

FCC SAR TEST REPORT

FCC ID : E2KT99W373PC15
Equipment : 5G WWAN Module
Brand Name : Foxconn
Model Name : T99W373
Applicant : Dell Inc.
One Dell Way Round Rock, TX 78682, USA
Manufacturer : Dell Inc.
One Dell Way Round Rock, TX 78682, USA
Standard : FCC 47 CFR Part 2 (2.1093)

The product was installed into Portable Computer (Brand Name: DELL, Model Name: P178G) during test.

The product was received on Dec. 04, 2023 and testing was started from Dec. 05, 2023 and completed on Dec. 26, 2023. 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

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan



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1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for Dell Inc., 5G WWAN Module, T99W373, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)
			Body		
			1g SAR (W/kg)		
Licensed	LTE	LTE Band 7	1.11		1.49
		LTE Band 2 / 25	1.15		
		LTE Band 30	1.08		
		LTE Band 4 / 66	1.18		
		LTE Band 38 / 41	1.11		
		LTE Band 42	1.10		
		LTE Band 43	1.05		
	LTE Band 48	1.02			
	FR1	FR1 n7	1.09		
		FR1 n2 / 25	1.09		
		FR1 n30	1.13		
		FR1 n66	1.12		
		FR1 n70	1.11		
		FR1 n38 / 41	0.64		
		FR1 n48	1.12		
		FR1 n77 / 78	0.83		
		Date of Testing:			

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: **Carlie Tsai**

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	5G WWAN Module
Brand Name	Foxconn
Model Name	T99W373
FCC ID	E2KT99W373PC15
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz, 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 n13: 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n70 : 1695 MHz ~ 1710 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450 MHz ~ 3550 MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450 MHz ~ 3550 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM
Remark:	<ol style="list-style-type: none"> The WWAN antenna has two antenna vendors by WNC and Speed; both antenna design, part number, gain all the same, but they're all called Wistron on the Antenna Report. The RF exposure evaluation selects SPEED as the main test, WNC will spot check worst case found in SPEED When EN-DC is active, operate with a combination of WWAN antenna 0 and a combination of antenna 1/2/3, and analyze Sim-Tx as outlined in section 14. The device implements P sensor detection. The P-sensor will detect device is close or away human body and limit output power for SAR compliance. This device support UL MIMO mode for NR n41, n77 and n78. In addition to PC1.5, PC2 and PC3 implemented to specification. Since the output power from each antenna will be reduced for 3 dB when UL MIMO activated and hence SAR were performed with the UL SISO mode for worse case. The FCC ID: PD9BE200D2, Intel BE200D2W WLAN/BT module is integrated into this host and the WiFi/BT SAR results refer to report no.: 231103-01.TR01 and 231103-01.TR02 were used for Sim-Tx compliance include in section14. The FCC ID: E2K-DWRFD2305 NFC module is integrated into this host, and NFC transmitters are consider 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 30 seconds.



Host Information	
Equipment Name	Portable Computer
Brand Name	DELL
Model Name	P178G
Integrated WiFi/BT Module	Brand Name: Intel Model Name: BE200D2W
Integrated NFC Module	Brand Name: DELL Model Name: DWRFID2305

WWAN Antenna Information				
Main Antenna 0	Manufacturer	Wistron Corporation	Peak gain(dBi)	2.00
	Part number	0G2FX Y	Type	PIFA
MIMO 3 Antenna 1	Manufacturer	Wistron Corporation	Peak gain(dBi)	1.47
	Part number	0PX7NW	Type	PIFA
MIMO 2 Antenna 2	Manufacturer	Wistron Corporation	Peak gain(dBi)	2.00
	Part number	0PX7NW	Type	PIFA
Aux Antenna 3	Manufacturer	Wistron Corporation	Peak gain(dBi)	0.88
	Part number	0G2FX Y	Type	PIFA



3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	E2KT99W373PC15																																																														
Equipment Name	5G WWAN Module																																																														
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz, 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	<p>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
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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	Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to section 11.																																																														
LTE Carrier Aggregation Additional Information	This device supports maximum of 5 carriers in the downlink and 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)		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)		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)		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)
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	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)	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	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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
H	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				
LTE Band 42 (3450 MHz ~ 3550 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	42115	3452.5	42140	3455	42165	3457.5	42190	3460				
M	42590	3500	42590	3500	42590	3500	42590	3500				
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540				
LTE Band 42 (3550 MHz ~ 3600 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	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)	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)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560				
L	55810	3607	55815	3607.5	55820	3608	55830	3609				
M	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)	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	E2KT99W373PC15							
Equipment Name	5G WWAN Module							
Operating Frequency Range of each 5G NR transmission band	5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13 : 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n70 : 1695 MHz ~ 1710 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77 : 3700 MHz ~ 3980 MHz, 3450 MHz ~ 3550 MHz 5G NR n78 : 3700 MHz ~ 3800 MHz, 3450 MHz ~ 3550 MHz							
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n7: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz 5G NR n12: 5MHz, 10MHz, 15MHz 5G NR n13: 5MHz, 10MHz 5G NR n14: 5MHz, 10MHz 5G NR n25: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz 5G NR n26: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n30: 5MHz, 10MHz 5G NR n38: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz 5G NR n41: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz 5G NR n48: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz, 25 MHz, 30MHz, 40MHz 5G NR n70: 5MHz, 10MHz, 15MHz 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 B5/12/14/30/66/71							
LTE Anchor Bands for n5	LTE B2/5/7/12/30/48/66							
LTE Anchor Bands for n7	LTE B5/12/13/66/71							
LTE Anchor Bands for n12	LTE B2/30/66							
LTE Anchor Bands for n25	LTE B2/7/12/26/48/66/71							
LTE Anchor Bands for n38	LTE B2/4/5/12/66/71							
LTE Anchor Bands for n41	LTE B2/5/7/12/25/26/66/71							
LTE Anchor Bands for n66	LTE B2/5/12/13/14/30/48/66/71							
LTE Anchor Bands for n71	LTE B2/7/66							
LTE Anchor Bands for n77	LTE B7/41							
LTE Anchor Bands for n78	LTE B7/38/41							
NR Band 2								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860
M	376000	1880	376000	1880	376000	1880	376000	1880
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900
NR Band 5								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	165300	826.5	165800	829	166300	831.5	166800	834
M	167300	836.5	167300	836.5	167300	836.5	167300	836.5
H	169300	846.5	168800	844	168300	841.5	167800	839



NR Band 7																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520								
M	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535								
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560	511500	2557.5	511000	2555	510000	2550								
NR Band 12																						
	Bandwidth 5MHz				Bandwidth 10MHz				Bandwidth 15MHz													
	Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)		Ch. #		Freq. (MHz)											
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 13																						
	Bandwidth 5MHz					Bandwidth 10MHz																
	Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)									
L	155900		779.5			156400		782			156400		782									
M	156400		782																			
H	156900		784.5																			
NR Band 14																						
	Bandwidth 5MHz					Bandwidth 10MHz																
	Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)									
L	158100		790.5			158600		793			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 40MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	374000	1870								
M	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5								
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379000	1895								
NR Band 26																						
	Bandwidth 5MHz			Bandwidth 10MHz			Bandwidth 15MHz			Bandwidth 20MHz												
	Ch. #		Freq. (MHz)	Ch. #		Freq. (MHz)	Ch. #		Freq. (MHz)	Ch. #		Freq. (MHz)	Ch. #		Freq. (MHz)							
L	163300		816.5	163800		819	164300		821.5	164800		824	164800		824							
M	166300		831.5	166300		831.5	166300		831.5	166300		831.5	166300		831.5							
H	169300		846.5	168800		844	168300		841.5	167800		839	167800		839							
NR Band 30																						
	Bandwidth 5MHz					Bandwidth 10MHz																
	Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)			Ch. #		Freq. (MHz)									
L	461500		2307.5			462000		2310			462000		2310									
M	462000		2310																			
H	462500		2312.5																			
NR Band 38																						
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	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																								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz													
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)												
L	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									
	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	342000	1710	345000	1725	345500	1727.5	346000	1730								
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745								
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	356000	1780	353000	1765	352500	1762.5	352000	1760								
NR Band 70																								
	Bandwidth 5MHz			Bandwidth 10MHz			Bandwidth 15MHz			Bandwidth 15MHz														
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)												
L	339500	1697.5	340000	1700	340500	1702.5	341000	1705	340500	1702.5	340500	1702.5												
M	340500	1702.5	340500	1702.5	340500	1702.5	340500	1702.5	340500	1702.5	340500	1702.5												
H	341500	1707.5	341000	1705	341000	1705	341000	1705	341000	1705	341000	1705												
NR Band 71																								
	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	133100	665.5	133600	668	13410	670.5	134600	673	135100	675.5	135600	678												
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5	136100	680.5	136100	680.5												
H	139100	695.5	138600	693	13810	690.5	137600	688	137100	685.5	136600	683												
NR Band 77																								
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		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)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647500	3712.5	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	656000	3840
H	665000	3975	664832	3972.48	664666	3969.99	664500	3967.50	664332	3964.98	664000	3960	663666	3954.99	663332	3949.98	663000	3945	662666	3939.99	662332	3934.98	662000	3930
NR Band 78																								
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		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)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647500	3712.5	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	650000	3750	650000	3750
H	653000	3795	652832	3792.48	652666	3789.99	652500	3787.50	652332	3784.98	652000	3780	651666	3774.99	651332	3769.98	651000	3765	650666	3759.99	650332	3754.98	650000	3750
NR Band 77/78(3450MHz ~ 3550MHz)																								
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		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)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	630834	3462.51	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	633332	3499.98	633332	3499.98
H	636332	3544.98	636166	3542.49	636000	3540	635832	3537.48	635666	3534.99	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99	633332	3499.98

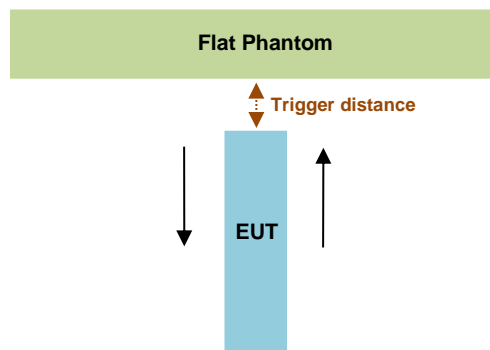
4. Proximity Sensor Triggering Test

<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.



MIMO 2 Antenna 2		
Proximity Sensor Trigger Distance (mm)		
Position	Bottom of Laptop	
	moving toward	moving away
Minimum	13	13

<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

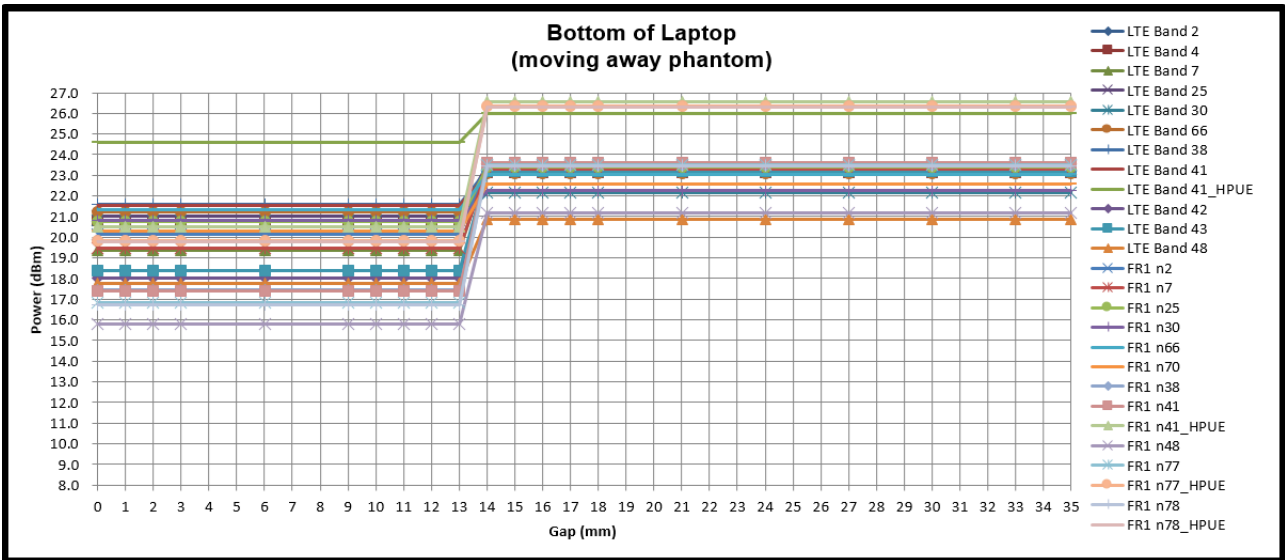
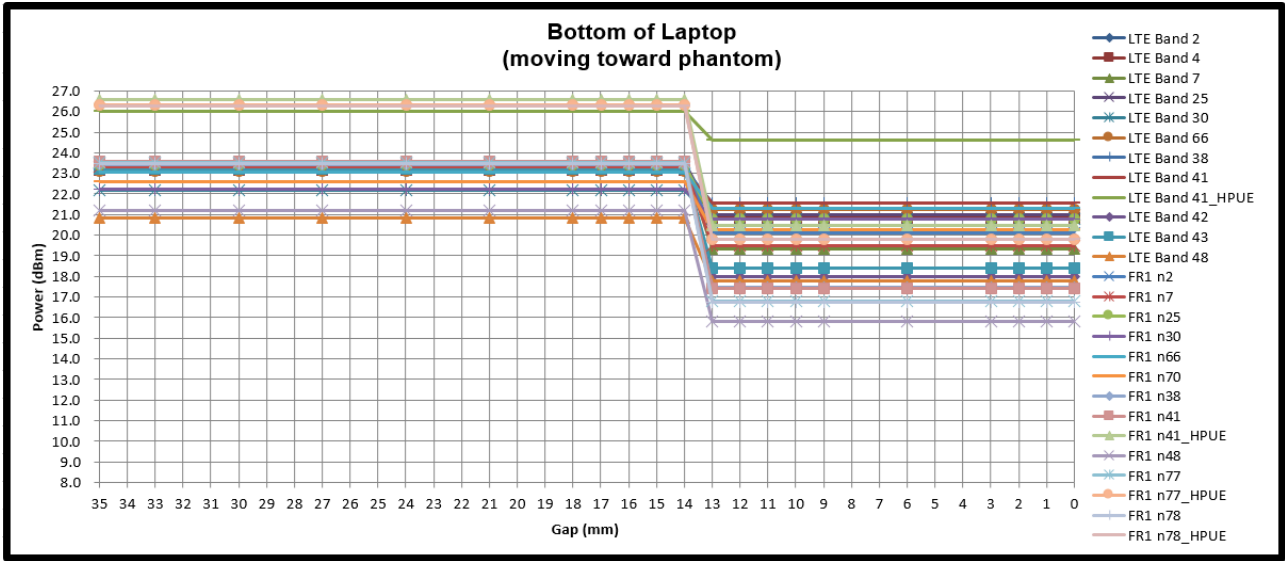
Band	Antenna	Reduce Level (dB) Bottom of Laptop ⁽¹⁾
LTE Band 2	MIMO2(Ant2)	3.0 dB
LTE Band 4	MIMO2(Ant2)	2.5 dB
LTE Band 7	MIMO2(Ant2)	4.5 dB
LTE Band 25	MIMO2(Ant2)	3.0 dB
LTE Band 30	MIMO2(Ant2)	2.0 dB
LTE Band 38	MIMO2(Ant2)	2.0 dB
LTE Band 41	MIMO2(Ant2)	2.0 dB
LTE Band 41_HPUE	MIMO2(Ant2)	2.0 dB
LTE Band 42_Part 96	MIMO2(Ant2)	4.0 dB
LTE Band 42_Part 27Q	MIMO2(Ant2)	6.0 dB
LTE Band 43	MIMO2(Ant2)	3.5 dB
LTE Band 48	MIMO2(Ant2)	4.0 dB
LTE Band 66	MIMO2(Ant2)	2.5 dB
FR1 n2	MIMO2(Ant2)	3.0 dB
FR1 n7	MIMO2(Ant2)	4.5 dB
FR1 n25	MIMO2(Ant2)	3.0 dB
FR1 n30	MIMO2(Ant2)	1.5 dB
FR1 n38	MIMO2(Ant2)	6.0 dB
FR1 n41	MIMO2(Ant2)	6.0 dB
FR1 n41_HPUE	MIMO2(Ant2)	6.0 dB
FR1 n48	MIMO2(Ant2)	6.0 dB
FR1 n66	MIMO2(Ant2)	2.5 dB
FR1 n70	MIMO2(Ant2)	3.5 dB
FR1 n77	MIMO2(Ant2)	7.0 dB
FR1 n77_HPUE	MIMO2(Ant2)	7.0 dB
FR1 n78	MIMO2(Ant2)	7.0 dB
FR1 n78_HPUE	MIMO2(Ant2)	7.0 dB

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:
 - (a) **MIMO2 Ant 2**
 - Bottom of Laptop: [12 mm](#)

Power Measurement during Sensor Trigger distance testing

<MIMO2>





5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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



6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

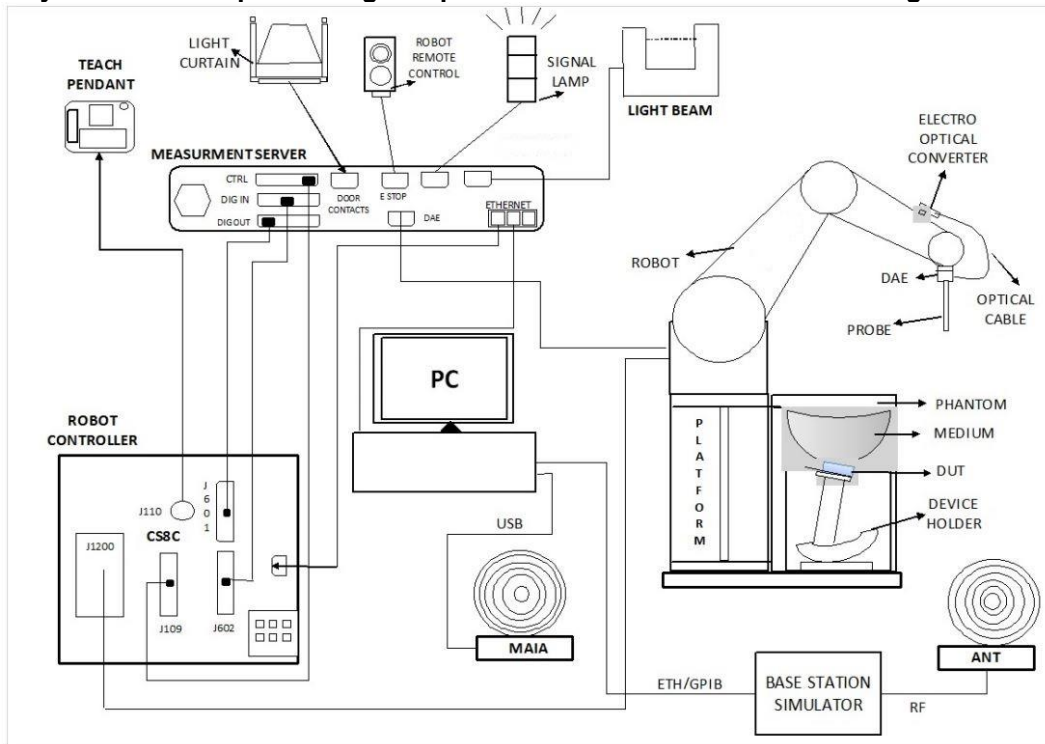
SAR is expressed in units of Watts per kilogram (W/kg)

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

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, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	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

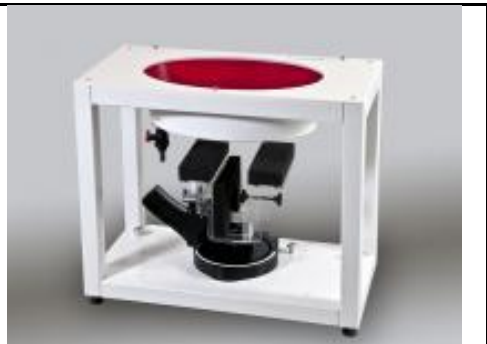
7.4 Phantom

<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° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

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

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

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

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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



9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit ⁽²⁾	D750V3	1107	Jun. 22, 2022	Jun. 20, 2024
SPEAG	835MHz System Validation Kit ⁽²⁾	D835V2	4d167	Nov. 24, 2022	Nov. 22, 2024
SPEAG	1750MHz System Validation Kit ⁽²⁾	D1750V2	1112	Jun. 22, 2022	Jun. 20, 2024
SPEAG	1900MHz System Validation Kit ⁽²⁾	D1900V2	5d185	Jun. 17, 2022	Jun. 15, 2024
SPEAG	2300MHz System Validation Kit ⁽²⁾	D2300V2	1006	Jan. 18, 2022	Jan. 16, 2024
SPEAG	2600MHz System Validation Kit ⁽²⁾	D2600V2	1078	Jun. 23, 2022	Jun. 21, 2024
SPEAG	3500MHz System Validation Kit ⁽²⁾	D3500V2	1036	Mar. 23, 2022	Mar. 21, 2024
SPEAG	3700MHz System Validation Kit ⁽²⁾	D3700V2	1006	Jun. 20, 2022	Jun. 18, 2024
SPEAG	3900MHz System Validation Kit	D3900V2	1092	May. 15, 2023	May. 14, 2024
SPEAG	Data Acquisition Electronics	DAE4	376	Sep. 14, 2023	Sep. 13, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7793	Mar. 08, 2023	Mar. 07, 2024
Testo	Hygro meter	608-H1	45196600	Nov. 02, 2023	Nov. 01, 2024
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 13, 2023	Nov. 12, 2024
Keysight	5G Wireless Test Platform	E7515B	MY59321826	Apr. 26, 2023	Apr. 25, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 27, 2023	Sep. 26, 2024
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 30, 2023	Oct. 29, 2024
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 19, 2023	Sep. 18, 2024
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 09, 2023	Aug. 08, 2024
Anritsu	Power Meter	ML2495A	1419002	Aug. 17, 2023	Aug. 16, 2024
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2023	Aug. 17, 2024
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 10, 2023	Jul. 09, 2024
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2023	Oct. 15, 2024
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 ± 2°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	22.5	0.902	42.800	0.89	41.90	1.35	2.15	±5	2023/12/16
835	22.5	0.928	41.600	0.90	41.50	3.11	0.24	±5	2023/12/26
1750	22.5	1.360	40.600	1.37	40.10	-0.73	1.25	±5	2023/12/5
1750	22.5	1.360	40.000	1.37	40.10	-0.73	-0.25	±5	2023/12/15
1900	22.5	1.430	39.100	1.40	40.00	2.14	-2.25	±5	2023/12/5
1900	22.5	1.430	39.700	1.40	40.00	2.14	-0.75	±5	2023/12/15
2300	22.5	1.650	40.200	1.67	39.50	-1.20	1.77	±5	2023/12/9
2600	22.6	1.970	38.900	1.96	39.00	0.51	-0.26	±5	2023/12/6
2600	22.5	1.920	39.300	1.96	39.00	-2.04	0.77	±5	2023/12/24
3500	22.5	2.980	37.700	2.91	37.90	2.41	-0.53	±5	2023/12/9
3500	22.4	2.990	37.800	2.91	37.90	2.75	-0.26	±5	2023/12/10
3500	22.5	2.970	37.900	2.91	37.90	2.06	0.00	±5	2023/12/11
3500	22.5	2.940	38.000	2.91	37.90	1.03	0.26	±5	2023/12/25
3700	22.5	3.160	37.400	3.12	37.70	1.28	-0.80	±5	2023/12/9
3700	22.5	3.160	37.600	3.12	37.70	1.28	-0.27	±5	2023/12/11
3700	22.5	3.130	37.700	3.12	37.70	0.32	0.00	±5	2023/12/25
3900	22.5	3.370	37.100	3.33	37.51	1.20	-1.09	±5	2023/12/9
3900	22.5	3.330	37.400	3.33	37.51	0.00	-0.29	±5	2023/12/25

10.2 System Performance Check Results

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

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
SAR-21	2023/12/16	750	50	D750V3-1107	EX3DV4 - SN7793	DAE4 Sn376	0.410	8.540	8.2	-3.98
SAR-21	2023/12/26	835	50	D835V2-4d167	EX3DV4 - SN7793	DAE4 Sn376	0.460	9.800	9.2	-6.12
SAR-21	2023/12/5	1750	50	D1750V2-1112	EX3DV4 - SN7793	DAE4 Sn376	1.680	36.900	33.6	-8.94
SAR-21	2023/12/15	1750	50	D1750V2-1112	EX3DV4 - SN7793	DAE4 Sn376	1.670	36.900	33.4	-9.49
SAR-21	2023/12/5	1900	50	D1900V2-5d185	EX3DV4 - SN7793	DAE4 Sn376	1.770	39.000	35.4	-9.23
SAR-21	2023/12/15	1900	50	D1900V2-5d185	EX3DV4 - SN7793	DAE4 Sn376	1.800	39.000	36	-7.69
SAR-21	2023/12/9	2300	50	D2300V2-1006	EX3DV4 - SN7793	DAE4 Sn376	2.460	48.300	49.2	1.86
SAR-21	2023/12/6	2600	50	D2600V2-1078	EX3DV4 - SN7793	DAE4 Sn376	2.680	55.400	53.6	-3.25
SAR-21	2023/12/24	2600	50	D2600V2-1078	EX3DV4 - SN7793	DAE4 Sn376	2.620	55.400	52.4	-5.42
SAR-21	2023/12/9	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn376	3.160	67.400	63.2	-6.23
SAR-21	2023/12/10	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn376	3.380	67.400	67.6	0.30
SAR-21	2023/12/11	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn376	3.080	67.400	61.6	-8.61
SAR-21	2023/12/25	3500	50	D3500V2-1036	EX3DV4 - SN7793	DAE4 Sn376	3.110	67.400	62.2	-7.72
SAR-21	2023/12/9	3700	50	D3700V2-1006	EX3DV4 - SN7793	DAE4 Sn376	3.170	65.600	63.4	-3.35
SAR-21	2023/12/11	3700	50	D3700V2-1006	EX3DV4 - SN7793	DAE4 Sn376	3.230	65.600	64.6	-1.52
SAR-21	2023/12/25	3700	50	D3700V2-1006	EX3DV4 - SN7793	DAE4 Sn376	3.110	65.600	62.2	-5.18
SAR-21	2023/12/9	3900	50	D3900V2-1092	EX3DV4 - SN7793	DAE4 Sn376	3.450	67.000	69	2.99
SAR-21	2023/12/25	3900	50	D3900V2-1092	EX3DV4 - SN7793	DAE4 Sn376	3.050	67.000	61	-8.96

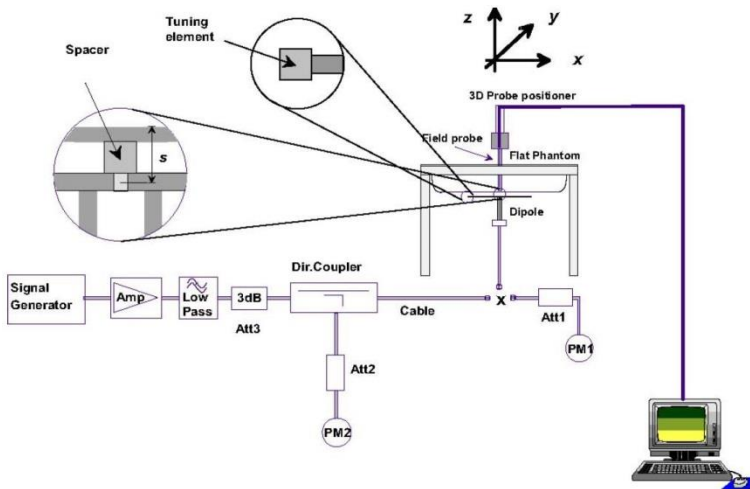


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo



11. DL/UL carrier aggregation

<LTE Carrier Aggregation combinations>

General Note:

- 1. This device supports Carrier Aggregation on downlink only for inter and intra band. For the device supports combination bands and configurations are according to 3GPP.
2. In applying the existing power measurement procedure of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of the frequency band and CCs in each row need consideration, and that configurations require power measurement should be highlighted in the below table.

Table with 6 columns: 2CC Downlink Carrier Aggregation (Number, Combination, Covered by Measurement Superset) and 3CC Downlink Carrier Aggregation (Number, Combination, Covered by Measurement Superset). Rows 12 and 18 are highlighted in yellow.



FCC SAR TEST REPORT

Report No. : FA3N0839

44	CA_5A-13A	242	131	CA_4A-4A-71A	350
45	CA_5A-25A		132	CA_4A-5B	527
46	CA_5A-29A	243	133	CA_4A-7A-7A	371
47	CA_5A-30A	530	134	CA_4A-7C	371
48	CA_5A-38A		135	CA_4A-12A-12A	419
49	CA_5A-41A		136	CA_4A-12B	419
50	CA_5A-46A	531	137	CA_4A-46A-46A	466
51	CA_5A-48A	532	138	CA_4A-46C	466
52	CA_5A-66A	532	139	CA_4A-48C	467
53	CA_7A-12A	436	140	CA_5A-5A-66A	532
54	CA_7A-13A	498	141	CA_5A-7A-7A	528
55	CA_7A-25A	534	142	CA_5A-7C	528
56	CA_7A-26A	258	143	CA_5A-12B	529
57	CA_7A-29A	440	144	CA_5B-30A	530
58	CA_7A-46A	528	145	CA_5A-46C	531
59	CA_7A-66A	534	146	CA_5B-46A	531
60	CA_12A-25A		147	CA_5A-48C	532
61	CA_12A-30A	441	148	CA_5A-66A-66A	532
62	CA_12A-46A	529	149	CA_5A-66B	532
63	CA_12A-48A	426	150	CA_5A-66C	532
64	CA_12A-66A	516	151	CA_5B-66A	532
65	CA_13A-46A	535	152	CA_7A-7A-13A	498
66	CA_13A-48A	536	153	CA_7A-7A-25A	534
67	CA_13A-66A	536	154	CA_7A-7A-26A	258
68	CA_14A-30A	448	155	CA_7A-7A-29A	440
69	CA_14A-66A	504	156	CA_7A-7A-46A	528
70	CA_25A-26A	537	157	CA_7A-7A-66A	534
71	CA_25A-41A	537	158	CA_7A-12B	436
72	CA_25A-46A	330	159	CA_7C-13A	498
73	CA_25A-66A	534	160	CA_7A-25A-25A	534
74	CA_26A-41A	537	161	CA_7C-25A	534
75	CA_26A-46A		162	CA_7C-29A	440
76	CA_29A-30A	451	163	CA_7A-46C	528
77	CA_29A-66A	505	164	CA_7C-46A	528
78	CA_30A-66A	530	165	CA_7A-66A-66A	534
79	CA_38A-40A	188	166	CA_7C-66A	534
80	CA_40A-41A		167	CA_12A-46C	529
81	CA_41A-46A	484	168	CA_12A-48C	426
82	CA_41A-48A	335	169	CA_12A-66A-66A	516
83	CA_46A-66A	540	170	CA_12A-66C	516
84	CA_46A-71A	339	171	CA_12B-66A	516
85	CA_48A-66A	540	172	CA_13A-46A-46A	535
86	CA_48A-71A	203	173	CA_13A-46C	535
87	CA_66A-71A	414	174	CA_13A-48A-48A	536
			175	CA_13A-48C	536
			176	CA_13A-66A-66A	536
			177	CA_13A-66B	536
			178	CA_13A-66C	536
			179	CA_14A-66A-66A	504
			180	CA_25A-25A-26A	537
			181	CA_25A-25A-41A	537
			182	CA_25A-25A-66A	534
			183	CA_25A-41C	537
			184	CA_25A-46C	330
			185	CA_26A-41C	537
			186	CA_29A-66A-66A	505



			187	CA_30A-66A-66A	530
			188	CA_38A-40C	
			189	CA_41A-42A-42A	483
			190	CA_41A-46C	484
			191	CA_41A-48C	335
			192	CA_46A-46A-66A	540
			193	CA_46A-66A-66A	540
			194	CA_46A-66C	540
			195	CA_46C-66A	540
			196	CA_46C-71A	339
			197	CA_48A-48A-66A	540
			198	CA_48A-48A-71A	203
			199	CA_48A-66A-66A	540
			200	CA_48A-66B	540
			201	CA_48A-66C	540
			202	CA_48C-66A	540
			203	CA_48C-71A	
			204	CA_66A-66A-71A	414
			205	CA_66C-71A	414
			206	CA_2A-4A-5A	369
			207	CA_2A-4A-12A	372
			208	CA_2A-4A-13A	
			209	CA_2A-4A-29A	
			210	CA_2A-4A-30A	
			211	CA_2A-4A-71A	350
			212	CA_2A-5A-7A	374
			213	CA_2A-5A-12A	375
			214	CA_2A-5A-13A	
			215	CA_2A-5A-29A	
			216	CA_2A-5A-30A	506
			217	CA_2A-5A-46A	507
			218	CA_2A-5A-48A	508
			219	CA_2A-5A-66A	511
			220	CA_2A-7A-12A	388
			221	CA_2A-7A-13A	498
			222	CA_2A-7A-26A	
			223	CA_2A-7A-29A	390
			224	CA_2A-7A-46A	514
			225	CA_2A-7A-66A	515
			226	CA_2A-12A-30A	394
			227	CA_2A-12A-66A	516
			228	CA_2A-13A-46A	517
			229	CA_2A-13A-48A	518
			230	CA_2A-13A-66A	521
			231	CA_2A-14A-30A	361
			232	CA_2A-14A-66A	504
			233	CA_2A-26A-66A	
			234	CA_2A-29A-30A	404
			235	CA_2A-29A-66A	505
			236	CA_2A-30A-66A	406
			237	CA_2A-46A-48A	524
			238	CA_2A-46A-66A	525
			239	CA_2A-48A-66A	526
			240	CA_2A-66A-71A	414
			241	CA_4A-5A-12A	419
			242	CA_4A-5A-13A	



			243	CA_4A-5A-29A	
			244	CA_4A-5A-30A	527
			245	CA_4A-7A-12A	
			246	CA_4A-12A-30A	417
			247	CA_4A-29A-30A	418
			248	CA_5A-7A-46A	528
			249	CA_5A-7A-66A	424
			250	CA_5A-12A-46A	529
			251	CA_5A-12A-66A	
			252	CA_5A-30A-66A	530
			253	CA_5A-46A-66A	531
			254	CA_5A-48A-66A	532
			255	CA_7A-12A-66A	436
			256	CA_7A-13A-66A	437
			257	CA_7A-25A-66A	534
			258	CA_7A-26A-66A	
			259	CA_7A-29A-66A	440
			260	CA_7A-46A-66A	
			261	CA_12A-30A-66A	441
			262	CA_13A-46A-66A	535
			263	CA_13A-48A-66A	536
			264	CA_14A-30A-66A	448
			265	CA_25A-26A-41A	537
			266	CA_29A-30A-66A	451
			267	CA_29A-46A-66A	
			268	CA_46A-48A-66A	540

4CC Downlink Carrier Aggregation			5CC Downlink Carrier Aggregation		
Number	Combination	Covered by Measurement Superset	Number	Combination	Covered by Measurement Superset
269	CA_48E	540	454	CA_48F	540
270	CA_41A-41A-41C	537	455	CA_41C-41D	537
271	CA_48A-48D	540	456	CA_48A-48E	540
272	CA_48C-48C	540	457	CA_48C-48D	540
273	CA_2A-2A-4A-4A	372	458	CA_2A-2A-46D	525
274	CA_2A-2A-5B	511	459	CA_2A-2A-66A-66B	526
275	CA_2A-2A-7A-7A	515	460	CA_2A-2A-66A-66C	526
276	CA_2A-2A-7C	515	461	CA_2A-46A-46D	525
277	CA_2A-2A-12A-12A	516	462	CA_2A-46E	525
278	CA_2A-2A-12B	516	463	CA_2A-48A-48D	526
279	CA_2A-2A-46C	525	464	CA_2A-48C-48C	526
280	CA_2A-2A-66A-66A	526	465	CA_2A-48E	526
281	CA_2A-2A-66B	526	466	CA_4A-46A-46D	
282	CA_2A-2A-66C	526	467	CA_4A-48E	
283	CA_2A-46A-46C	525	468	CA_5A-46E	531
284	CA_2A-46D	525	469	CA_5B-46D	531
285	CA_2A-48A-48C	526	470	CA_5B-66A-66B	532
286	CA_2A-48D	526	471	CA_5B-66A-66C	532
287	CA_2A-66A-66A-66A	526	472	CA_7A-7A-46D	528
288	CA_2A-66A-66B	526	473	CA_7A-46E	528
289	CA_2A-66A-66C	526	474	CA_7C-46D	528
290	CA_2C-66A-66A	526	475	CA_12A-46E	529
291	CA_2A-66D	526	476	CA_13A-46A-46D	535
292	CA_4A-4A-5B	527	477	CA_13A-46E	535
293	CA_4A-4A-12A-12A	419	478	CA_13A-48A-48D	536
294	CA_4A-4A-12B	419	479	CA_13A-48C-48C	536



295	CA_4A-46A-46C	466	480	CA_13A-48E	536
296	CA_4A-46D	466	481	CA_25A-25A-41D	537
297	CA_4A-48D	467	482	CA_25A-41E	537
298	CA_5A-5A-66A-66A	532	483	CA_41D-42C	
299	CA_5A-5A-66B	532	484	CA_41A-46E	
300	CA_5A-5A-66C	532	485	CA_46A-46D-66A	540
301	CA_5A-46D	531	486	CA_46D-66A-66A	540
302	CA_5B-46C	531	487	CA_46E-66A	540
303	CA_5A-48D	532	488	CA_48A-48C-66B	540
304	CA_5A-66A-66B	532	489	CA_48A-48C-66C	540
305	CA_5A-66A-66C	532	490	CA_48A-48D-66A	540
306	CA_5B-66A-66A	532	491	CA_48C-48C-66A	540
307	CA_5A-66D	532	492	CA_48E-66A	540
308	CA_5B-66B	532	493	CA_2A-2A-5A-66A-66A	511
309	CA_5B-66C	532	494	CA_2A-2A-5A-66B	511
310	CA_7A-7A-25A-25A	534	495	CA_2A-2A-5A-66C	511
311	CA_7A-7A-46C	528	496	CA_2A-2A-5B-66A	511
312	CA_7A-7A-66A-66A	534	497	CA_2A-2A-7A-7A-13A	498
313	CA_7C-25A-25A	534	498	CA_2A-2A-7C-13A	
314	CA_7A-46D	528	499	CA_2A-2A-7A-66A-66A	515
315	CA_7C-46C	528	500	CA_2A-2A-12A-66A-66A	516
316	CA_7C-66A-66A	534	501	CA_2A-2A-12B-66A	516
317	CA_12A-46D	529	502	CA_2A-2A-13A-66A-66A	521
318	CA_12A-48D	426	503	CA_2A-2A-13A-66B	521
319	CA_12B-66A-66A	516	504	CA_2A-2A-14A-66A-66A	
320	CA_13A-46A-46C	535	505	CA_2A-2A-29A-66A-66A	
321	CA_13A-46D	535	506	CA_2C-5B-30A	
322	CA_13A-48A-48C	536	507	CA_2A-5A-46D	
323	CA_13A-48D	536	508	CA_2A-5A-48D	
324	CA_13A-66A-66B	536	509	CA_2A-5B-66A-66A	511
325	CA_13A-66A-66C	536	510	CA_2A-5B-66B	511
326	CA_13A-66D	536	511	CA_2A-5B-66C	
327	CA_14A-66A-66A-66A	504	512	CA_2A-7A-7A-46C	514
328	CA_25A-25A-41C	537	513	CA_2A-7A-7A-66A-66A	515
329	CA_25A-41D	537	514	CA_2A-7A-46D	
330	CA_25A-46D		515	CA_2A-7C-66A-66A	
331	CA_40A-40A-42C		516	CA_2A-12B-66A-66A	
332	CA_41A-42D	483	517	CA_2A-13A-46D	
333	CA_41D-42A	483	518	CA_2A-13A-48D	
334	CA_41A-46D	484	519	CA_2A-13A-66A-66B	521
335	CA_41A-48D		520	CA_2A-13A-66A-66C	521
336	CA_46A-46C-66A	540	521	CA_2A-13A-66D	
337	CA_46C-66A-66A	540	522	CA_2A-46A-48D	524
338	CA_46D-66A	540	523	CA_2A-46C-48C	524
339	CA_46D-71A		524	CA_2A-46D-48A	
340	CA_48A-48A-66A-66A	540	525	CA_2A-46D-66A	
341	CA_48A-48A-66B	540	526	CA_2A-48D-66A	
342	CA_48A-48A-66C	540	527	CA_4A-4A-5B-30A	
343	CA_48A-48C-66A	540	528	CA_5A-7A-46D	
344	CA_48C-66A-66A	540	529	CA_5A-12A-46D	
345	CA_48C-66B	540	530	CA_5B-30A-66A-66A	
346	CA_48C-66C	540	531	CA_5A-46D-66A	
347	CA_48D-66A	540	532	CA_5A-48D-66A	
348	CA_2A-2A-4A-5A	369	533	CA_7A-7A-25A-25A-66A	534
349	CA_2A-2A-4A-12A	372	534	CA_7C-25A-25A-66A	
350	CA_2A-2A-4A-71A		535	CA_13A-46D-66A	



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351	CA_2A-2A-5A-7A	374	536	CA_13A-48D-66A	
352	CA_2A-2A-5A-12A	375	537	CA_25A-25A-26A-41C	
353	CA_2A-2A-5A-30A	506	538	CA_46A-48D-66A	540
354	CA_2A-2A-5A-66A	511	539	CA_46C-48C-66A	540
355	CA_2A-2A-7A-12A	388	540	CA_46D-48A-66A	
356	CA_2A-2A-7A-13A	498			
357	CA_2A-2A-7A-66A	515			
358	CA_2A-2A-12A-30A	394			
359	CA_2A-2A-12A-66A	516			
360	CA_2A-2A-13A-66A	521			
361	CA_2A-2A-14A-30A				
362	CA_2A-2A-14A-66A	504			
363	CA_2A-2A-29A-30A	404			
364	CA_2A-2A-29A-66A	505			
365	CA_2A-2A-30A-66A	406			
366	CA_2A-2A-66A-71A	414			
367	CA_2A-4A-4A-5A	369			
368	CA_2A-4A-4A-12A	372			
369	CA_2A-4A-5B				
370	CA_2A-4A-7A-7A	371			
371	CA_2A-4A-7C				
372	CA_2A-4A-12B				
373	CA_2A-5A-7A-7A	374			
374	CA_2A-5A-7C				
375	CA_2A-5A-12B				
376	CA_2A-5B-30A	506			
377	CA_2C-5A-30A	506			
378	CA_2A-5A-46C	507			
379	CA_2A-5A-48C	508			
380	CA_2A-5A-66A-66A	511			
381	CA_2A-5A-66B	511			
382	CA_2A-5A-66C	511			
383	CA_2A-5B-66A	511			
384	CA_2A-7A-7A-13A	498			
385	CA_2A-7A-7A-29A	390			
386	CA_2A-7A-7A-46A	514			
387	CA_2A-7A-7A-66A	515			
388	CA_2A-7A-12B				
389	CA_2A-7C-13A	498			
390	CA_2A-7C-29A				
391	CA_2A-7A-46C	514			
392	CA_2A-7A-66A-66A	515			
393	CA_2A-7C-66A	515			
394	CA_2C-12A-30A				
395	CA_2A-12A-66A-66A	516			
396	CA_2A-12A-66C	516			
397	CA_2A-12B-66A	516			
398	CA_2A-13A-46C	517			
399	CA_2A-13A-48C	518			
400	CA_2A-13A-66A-66A	521			
401	CA_2A-13A-66B	521			
402	CA_2A-13A-66C	521			
403	CA_2A-14A-66A-66A	504			
404	CA_2C-29A-30A				
405	CA_2A-29A-66A-66A	505			
406	CA_2A-30A-66A-66A				



407	CA_2A-46A-48C	524			
408	CA_2A-46C-48A	524			
409	CA_2A-46A-66A-66A	525			
410	CA_2A-46C-66A	525			
411	CA_2A-48A-66A-66A	526			
412	CA_2A-48C-66A	526			
413	CA_2A-66A-66A-71A	414			
414	CA_2A-66C-71A				
415	CA_4A-4A-5A-12A	419			
416	CA_4A-4A-5A-30A	527			
417	CA_4A-4A-12A-30A				
418	CA_4A-4A-29A-30A				
419	CA_4A-5A-12B				
420	CA_4A-5B-30A	527			
421	CA_5A-7A-7A-66A	424			
422	CA_5A-7A-46C	528			
423	CA_5A-7A-66A-66A	424			
424	CA_5A-7C-66A				
425	CA_5A-12A-46C	529			
426	CA_5A-12A-48C				
427	CA_5A-30A-66A-66A	530			
428	CA_5B-30A-66A	530			
429	CA_5A-46C-66A	531			
430	CA_5A-48A-66A-66A	532			
431	CA_5A-48C-66A	532			
432	CA_7A-7A-13A-66A	437			
433	CA_7A-7A-25A-66A	534			
434	CA_7A-7A-29A-66A	440			
435	CA_7A-12A-66A-66A	436			
436	CA_7A-12B-66A				
437	CA_7C-13A-66A				
438	CA_7A-25A-25A-66A	534			
439	CA_7C-25A-66A	534			
440	CA_7C-29A-66A				
441	CA_12A-30A-66A-66A				
442	CA_13A-46A-66A-66A	535			
443	CA_13A-46C-66A	535			
444	CA_13A-48A-66A-66A	536			
445	CA_13A-48A-66B	536			
446	CA_13A-48A-66C	536			
447	CA_13A-48C-66A	536			
448	CA_14A-30A-66A-66A				
449	CA_25A-25A-26A-41A	537			
450	CA_25A-26A-41C	537			
451	CA_29A-30A-66A-66A				
452	CA_46A-48C-66A	540			
453	CA_46C-48A-66A	540			

<Power verification when LTE Carrier Aggregation Active>

General Note:

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

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

<Two Carrier power verification>

Configure	PCC							SCC				Power	
	LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	5	10	836.5	20525	QPSK	1	0	25	20	1960	8340	23.60	23.65
	5	10	836.5	20525	QPSK	1	0	38	20	2595	38000	23.53	23.65
	5	10	836.5	20525	QPSK	1	0	41	20	2593	40620	23.45	23.65
	12	10	707.5	23095	QPSK	1	0	25	20	1960	8340	23.39	23.40
	26	15	831.5	26865	QPSK	1	0	46	20	5537.5	50665	23.48	23.58
	41	20	2593	40620	QPSK	1	0	48	20	3641	56150	23.08	23.23
	43	20	3610	43690	QPSK	1	0	43	20	3662.5	44215	21.85	22.00
	43	20	3610	43690	QPSK	1	0	43	20	3662.5	44215	23.86	23.94



<Five Carrier power verification>

Table with columns: Configure, PCC, SCC1, SCC2, SCC3, SCC4, Power (With CA Tx.Power, W/O CA Tx.Power). Rows include various carrier configurations with LTE Band, BW, UL Freq., UL Channel, Mod., UL# RB, UL RB Offset, DL Freq., DL Channel, and power values.

<LTE Uplink carrier aggregation>

2CC Uplink Carrier Aggregation	
Number	Combination
	Ant 0
1	2C
2	5B
3	7C
4	66B
5	66C
6	38C
7	41C
8	42C
9	43C
10	48C

<Intra-band>

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.

CA_2C_Ant 0										
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				
18700	18898	QPSK	1	0	0	0	1	0	23.03	24
18900	18702	QPSK	1	0	1	99	2	0	22.92	24
19100	18902	QPSK	1	0	1	99	2	0	22.78	24

CA_5B_Ant 0										
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	23.49	24.5
20475	20574	QPSK	1	0	1	49	2	0	23.5	24.5
20600	20501	QPSK	1	0	1	49	2	0	23.38	24.5



CA_7C_Ant 0										
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	22.71	24
21100	20902	QPSK	1	0	1	99	2	0	22.94	24
21350	21152	QPSK	1	0	1	99	2	0	22.76	24

CA_66B_Ant 0										
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	22.85	24
132322	132229	QPSK	1	0	1	24	2	0	23.09	24
132597	132504	QPSK	1	0	1	24	2	0	23.03	24

CA_66C_Ant 0										
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	22.86	24
132322	132124	QPSK	1	0	1	99	2	0	23.13	24
132572	132374	QPSK	1	0	1	99	2	0	23.11	24

CA_38C_Ant 0										
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	22.72	24
37901	38099	QPSK	1	0	0	0	1	0	23.03	24
38150	37952	QPSK	1	0	1	99	2	0	22.84	24

CA_41C_Ant 0										
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	22.66	24
40185	39987	QPSK	1	0	1	99	2	0	22.82	24
40620	40422	QPSK	1	0	1	99	2	0	22.98	24
41055	40857	QPSK	1	0	1	99	2	0	22.53	24
41490	41292	QPSK	1	0	1	99	2	0	22.59	24

CA_41C (HPUE)										
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	25.17	27
40185	39987	QPSK	1	0	1	99	2	0	25.39	27
40620	40422	QPSK	1	0	1	99	2	0	25.55	27
41055	40857	QPSK	1	0	1	99	2	0	25.33	27
41490	41292	QPSK	1	0	1	99	2	0	25.16	27



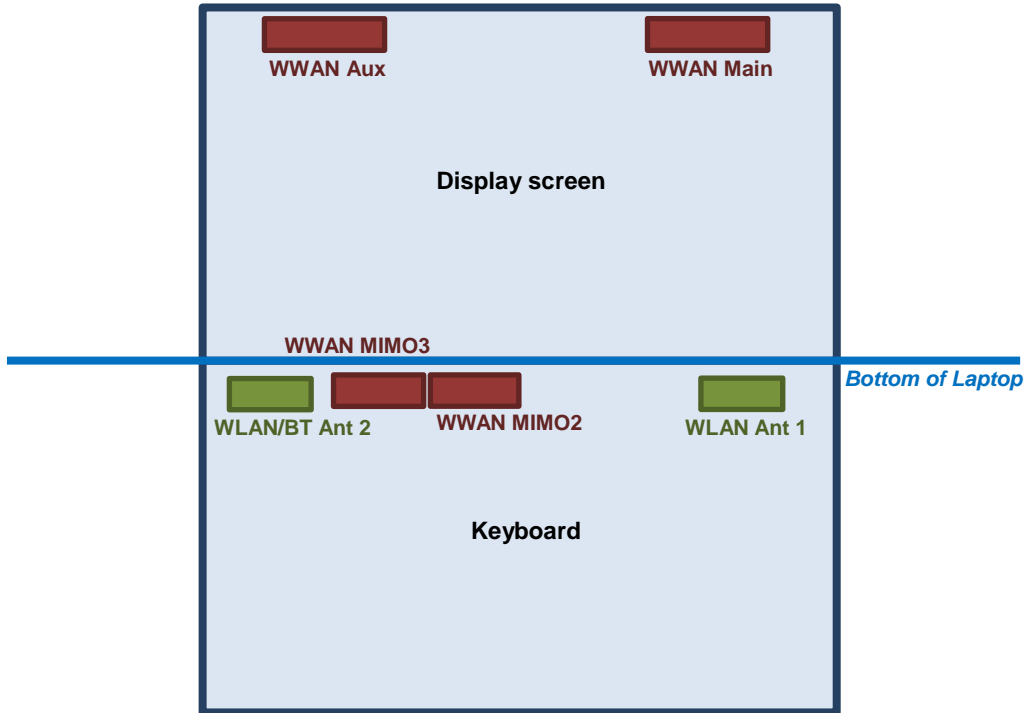
CA_42C Part 96_Ant 0										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	21.59	22
43340	43538	QPSK	1	0	1	99	2	0	21.67	22
43490	43292	QPSK	1	0	1	99	2	0	21.92	22

CA_42C Part 27Q_Ant 0										
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				
42190	42388	QPSK	1	0	0	0	1	0	23.24	24
42590	42788	QPSK	1	0	1	99	2	0	23.43	24
42990	42792	QPSK	1	0	1	99	2	0	23.62	24

CA_43C Part 96_Ant 0										
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				
43690	43888	QPSK	1	0	0	0	1	0	21.81	22
44090	44288	QPSK	1	0	0	0	2	0	21.43	22
44490	44292	QPSK	1	0	1	99	2	0	21.35	22

CA_48C_Ant 0										
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	21.53	22
55830	55632	QPSK	1	0	1	99	2	0	21.55	22
56150	55952	QPSK	1	0	1	99	2	0	21.58	22
56640	56442	QPSK	1	0	1	99	2	0	21.49	22

12. Antenna Location



The separation distance for antenna to edge :

Antenna	To Bottom of Laptop (mm)
WWAN Main Antenna 0	194.46
WWAN Aux Antenna 3	194.46
WWAN MIMO3 Antenna 1	< 5
WWAN MIMO2 Antenna 2	< 5



<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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison
- 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_Ant 0>

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band n70	LTE Band 71/n71	LTE Band 12	LTE Band n12	LTE Band 13	LTE Band n13	LTE Band 14	LTE Band n14	LTE Band 17	LTE Band 5	LTE Band n5	LTE Band 26	LTE Band n26	LTE Band 4	LTE Band 66/n66	LTE Band 2/n2	LTE Band 25/n25	LTE Band 30/n30	LTE Band 7/n7	LTE Band 38/n38	LTE Band 41/n41	LTE Band 42	LTE Band 43	LTE Band 48/n48	LTE Band n77 / n78
	Calculated Frequency (MHz)	846	1750	1907	1710	695	715	715	784	784	795	795	713	848	848	848	848	1754	1779	1909	1914	2312	2567	2617	2687	3597	3697	3697	3975
Maximum power (dBm)	24.5	24.5	24.5	24.0	24.0	24.5	24.0	24.5	24.0	24.5	24.0	24.5	24.5	24.0	24.5	24.0	24.0	24.0	24.0	24.0	23.0	24.0	24.0	24.0	24.0	22.0	22.0	24.0	
Maximum rated power(mW)	281.84	281.84	281.84	251.19	251.19	281.84	251.19	281.84	251.19	281.84	251.19	281.84	281.84	251.19	281.84	251.19	251.19	251.19	251.19	251.19	199.53	251.19	251.19	251.19	251.19	158.49	158.49	251.19	
Separation distance(mm)	194.46																												
Bottom of Laptop	978.0	1558.0	1553.0	1559.0	1625.0	866.0	866.0	924.0	924.0	934.0	934.0	864.0	980.0	980.0	980.0	980.0	1802.0	1557.0	1553.0	1553.0	1543.0	1538.0	1537.0	1536.0	1524.0	1523.0	1523.0	1520.0	
exclusion threshold	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	

<MIMO3_Ant 1>

Exposure Position	Wireless Interface	LTE Band n41	LTE Band n77/n78
	Calculated Frequency (MHz)	2687	3975
Maximum power (dBm)	13.0	12.0	
Maximum rated power(mW)	19.95	15.85	
Bottom of Laptop	Separation distance(mm)	5.0	
exclusion threshold	6.5	6.3	
Testing required?	Yes	Yes	



<MIMO2_Ant 2>

Exposure Position	Wireless Interface	LTE Band n70	LTE Band 4	LTE Band 66/n66	LTE Band 2/n2	LTE Band 25/n25	LTE Band 30	LTE Band n30	LTE Band 7/n7	LTE Band 38	LTE Band n38	LTE Band 41/n41	LTE Band 42	LTE Band 43	LTE Band 48/n48	LTE Band n77 / n78
	Calculated Frequency (MHz)	1710	1754	1779	1909	1914	2312	2312	2567	2617	2617	2687	3597	3697	3697	3975
	Maximum power (dBm)	24.0	24.0	24.0	24.0	24.0	23.0	23.0	24.0	24.0	24.0	24.0	24.0	22.0	22.0	24.0
	Maximum rated power(mW)	251.19	251.19	251.19	251.19	251.19	199.53	199.53	251.19	251.19	251.19	251.19	251.19	158.49	158.49	251.19
Bottom of Laptop	Separation distance(mm)	5.0														
	exclusion threshold	65.7	66.5	67.0	69.4	69.5	60.7	60.7	80.5	81.3	81.3	82.4	95.3	61.0	61.0	100.2
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

<Aux_Ant 3>

Exposure Position	Wireless Interface	LTE Band n41	LTE Band n77/n78
	Calculated Frequency (MHz)	2687	3975
	Maximum power (dBm)	22.0	22.0
	Maximum rated power(mW)	158.49	158.49
Bottom of Laptop	Separation distance(mm)	194.46	
	exclusion threshold	1536.0	1520.0
	Testing required?	No	No

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.
4. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in sensor trigger distance was performed according to section 4. The test results just verification the sensor trigger distance to meet KDB 616217 requirement, when in normal usage will not operate at trigger distance, therefore, these results were not using performed Sim-Tx analysis.

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 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. The NR n2/38 SAR test was covered by NR n25/41; due to SAR test for overlapping NR bands can be reduced if the maximum power including tolerance, for the smaller band is \leq the larger band to qualify for the SAR test exclusion and the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.
 - g. 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

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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)
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	21350	2560	Speed	19.35	19.50	1.035	0.08	0.864	0.894
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	20850	2510	Speed	18.99	19.50	1.125	0.01	0.832	0.936
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	21100	2535	Speed	19.23	19.50	1.064	0.03	0.863	0.918
	LTE Band 7_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	21350	2560	Speed	19.29	19.50	1.050	-0.08	0.810	0.850
	LTE Band 7_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	20850	2510	Speed	18.90	19.50	1.148	-0.08	0.787	0.904
	LTE Band 7_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	21100	2535	Speed	19.12	19.50	1.091	0.1	0.801	0.874
	LTE Band 7_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	21350	2560	Speed	19.28	19.50	1.052	-0.18	0.818	0.861
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	21350	2560	Speed	23.51	24.00	1.119	0.08	0.282	0.316
	LTE Band 7_Ant 2	20M	QPSK	50	24	Bottom of Laptop	12mm	OFF	21350	2560	Speed	22.31	23.00	1.172	-0.17	0.220	0.258
01	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	20850	2510	WNC	18.99	19.50	1.125	0.1	0.989	1.112
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	21100	2535	WNC	19.23	19.50	1.064	0.1	0.920	0.979
	LTE Band 7_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	21350	2560	WNC	19.35	19.50	1.035	0.12	0.921	0.953
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26590	1905	Speed	21.00	21.00	1.000	-0.03	0.942	0.942
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26140	1860	Speed	20.85	21.00	1.035	0.14	0.985	1.020
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26340	1880	Speed	20.98	21.00	1.005	0.11	0.994	0.999
	LTE Band 25_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	26590	1905	Speed	20.99	21.00	1.002	-0.05	0.900	0.902
	LTE Band 25_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	26140	1860	Speed	20.80	21.00	1.047	0.18	1.020	1.068
	LTE Band 25_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	26340	1880	Speed	20.87	21.00	1.030	0.14	0.985	1.015
	LTE Band 25_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	26590	1905	Speed	20.98	21.00	1.005	-0.17	0.916	0.920
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	26340	1880	Speed	23.50	24.00	1.122	0.01	0.272	0.305
	LTE Band 25_Ant 2	20M	QPSK	50	24	Bottom of Laptop	12mm	OFF	26340	1880	Speed	22.48	23.00	1.127	0.1	0.216	0.243
02	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26140	1860	WNC	20.85	21.00	1.035	-0.08	1.110	1.149
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26590	1905	WNC	21.00	21.00	1.000	0.17	1.000	1.000
	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26340	1880	WNC	20.98	21.00	1.005	-0.05	1.100	1.105
	LTE Band 30_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	ON	27710	2310	Speed	20.80	21.00	1.047	-0.17	1.010	1.058
	LTE Band 30_Ant 2	10M	QPSK	25	25	Bottom of Laptop	0mm	ON	27710	2310	Speed	20.74	21.00	1.062	0.04	0.929	0.986
	LTE Band 30_Ant 2	10M	QPSK	50	0	Bottom of Laptop	0mm	ON	27710	2310	Speed	20.67	21.00	1.079	-0.01	0.986	1.064
	LTE Band 30_Ant 2	10M	QPSK	1	0	Bottom of Laptop	12mm	OFF	27710	2310	Speed	22.17	23.00	1.211	-0.08	0.181	0.219
	LTE Band 30_Ant 2	10M	QPSK	25	0	Bottom of Laptop	12mm	OFF	27710	2310	Speed	21.22	22.00	1.197	0.05	0.144	0.172
03	LTE Band 30_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	ON	27710	2310	WNC	20.80	21.00	1.047	-0.01	1.030	1.079
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132072	1720	Speed	21.25	21.50	1.059	0.06	0.925	0.980
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132322	1745	Speed	21.23	21.50	1.064	-0.09	1.030	1.096
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132572	1770	Speed	21.19	21.50	1.074	-0.08	1.090	1.171
	LTE Band 66_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	132072	1720	Speed	21.24	21.50	1.062	0.13	0.976	1.036
	LTE Band 66_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	132322	1745	Speed	21.19	21.50	1.074	0.12	1.070	1.149
	LTE Band 66_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	132572	1770	Speed	21.17	21.50	1.079	0.03	1.080	1.165
	LTE Band 66_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	132072	1720	Speed	21.19	21.50	1.074	0.18	0.966	1.037
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	132322	1745	Speed	23.09	24.00	1.233	0.07	0.253	0.312
	LTE Band 66_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	132322	1745	Speed	21.82	23.00	1.312	0.18	0.196	0.257
04	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132572	1770	WNC	21.19	21.50	1.074	-0.04	1.100	1.181
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132072	1720	WNC	21.25	21.50	1.059	0.16	0.887	0.940
	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132322	1745	WNC	21.23	21.50	1.064	-0.1	0.913	0.972



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40620	2593	Speed	21.56	22.00	1.107	62.9	1.006	-0.1	0.678	0.755
	LTE Band 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	39750	2506	Speed	21.40	22.00	1.148	62.9	1.006	-0.15	0.643	0.743
	LTE Band 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40185	2549.5	Speed	21.53	22.00	1.114	62.9	1.006	0.19	0.643	0.721
	LTE Band 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41055	2636.5	Speed	21.51	22.00	1.119	62.9	1.006	0.07	0.647	0.729
	LTE Band 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41490	2680	Speed	21.41	22.00	1.146	62.9	1.006	-0.18	0.591	0.681
	LTE Band 41_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	40620	2593	Speed	21.55	22.00	1.109	62.9	1.006	0.03	0.673	0.751
	LTE Band 41_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	39750	2506	Speed	21.37	22.00	1.156	62.9	1.006	-0.15	0.647	0.752
	LTE Band 41_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	40185	2549.5	Speed	21.49	22.00	1.125	62.9	1.006	0.11	0.680	0.769
	LTE Band 41_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	41055	2636.5	Speed	21.48	22.00	1.127	62.9	1.006	-0.08	0.525	0.595
	LTE Band 41_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	41490	2680	Speed	21.40	22.00	1.148	62.9	1.006	-0.17	0.576	0.665
	LTE Band 41_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	40620	2593	Speed	21.50	22.00	1.122	62.9	1.006	-0.08	0.693	0.782
05	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	39750	2506	Speed	24.41	25.00	1.146	42.9	1.009	0.03	0.958	1.107
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40620	2593	Speed	24.59	25.00	1.099	42.9	1.009	-0.13	0.848	0.940
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40185	2549.5	Speed	24.53	25.00	1.114	42.9	1.009	0.06	0.927	1.042
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41055	2636.5	Speed	24.55	25.00	1.109	42.9	1.009	-0.03	0.848	0.949
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41490	2680	Speed	24.45	25.00	1.135	42.9	1.009	-0.03	0.903	1.034
	LTE Band 41_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	40185	2549.5	Speed	23.06	24.00	1.242	62.9	1.006	0.08	0.140	0.175
	LTE Band 41_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	40185	2549.5	Speed	22.32	23.00	1.169	62.9	1.006	-0.07	0.106	0.125
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40620	2593	WNC	24.59	25.00	1.099	42.9	1.009	-0.04	0.887	0.984
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	39750	2506	WNC	24.41	25.00	1.146	42.9	1.009	0.17	0.864	0.999
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	40185	2549.5	WNC	24.53	25.00	1.114	42.9	1.009	0.18	0.817	0.919
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41055	2636.5	WNC	24.55	25.00	1.109	42.9	1.009	-0.04	0.817	0.914
	LTE Band 41_HPUE_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	41490	2680	WNC	24.45	25.00	1.135	42.9	1.009	-0.08	0.711	0.814
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43340	3575	Speed	17.75	18.00	1.059	62.9	1.006	-0.12	0.812	0.865
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	0mm	ON	43340	3575	Speed	17.66	18.00	1.081	62.9	1.006	0.03	0.733	0.797
	LTE Band 42_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	43340	3575	Speed	17.63	18.00	1.089	62.9	1.006	-0.16	0.788	0.863
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	43340	3575	Speed	21.69	22.00	1.074	62.9	1.006	-0.02	0.220	0.238
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	43340	3575	Speed	21.63	22.00	1.089	62.9	1.006	0.15	0.215	0.236
06	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43340	3575	WNC	17.75	18.00	1.059	62.9	1.006	0.05	1.030	1.098
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42190	3460	Speed	18.00	18.00	1.000	62.9	1.006	0.11	0.645	0.649
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42590	3500	Speed	17.94	18.00	1.014	62.9	1.006	-0.09	0.726	0.741
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42990	3540	Speed	17.83	18.00	1.040	62.9	1.006	-0.05	0.858	0.898
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	0mm	ON	42190	3460	Speed	17.99	18.00	1.002	62.9	1.006	0.16	0.655	0.660
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	0mm	ON	42590	3500	Speed	17.86	18.00	1.033	62.9	1.006	-0.08	0.740	0.769
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	0mm	ON	42990	3540	Speed	17.76	18.00	1.057	62.9	1.006	0.05	0.844	0.897
	LTE Band 42_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	42190	3460	Speed	17.91	18.00	1.021	62.9	1.006	0.05	0.751	0.771
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	42590	3500	Speed	23.37	24.00	1.156	62.9	1.006	0.02	0.291	0.338
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	42590	3500	Speed	22.55	23.00	1.109	62.9	1.006	0.07	0.225	0.251
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42990	3540	WNC	17.83	18.00	1.040	62.9	1.006	0.05	0.880	0.921
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42590	3500	WNC	17.94	18.00	1.014	62.9	1.006	-0.03	0.727	0.742
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	42190	3460	WNC	18.00	18.00	1.000	62.9	1.006	-0.15	0.699	0.703



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43690	3610	Speed	18.38	18.50	1.028	62.9	1.006	0.16	0.889	0.919
	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	44090	3650	Speed	18.35	18.50	1.035	62.9	1.006	0.13	0.846	0.881
	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	44490	3690	Speed	18.34	18.50	1.038	62.9	1.006	-0.18	0.754	0.787
	LTE Band 43_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	43690	3610	Speed	18.35	18.50	1.035	62.9	1.006	0.02	0.876	0.912
	LTE Band 43_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	44090	3650	Speed	18.31	18.50	1.045	62.9	1.006	0.16	0.794	0.834
	LTE Band 43_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	44490	3690	Speed	18.30	18.50	1.047	62.9	1.006	-0.03	0.756	0.796
	LTE Band 43_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	43690	3610	Speed	18.37	18.50	1.030	62.9	1.006	0.07	0.885	0.917
	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	44490	3690	Speed	21.48	22.00	1.127	62.9	1.006	-0.01	0.217	0.246
	LTE Band 43_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	44490	3690	Speed	21.48	22.00	1.127	62.9	1.006	-0.06	0.214	0.243
07	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43690	3610	WNC	18.38	18.50	1.028	62.9	1.006	0.05	1.010	1.045
	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	44490	3690	WNC	18.34	18.50	1.038	62.9	1.006	0	0.797	0.832
	LTE Band 43_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	44090	3650	WNC	18.35	18.50	1.035	62.9	1.006	0.01	0.936	0.975
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	55340	3560	Speed	17.77	18.00	1.054	62.9	1.006	-0.09	0.607	0.644
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	55830	3609	Speed	17.64	18.00	1.086	62.9	1.006	0.05	0.616	0.673
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	56150	3641	Speed	17.55	18.00	1.109	62.9	1.006	0.02	0.624	0.696
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	56640	3690	Speed	17.45	18.00	1.135	62.9	1.006	-0.13	0.570	0.651
	LTE Band 48_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	55340	3560	Speed	17.75	18.00	1.059	62.9	1.006	0.17	0.652	0.695
	LTE Band 48_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	55830	3609	Speed	17.54	18.00	1.112	62.9	1.006	0.06	0.605	0.677
	LTE Band 48_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	56150	3641	Speed	17.49	18.00	1.125	62.9	1.006	0	0.571	0.646
	LTE Band 48_Ant 2	20M	QPSK	50	50	Bottom of Laptop	0mm	ON	56640	3690	Speed	17.43	18.00	1.140	62.9	1.006	-0.04	0.541	0.621
	LTE Band 48_Ant 2	20M	QPSK	100	0	Bottom of Laptop	0mm	ON	55340	3560	Speed	17.73	18.00	1.064	62.9	1.006	-0.15	0.630	0.674
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	OFF	55340	3560	Speed	20.86	22.00	1.300	62.9	1.006	0.04	0.179	0.234
	LTE Band 48_Ant 2	20M	QPSK	50	0	Bottom of Laptop	12mm	OFF	55340	3560	Speed	20.07	21.00	1.239	62.9	1.006	0.13	0.143	0.178
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	56150	3641	WNC	17.55	18.00	1.109	62.9	1.006	-0.02	0.900	1.004
08	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	55830	3609	WNC	17.64	18.00	1.086	62.9	1.006	0.05	0.936	1.023
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	55340	3560	WNC	17.77	18.00	1.054	62.9	1.006	0.11	0.834	0.885
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	56640	3690	WNC	17.45	18.00	1.135	62.9	1.006	0.1	0.783	0.894

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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)
	FR1 n7_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	507000	2535	Speed	19.29	19.50	1.050	-0.18	0.890	0.934
	FR1 n7_Ant 2	40M	BPSK	108	54	Bottom of Laptop	0mm	ON	507000	2535	Speed	19.20	19.50	1.072	-0.11	0.865	0.927
	FR1 n7_Ant 2	40M	BPSK	216	0	Bottom of Laptop	0mm	ON	507000	2535	Speed	19.16	19.50	1.081	-0.16	0.829	0.897
	FR1 n7_Ant 2	40M	BPSK	1	1	Bottom of Laptop	12mm	OFF	507000	2535	Speed	23.06	24.00	1.242	-0.15	0.301	0.374
	FR1 n7_Ant 2	40M	BPSK	108	54	Bottom of Laptop	12mm	OFF	507000	2535	Speed	23.05	24.00	1.245	-0.06	0.289	0.360
09	FR1 n7_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	507000	2535	WNC	19.29	19.50	1.050	0.01	1.040	1.092
10	FR1 n25_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	376500	1882.5	Speed	20.62	21.00	1.091	0.02	1.000	1.091
	FR1 n25_Ant 2	40M	BPSK	108	0	Bottom of Laptop	0mm	ON	376500	1882.5	Speed	20.55	21.00	1.109	-0.14	0.917	1.017
	FR1 n25_Ant 2	40M	BPSK	216	0	Bottom of Laptop	0mm	ON	376500	1882.5	Speed	20.58	21.00	1.102	-0.19	0.921	1.015
	FR1 n25_Ant 2	40M	BPSK	1	1	Bottom of Laptop	12mm	OFF	376500	1882.5	Speed	23.04	24.00	1.247	0.06	0.270	0.337
	FR1 n25_Ant 2	40M	BPSK	108	54	Bottom of Laptop	12mm	OFF	376500	1882.5	Speed	22.97	24.00	1.268	0.02	0.269	0.341
	FR1 n25_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	376500	1882.5	WNC	20.62	21.00	1.091	0.01	0.934	1.019
	FR1 n30_Ant 2	10M	BPSK	1	1	Bottom of Laptop	0mm	ON	462000	2310	Speed	20.80	21.50	1.175	0.12	0.817	0.960
	FR1 n30_Ant 2	10M	BPSK	25	0	Bottom of Laptop	0mm	ON	462000	2310	Speed	20.79	21.50	1.178	-0.16	0.802	0.944
	FR1 n30_Ant 2	10M	BPSK	50	0	Bottom of Laptop	0mm	ON	462000	2310	Speed	20.74	21.50	1.191	-0.12	0.780	0.929
	FR1 n30_Ant 2	10M	BPSK	1	1	Bottom of Laptop	12mm	OFF	462000	2310	Speed	22.25	23.00	1.189	0.07	0.140	0.166
	FR1 n30_Ant 2	10M	BPSK	25	14	Bottom of Laptop	12mm	OFF	462000	2310	Speed	22.04	23.00	1.247	-0.02	0.134	0.167
11	FR1 n30_Ant 2	10M	BPSK	1	1	Bottom of Laptop	0mm	ON	462000	2310	WNC	20.80	21.50	1.175	0.03	0.959	1.127



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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)
	FR1 n66_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	349000	1745	Speed	21.28	21.50	1.052	-0.05	1.010	1.062
	FR1 n66_Ant 2	40M	BPSK	108	0	Bottom of Laptop	0mm	ON	349000	1745	Speed	21.19	21.50	1.074	-0.13	0.973	1.045
	FR1 n66_Ant 2	40M	BPSK	216	0	Bottom of Laptop	0mm	ON	349000	1745	Speed	21.11	21.50	1.094	0.08	0.962	1.052
	FR1 n66_Ant 2	40M	BPSK	1	1	Bottom of Laptop	12mm	OFF	349000	1745	Speed	23.06	24.00	1.242	0.16	0.215	0.267
	FR1 n66_Ant 2	40M	BPSK	108	54	Bottom of Laptop	12mm	OFF	349000	1745	Speed	23.05	24.00	1.245	0.01	0.242	0.301
12	FR1 n66_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	349000	1745	WNC	21.28	21.50	1.052	0.03	1.060	1.115
	FR1 n70_Ant 2	15M	BPSK	1	1	Bottom of Laptop	0mm	ON	340500	1702.5	Speed	20.28	20.50	1.052	-0.16	0.769	0.809
	FR1 n70_Ant 2	15M	BPSK	36	22	Bottom of Laptop	0mm	ON	340500	1702.5	Speed	20.26	20.50	1.057	0.1	0.760	0.803
	FR1 n70_Ant 2	15M	BPSK	75	0	Bottom of Laptop	0mm	ON	340500	1702.5	Speed	20.23	20.50	1.064	-0.04	0.759	0.808
	FR1 n70_Ant 2	15M	BPSK	1	1	Bottom of Laptop	12mm	OFF	340500	1702.5	Speed	22.59	24.00	1.384	-0.01	0.196	0.271
	FR1 n70_Ant 2	15M	BPSK	36	22	Bottom of Laptop	12mm	OFF	340500	1702.5	Speed	22.46	24.00	1.426	0	0.223	0.318
13	FR1 n70_Ant 2	15M	BPSK	1	1	Bottom of Laptop	0mm	ON	340500	1702.5	WNC	20.28	20.50	1.052	-0.02	1.050	1.105
	FR1 n41_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	12.62	13.00	1.091	-0.02	0.163	0.178
	FR1 n41_Ant 1	100M	BPSK	135	0	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	12.52	13.00	1.117	0.02	0.149	0.166
	FR1 n41_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	15.63	16.00	1.089	0.02	0.151	0.164
	FR1 n41_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	WNC	12.62	13.00	1.091	0.05	0.177	0.193
	FR1 n41_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	WNC	15.63	16.00	1.089	0.09	0.165	0.180
	FR1 n41_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	518598	2592.99	Speed	17.42	18.00	1.143	-0.11	0.522	0.597
	FR1 n41_Ant 2	100M	BPSK	135	0	Bottom of Laptop	0mm	ON	518598	2592.99	Speed	17.36	18.00	1.159	-0.06	0.497	0.576
	FR1 n41_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	518598	2592.99	Speed	20.49	21.00	1.125	0.03	0.521	0.586
	FR1 n41_Ant 2	100M	BPSK	1	1	Bottom of Laptop	12mm	OFF	518598	2592.99	Speed	23.59	24.00	1.099	-0.13	0.289	0.318
	FR1 n41_Ant 2	100M	BPSK	135	69	Bottom of Laptop	12mm	OFF	518598	2592.99	Speed	23.17	24.00	1.211	0.16	0.184	0.223
14	FR1 n41_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	518598	2592.99	WNC	17.42	18.00	1.143	0.03	0.562	0.642
	FR1 n41_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	518598	2592.99	WNC	20.49	21.00	1.125	0.12	0.533	0.599
	FR1 n41_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	21.53	22.00	1.114	0.03	0.016	0.018
	FR1 n41_Ant 3	100M	BPSK	135	69	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	21.05	22.00	1.245	0.08	0.013	0.016
	FR1 n41_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	Speed	23.98	25.00	1.265	0.01	0.013	0.016
	FR1 n41_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	WNC	21.53	22.00	1.114	0.01	0.018	0.020
	FR1 n41_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	518598	2592.99	WNC	23.98	25.00	1.265	0.04	0.015	0.019
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	638000	3570	Speed	15.81	16.00	1.045	-0.09	0.837	0.874
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	641666	3624.99	Speed	15.63	16.00	1.089	0.07	0.841	0.916
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	645332	3679.98	Speed	15.60	16.00	1.096	-0.09	0.665	0.729
	FR1 n48_Ant 2	40M	BPSK	50	0	Bottom of Laptop	0mm	ON	638000	3570	Speed	15.77	16.00	1.054	-0.16	0.754	0.795
	FR1 n48_Ant 2	40M	BPSK	50	0	Bottom of Laptop	0mm	ON	641666	3624.99	Speed	15.50	16.00	1.122	-0.18	0.735	0.825
	FR1 n48_Ant 2	40M	BPSK	50	0	Bottom of Laptop	0mm	ON	645332	3679.98	Speed	15.47	16.00	1.130	-0.07	0.642	0.725
	FR1 n48_Ant 2	40M	BPSK	100	0	Bottom of Laptop	0mm	ON	638000	3570	Speed	15.78	16.00	1.052	0.11	0.712	0.749
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	12mm	OFF	638000	3570	Speed	21.20	22.00	1.202	-0.01	0.316	0.380
	FR1 n48_Ant 2	40M	BPSK	50	28	Bottom of Laptop	12mm	OFF	638000	3570	Speed	21.14	22.00	1.219	-0.09	0.329	0.401
15	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	641666	3624.99	WNC	15.63	16.00	1.089	0.02	1.030	1.122
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	638000	3570	WNC	15.81	16.00	1.045	-0.08	0.941	0.983
	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	645332	3679.98	WNC	15.60	16.00	1.096	-0.1	0.928	1.018



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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)
	FR1 n77_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	Speed	11.51	12.00	1.119	-0.01	0.108	0.121
	FR1 n77_Ant 1	100M	BPSK	135	0	Bottom of Laptop	0mm	OFF	656000	3840	Speed	11.48	12.00	1.127	-0.11	0.043	0.048
	FR1 n77_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	Speed	14.57	15.00	1.104	0.19	0.105	0.116
	FR1 n77_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	WNC	11.51	12.00	1.119	-0.14	0.109	0.122
	FR1 n77_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	WNC	14.57	15.00	1.104	0.01	0.107	0.118
	FR1 n77_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	11.88	12.00	1.028	-0.18	0.196	0.201
	FR1 n77_Ant 1	100M	BPSK	135	0	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	11.52	12.00	1.117	-0.06	0.179	0.200
	FR1 n77_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	14.89	15.00	1.026	0.02	0.190	0.195
	FR1 n77_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	WNC	11.88	12.00	1.028	0.15	0.210	0.216
	FR1 n77_HPUE_Ant 1	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	WNC	14.89	15.00	1.026	0.01	0.197	0.202
	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	656000	3840	Speed	16.03	17.00	1.250	0.04	0.658	0.823
	FR1 n77_Ant 2	100M	BPSK	135	0	Bottom of Laptop	0mm	ON	656000	3840	Speed	15.93	17.00	1.279	-0.17	0.635	0.812
	FR1 n77_Ant 2	100M	BPSK	270	0	Bottom of Laptop	0mm	ON	656000	3840	Speed	15.95	17.00	1.274	-0.01	0.636	0.810
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	656000	3840	Speed	19.09	20.00	1.233	-0.11	0.636	0.784
	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	12mm	OFF	656000	3840	Speed	22.84	24.00	1.306	0.03	0.312	0.408
	FR1 n77_Ant 2	100M	BPSK	135	69	Bottom of Laptop	12mm	OFF	656000	3840	Speed	22.78	24.00	1.324	0.1	0.316	0.418
16	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	656000	3840	WNC	16.03	17.00	1.250	0.05	0.665	0.831
	FR1 n77_Ant 2	100M	BPSK	135	0	Bottom of Laptop	0mm	ON	656000	3840	WNC	15.93	17.00	1.279	0.05	0.638	0.816
	FR1 n77_Ant 2	100M	BPSK	270	0	Bottom of Laptop	0mm	ON	656000	3840	WNC	15.95	17.00	1.274	0.14	0.641	0.816
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	656000	3840	WNC	19.09	20.00	1.233	0.15	0.644	0.794
	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	633332	3499.98	Speed	16.82	17.00	1.042	0.16	0.752	0.784
	FR1 n77_Ant 2	100M	BPSK	135	0	Bottom of Laptop	0mm	ON	633332	3499.98	Speed	16.78	17.00	1.052	-0.06	0.694	0.730
	FR1 n77_Ant 2	100M	BPSK	270	0	Bottom of Laptop	0mm	ON	633332	3499.98	Speed	16.69	17.00	1.074	0.02	0.726	0.780
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	633332	3499.98	Speed	19.82	20.00	1.042	-0.16	0.710	0.740
	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	12mm	OFF	633332	3499.98	Speed	23.52	24.00	1.117	-0.03	0.445	0.497
	FR1 n77_Ant 2	100M	BPSK	135	69	Bottom of Laptop	12mm	OFF	633332	3499.98	Speed	23.46	24.00	1.132	0.17	0.436	0.494
	FR1 n77_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	633332	3499.98	WNC	16.82	17.00	1.042	0.05	0.787	0.820
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	ON	633332	3499.98	WNC	19.82	20.00	1.042	0.09	0.734	0.765
	FR1 n77_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	Speed	20.82	22.00	1.312	0.12	0.001	0.001
	FR1 n77_Ant 3	100M	BPSK	135	0	Bottom of Laptop	0mm	OFF	656000	3840	Speed	20.67	22.00	1.358	0.02	0.001	0.001
	FR1 n77_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	Speed	23.82	25.00	1.312	-0.08	0.001	0.001
	FR1 n77_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	WNC	20.82	22.00	1.312	-0.11	0.001	0.001
	FR1 n77_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	656000	3840	WNC	23.82	25.00	1.312	0.04	0.001	0.001
	FR1 n77_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	21.20	22.00	1.202	-0.06	0.002	0.002
	FR1 n77_Ant 3	100M	BPSK	135	0	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	21.13	22.00	1.222	0.06	0.001	0.001
	FR1 n77_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	Speed	24.32	25.00	1.169	0.08	0.002	0.002
	FR1 n77_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	WNC	21.20	22.00	1.202	0.03	0.002	0.002
	FR1 n77_HPUE_Ant 3	100M	BPSK	1	1	Bottom of Laptop	0mm	OFF	633332	3499.98	WNC	24.32	25.00	1.169	0.05	0.002	0.002



13.2 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Sensor ON / OFF	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_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26140	1860	WNC	20.85	21.00	1.035			-0.08	1.110	-	1.149
2nd	LTE Band 25_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	26140	1860	WNC	20.85	21.00	1.035			0.09	1.080	1.03	1.118
1st	LTE Band 30_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	ON	27710	2310	WNC	20.80	21.00	1.047			-0.01	1.030	-	1.079
2nd	LTE Band 30_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	ON	27710	2310	WNC	20.80	21.00	1.047			0.07	0.994	1.04	1.041
1st	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132572	1770	WNC	21.19	21.50	1.074			-0.04	1.100	-	1.181
2nd	LTE Band 66_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	132572	1770	WNC	21.19	21.50	1.074			0.04	1.050	1.05	1.128
1st	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43340	3575	WNC	17.75	18.00	1.059	62.9	1.006	0.05	1.030	-	1.098
2nd	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	ON	43340	3575	WNC	17.75	18.00	1.059	62.9	1.006	0.03	0.998	1.03	1.063
1st	FR1 n7_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	507000	2535	WNC	19.29	19.50	1.050			0.01	1.040	-	1.092
2nd	FR1 n7_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	507000	2535	WNC	19.29	19.50	1.050			0.14	1.010	1.03	1.060
1st	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	641666	3624.99	WNC	15.63	16.00	1.089			0.02	1.030	-	1.122
2nd	FR1 n48_Ant 2	40M	BPSK	1	1	Bottom of Laptop	0mm	ON	641666	3624.99	WNC	15.63	16.00	1.089			0.03	1.010	1.02	1.100

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 LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device support Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each LTE configuration and exposure condition combination, according to the highest time averaged power for all applicable uplink-downlink configurations in Power Class 2. When the reported SAR vs. output power is linearly scaled with $< 10\%$ discrepancy between power classes and all reported SAR are < 1.4 W/kg, 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 $< 10\%$

	LTE Band 41_Ant 2 (Power Class 3)	LTE Band 41_Ant 2 (Power Class 2)
Maximum Tune up Power (dBm)	22	25
Reported 1g SAR (W/kg)	0.782	1.107
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	100.32	136.93
Linearity SAR(W/kg)	1.07	
% deviation from expected linearity		3.72%



13.4 FR1 n41/n77 Power Class 2 and Power Class 3 Linearity

This device support Power Class 2 and Power Class 3 operations for FR1 n41/n77. The highest available duty cycle for Power Class 2 operation is 50%. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each 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 1 (Power Class 3)	FR1 n41_Ant 1 (Power Class 2)
Maximum Tune up Power (dBm)	13	16
Reported 1g SAR (W/kg)	0.193	0.18
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	19.95	19.91
Linearity SAR(W/kg)	0.19	
% deviation from expected linearity		-6.51%

	FR1 n41_Ant 2 (Power Class 3)	FR1 n41_Ant 2 (Power Class 2)
Maximum Tune up Power (dBm)	18	21
Reported 1g SAR (W/kg)	0.642	0.599
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	63.10	62.95
Linearity SAR(W/kg)	0.64	
% deviation from expected linearity		-6.48%

	FR1 n41_Ant 3 (Power Class 3)	FR1 n41_Ant 3 (Power Class 2)
Maximum Tune up Power (dBm)	22	25
Reported 1g SAR (W/kg)	0.02	0.019
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	158.49	158.11
Linearity SAR(W/kg)	0.02	
% deviation from expected linearity		-4.77%



<Part 270>

	FR1 n77_Ant 1 (Power Class 3)	FR1 n77_Ant 1 (Power Class 2)
Maximum Tune up Power (dBm)	12	15
Reported 1g SAR (W/kg)	0.122	0.118
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	15.85	15.81
Linearity SAR(W/kg)	0.12	
% deviation from expected linearity		-3.05%

	FR1 n77_Ant 2 (Power Class 3)	FR1 n77_Ant 2 (Power Class 2)
Maximum Tune up Power (dBm)	17	20
Reported 1g SAR (W/kg)	0.831	0.794
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	50.12	50.00
Linearity SAR(W/kg)	0.83	
% deviation from expected linearity		-4.23%

	FR1 n77_Ant 3 (Power Class 3)	FR1 n77_Ant 3 (Power Class 2)
Maximum Tune up Power (dBm)	22	25
Reported 1g SAR (W/kg)	0.001	0.001
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	158.49	158.11
Linearity SAR(W/kg)	0.00	
% deviation from expected linearity		0.24%



<Part 27Q>

	FR1 n77_Ant 1	FR1 n77_Ant 1
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	12	15
Reported 1g SAR (W/kg)	0.216	0.202
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	15.85	15.81
Linearity SAR(W/kg)	0.22	
% deviation from expected linearity		-6.26%

	FR1 n77_Ant 2	FR1 n77_Ant 2
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	17	20
Reported 1g SAR (W/kg)	0.82	0.765
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	50.12	50.00
Linearity SAR(W/kg)	0.82	
% deviation from expected linearity		-6.49%

	FR1 n77_Ant 3	FR1 n77_Ant 3
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	22	25
Reported 1g SAR (W/kg)	0.002	0.002
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	158.49	158.11
Linearity SAR(W/kg)	0.00	
% deviation from expected linearity		0.24%



14. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN Ant 1 + WWAN Ant 2 + WLAN2.4GHz Ant 1 + WLAN2.4GHz Ant 2	Yes
2.	WWAN Ant 1 + WWAN Ant 2 + WLAN2.4GHz Ant 1 + Bluetooth Ant 2	Yes
3.	WWAN Ant 1 + WWAN Ant 2 + WLAN5/6GHz Ant 1 + WLAN5/6GHz Ant 2 + Bluetooth Ant 2	Yes

General Note:

- The FCC ID: PD9BE200D2, Intel BE200D2W WLAN/BT module is integrated into this host and the WiFi/BT SAR results refer to report no.: 231103-01.TR01 and 231103-01.TR02 were used for Sim-Tx compliance include in section16.
- 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

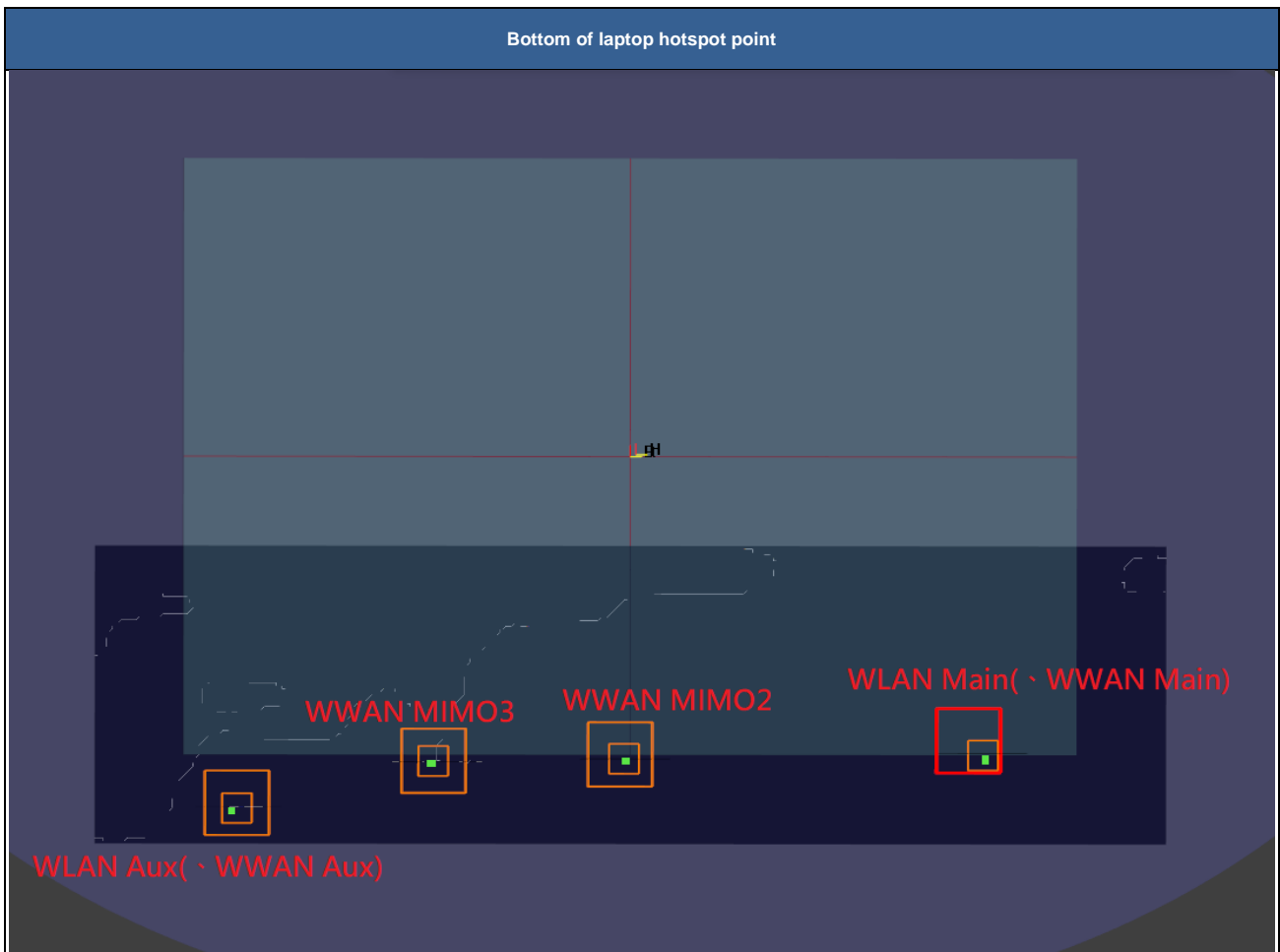
WWAN 1	WWAN 2	Exposure Position	1	2	3	4	9	10	11	1+2+3+4 Summed 1g SAR (W/kg)	1+2+3+11 Summed 1g SAR (W/kg)	1+2+9+10+11 Summed 1g SAR (W/kg)	SPLSR	Case No
			Maximum WWAN 1 Estimated 1g SAR (W/kg)	Maximum WWAN 2 1g SAR (W/kg)	WLAN2.4GHz Main Ant 1g SAR (W/kg)	WLAN2.4GHz Aux Ant 1g SAR (W/kg)	WLAN5/6GHz Main Ant 1g SAR (W/kg)	WLAN5/6GHz Aux Ant 1g SAR (W/kg)	Bluetooth Aux Ant 1g SAR (W/kg)					
WWAN Ant 0	WWAN Ant 2	Bottom of Laptop	0.400	1.181	0.530	0.470	1.020	0.590	0.540	2.581	2.651	3.731	0.04	Case 1
WWAN Ant 0	WWAN Ant 1	Bottom of Laptop	0.400	0.216	0.530	0.470	1.020	0.590	0.540	1.616	1.686	2.766	0.04	Case 2
WWAN Ant 0	WWAN Ant 3	Bottom of Laptop	0.400	0.020	0.530	0.470	1.020	0.590	0.540	1.420	1.490	2.570	0.03	Case 3

WWAN 1	WWAN 2	Exposure Position	1	2	3	4	9	10	11	1+2+3+4 Summed 1g SAR (W/kg)	1+2+3+11 Summed 1g SAR (W/kg)	1+2+9+10+11 Summed 1g SAR (W/kg)	SPLSR	Case No
			Maximum WWAN 1 1g SAR (W/kg)	Maximum WWAN 2 1g SAR (W/kg)	WLAN2.4GHz Main Ant 1g SAR (W/kg)	WLAN2.4GHz Aux Ant 1g SAR (W/kg)	WLAN5/6GHz Main Ant 1g SAR (W/kg)	WLAN5/6GHz Aux Ant 1g SAR (W/kg)	Bluetooth Aux Ant 1g SAR (W/kg)					
WWAN Ant 2	WWAN Ant 1	Bottom of Laptop	1.181	0.216	0.530	0.470	1.020	0.590	0.540	2.397	2.467	3.547	0.04	Case 4
WWAN Ant 2	WWAN Ant 3	Bottom of Laptop	1.181	0.020	0.530	0.470	1.020	0.590	0.540	2.201	2.271	3.351	0.03	Case 5
WWAN Ant 1	WWAN Ant 3	Bottom of Laptop	0.216	0.020	0.530	0.470	1.020	0.590	0.540	1.236	1.306	2.386	0.04	Case 6

14.2 SPLSR Evaluation and Analysis

General Note:

1. 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.
2. $SPLSR = (SAR_1 + SAR_2)^{1.5} / (min. \text{ separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary
3. 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 (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 1	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	118.3	2.11	0.03	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	224.0	1.40	0.01	Not required
	WLAN2.4G_Aux		0.47	0	96	-106	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	105.8	1.65	0.02	Not required
	WLAN2.4G_Aux		0.47	0	96	-106	-177				
	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	224.0	1.47	0.01	Not required
	BT_Aux		0.54	0	96	-106	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	105.8	1.72	0.02	Not required
	BT_Aux		0.54	0	96	-106	-177				
	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	105.5	2.60	0.04	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	206.4	2.55	0.02	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	102.1	2.31	0.03	Not required	
WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177					

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 2	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	173.2	1.64	0.01	Not required
	WWAN_Ant 1		0.216	0	104	-68	-177				
	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	206.4	2.55	0.02	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	36.0	1.35	0.04	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	186.1	1.15	0.01	Not required
	WWAN_Ant 1		0.216	0	104	-68	-177				
	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	224.0	1.40	0.01	Not required
	WLAN2.4G_Aux		0.47	0	96	-106	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	38.8	0.69	0.01	Not required
	WLAN2.4G_Aux		0.47	0	96	-106	-177				
	WWAN_Ant 0 + WLAN2.4G_Main	Bottom of Laptop	0.93	0	99.5	118	-177	224.0	1.47	0.01	Not required
	BT_Aux		0.54	0	96	-106	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	38.8	0.76	0.02	Not required
	BT_Aux		0.54	0	96	-106	-177				

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 3	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	234.4	1.44	0.01	Not required
	WWAN_Ant 3		0.02	0	117.5	-128	-177				
	WWAN_Ant 0 + WLAN5/6G_Main	Bottom of Laptop	1.42	0	85.8	104.2	-177	206.4	2.55	0.02	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WWAN_Ant 3	Bottom of Laptop	0.02	0	117.5	-128	-177	36.0	1.15	0.03	Not required
WLAN5/6G_Aux + BT_Aux	1.13		0	92.5	-102.1	-177					



Case 4	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 4	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	67.8	1.40	0.02	Not required
	WWAN_Ant 1		0.216	0	104	-68	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	105.5	2.20	0.03	Not required
	WLAN5/6G_Main		1.02	0	85.8	104.2	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	102.1	2.31	0.03	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	173.2	1.24	0.01	Not required
	WLAN5/6G_Main		1.02	0	85.8	104.2	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	36.0	1.35	0.04	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WLAN5/6G_Main	Bottom of Laptop	1.02	0	85.8	104.2	-177	206.4	2.15	0.02	Not required
	WLAN5/6G_Aux + BT_Aux		1.13	0	92.5	-102.1	-177				
	WWAN_Ant 1 + WLAN2.4G_Aux	Bottom of Laptop	0.686	0	104	-68	-177	67.8	1.87	0.04	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 1 + WLAN2.4G_Aux	Bottom of Laptop	0.686	0	104	-68	-177	186.1	1.22	0.01	Not required
	WLAN2.4G_Main		0.53	0	99.5	118	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	118.3	1.71	0.02	Not required
	WLAN2.4G_Main		0.53	0	99.5	118	-177				
	WWAN_Ant 1 + BT_Aux	Bottom of Laptop	0.756	0	104	-68	-177	67.8	1.94	0.04	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
WWAN_Ant 1 + BT_Aux	Bottom of Laptop	0.756	0	104	-68	-177	186.1	1.29	0.01	Not required	
WLAN2.4G_Main		0.53	0	99.5	118	-177					

Case 5	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 5	WWAN_Ant 3 + WLAN5/6G_Aux + BT_Aux	Bottom of Laptop	1.15	0	92.5	-102.1	-177	102.1	2.33	0.03	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 3 + WLAN5/6G_Aux + BT_Aux	Bottom of Laptop	1.15	0	92.5	-102.1	-177	206.4	2.17	0.02	Not required
	WLAN5/6G_Main		1.02	0	85.8	104.2	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	105.5	2.20	0.03	Not required
	WLAN5/6G_Main		1.02	0	85.8	104.2	-177				
	WWAN_Ant 3 + WLAN2.4G_Aux	Bottom of Laptop	0.49	0	96	-106	-177	105.8	1.67	0.02	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 3 + WLAN2.4G_Aux	Bottom of Laptop	0.49	0	96	-106	-177	224.0	1.02	0.00	Not required
	WLAN2.4G_Main		0.53	0	99.5	118	-177				
	WWAN_Ant 2	Bottom of Laptop	1.181	0	100.3	-0.3	-177	118.3	1.71	0.02	Not required
	WLAN2.4G_Main		0.53	0	99.5	118	-177				
	WWAN_Ant 3 + BT_Aux	Bottom of Laptop	0.56	0	96	-106	-177	105.8	1.74	0.02	Not required
	WWAN_Ant 2		1.181	0	100.3	-0.3	-177				
	WWAN_Ant 3 + BT_Aux	Bottom of Laptop	0.56	0	96	-106	-177	224.0	1.09	0.01	Not required
	WLAN2.4G_Main		0.53	0	99.5	118	-177				

Case 6	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 6	WWAN_Ant 3 + WLAN5/6G_Aux + BT_Aux	Bottom of Laptop	1.15	0	92.5	-102.1	-177	36.0	1.37	0.04	Not required
	WWAN_Ant 1		0.216	0	104	-68	-177				
	WWAN_Ant 3 + WLAN5/6G_Aux + BT_Aux	Bottom of Laptop	1.15	0	92.5	-102.1	-177	206.4	2.17	0.02	Not required
	WLAN5/6G_Main		1.02	0	85.8	104.2	-177				
	WWAN_Ant 1	Bottom of Laptop	0.216	0	104	-68	-177	173.2	1.24	0.01	Not required
WLAN5/6G_Main	1.02		0	85.8	104.2	-177					

Test Engineer : Jefferson Lin, Jerry Hsu, and Teddy Chang



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. 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.