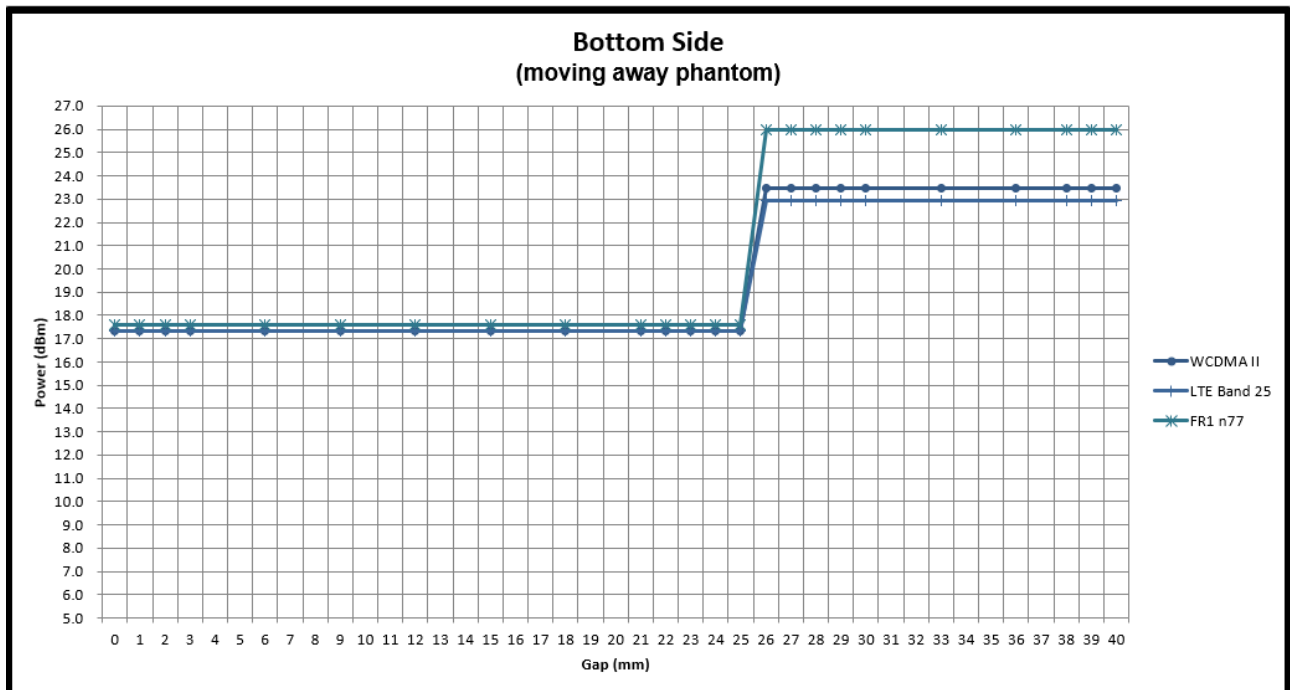
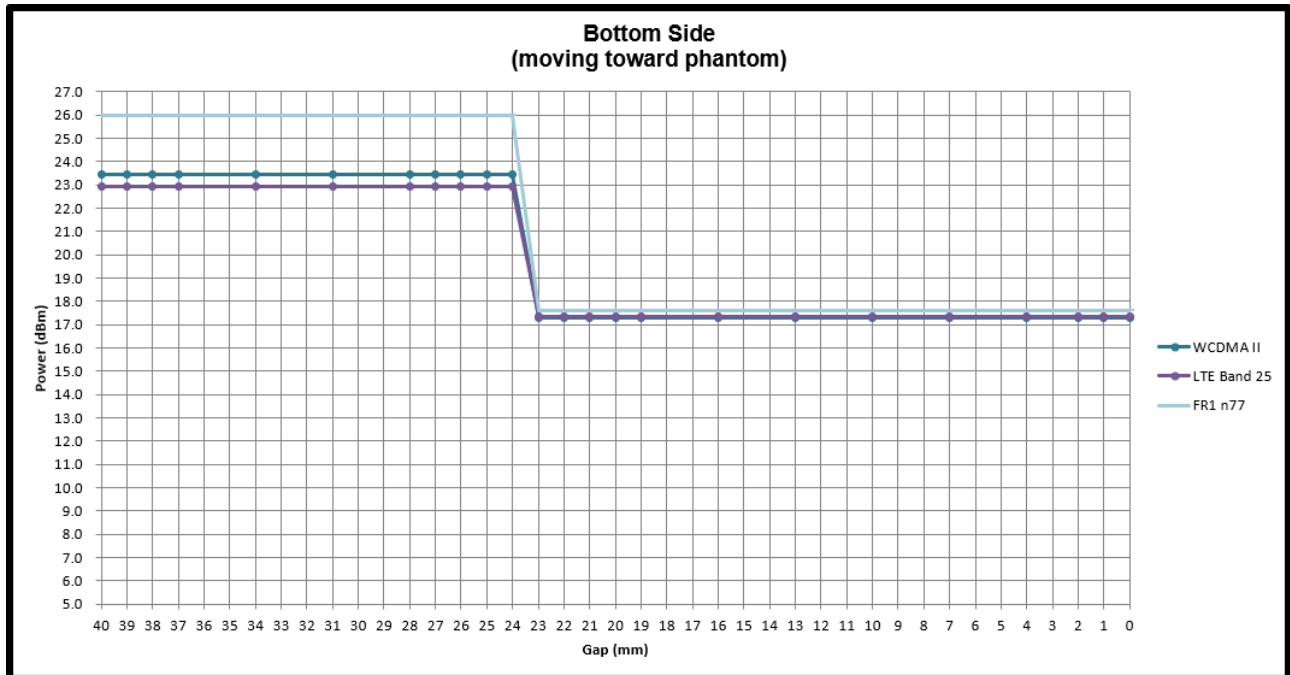
- Bottom Side: [22 mm](#)

Aux:

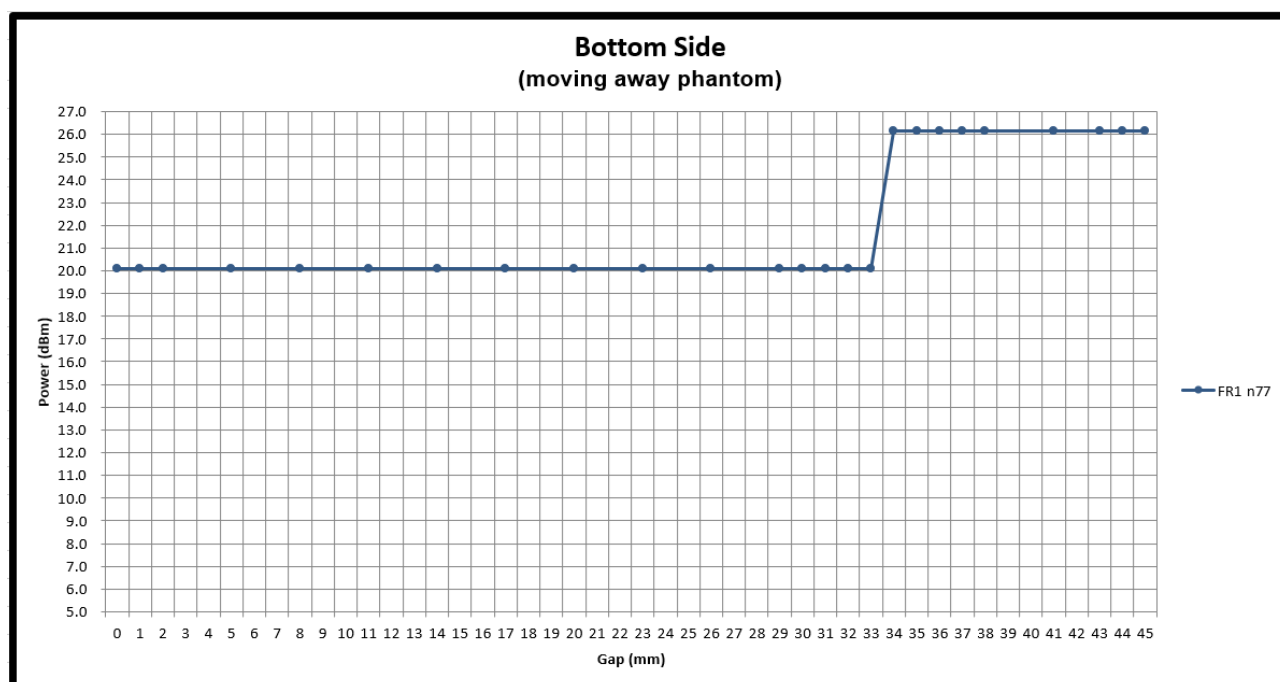
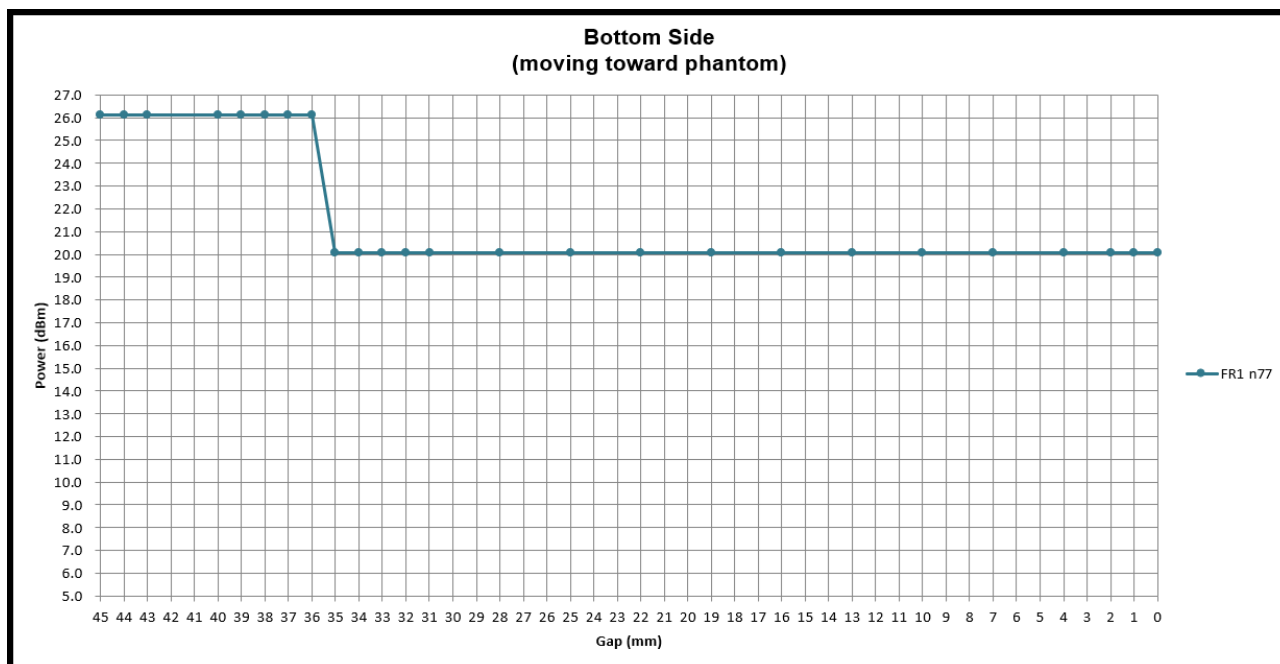
- Bottom Side: [32 mm](#)

Power Measurement during Sensor Trigger distance testing
Main


MIMO2



Aux



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:

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

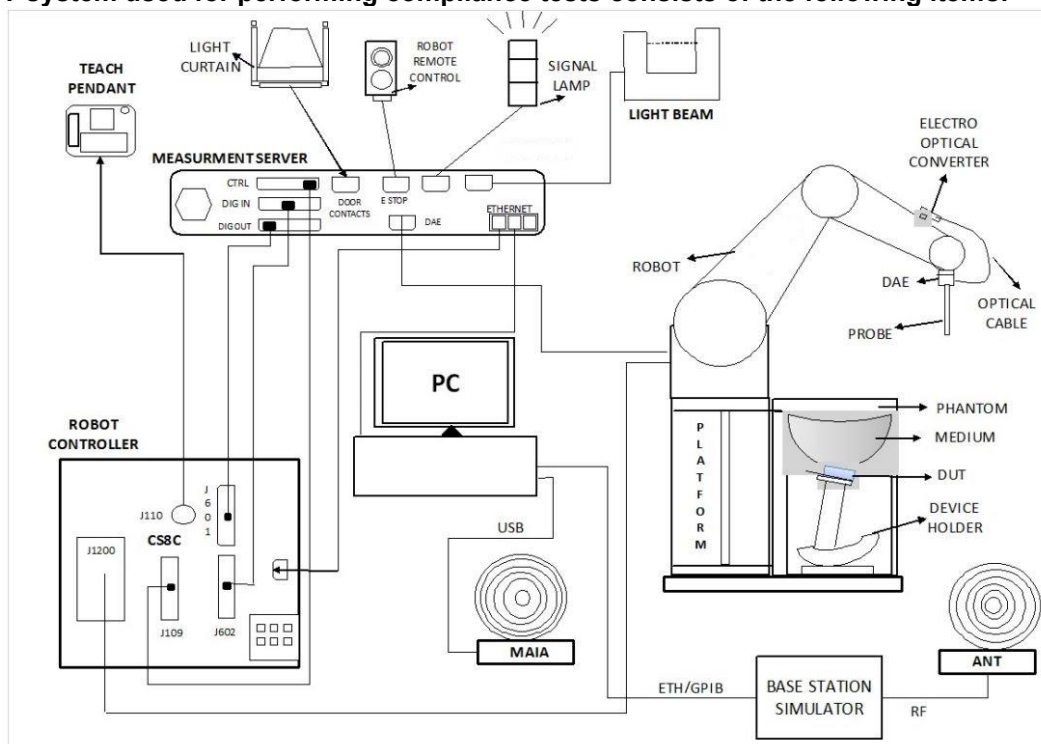
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values 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	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit ⁽²⁾	D750V3	1107	Jun. 22, 2022	Jun. 19, 2025
SPEAG	835MHz System Validation Kit	D835V2	499	Aug. 22, 2024	Aug. 21, 2025
SPEAG	835MHz System Validation Kit ⁽²⁾	D835V2	4d167	Nov. 24, 2022	Nov. 21, 2025
SPEAG	1750MHz System Validation Kit ⁽²⁾	D1750V2	1112	Jun. 22, 2022	Jun. 19, 2025
SPEAG	1900MHz System Validation Kit ⁽²⁾	D1900V2	5d093	Mar. 25, 2022	Mar. 22, 2025
SPEAG	2300MHz System Validation Kit ⁽²⁾	D2300V2	1006	Jan. 18, 2022	Jan. 15, 2025
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 15, 2024	Aug. 14, 2025
SPEAG	2600MHz System Validation Kit ⁽²⁾	D2600V2	1089	Mar. 24, 2022	Mar. 21, 2025
SPEAG	3500MHz System Validation Kit ⁽²⁾	D3500V2	1014	Jan. 17, 2022	Jan. 14, 2025
SPEAG	3500MHz System Validation Kit ⁽²⁾	D3500V2	1036	Mar. 23, 2022	Mar. 20, 2025
SPEAG	3700MHz System Validation Kit	D3700V2	1022	Jul. 10, 2024	Jul. 09, 2025
SPEAG	3900MHz System Validation Kit ⁽²⁾	D3900V2	1092	May. 15, 2023	May. 13, 2025
SPEAG	Data Acquisition Electronics	DAE4	661	May. 16, 2024	May. 15, 2025
SPEAG	Data Acquisition Electronics	DAE4	1694	Nov. 19, 2024	Nov. 18, 2025
SPEAG	Data Acquisition Electronics	DAE4	1696	Sep. 03, 2024	Sep. 02, 2025
SPEAG	Data Acquisition Electronics	DAE4	1697	Nov. 14, 2024	Nov. 13, 2025
SPEAG	Data Acquisition Electronics	DAE4	1794	Feb. 15, 2024	Feb. 14, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7694	Nov. 18, 2024	Nov. 17, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7700	Feb. 01, 2024	Jan. 31, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7785	Nov. 28, 2024	Nov. 27, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7793	Mar. 01, 2024	Feb. 28, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7813	May. 30, 2024	May. 29, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7814	Jun. 20, 2024	Jun. 19, 2025
Testo	Hygro meter	608-H1	45196600	Oct. 28, 2024	Oct. 27, 2025
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 12, 2024	Nov. 11, 2025
Keysight	5G Wireless Test Platform	E7515B	MY58300712	Apr. 22, 2024	Apr. 21, 2025
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 24, 2024	Sep. 23, 2025
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 20, 2024	Oct. 19, 2025
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 17, 2024	Sep. 16, 2025
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 07, 2024	Aug. 06, 2025
Anritsu	Power Meter	ML2495A	1419002	Aug. 13, 2024	Aug. 12, 2025
Anritsu	Power Sensor	MA2411B	1911176	Aug. 13, 2024	Aug. 12, 2025
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 09, 2024	Jul. 08, 2025
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 23, 2024	Oct. 22, 2025
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 according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

10. System Verification

10.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18°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

<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
750	22.3	0.893	41.500	0.89	41.90	0.34	-0.95	± 5	2024/12/21
750	22.4	0.897	42.200	0.89	41.90	0.79	0.72	± 5	2024/12/24
750	22.3	0.892	41.800	0.89	41.90	0.22	-0.24	± 5	2025/1/12
750	22.5	0.886	42.900	0.89	41.90	-0.45	2.39	± 5	2025/1/13
835	22.3	0.927	41.200	0.90	41.50	3.00	-0.72	± 5	2024/12/21
835	22.4	0.932	41.900	0.90	41.50	3.56	0.96	± 5	2024/12/24
835	22.5	0.914	41.300	0.90	41.50	1.56	-0.48	± 5	2025/1/12
1750	22.2	1.360	40.600	1.37	40.10	-0.73	1.25	± 5	2024/12/22
1750	22.5	1.380	40.800	1.37	40.10	0.73	1.75	± 5	2024/12/25
1750	22.8	1.360	40.500	1.37	40.10	-0.73	1.00	± 5	2025/1/8
1900	22.2	1.440	39.100	1.40	40.00	2.86	-2.25	± 5	2024/12/22
1900	22.5	1.450	39.300	1.40	40.00	3.57	-1.75	± 5	2024/12/25
1900	22.8	1.440	39.000	1.40	40.00	2.86	-2.50	± 5	2025/1/8
2300	22.5	1.590	40.400	1.67	39.50	-4.79	2.28	± 5	2024/12/23
2300	22.6	1.620	40.700	1.67	39.50	-2.99	3.04	± 5	2024/12/26
2600	22.5	1.910	39.200	1.96	39.00	-2.55	0.51	± 5	2024/12/23
2600	22.6	1.970	39.600	1.96	39.00	0.51	1.54	± 5	2024/12/26
2600	22.6	2.000	38.400	1.96	39.00	2.04	-1.54	± 5	2025/1/10
2600	22.4	1.980	38.600	1.96	39.00	1.02	-1.03	± 5	2025/1/14
2600	22.5	1.990	38.700	1.96	39.00	1.53	-0.77	± 5	2025/1/15
2600	22.6	2.000	38.700	1.96	39.00	2.04	-0.77	± 5	2025/1/16
3500	22.4	2.910	37.900	2.91	37.90	0.00	0.00	± 5	2024/12/24
3500	22.9	3.000	37.800	2.91	37.90	3.09	-0.26	± 5	2024/12/27
3500	22.5	2.890	37.900	2.91	37.90	-0.69	0.00	± 5	2025/1/10
3500	22.5	2.940	38.100	2.91	37.90	1.03	0.53	± 5	2025/1/11
3500	22.7	2.950	37.900	2.91	37.90	1.37	0.00	± 5	2025/1/17
3500	22.8	2.970	38.000	2.91	37.90	2.06	0.26	± 5	2025/1/18
3700	22.4	3.110	37.700	3.12	37.70	-0.32	0.00	± 5	2024/12/24
3700	22.9	3.160	37.500	3.12	37.70	1.28	-0.53	± 5	2024/12/27
3700	22.5	3.080	37.800	3.12	37.70	-1.28	0.27	± 5	2025/1/10
3700	22.5	3.100	37.800	3.12	37.70	-0.64	0.27	± 5	2025/1/11
3700	22.5	3.150	38.000	3.12	37.70	0.96	0.80	± 5	2025/1/19
3900	22.4	3.320	37.500	3.33	37.51	-0.30	-0.03	± 5	2024/12/24
3900	22.9	3.330	37.300	3.33	37.51	0.00	-0.56	± 5	2024/12/27
3900	22.5	3.330	37.700	3.33	37.51	0.00	0.51	± 5	2025/1/20

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.

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 (%)	Test Site
2024/12/21	750	50	D750V3-1107	EX3DV4 - SN7785	DAE4 Sn1694	0.435	8.540	8.7	1.87	SAR-13
2024/12/24	750	50	D750V3-1107	EX3DV4 - SN7700	DAE4 Sn1696	0.414	8.540	8.28	-3.04	SAR-16
2025/1/12	750	50	D750V3-1107	EX3DV4 - SN7793	DAE4 Sn1794	0.435	8.540	8.7	1.87	SAR-17
2025/1/13	750	50	D750V3-1107	EX3DV4 - SN7700	DAE4 Sn661	0.397	8.540	7.94	-7.03	SAR-16
2024/12/21	835	50	D835V2-4d167	EX3DV4 - SN7785	DAE4 Sn1694	0.498	9.800	9.96	1.63	SAR-13
2024/12/24	835	50	D835V2-4d167	EX3DV4 - SN7700	DAE4 Sn1696	0.475	9.800	9.5	-3.06	SAR-16
2025/1/12	835	50	D835V2-499	EX3DV4 - SN7793	DAE4 Sn1794	0.477	9.440	9.54	1.06	SAR-17
2024/12/22	1750	50	D1750V2-1112	EX3DV4 - SN7785	DAE4 Sn1694	1.820	36.900	36.4	-1.36	SAR-13
2024/12/25	1750	50	D1750V2-1112	EX3DV4 - SN7700	DAE4 Sn1696	1.860	36.900	37.2	0.81	SAR-16
2025/1/8	1750	50	D1750V2-1112	EX3DV4 - SN7694	DAE4 Sn1697	1.740	36.900	34.8	-5.69	SAR-14
2024/12/22	1900	50	D1900V2-5d093	EX3DV4 - SN7785	DAE4 Sn1694	1.990	39.900	39.8	-0.25	SAR-13
2024/12/25	1900	50	D1900V2-5d093	EX3DV4 - SN7700	DAE4 Sn1696	1.930	39.900	38.6	-3.26	SAR-16
2025/1/8	1900	50	D1900V2-5d093	EX3DV4 - SN7694	DAE4 Sn1697	1.900	39.900	38	-4.76	SAR-14
2024/12/23	2300	50	D2300V2-1006	EX3DV4 - SN7785	DAE4 Sn1694	2.190	48.300	43.8	-9.32	SAR-13
2024/12/26	2300	50	D2300V2-1006	EX3DV4 - SN7700	DAE4 Sn1696	2.280	48.300	45.6	-5.59	SAR-16
2024/12/23	2600	50	D2600V2-1008	EX3DV4 - SN7785	DAE4 Sn1694	2.670	55.700	53.4	-4.13	SAR-13
2024/12/26	2600	50	D2600V2-1008	EX3DV4 - SN7700	DAE4 Sn1696	2.650	55.700	53	-4.85	SAR-16
2025/1/10	2600	50	D2600V2-1089	EX3DV4 - SN7793	DAE4 Sn1794	2.780	55.400	55.6	0.36	SAR-17
2025/1/14	2600	50	D2600V2-1089	EX3DV4 - SN7793	DAE4 Sn1794	2.620	55.400	52.4	-5.42	SAR-17
2025/1/15	2600	50	D2600V2-1089	EX3DV4 - SN7793	DAE4 Sn1794	2.640	55.400	52.8	-4.69	SAR-17
2025/1/16	2600	50	D2600V2-1089	EX3DV4 - SN7793	DAE4 Sn1794	2.660	55.400	53.2	-3.97	SAR-17
2024/12/24	3500	50	D3500V2-1014	EX3DV4 - SN7785	DAE4 Sn1694	3.440	67.200	68.8	2.38	SAR-13
2024/12/27	3500	50	D3500V2-1014	EX3DV4 - SN7700	DAE4 Sn1696	3.280	67.200	65.6	-2.38	SAR-16
2025/1/10	3500	50	D3500V2-1014	EX3DV4 - SN7813	DAE4 Sn661	3.290	67.200	65.8	-2.08	SAR-15
2025/1/11	3500	50	D3500V2-1014	EX3DV4 - SN7793	DAE4 Sn1794	3.080	67.200	61.6	-8.33	SAR-17
2025/1/17	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn1794	3.190	67.400	63.8	-5.34	SAR-17
2025/1/18	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn1794	3.200	67.400	64	-5.04	SAR-17
2024/12/24	3700	50	D3700V2-1022	EX3DV4 - SN7785	DAE4 Sn1694	3.410	68.100	68.2	0.15	SAR-13
2024/12/27	3700	50	D3700V2-1022	EX3DV4 - SN7700	DAE4 Sn1696	3.150	68.100	63	-7.49	SAR-16
2025/1/10	3700	50	D3700V2-1022	EX3DV4 - SN7813	DAE4 Sn661	3.210	68.100	64.2	-5.73	SAR-15
2025/1/11	3700	50	D3700V2-1022	EX3DV4 - SN7793	DAE4 Sn1794	3.100	68.100	62	-8.96	SAR-17
2025/1/19	3700	50	D3700V2-1022	EX3DV4 - SN7793	DAE4 Sn1794	3.180	68.100	63.6	-6.61	SAR-17
2024/12/24	3900	50	D3900V2-1092	EX3DV4 - SN7785	DAE4 Sn1694	3.270	67.000	65.4	-2.39	SAR-13
2024/12/27	3900	50	D3900V2-1092	EX3DV4 - SN7700	DAE4 Sn1696	3.130	67.000	62.6	-6.57	SAR-16
2025/1/20	3900	50	D3900V2-1092	EX3DV4 - SN7814	DAE4 Sn1794	3.120	67.000	62.4	-6.87	SAR-18

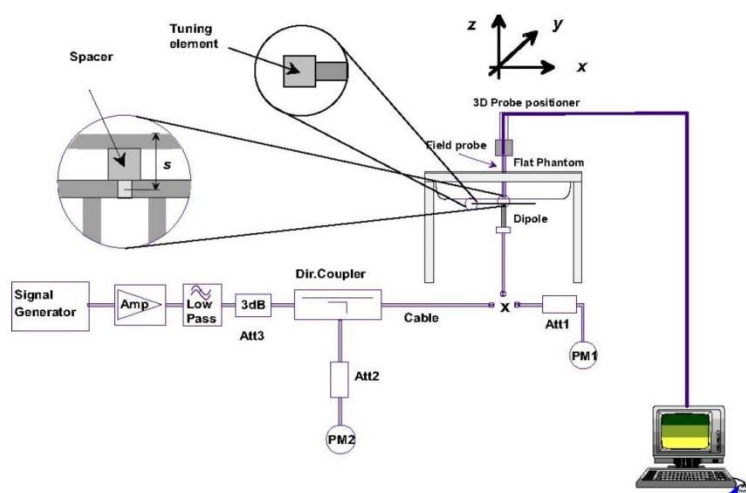


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. UL/DL Carrier aggregation

<LTE DL Carrier Aggregation>

General Note:

1. This device supports LTE carrier aggregation in the downlink. All uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded

<LTE UL carrier aggregation>

General Note:

- i. The device supports intra-band uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.
- ii. The device supports uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.
- iii. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- iv. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- v. Additional SAR measurement for LTE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

2CC Uplink Carrier Aggregation	
Number	Combination
1	5B
2	7C
3	66B
4	66C
5	38C
6	41C
7	42C
8	48C

Sensor Off

CA_5B_Main										
Combination 10MHz+10MHz (50RB+50RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20450	20549	QPSK	1	0	0	0	1	0	22.48	24
20475	20574	QPSK	1	49	1	0	2	0	22.43	24
20600	20501	QPSK	1	0	1	49	2	0	22.48	24

CA_41C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	0	0	0	1	0	22.1	24
40185	39987	QPSK	1	0	0	0	1	0	22.56	24
40620	40422	QPSK	1	0	0	0	1	0	22.42	24
41055	40857	QPSK	1	0	0	0	1	0	22.53	24
41490	41292	QPSK	1	0	0	0	1	0	22.36	24

CA_42C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	21.03	22
43241	43439	QPSK	1	0	0	0	1	0	20.93	22
43292	43490	QPSK	1	0	0	0	1	0	21.04	22

CA_48C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	20.15	22
55632	55830	QPSK	1	0	0	0	1	0	20.09	22
55952	56150	QPSK	1	0	0	0	1	0	20.05	22
56442	56640	QPSK	1	0	0	0	1	0	20.19	22

CA_7C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	0	0	0	1	0	22.81	24
21100	20902	QPSK	1	0	1	99	2	0	22.32	24
21350	21152	QPSK	1	0	1	99	2	0	22.74	24

CA_66B_MIMO2										
Combination 15MHz+5MHz (75RB+25RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
132047	132140	QPSK	1	0	0	0	1	0	23.19	24
132229	132322	QPSK	1	0	0	0	1	0	23.14	24
132504	132597	QPSK	1	0	0	0	1	0	23.3	24

CA_66C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
132072	132270	QPSK	1	0	0	0	1	0	22.01	24
132322	132124	QPSK	1	0	1	99	2	0	22.32	24
132572	132374	QPSK	1	0	1	99	2	0	22.55	24

CA_38C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
37850	38048	QPSK	1	0	0	0	1	0	22.03	24
37901	38000	QPSK	1	0	0	0	1	0	22.31	24
38150	37952	QPSK	1	0	0	0	1	0	22.72	24

CA_41C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	0	0	0	1	0	22.09	24
40185	39987	QPSK	1	0	0	0	1	0	22.47	24
40620	40422	QPSK	1	0	0	0	1	0	22.38	24
41055	40857	QPSK	1	0	0	0	1	0	22.62	24
41490	41292	QPSK	1	0	0	0	1	0	22.34	24

CA_42C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	21.06	22
43241	43439	QPSK	1	0	0	0	1	0	20.9	22
43292	43490	QPSK	1	0	0	0	1	0	21.07	22

CA_48C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	20.15	22
55632	55830	QPSK	1	0	0	0	1	0	20.12	22
55952	56150	QPSK	1	0	0	0	1	0	20.12	22
56442	56640	QPSK	1	0	0	0	1	0	20.11	22

Sensor On

CA_5B_Main										
Combination 10MHz+10MHz (50RB+50RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20450	20549	QPSK	1	0	0	0	1	0	16.86	17
20475	20574	QPSK	1	49	1	0	2	0	16.85	17
20600	20501	QPSK	1	0	1	49	2	0	16.87	17

CA_41C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	0	0	0	1	0	16.28	17.5
40185	39987	QPSK	1	0	0	0	1	0	16.35	17.5
40620	40422	QPSK	1	0	0	0	1	0	16.33	17.5
41055	40857	QPSK	1	0	0	0	1	0	16.38	17.5
41490	41292	QPSK	1	0	0	0	1	0	16.4	17.5

CA_42C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	15.35	16.5
43241	43439	QPSK	1	0	0	0	1	0	15.32	16.5
43292	43490	QPSK	1	0	0	0	1	0	15.34	16.5

CA_48C_Main										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	15.52	16.5
55632	55830	QPSK	1	0	0	0	1	0	15.59	16.5
55952	56150	QPSK	1	0	0	0	1	0	15.58	16.5
56442	56640	QPSK	1	0	0	0	1	0	15.64	16.5

CA_7C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	0	0	0	1	0	17.66	19
21100	20902	QPSK	1	0	1	99	2	0	18.12	19
21350	21152	QPSK	1	0	1	99	2	0	18.15	19

CA_66B_MIMO2										
Combination 15MHz+5MHz (75RB+25RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
132047	132140	QPSK	1	0	0	0	1	0	18.15	19
132229	132322	QPSK	1	0	0	0	1	0	18.21	19
132504	132597	QPSK	1	0	0	0	1	0	18.19	19

CA_66C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
132072	132270	QPSK	1	0	0	0	1	0	17.57	19
132322	132124	QPSK	1	0	1	99	2	0	17.77	19
132572	132374	QPSK	1	0	1	99	2	0	17.71	19

CA_38C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
37850	38048	QPSK	1	0	0	0	1	0	16.97	18.5
37901	38000	QPSK	1	0	0	0	1	0	17.18	18.5
38150	37952	QPSK	1	0	0	0	1	0	17.31	18.5

CA_41C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	0	0	0	1	0	17.19	18.5
40185	39987	QPSK	1	0	0	0	1	0	17.15	18.5
40620	40422	QPSK	1	0	0	0	1	0	17.24	18.5
41055	40857	QPSK	1	0	0	0	1	0	17.14	18.5
41490	41292	QPSK	1	0	0	0	1	0	17.15	18.5

CA_42C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	16.55	18.5
43241	43439	QPSK	1	0	0	0	1	0	16.52	18.5
43292	43490	QPSK	1	0	0	0	1	0	16.62	18.5

CA_48C_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	19.7	20.5
55632	55830	QPSK	1	0	0	0	1	0	19.61	20.5
55952	56150	QPSK	1	0	0	0	1	0	19.65	20.5
56442	56640	QPSK	1	0	0	0	1	0	19.64	20.5

12. Exposure position consideration

<SAR test exclusion table>

General Note:

- The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
- Maximum power is the source-based time-average power and represents the maximum RF output power among production units
- Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
- Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR}$$
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison
- Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
 - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
 - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz

<Main>

Exposure Position	Wireless Interface	WCDMA Band V	LTE Band 71/n71	LTE Band 12/17/n12	LTE Band 13	LTE Band 14/n14	LTE Band 26/5/n26/n5	LTE Band n2/n25	LTE Band 41/n41	LTE Band 42	LTE Band 48/n48	NR Band n77	NR Band n78
	Calculated Frequency (MHz)	846	695	715	784	795	713	1914	2690	3600	3700	3980	3800
	Maximum power (dBm)	24.5	24.0	24.0	24.0	24.0	24.0	24.0	27.0	22.0	22.0	27.0	27.0
	Maximum rated power(mW)	281.84	251.19	251.19	251.19	251.19	251.19	251.19	501.19	158.49	158.49	501.19	501.19
Bottom Side	Separation distance(mm)	5.0											
	exclusion threshold	51.9	41.9	42.5	44.5	44.8	42.4	69.5	164.4	60.1	61.0	200.0	195.4
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

<MIMO1>

Exposure Position	Wireless Interface	NR Band n41	NR Band n77	NR Band n78
	Calculated Frequency (MHz)	2690	3980	3800
	Maximum power (dBm)	18.5	18.5	18.5
	Maximum rated power(mW)	70.79	70.79	70.79
Bottom Side	Separation distance(mm)	5.0		
	exclusion threshold	23.2	28.3	27.6
	Testing required?	Yes	Yes	Yes

<MIMO2>

Exposure Position	Wireless Interface	WCDMA Band IV	WCDMA Band II	LTE Band 4/66/n66	LTE Band 2/25/n2/n25	LTE Band 30/n30	LTE Band 7/n7	LTE Band 41/38/n41/n38	LTE Band 42	LTE Band 43	LTE Band 48/n48	NR Band n77	NR Band n78
	Calculated Frequency (MHz)	1750	1907	1779	1914	2312	2567	2690	3600	3700	3700	3980	3800
	Maximum power (dBm)	24.5	24.5	24.0	24.0	23.0	24.0	27.0	22.0	22.0	22.0	27.0	27.0
	Maximum rated power(mW)	281.84	281.84	251.19	251.19	199.53	251.19	501.19	158.49	158.49	158.49	501.19	501.19
Bottom Side	Separation distance(mm)	5.0											
	exclusion threshold	74.6	77.8	67.0	69.5	60.7	80.5	164.4	60.1	61.0	61.0	200.0	195.4
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**<Aux>**

Exposure Position	Wireless Interface	NR Band n41	NR Band n77	NR Band n78
	Calculated Frequency (MHz)	2690	3980	3800
	Maximum power (dBm)	27.0	27.0	27.0
	Maximum rated power(mW)	501.19	501.19	501.19
Bottom Side	Separation distance(mm)	5.0		
	exclusion threshold	164.4	200.0	195.4
	Testing required?	Yes	Yes	Yes

13. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - c. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.

UMTS Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B5/B12/B17/B26/B38/B71 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 2/4/5/17/38 SAR test was covered by Band 25/66/26/12/41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

5G NR Note:

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below:
 - a. 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
 - b. 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.
 - c. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not $\frac{1}{2}$ 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.
 - d. Smaller bandwidth output power for each RB allocation configuration for this device is not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
 - e. For 5G FR1 n5/n12/n41/n71/n77, the maximum channel bandwidth does not support three non-overlapping channels in the frequency band, the middle channel of the group of overlapping channels were selected for testing.
 - f. 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

13.1 Body SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	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)
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9400	1880	SPEED	17.32	18.00	1.169	-0.17	0.894	1.046
01	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9262	1852.4	SPEED	16.97	18.00	1.268	0.08	0.861	1.091
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9538	1907.6	SPEED	17.26	18.00	1.186	0.04	0.786	0.932
	WCDMA II	RMC 12.2Kbps	Bottom Side	22mm	MIMO2	OFF	9262	1852.4	SPEED	23.23	24.00	1.194	-0.08	0.171	0.204
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9262	1852.4	ATC	16.97	18.00	1.268	-0.09	0.803	1.018
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9400	1880	ATC	17.32	18.00	1.169	0.06	0.807	0.944
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	9538	1907.6	ATC	17.26	18.00	1.186	-0.08	0.756	0.896
02	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1312	1712.4	SPEED	18.07	19.00	1.239	-0.03	0.964	1.194
	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1413	1732.6	SPEED	17.72	19.00	1.343	0.18	0.707	0.949
	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1513	1752.6	SPEED	17.95	19.00	1.274	0.14	0.687	0.875
	WCDMA IV	RMC 12.2Kbps	Bottom Side	22mm	MIMO2	OFF	1312	1712.4	SPEED	23.71	24.00	1.069	-0.08	0.186	0.199
	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1312	1712.4	ATC	18.07	19.00	1.239	0.01	0.879	1.089
	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1413	1732.6	ATC	17.72	19.00	1.343	0.1	0.692	0.929
	WCDMA IV	RMC 12.2Kbps	Bottom Side	0mm	MIMO2	ON	1513	1752.6	ATC	17.95	19.00	1.274	-0.17	0.619	0.788
03	WCDMA V	RMC 12.2Kbps	Bottom Side	0mm	Main	ON	4132	826.4	SPEED	16.40	17.00	1.148	-0.07	0.239	0.274
	WCDMA V	RMC 12.2Kbps	Bottom Side	38mm	Main	OFF	4132	826.4	SPEED	23.45	24.50	1.274	0.06	0.115	0.146
	WCDMA V	RMC 12.2Kbps	Bottom Side	0mm	Main	ON	4132	826.4	ATC	16.40	17.00	1.148	-0.07	0.238	0.273



<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Antenna Vendor	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	21350	2560	SPEED	18.79	19.00	1.050			0.05	0.844	0.886
	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	20850	2510	SPEED	18.34	19.00	1.164			0.06	0.647	0.753
	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	21100	2535	SPEED	18.23	19.00	1.194			-0.09	0.690	0.824
	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	21350	2560	SPEED	18.72	19.00	1.067			-0.08	0.827	0.882
	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	20850	2510	SPEED	18.33	19.00	1.167			0.13	0.641	0.748
	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	21100	2535	SPEED	18.24	19.00	1.191			0.12	0.684	0.815
	LTE Band 7	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	ON	21350	2560	SPEED	18.68	19.00	1.076			0.03	0.812	0.874
	LTE Band 7C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	21350+21152	2560	SPEED	18.15	19.00	1.216			0.01	0.695	0.845
	LTE Band 7C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	20850+21048	2510	SPEED	17.66	19.00	1.361			0.03	0.551	0.750
	LTE Band 7C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	21100+20902	2535	SPEED	18.12	19.00	1.225			-0.08	0.641	0.785
	LTE Band 7	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	21350	2560	SPEED	23.16	24.00	1.213			-0.1	0.131	0.159
	LTE Band 7	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	21350	2560	SPEED	22.09	23.00	1.233			0.07	0.100	0.123
04	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	21350	2560	ATC	18.79	19.00	1.050			0.05	0.863	0.906
	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	20850	2510	ATC	18.34	19.00	1.164			-0.15	0.661	0.769
	LTE Band 7	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	21100	2535	ATC	18.23	19.00	1.194			0.19	0.740	0.884
05	LTE Band 12	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23095	707.5	SPEED	17.89	19.00	1.291			0	0.354	0.457
	LTE Band 12	10M	QPSK	25	12	Bottom Side	0mm	Main	ON	23095	707.5	SPEED	17.87	19.00	1.297			0.08	0.313	0.406
	LTE Band 12	10M	QPSK	1	25	Bottom Side	38mm	Main	OFF	23095	707.5	SPEED	23.28	24.00	1.180			-0.08	0.076	0.090
	LTE Band 12	10M	QPSK	25	12	Bottom Side	38mm	Main	OFF	23095	707.5	SPEED	22.25	23.00	1.189			0.13	0.058	0.069
	LTE Band 12	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23095	707.5	ATC	17.89	19.00	1.291			0.01	0.331	0.427
06	LTE Band 13	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23230	782	SPEED	17.46	18.00	1.132			0	0.565	0.640
	LTE Band 13	10M	QPSK	25	12	Bottom Side	0mm	Main	ON	23230	782	SPEED	17.40	18.00	1.148			-0.17	0.556	0.638
	LTE Band 13	10M	QPSK	1	25	Bottom Side	38mm	Main	OFF	23230	782	SPEED	23.33	24.00	1.167			0.18	0.083	0.097
	LTE Band 13	10M	QPSK	25	12	Bottom Side	38mm	Main	OFF	23230	782	SPEED	22.28	23.00	1.180			0.16	0.066	0.078
	LTE Band 13	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23230	782	ATC	17.46	18.00	1.132			-0.08	0.518	0.587
07	LTE Band 14	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23330	793	SPEED	17.00	17.50	1.122			0.02	0.489	0.549
	LTE Band 14	10M	QPSK	25	12	Bottom Side	0mm	Main	ON	23330	793	SPEED	16.99	17.50	1.125			0.1	0.479	0.539
	LTE Band 14	10M	QPSK	1	25	Bottom Side	38mm	Main	OFF	23330	793	SPEED	23.46	24.00	1.132			0.19	0.098	0.111
	LTE Band 14	10M	QPSK	25	12	Bottom Side	38mm	Main	OFF	23330	793	SPEED	22.43	23.00	1.140			0.07	0.076	0.087
	LTE Band 14	10M	QPSK	1	25	Bottom Side	0mm	Main	ON	23330	793	ATC	17.00	17.50	1.122			-0.08	0.448	0.503
	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26340	1880	SPEED	17.35	17.50	1.035			0.06	1.000	1.035
	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26140	1860	SPEED	17.07	17.50	1.104			0.04	0.905	0.999
	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26590	1905	SPEED	17.12	17.50	1.091			-0.01	0.823	0.898
	LTE Band 25	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	26340	1880	SPEED	17.34	17.50	1.038			-0.08	0.984	1.021
	LTE Band 25	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	26140	1860	SPEED	17.11	17.50	1.094			0.05	0.891	0.975
	LTE Band 25	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	26590	1905	SPEED	17.17	17.50	1.079			0.06	0.810	0.874
	LTE Band 25	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	ON	26340	1880	SPEED	17.27	17.50	1.054			-0.09	0.947	0.999
	LTE Band 25	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	26340	1880	SPEED	22.95	24.00	1.274			0.18	0.163	0.208
	LTE Band 25	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	26340	1880	SPEED	21.91	23.00	1.285			-0.1	0.125	0.161
	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26340	1880	ATC	17.35	17.50	1.035			0.06	1.020	1.056
08	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26140	1860	ATC	17.07	17.50	1.104			-0.05	0.983	1.085
	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26590	1905	ATC	17.12	17.50	1.091			-0.09	0.874	0.954
09	LTE Band 26	15M	QPSK	1	37	Bottom Side	0mm	Main	ON	26865	831.5	SPEED	16.54	17.00	1.112			-0.03	0.319	0.355
	LTE Band 26	15M	QPSK	36	0	Bottom Side	0mm	Main	ON	26865	831.5	SPEED	16.53	17.00	1.114			0.14	0.291	0.324
	LTE Band 5B	10M	QPSK	1	49	Bottom Side	0mm	Main	ON	20475+20574	831.5	SPEED	16.85	17.00	1.035			0.08	0.305	0.316
	LTE Band 26	15M	QPSK	1	37	Bottom Side	38mm	Main	OFF	26865	831.5	SPEED	22.91	24.00	1.285			-0.08	0.111	0.143
	LTE Band 26	15M	QPSK	36	20	Bottom Side	38mm	Main	OFF	26865	831.5	SPEED	21.82	23.00	1.312			-0.13	0.086	0.113
	LTE Band 26	15M	QPSK	1	37	Bottom Side	0mm	Main	ON	26865	831.5	ATC	16.54	17.00	1.112			0.11	0.310	0.345
10	LTE Band 30	10M	QPSK	1	25	Bottom Side	0mm	MIMO2	ON	27710	2310	SPEED	18.67	19.50	1.211			-0.06	0.893	1.081
	LTE Band 30	10M	QPSK	25	12	Bottom Side	0mm	MIMO2	ON	27710	2310	SPEED	18.63	19.50	1.222			0.08	0.833	1.018
	LTE Band 30	10M	QPSK	50	0	Bottom Side	0mm	MIMO2	ON	27710	2310	SPEED	18.59	19.50	1.233			0.01	0.866	1.068



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	LTE Band 30	10M	QPSK	1	25	Bottom Side	22mm	MIMO2	OFF	27710	2310	SPEED	22.10	23.00	1.230			-0.08	0.119	0.146
	LTE Band 30	10M	QPSK	25	12	Bottom Side	22mm	MIMO2	OFF	27710	2310	SPEED	21.04	22.00	1.247			0.1	0.091	0.114
	LTE Band 30	10M	QPSK	1	25	Bottom Side	0mm	MIMO2	ON	27710	2310	ATC	18.67	19.50	1.211			0.09	0.760	0.920
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132572	1770	SPEED	18.30	19.00	1.175			0.08	0.692	0.813
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132072	1720	SPEED	18.25	19.00	1.189			0.01	0.853	1.014
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132322	1745	SPEED	18.23	19.00	1.194			0.03	0.705	0.842
	LTE Band 66	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	ON	132572	1770	SPEED	18.22	19.00	1.197			-0.08	0.680	0.814
	LTE Band 66	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	ON	132072	1720	SPEED	18.21	19.00	1.199			-0.08	0.838	1.005
	LTE Band 66	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	ON	132322	1745	SPEED	18.16	19.00	1.213			0.1	0.691	0.838
	LTE Band 66	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	ON	132572	1770	SPEED	18.26	19.00	1.186			-0.18	0.637	0.755
	LTE Band 66B	15M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132229+132322	1735.7	SPEED	18.21	19.00	1.199			-0.08	0.671	0.805
	LTE Band 66B	15M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132047+132140	1717.5	SPEED	18.15	19.00	1.216			0.1	0.789	0.960
	LTE Band 66B	15M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132504+132597	1763.2	SPEED	18.19	19.00	1.205			-0.18	0.659	0.794
	LTE Band 66C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132322+132124	1745	SPEED	17.77	19.00	1.327			0.1	0.611	0.811
	LTE Band 66C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132072+132270	1720	SPEED	17.57	19.00	1.390			0.12	0.719	0.999
	LTE Band 66C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	132572+132374	1770	SPEED	17.71	19.00	1.346			0.08	0.603	0.812
	LTE Band 66	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	132572	1770	SPEED	23.46	24.00	1.132			0.12	0.128	0.145
	LTE Band 66	20M	QPSK	50	0	Bottom Side	22mm	MIMO2	OFF	132572	1770	SPEED	22.54	23.00	1.112			0.08	0.098	0.109
11	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132072	1720	ATC	18.25	19.00	1.189			-0.03	0.916	1.089
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132572	1770	ATC	18.30	19.00	1.175			0.11	0.736	0.865
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	132322	1745	ATC	18.23	19.00	1.194			0.18	0.755	0.901
12	LTE Band 71	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	133297	680.5	SPEED	18.60	19.50	1.230			0.06	0.296	0.364
	LTE Band 71	20M	QPSK	50	24	Bottom Side	0mm	Main	ON	133297	680.5	SPEED	18.63	19.50	1.222			-0.08	0.288	0.352
	LTE Band 71	20M	QPSK	1	49	Bottom Side	38mm	Main	OFF	133297	680.5	SPEED	23.30	24.00	1.175			-0.13	0.084	0.099
	LTE Band 71	20M	QPSK	50	24	Bottom Side	38mm	Main	OFF	133297	680.5	SPEED	22.37	23.00	1.156			0.06	0.069	0.080
	LTE Band 71	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	133297	680.5	ATC	18.60	19.50	1.230			0.08	0.288	0.354
	LTE Band 41	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	40620	2593	SPEED	16.75	17.50	1.189	62.9	1.006	0.14	0.381	0.456
	LTE Band 41	20M	QPSK	50	24	Bottom Side	0mm	Main	ON	40620	2593	SPEED	16.80	17.50	1.175	62.9	1.006	-0.08	0.350	0.414
	LTE Band 41C	20M	QPSK	1	0	Bottom Side	0mm	Main	ON	41490+41292	2680	SPEED	16.40	17.50	1.288	62.9	1.006	-0.17	0.316	0.410
	LTE Band 41	20M	QPSK	1	49	Bottom Side	38mm	Main	OFF	40620	2593	SPEED	23.23	24.00	1.194	62.9	1.006	-0.18	0.156	0.187
	LTE Band 41	20M	QPSK	50	24	Bottom Side	38mm	Main	OFF	40620	2593	SPEED	22.19	23.00	1.205	62.9	1.006	0.1	0.152	0.184
	LTE Band 41	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	40620	2593	ATC	16.75	17.50	1.189	62.9	1.006	0.08	0.325	0.389
13	LTE Band 41	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	40620	2593	SPEED	17.57	18.50	1.239	62.9	1.006	0.06	0.413	0.515
	LTE Band 41	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	40620	2593	SPEED	17.56	18.50	1.242	62.9	1.006	0.14	0.408	0.510
	LTE Band 41C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	40620+40422	2593	SPEED	17.24	18.50	1.337	62.9	1.006	-0.03	0.373	0.502
	LTE Band 41	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	40620	2593	SPEED	23.26	24.00	1.186	62.9	1.006	0.18	0.125	0.149
	LTE Band 41	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	40620	2593	SPEED	22.23	23.00	1.194	62.9	1.006	0.14	0.098	0.118
	LTE Band 41	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	40620	2593	ATC	17.57	18.50	1.239	62.9	1.006	-0.05	0.408	0.508
	LTE Band 42	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	43340	3575	SPEED	16.08	16.50	1.102	62.9	1.006	0	0.537	0.595
	LTE Band 42	20M	QPSK	50	24	Bottom Side	0mm	Main	ON	43340	3575	SPEED	16.07	16.50	1.104	62.9	1.006	0.18	0.487	0.541
	LTE Band 42C	20M	QPSK	1	0	Bottom Side	0mm	Main	ON	43190+43388	3560	SPEED	15.35	16.50	1.303	62.9	1.006	0.14	0.429	0.562
	LTE Band 42	20M	QPSK	1	49	Bottom Side	38mm	Main	OFF	43340	3575	SPEED	21.21	22.00	1.199	62.9	1.006	0.16	0.249	0.300
	LTE Band 42	20M	QPSK	50	24	Bottom Side	38mm	Main	OFF	43340	3575	SPEED	21.18	22.00	1.208	62.9	1.006	-0.1	0.221	0.269
	LTE Band 42	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	43340	3575	ATC	16.08	16.50	1.102	62.9	1.006	0.07	0.505	0.560
14	LTE Band 42	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	43340	3575	SPEED	17.62	18.50	1.225	62.9	1.006	0.02	0.489	0.602
	LTE Band 42	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	43340	3575	SPEED	17.60	18.50	1.230	62.9	1.006	-0.08	0.453	0.561
	LTE Band 42C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	43292+43490	3590	SPEED	16.62	18.50	1.542	62.9	1.006	0.11	0.354	0.549
	LTE Band 42	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	43340	3575	SPEED	21.24	22.00	1.191	62.9	1.006	0.08	0.295	0.354
	LTE Band 42	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	43340	3575	SPEED	21.22	22.00	1.197	62.9	1.006	0.01	0.235	0.283
	LTE Band 42	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	43340	3575	ATC	17.62	18.50	1.225	62.9	1.006	-0.08	0.433	0.533
	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	44490	3690	SPEED	19.34	20.50	1.306	62.9	1.006	0.05	0.684	0.899
	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	43690	3610	SPEED	19.27	20.50	1.327	62.9	1.006	0.08	0.624	0.833
	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	44090	3650	SPEED	19.33	20.50	1.309	62.9	1.006	-0.08	0.669	0.881
	LTE Band 43	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	44490	3690	SPEED	19.28	20.50	1.324	62.9	1.006	-0.05	0.651	0.867
	LTE Band 43	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	43690	3610	SPEED	19.20	20.50	1.349	62.9	1.006	-0.08	0.593	0.805
	LTE Band 43	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	44090	3650	SPEED	19.27	20.50	1.327	62.9	1.006	-0.17	0.635	0.848



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	LTE Band 43	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	ON	44490	3690	SPEED	19.21	20.50	1.346	62.9	1.006	-0.08	0.581	0.787
	LTE Band 43	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	44090	3650	SPEED	20.92	22.00	1.282	62.9	1.006	0.18	0.282	0.364
	LTE Band 43	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	44090	3650	SPEED	20.88	22.00	1.294	62.9	1.006	0.14	0.225	0.293
15	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	44490	3690	ATC	19.34	20.50	1.306	62.9	1.006	0.02	0.697	0.916
	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	43690	3610	ATC	19.27	20.50	1.327	62.9	1.006	-0.03	0.667	0.891
	LTE Band 43	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	44090	3650	ATC	19.33	20.50	1.309	62.9	1.006	-0.08	0.618	0.814
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	56150	3641	SPEED	16.05	16.50	1.109	62.9	1.006	-0.01	0.497	0.555
	LTE Band 48	20M	QPSK	50	24	Bottom Side	0mm	Main	ON	56150	3641	SPEED	16.03	16.50	1.114	62.9	1.006	0.08	0.465	0.521
	LTE Band 48C	20M	QPSK	1	0	Bottom Side	0mm	Main	ON	56442+56640	3690.2	SPEED	15.64	16.50	1.219	62.9	1.006	0.08	0.399	0.489
	LTE Band 48	20M	QPSK	1	49	Bottom Side	38mm	Main	OFF	56150	3641	SPEED	21.36	22.00	1.159	62.9	1.006	0.08	0.172	0.201
	LTE Band 48	20M	QPSK	50	24	Bottom Side	38mm	Main	OFF	56150	3641	SPEED	20.38	21.00	1.153	62.9	1.006	-0.17	0.153	0.178
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	Main	ON	56150	3641	ATC	16.05	16.50	1.109	62.9	1.006	-0.04	0.467	0.521
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56150	3641	SPEED	20.44	20.50	1.014	62.9	1.006	0.08	0.891	0.909
16	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55340	3560	SPEED	20.42	20.50	1.019	62.9	1.006	0.02	1.010	1.035
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55830	3609	SPEED	20.43	20.50	1.016	62.9	1.006	0.01	0.896	0.916
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56640	3690	SPEED	20.39	20.50	1.026	62.9	1.006	0.03	0.967	0.998
	LTE Band 48	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	56150	3641	SPEED	20.42	20.50	1.019	62.9	1.006	-0.08	0.801	0.821
	LTE Band 48	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	55340	3560	SPEED	20.37	20.50	1.030	62.9	1.006	-0.08	0.908	0.941
	LTE Band 48	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	55830	3609	SPEED	20.36	20.50	1.033	62.9	1.006	0.1	0.806	0.837
	LTE Band 48	20M	QPSK	50	24	Bottom Side	0mm	MIMO2	ON	56640	3690	SPEED	20.31	20.50	1.045	62.9	1.006	-0.18	0.870	0.914
	LTE Band 48	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	ON	56150	3641	SPEED	20.26	20.50	1.057	62.9	1.006	0.1	0.824	0.876
	LTE Band 48C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	55340+55538	3560	SPEED	19.70	20.50	1.202	62.9	1.006	-0.05	0.771	0.933
	LTE Band 48C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	55632+55830	3589.2	SPEED	19.61	20.50	1.227	62.9	1.006	0.18	0.689	0.851
	LTE Band 48C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	55952+56150	3621.2	SPEED	19.65	20.50	1.216	62.9	1.006	0.14	0.685	0.838
	LTE Band 48C	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	ON	56442+56640	3690.2	SPEED	19.64	20.50	1.219	62.9	1.006	-0.17	0.744	0.912
	LTE Band 48	20M	QPSK	1	49	Bottom Side	22mm	MIMO2	OFF	56150	3641	SPEED	21.42	22.00	1.143	62.9	1.006	-0.05	0.289	0.332
	LTE Band 48	20M	QPSK	50	24	Bottom Side	22mm	MIMO2	OFF	56150	3641	SPEED	20.41	21.00	1.146	62.9	1.006	0.01	0.230	0.265
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55340	3560	ATC	20.42	20.50	1.019	62.9	1.006	0.01	0.898	0.920
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55830	3609	ATC	20.43	20.50	1.016	62.9	1.006	0.03	0.790	0.808
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56150	3641	ATC	20.44	20.50	1.014	62.9	1.006	0.08	0.805	0.821
	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56640	3690	ATC	20.39	20.50	1.026	62.9	1.006	-0.08	0.906	0.935

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Power Reduction	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)
17	FR1 n5	25M	BPSK	1	1	Bottom Side	0mm	Main	ON	167300	836.5	SPEED	16.62	17.50	1.225	0	0.284	0.348
	FR1 n5	25M	BPSK	64	33	Bottom Side	0mm	Main	ON	167300	836.5	SPEED	16.56	17.50	1.242	0.05	0.247	0.307
	FR1 n5	25M	BPSK	1	1	Bottom Side	38mm	Main	OFF	167300	836.5	SPEED	22.80	24.00	1.318	-0.01	0.103	0.136
	FR1 n5	25M	BPSK	64	33	Bottom Side	38mm	Main	OFF	167300	836.5	SPEED	22.77	24.00	1.327	-0.08	0.101	0.134
	FR1 n5	25M	BPSK	1	1	Bottom Side	0mm	Main	ON	167300	836.5	ATC	16.62	17.50	1.225	0.04	0.234	0.287
	FR1 n7	50M	BPSK	1	268	Bottom Side	0mm	MIMO2	ON	507000	2535	SPEED	18.98	20.00	1.265	0.12	0.776	0.981
	FR1 n7	50M	BPSK	135	68	Bottom Side	0mm	MIMO2	ON	507000	2535	SPEED	18.95	20.00	1.274	0.08	0.723	0.921
	FR1 n7	50M	BPSK	270	0	Bottom Side	0mm	MIMO2	ON	507000	2535	SPEED	18.94	20.00	1.276	-0.17	0.705	0.900
	FR1 n7	50M	BPSK	1	268	Bottom Side	22mm	MIMO2	OFF	507000	2535	SPEED	23.33	24.00	1.167	-0.09	0.136	0.159
	FR1 n7	50M	BPSK	135	68	Bottom Side	22mm	MIMO2	OFF	507000	2535	SPEED	23.19	24.00	1.205	-0.08	0.122	0.147
18	FR1 n7	50M	BPSK	1	268	Bottom Side	0mm	MIMO2	ON	507000	2535	ATC	18.98	20.00	1.265	-0.04	0.812	1.027
19	FR1 n12	15M	BPSK	1	1	Bottom Side	0mm	Main	ON	141500	707.5	SPEED	18.98	19.00	1.005	0.01	0.288	0.289
	FR1 n12	15M	BPSK	36	22	Bottom Side	0mm	Main	ON	141500	707.5	SPEED	18.96	19.00	1.009	0.09	0.276	0.279
	FR1 n12	15M	BPSK	1	1	Bottom Side	38mm	Main	OFF	141500	707.5	SPEED	23.17	24.00	1.211	0.03	0.068	0.082
	FR1 n12	15M	BPSK	36	22	Bottom Side	38mm	Main	OFF	141500	707.5	SPEED	23.07	24.00	1.239	0.18	0.061	0.076
	FR1 n12	15M	BPSK	1	1	Bottom Side	0mm	Main	ON	141500	707.5	ATC	18.98	19.00	1.005	-0.05	0.251	0.252
20	FR1 n14	10M	BPSK	1	1	Bottom Side	0mm	Main	ON	158600	793	SPEED	17.93	18.00	1.016	0	0.447	0.454
	FR1 n14	10M	BPSK	25	14	Bottom Side	0mm	Main	ON	158600	793	SPEED	17.90	18.00	1.023	-0.08	0.431	0.441
	FR1 n14	10M	BPSK	1	1	Bottom Side	38mm	Main	OFF	158600	793	SPEED	23.21	24.00	1.199	0.07	0.086	0.103
	FR1 n14	10M	BPSK	25	14	Bottom Side	38mm	Main	OFF	158600	793	SPEED	23.18	24.00	1.208	0.18	0.081	0.098



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	FR1 n14	10M	BPSK	1	1	Bottom Side	0mm	Main	ON	158600	793	ATC	17.93	18.00	1.016	0.1	0.433	0.440
	FR1 n25	45M	BPSK	1	120	Bottom Side	0mm	Main	ON	376500	1882.5	SPEED	18.66	19.00	1.081	0.01	0.620	0.670
	FR1 n25	45M	BPSK	120	60	Bottom Side	0mm	Main	ON	376500	1882.5	SPEED	18.60	19.00	1.096	0.08	0.582	0.638
	FR1 n25	45M	BPSK	1	120	Bottom Side	38mm	Main	OFF	376500	1882.5	SPEED	22.63	24.00	1.371	-0.08	0.001	0.001
	FR1 n25	45M	BPSK	120	60	Bottom Side	38mm	Main	OFF	376500	1882.5	SPEED	22.60	24.00	1.380	-0.08	0.001	0.001
	FR1 n25	45M	BPSK	1	120	Bottom Side	0mm	Main	ON	376500	1882.5	ATC	18.66	19.00	1.081	0.1	0.587	0.635
	FR1 n25	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	376500	1882.5	SPEED	17.64	18.50	1.219	0.08	0.830	1.012
	FR1 n25	45M	BPSK	120	60	Bottom Side	0mm	MIMO2	ON	376500	1882.5	SPEED	17.59	18.50	1.233	0.01	0.749	0.924
	FR1 n25	45M	BPSK	240	0	Bottom Side	0mm	MIMO2	ON	376500	1882.5	SPEED	17.57	18.50	1.239	0.03	0.766	0.949
	FR1 n25	45M	BPSK	1	120	Bottom Side	22mm	MIMO2	OFF	376500	1882.5	SPEED	22.68	24.00	1.355	-0.15	0.149	0.202
	FR1 n25	45M	BPSK	120	60	Bottom Side	22mm	MIMO2	OFF	376500	1882.5	SPEED	22.66	24.00	1.361	0.19	0.141	0.192
21	FR1 n25	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	376500	1882.5	ATC	17.64	18.50	1.219	-0.01	0.886	1.080
22	FR1 n26	20M	BPSK	1	1	Bottom Side	0mm	Main	ON	166300	831.5	SPEED	16.63	17.50	1.222	0.02	0.272	0.332
	FR1 n26	20M	BPSK	50	28	Bottom Side	0mm	Main	ON	166300	831.5	SPEED	16.61	17.50	1.227	0.06	0.267	0.328
	FR1 n26	20M	BPSK	1	1	Bottom Side	38mm	Main	OFF	166300	831.5	SPEED	22.80	24.00	1.318	0.03	0.111	0.146
	FR1 n26	20M	BPSK	50	28	Bottom Side	38mm	Main	OFF	166300	831.5	SPEED	22.78	24.00	1.324	-0.15	0.109	0.144
	FR1 n26	20M	BPSK	1	1	Bottom Side	0mm	Main	ON	166300	831.5	ATC	16.63	17.50	1.222	0.13	0.248	0.303
	FR1 n30	10M	BPSK	1	26	Bottom Side	0mm	MIMO2	ON	462000	2310	SPEED	19.12	20.00	1.225	0	0.783	0.959
	FR1 n30	10M	BPSK	25	14	Bottom Side	0mm	MIMO2	ON	462000	2310	SPEED	18.88	20.00	1.294	0.08	0.730	0.945
	FR1 n30	10M	BPSK	50	0	Bottom Side	0mm	MIMO2	ON	462000	2310	SPEED	18.95	20.00	1.274	0.01	0.759	0.967
	FR1 n30	10M	BPSK	1	26	Bottom Side	22mm	MIMO2	OFF	462000	2310	SPEED	22.65	23.00	1.084	-0.15	0.136	0.147
	FR1 n30	10M	BPSK	25	14	Bottom Side	22mm	MIMO2	OFF	462000	2310	SPEED	22.34	23.00	1.164	0.11	0.129	0.150
23	FR1 n30	10M	BPSK	1	26	Bottom Side	0mm	MIMO2	ON	462000	2310	ATC	19.12	20.00	1.225	-0.07	0.881	1.079
	FR1 n66	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	349000	1745	SPEED	19.55	20.00	1.109	-0.17	0.930	1.032
	FR1 n66	45M	BPSK	120	60	Bottom Side	0mm	MIMO2	ON	349000	1745	SPEED	19.50	20.00	1.122	0.17	0.860	0.965
	FR1 n66	45M	BPSK	240	0	Bottom Side	0mm	MIMO2	ON	349000	1745	SPEED	19.32	20.00	1.169	-0.05	0.800	0.936
	FR1 n66	45M	BPSK	1	120	Bottom Side	22mm	MIMO2	OFF	349000	1745	SPEED	23.49	24.00	1.125	-0.08	0.131	0.147
	FR1 n66	45M	BPSK	120	60	Bottom Side	22mm	MIMO2	OFF	349000	1745	SPEED	23.48	24.00	1.127	-0.04	0.128	0.144
24	FR1 n66	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	349000	1745	ATC	19.55	20.00	1.109	-0.01	0.973	1.079
25	FR1 n71	20M	BPSK	1	1	Bottom Side	0mm	Main	ON	136100	680.5	SPEED	19.23	20.00	1.194	0	0.241	0.288
	FR1 n71	20M	BPSK	50	28	Bottom Side	0mm	Main	ON	136100	680.5	SPEED	19.19	20.00	1.205	0.05	0.234	0.282
	FR1 n71	20M	BPSK	1	1	Bottom Side	38mm	Main	OFF	136100	680.5	SPEED	23.22	24.00	1.197	0.18	0.078	0.093
	FR1 n71	20M	BPSK	50	28	Bottom Side	38mm	Main	OFF	136100	680.5	SPEED	23.21	24.00	1.199	-0.04	0.074	0.089
	FR1 n71	20M	BPSK	1	1	Bottom Side	0mm	Main	ON	136100	680.5	ATC	19.23	20.00	1.194	0.07	0.205	0.245
	FR1 n41	100M	BPSK	1	1	Bottom Side	0mm	Main	ON	518598	2592.99	SPEED	15.34	15.50	1.038	0	0.727	0.754
	FR1 n41	100M	BPSK	135	69	Bottom Side	0mm	Main	ON	518598	2592.99	SPEED	15.49	15.50	1.002	-0.03	0.614	0.615
	FR1 n41	100M	BPSK	270	0	Bottom Side	0mm	Main	ON	518598	2592.99	SPEED	15.46	15.50	1.009	0.14	0.597	0.603
	FR1 n41	100M	BPSK	1	1	Bottom Side	38mm	Main	OFF	518598	2592.99	SPEED	22.66	24.00	1.361	0.18	0.154	0.210
	FR1 n41	100M	BPSK	135	0	Bottom Side	38mm	Main	OFF	518598	2592.99	SPEED	22.85	23.50	1.161	0.14	0.150	0.174
	FR1 n41_HPUE	100M	BPSK	1	1	Bottom Side	0mm	Main	ON	518598	2592.99	SPEED	18.22	18.50	1.067	0.08	0.688	0.734
	FR1 n41	100M	BPSK	1	1	Bottom Side	0mm	Main	ON	518598	2592.99	ATC	15.34	15.50	1.038	-0.02	0.700	0.726
	FR1 n41	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	ON	518598	2592.99	SPEED	15.83	16.50	1.167	0.04	0.352	0.411
	FR1 n41	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	ON	518598	2592.99	SPEED	16.15	16.50	1.084	-0.01	0.339	0.367
	FR1 n41	100M	BPSK	1	271	Bottom Side	22mm	MIMO2	OFF	518598	2592.99	SPEED	23.02	24.00	1.253	-0.13	0.210	0.263
	FR1 n41	100M	BPSK	135	69	Bottom Side	22mm	MIMO2	OFF	518598	2592.99	SPEED	23.18	24.00	1.208	0.06	0.166	0.200
	FR1 n41_HPUE	100M	BPSK	1	271	Bottom Side	0mm	MIMO2	ON	518598	2592.99	SPEED	18.65	19.50	1.216	0.03	0.323	0.393
	FR1 n41	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	ON	518598	2592.99	ATC	15.83	16.50	1.167	0.06	0.334	0.390
26	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	14.65	15.50	1.216	-0.01	0.933	1.135
	FR1 n41	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	14.83	15.50	1.167	-0.08	0.802	0.936
	FR1 n41	100M	BPSK	270	0	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	14.74	15.50	1.191	0.1	0.925	1.102
	FR1 n41_HPUE	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	17.49	18.50	1.262	-0.08	0.858	1.083
	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	ATC	14.65	15.50	1.216	0.12	0.807	0.981
	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	Aux	ON	518598	2592.99	SPEED	18.82	19.50	1.169	-0.03	0.838	0.980
	FR1 n41	100M	BPSK	135	69	Bottom Side	0mm	Aux	ON	518598	2592.99	SPEED	19.07	19.50	1.104	0.03	0.766	0.846
	FR1 n41	100M	BPSK	270	0	Bottom Side	0mm	Aux	ON	518598	2592.99	SPEED	19.00	19.50	1.122	-0.08	0.803	0.901



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	FR1 n41	100M	BPSK	1	271	Bottom Side	32mm	Aux	OFF	518598	2592.99	SPEED	23.47	24.00	1.130	-0.12	0.068	0.077
	FR1 n41	100M	BPSK	135	69	Bottom Side	32mm	Aux	OFF	518598	2592.99	SPEED	23.22	24.00	1.197	0.03	0.061	0.073
	FR1 n41_HPUE	100M	BPSK	1	271	Bottom Side	0mm	Aux	ON	518598	2592.99	SPEED	21.67	22.50	1.211	0.08	0.785	0.950
	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	Aux	ON	518598	2592.99	ATC	18.82	19.50	1.169	0.01	0.818	0.957
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	Main	ON	641666	3624.99	SPEED	13.95	14.00	1.012	0.01	0.493	0.499
	FR1 n48	40M	BPSK	50	28	Bottom Side	0mm	Main	ON	641666	3624.99	SPEED	13.80	14.00	1.047	0.08	0.461	0.483
	FR1 n48	40M	BPSK	1	53	Bottom Side	38mm	Main	OFF	638000	3570	SPEED	21.10	22.00	1.230	0.03	0.146	0.180
	FR1 n48	40M	BPSK	50	28	Bottom Side	38mm	Main	OFF	638000	3570	SPEED	20.98	22.00	1.265	-0.08	0.131	0.166
	FR1 n48	40M	BPSK	1	1	Bottom Side	0mm	Main	ON	641666	3624.99	ATC	13.56	14.00	1.107	0.01	0.426	0.471
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	641666	3624.99	SPEED	18.26	18.50	1.057	-0.05	0.720	0.761
27	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	638000	3570	SPEED	18.12	18.50	1.091	0.02	0.767	0.837
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	645332	3679.98	SPEED	17.85	18.50	1.161	0.18	0.655	0.761
	FR1 n48	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	ON	641666	3624.99	SPEED	18.16	18.50	1.081	0.14	0.680	0.735
	FR1 n48	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	ON	638000	3570	SPEED	17.99	18.50	1.125	-0.17	0.727	0.818
	FR1 n48	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	ON	645332	3679.98	SPEED	17.72	18.50	1.197	0.17	0.618	0.740
	FR1 n48	40M	BPSK	100	0	Bottom Side	0mm	MIMO2	ON	641666	3624.99	SPEED	18.07	18.50	1.104	-0.05	0.671	0.741
	FR1 n48	40M	BPSK	1	53	Bottom Side	22mm	MIMO2	OFF	638000	3570	SPEED	21.02	22.00	1.253	0.05	0.196	0.246
	FR1 n48	40M	BPSK	50	28	Bottom Side	22mm	MIMO2	OFF	638000	3570	SPEED	20.98	22.00	1.265	0.06	0.184	0.233
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	638000	3570	ATC	18.12	18.50	1.091	0.13	0.639	0.697
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	641666	3624.99	ATC	18.26	18.50	1.057	-0.02	0.600	0.634
	FR1 n48	40M	BPSK	1	53	Bottom Side	0mm	MIMO2	ON	645332	3679.98	ATC	17.85	18.50	1.161	0.1	0.546	0.634
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	656000	3840	SPEED	12.93	13.50	1.140	0.02	0.379	0.432
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Main	ON	656000	3840	SPEED	12.91	13.50	1.146	0.18	0.354	0.406
	FR1 n77	100M	BPSK	1	137	Bottom Side	38mm	Main	OFF	656000	3840	SPEED	23.11	24.00	1.227	0.1	0.248	0.304
	FR1 n77	100M	BPSK	135	69	Bottom Side	38mm	Main	OFF	656000	3840	SPEED	23.10	24.00	1.230	-0.18	0.241	0.296
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	656000	3840	SPEED	15.71	16.50	1.199	0.1	0.348	0.417
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	656000	3840	ATC	12.93	13.50	1.140	0.14	0.372	0.424
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	656000	3840	SPEED	14.79	16.00	1.321	-0.01	0.373	0.493
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	ON	656000	3840	SPEED	14.78	16.00	1.324	0.08	0.350	0.464
	FR1 n77	100M	BPSK	1	137	Bottom Side	22mm	MIMO2	OFF	656000	3840	SPEED	22.94	24.00	1.276	0.03	0.324	0.414
	FR1 n77	100M	BPSK	135	69	Bottom Side	22mm	MIMO2	OFF	656000	3840	SPEED	23.05	24.00	1.245	-0.08	0.315	0.392
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	656000	3840	SPEED	17.66	19.00	1.361	-0.08	0.344	0.468
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	656000	3840	ATC	14.79	16.00	1.321	0.01	0.372	0.492
28	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	14.55	15.50	1.245	-0.01	0.807	1.004
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	14.52	15.50	1.253	0.1	0.785	0.984
	FR1 n77	100M	BPSK	270	0	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	14.42	15.50	1.282	0.12	0.771	0.989
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	17.37	18.50	1.297	0.12	0.752	0.975
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	656000	3840	ATC	14.55	15.50	1.245	0.03	0.799	0.994
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	656000	3840	SPEED	17.21	18.50	1.346	0.01	0.593	0.798
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Aux	ON	656000	3840	SPEED	17.20	18.50	1.349	0.08	0.520	0.701
	FR1 n77	100M	BPSK	1	271	Bottom Side	32mm	Aux	OFF	656000	3840	SPEED	22.47	24.00	1.422	0.01	0.106	0.151
	FR1 n77	100M	BPSK	135	69	Bottom Side	32mm	Aux	OFF	656000	3840	SPEED	23.11	24.00	1.227	0.03	0.096	0.118
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	656000	3840	SPEED	20.07	21.50	1.390	0.1	0.539	0.749
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	656000	3840	ATC	17.21	18.50	1.346	-0.08	0.545	0.733
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	633332	3499.98	SPEED	13.37	13.50	1.030	0.05	0.423	0.436
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Main	ON	633332	3499.98	SPEED	13.28	13.50	1.052	0.01	0.403	0.424
	FR1 n77	100M	BPSK	1	137	Bottom Side	38mm	Main	OFF	633332	3499.98	SPEED	23.46	24.00	1.132	-0.18	0.211	0.239
	FR1 n77	100M	BPSK	135	69	Bottom Side	38mm	Main	OFF	633332	3499.98	SPEED	23.44	24.00	1.138	0.1	0.205	0.233
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	633332	3499.98	SPEED	16.23	16.50	1.064	0.12	0.385	0.410
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Main	ON	633332	3499.98	ATC	13.37	13.50	1.030	0.08	0.412	0.425
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	633332	3499.98	SPEED	15.18	16.00	1.208	-0.04	0.408	0.493
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	ON	633332	3499.98	SPEED	15.26	16.00	1.186	-0.08	0.373	0.442
	FR1 n77	100M	BPSK	1	137	Bottom Side	22mm	MIMO2	OFF	633332	3499.98	SPEED	23.06	24.00	1.242	0.08	0.306	0.380
	FR1 n77	100M	BPSK	135	69	Bottom Side	22mm	MIMO2	OFF	633332	3499.98	SPEED	23.18	24.00	1.208	0.01	0.298	0.360
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	633332	3499.98	SPEED	18.12	19.00	1.225	-0.08	0.380	0.465



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	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO2	ON	633332	3499.98	ATC	15.18	16.00	1.208	0.03	0.368	0.444
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	633332	3499.98	SPEED	14.08	15.50	1.387	-0.01	0.593	0.822
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	OFF	633332	3499.98	SPEED	14.12	15.50	1.374	0.1	0.585	0.804
	FR1 n77	100M	BPSK	270	0	Bottom Side	0mm	MIMO1	OFF	633332	3499.98	SPEED	14.04	15.50	1.400	-0.18	0.580	0.812
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	633332	3499.98	SPEED	17.03	18.50	1.403	0.12	0.535	0.751
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	633332	3499.98	ATC	14.08	15.50	1.387	0.1	0.589	0.817
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	633332	3499.98	SPEED	18.24	18.50	1.062	-0.02	0.695	0.738
	FR1 n77	100M	BPSK	135	69	Bottom Side	0mm	Aux	ON	633332	3499.98	SPEED	18.33	18.50	1.040	0.08	0.667	0.694
	FR1 n77	100M	BPSK	1	271	Bottom Side	32mm	Aux	OFF	633332	3499.98	SPEED	22.12	24.00	1.542	-0.17	0.103	0.159
	FR1 n77	100M	BPSK	135	69	Bottom Side	32mm	Aux	OFF	633332	3499.98	SPEED	23.13	24.00	1.222	-0.03	0.094	0.115
	FR1 n77_HPUE	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	633332	3499.98	ATC	21.04	21.50	1.112	0.11	0.634	0.705
	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	Aux	ON	633332	3499.98	ATC	18.24	18.50	1.062	0.14	0.664	0.705

13.2 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Antenna Vendor	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26340	1880	ATC	17.35	17.50	1.035			0.06	1.020	-	1.056
2nd	LTE Band 25	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	26340	1880	ATC	17.35	17.50	1.035			0.07	0.998	1.02	1.033
1st	LTE Band 30	10M	QPSK	1	25	Bottom Side	0mm	MIMO2	ON	27710	2310	SPEED	18.67	19.50	1.211			-0.06	0.893	-	1.081
2nd	LTE Band 30	10M	QPSK	1	25	Bottom Side	0mm	MIMO2	ON	27710	2310	SPEED	18.67	19.50	1.211			0.08	0.850	1.05	1.029
1st	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55340	3560	SPEED	20.42	20.50	1.019	62.9	1.006	0.02	1.010	-	1.035
2nd	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	55340	3560	SPEED	20.42	20.50	1.019	62.9	1.006	0.01	0.961	1.05	0.985
1st	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56640	3690	SPEED	20.39	20.50	1.026	62.9	1.006	0.03	0.967	-	0.998
2nd	LTE Band 48	20M	QPSK	1	49	Bottom Side	0mm	MIMO2	ON	56640	3690	SPEED	20.39	20.50	1.026	62.9	1.006	0.03	0.911	1.06	0.940
1st	FR1 n66	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	349000	1745	ATC	19.55	20.00	1.109			-0.01	0.973	-	1.079
2nd	FR1 n66	45M	BPSK	1	120	Bottom Side	0mm	MIMO2	ON	349000	1745	ATC	19.55	20.00	1.109			-0.08	0.933	1.04	1.035
1st	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	14.65	15.50	1.216			-0.01	0.933	-	1.135
2nd	FR1 n41	100M	BPSK	1	271	Bottom Side	0mm	MIMO1	OFF	518598	2592.99	SPEED	14.65	15.50	1.216			-0.08	0.897	1.04	1.091
1st	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	14.55	15.50	1.245			-0.01	0.807	-	1.004
2nd	FR1 n77	100M	BPSK	1	137	Bottom Side	0mm	MIMO1	OFF	656000	3840	SPEED	14.55	15.50	1.245			0.11	0.786	1.03	0.978

General Note:

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

13.3 Power Class 2 and Power Class 3 Linearity

General Note:

This device support Power Class 2 and Power Class 3 operations, 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%

	FR1 n41_Ant Main	FR1 n41_Ant Main
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	15.5	18.5
Reported 1g SAR (W/kg)	0.754	0.734
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	35.48	35.40
Linearity SAR(W/kg)	0.75	
% deviation from expected linearity		-2.42%

	FR1 n41_Ant MIMO1	FR1 n41_Ant MIMO1
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	15.5	18.5
Reported 1g SAR (W/kg)	1.135	1.083
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	35.48	35.40
Linearity SAR(W/kg)	1.13	
% deviation from expected linearity		-4.35%

	FR1 n41_Ant MIMO2	FR1 n41_Ant MIMO2
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	16.5	19.5
Reported 1g SAR (W/kg)	0.411	0.393
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	44.67	44.56
Linearity SAR(W/kg)	0.41	
% deviation from expected linearity		-4.15%

	FR1 n41_Ant Aux	FR1 n41_Ant Aux
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	19.5	22.5
Reported 1g SAR (W/kg)	0.98	0.95
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	89.13	88.91
Linearity SAR(W/kg)	0.98	
% deviation from expected linearity		-2.83%

	FR1 n77_Ant Main	FR1 n77_Ant Main
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	13.5	16.5
Reported 1g SAR (W/kg)	0.436	0.41
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	22.39	22.33
Linearity SAR(W/kg)	0.43	
% deviation from expected linearity		-5.74%

	FR1 n77_Ant MIMO1	FR1 n77_Ant MIMO1
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	15.5	18.5
Reported 1g SAR (W/kg)	1.004	0.975
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	35.48	35.40
Linearity SAR(W/kg)	1.00	
% deviation from expected linearity		-2.66%

	FR1 n77_Ant MIMO2	FR1 n77_Ant MIMO2
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	16	19
Reported 1g SAR (W/kg)	0.493	0.465
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	39.81	39.72
Linearity SAR(W/kg)	0.49	
% deviation from expected linearity		-5.46%

	FR1 n77_Ant Aux	FR1 n77_Ant Aux
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	18.5	21.5
Reported 1g SAR (W/kg)	0.798	0.749
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	70.79	70.63
Linearity SAR(W/kg)	0.80	
% deviation from expected linearity		-5.92%

14. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN Main + WWAN MIMO2 + WLAN Main	Yes
2.	WWAN Main + WWAN MIMO2 + WLAN Aux	Yes
3.	WWAN Main + WWAN MIMO2 + Bluetooth Aux	Yes
4.	WWAN MIMO1 + WLAN Main	Yes
5.	WWAN MIMO1 + WLAN Aux	Yes
6.	WWAN MIMO1 + Bluetooth Aux	Yes
7.	WWAN Aux + WLAN Main	Yes
8.	WWAN Aux + WLAN Aux	Yes
9.	WWAN Aux + Bluetooth Aux	Yes

General Note:

- The WiFi/BT SAR of 1.59 W/kg was used conservatively for the purpose of simultaneous transmission analysis. For the WLAN main and WLAN Aux Sim-Tx analysis include in WLAN SAR report. In this report only, assessment WWAN to each WLAN/BT antenna.
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, 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.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
 - The SPLSR calculated results please refer to section 14.2.

14.1 Body Exposure Conditions

Exposure Position	0	1	2	3	4	0+1+2 Summed 1g SAR (W/kg)	0+1+3 Summed 1g SAR (W/kg)	0+1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
	Maximum WWAN Main 1g SAR (W/kg)	Maximum WWAN MIMO 2 1g SAR (W/kg)	WLAN Main 1g SAR (W/kg)	WLAN Aux 1g SAR (W/kg)	Bluetooth Aux 1g SAR (W/kg)					
Bottom Side at 0mm	0.754	1.194	1.590	1.590	1.590	3.538	3.538	3.538	0.030	Case 1

Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
	Maximum WWAN MIMO 1 1g SAR (W/kg)	WLAN Main 1g SAR (W/kg)	WLAN Aux 1g SAR (W/kg)	Bluetooth Aux 1g SAR (W/kg)					
Bottom Side at 0mm	1.135	1.590	1.590	1.590	2.725	2.725	2.725	0.030	Case 2

Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
	Maximum WWAN Aux 1g SAR (W/kg)	WLAN Main 1g SAR (W/kg)	WLAN Aux 1g SAR (W/kg)	Bluetooth Aux 1g SAR (W/kg)					
Bottom Side at 0mm	0.980	1.590	1.590	1.590	2.570	2.570	2.570	0.020	Case 3

14.2 SPLSR Evaluation and Analysis

General Note:

1. According to antenna location the minimum distance between each transmit antenna is using for SPLSR analysis
2. Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Therefore, the adjacent transmit antennas will be summed first, and then the SPLSR calculation will be evaluated with the farther transmitted antennas.
3. $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary
4. The detail hotspot point for each transmitter in each exposure condition are showing as below figure and the minimum 3D distance for each sum combination is used for SPLSR analysis.

	Band	Position	SAR (W/kg)	Gap	SAR peak location (mm)			3D/Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)	X	Y	Z				
Case 1	Maximum WWAN Main	Bottom Side	0.754	0mm	-94.5	74	-177	220.5	1.95	0.01	Not required
	Maximum WWAN MIMO 2		1.194	0mm	-66	-144.6	-177				
	Maximum WWAN Main	Bottom Side	0.754	0mm				181.0	2.34	0.02	Not required
	WLAN Main		1.59	0mm							
	Maximum WWAN MIMO 2	Bottom Side	1.194	0mm				220.0	2.78	0.02	Not required
	WLAN Main		1.59	0mm							
	Maximum WWAN Main	Bottom Side	0.754	0mm				198.0	2.34	0.02	Not required
	WLAN Aux		1.59	0mm							
	Maximum WWAN MIMO 2	Bottom Side	1.194	0mm				177.0	2.78	0.03	Not required
	WLAN Aux		1.59	0mm							
	Maximum WWAN Main	Bottom Side	0.754	0mm				198.0	2.34	0.02	Not required
	BT Aux		1.59	0mm							
	Maximum WWAN MIMO 2	Bottom Side	1.194	0mm				177.0	2.78	0.03	Not required
	BT Aux		1.59	0mm							
Case 2	Band	Position	SAR (W/kg)	Gap (mm)	X	Y	Z	3D/Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	Maximum WWAN MIMO1	Bottom Side	1.135	0mm				146.0	2.73	0.03	Not required
	WLAN Main		1.59	0mm							
	Maximum WWAN MIMO1	Bottom Side	1.135	0mm				185.0	2.73	0.02	Not required
	WLAN Aux		1.59	0mm							
	Maximum WWAN MIMO1	Bottom Side	1.135	0mm				185.0	2.73	0.02	Not required
	BT Aux		1.59	0mm							
Case 3	Band	Position	SAR (W/kg)	Gap (mm)	X	Y	Z	3D/Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	Maximum WWAN Aux	Bottom Side	0.98	0mm				214.0	2.57	0.02	Not required
	WLAN Main		1.59	0mm							
	Maximum WWAN Aux	Bottom Side	0.98	0mm				191.0	2.57	0.02	Not required
	WLAN Aux		1.59	0mm							
	Maximum WWAN Aux	Bottom Side	0.98	0mm				191.0	2.57	0.02	Not required
	BT Aux		1.59	0mm							

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15. Uncertainty Assessment

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

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.

16. 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.