

APPENDIX D: TOTAL EXPOSURE RATIO

The total exposure ratio (TER) is calculated by combining all SAR measurements and power density measurements after normalizing to their respective limits. The general expression is below.

$$TER = \sum_{n=1}^N \frac{SAR_n}{SAR_n, limit} + \sum_{m=1}^M \frac{S_{m,avg}}{S_{m, limit}} < 1$$

The TER shall be less than unity to ensure compliance with the limits.

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for the applicable exposure conditions was used for simultaneous transmission analysis.

Worst-case power density results for each test configuration among all antenna arrays (J Patch, K Patch, L Patch, J Dipole) were considered for TER analysis. Some bands and modes may be evaluated at a higher power or at a closer separation distance representing a more conservative TER analysis. LTE ULCA is not available during EN-DC operations with 5G NR.

**Table D-1
NR Band n261 Head Total Exposure Ratio**



Anchor Band	LTE Reported SAR	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	Bluetooth Reported SAR	5 GHz WLAN Ant1 Reported SAR	5 GHz WLAN Ant2 Reported SAR	n261 S	LTE + 2.4 GHz WLAN Ant1 + n261	LTE + 2.4 GHz WLAN Ant2 + n261	LTE + 2.4 GHz WLAN MIMO + n261	LTE + BT+ 5 GHz WLAN Ant1 + n261	LTE + BT+ 5 GHz WLAN Ant2 + n261	LTE + BT+ 5 GHz WLAN MIMO + n261	LTE + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO + n261	
	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	mW/cm ²								
	1	2	3	4	5	6	7	1+2+7	1+3+7	1+2+3+7	1+4+5+7	1+4+6+7	1+4+5+6+7	1+2+3+5+6+7	
Applicable Limit	1.6	1.6	1.6	1.6	1.6	1.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
LTE B13	Reported Value	0.177	0.457	0.027	0.254	0.324	0.057	0.088							
	Ratio to Limit	0.111	0.286	0.017	0.159	0.203	0.036	0.088	0.485	0.216	0.502	0.561	0.394	0.597	0.741
LTE B5	Reported Value	0.177	0.457	0.027	0.254	0.324	0.057	0.088							
	Ratio to Limit	0.111	0.286	0.017	0.159	0.203	0.036	0.088	0.485	0.216	0.502	0.561	0.394	0.597	0.741
LTE B66	Reported Value	0.152	0.457	0.027	0.254	0.324	0.057	0.088							
	Ratio to Limit	0.095	0.286	0.017	0.159	0.203	0.036	0.088	0.469	0.200	0.486	0.545	0.378	0.581	0.725
LTE B2	Reported Value	0.156	0.457	0.027	0.254	0.324	0.057	0.088							
	Ratio to Limit	0.098	0.286	0.017	0.159	0.203	0.036	0.088	0.472	0.203	0.489	0.548	0.381	0.584	0.728

Worst-case front side total power density value was considered for Head TER analysis.

**Table D-2
NR Band n261 Body-Worn Total Exposure Ratio - Back Side at 15 mm**

Anchor Band	LTE Reported SAR	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	2.4 GHz WLAN MIMO at 19 dBm Reported SAR	Bluetooth Reported SAR	5 GHz WLAN Ant1 Reported SAR	5 GHz WLAN Ant2 Reported SAR	5 GHz WLAN MIMO at 16 dBm Reported SAR	n261 S	LTE + 2.4 GHz WLAN Ant1 + n261	LTE + 2.4 GHz WLAN Ant2 + n261	LTE + 2.4 GHz WLAN MIMO + n261	LTE + BT + 5 GHz WLAN Ant1 + n261	LTE + BT + 5 GHz WLAN Ant2 + n261	LTE + BT + 5 GHz WLAN MIMO at 16 dBm + n261	LTE + 2.4 GHz WLAN MIMO at 19 dBm + 5 GHz WLAN MIMO at 16 dBm + n261	
	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	mW/cm ²								
	1	2	3	4	5	6	7	8	9	1+2+9	1+3+9	1+4+9	1+5+6+9	1+5+7+9	1+5+8+9	1+4+8+9	
Applicable Limit	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
LTE B13	Reported Value	0.239	0.109	0.177	0.092	0.034	0.181	0.313	0.177	0.202							
	Ratio to Limit	0.149	0.068	0.111	0.058	0.021	0.113	0.196	0.111	0.202	0.419	0.462	0.409	0.485	0.568	0.483	0.520
LTE B5	Reported Value	0.307	0.109	0.177	0.092	0.034	0.181	0.313	0.177	0.202							
	Ratio to Limit	0.192	0.068	0.111	0.058	0.021	0.113	0.196	0.111	0.202	0.462	0.505	0.452	0.528	0.611	0.526	0.563
LTE B66	Reported Value	0.863	0.109	0.177	0.092	0.034	0.181	0.313	0.177	0.202							
	Ratio to Limit	0.539	0.068	0.111	0.058	0.021	0.113	0.196	0.111	0.202	0.809	0.852	0.759	0.875	0.958	0.873	0.910
LTE B2	Reported Value	0.799	0.109	0.177	0.092	0.034	0.181	0.313	0.177	0.202							
	Ratio to Limit	0.499	0.068	0.111	0.058	0.021	0.113	0.196	0.111	0.202	0.769	0.812	0.759	0.835	0.918	0.833	0.870



1. Worst-case back side total power density at 15 mm was considered for Body-Worn TER analysis.
2. For L patch and J dipole antennas, power density results for back side at 10 mm were considered as a more conservative evaluation for 15mm body-worn.

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**Table D-3
NR Band n261 Hotspot Total Exposure Ratio**

Anchor Band	LTE Reported SAR	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	2.4 GHz WLAN MIMO at 19 dBm Reported SAR	Bluetooth Reported SAR	5 GHz WLAN Ant1 Reported SAR	5 GHz WLAN Ant2 Reported SAR	5 GHz WLAN MIMO at 16 dBm Reported SAR	n261 S	LTE + 2.4 GHz WLAN Ant1 + n261	LTE + 2.4 GHz WLAN Ant2 + n261	LTE + 2.4 GHz WLAN MIMO + n261	LTE + Bluetooth + 5 GHz WLAN Ant1 + n261	LTE + Bluetooth + 5 GHz WLAN Ant2 + n261	LTE + Bluetooth + 5 GHz WLAN MIMO + n261	LTE + 2.4 GHz WLAN MIMO at 19 dBm + 5 GHz WLAN MIMO at 16 dBm + n261	
		W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg	mW/cm ²	1+2+9	1+3+9	1+4+9	1+5+6+9	1+5+7+9	1+5+8+9	1+4+8+9	
		1	2	3	4	5	6	7	8	9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Applicable Limit																	
LTE B13	Back Side at 10 mm	Reported Value	0.452	0.242	0.377	0.178	0.113	0.242	0.367	0.258	0.273						
		Ratio to Limit	0.283	0.151	0.236	0.111	0.071	0.151	0.229	0.161	0.273	0.707	0.792	0.667	0.778	0.856	0.788
	Front Side at 10 mm	Reported Value	0.390	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.273						
		Ratio to Limit	0.244	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.273	0.483	0.568	0.443	0.532	0.610	0.542
	Top Edge at 10 mm	Reported Value	0	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.189						
		Ratio to Limit	0	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.189	0.340	0.425	0.300	0.389	0.467	0.399
	Bottom Edge at 10 mm	Reported Value	0.353	0	0	0	0	0	0	0	0.006						
		Ratio to Limit	0.221	0	0	0	0	0	0	0	0.006	0.227	0.227	0.227	0.227	0.227	0.227
	Right Edge at 10 mm	Reported Value	0.263	0	0	0	0	0	0	0	0.593						
		Ratio to Limit	0.164	0.0	0.0	0	0	0	0	0	0.593	0.757	0.757	0.757	0.757	0.757	0.757
	Left Edge at 10 mm	Reported Value	0.105	0.248	0.377**	0.082	0.106	0.242*	0.367**	0.258	0.463						
		Ratio to Limit	0.066	0.149	0.236	0.051	0.066	0.151	0.229	0.161	0.463	0.678	0.765	0.580	0.746	0.824	0.682
LTE B5	Back Side at 10 mm	Reported Value	0.635	0.242	0.377	0.178	0.113	0.242	0.367	0.258	0.273						
		Ratio to Limit	0.397	0.151	0.236	0.111	0.071	0.151	0.229	0.161	0.273	0.821	0.906	0.781	0.892	0.970	0.902
	Front Side at 10 mm	Reported Value	0.512	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.273						
		Ratio to Limit	0.320	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.273	0.559	0.644	0.519	0.608	0.686	0.618
	Top Edge at 10 mm	Reported Value	0	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.189						
		Ratio to Limit	0	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.189	0.340	0.425	0.300	0.389	0.467	0.399
	Bottom Edge at 10 mm	Reported Value	0.4	0	0	0	0	0	0	0	0.006						
		Ratio to Limit	0.250	0	0	0	0	0	0	0	0.006	0.256	0.256	0.256	0.256	0.256	0.256
	Right Edge at 10 mm	Reported Value	0.194	0	0	0	0	0	0	0	0.593						
		Ratio to Limit	0.121	0	0	0	0	0	0	0	0.593	0.714	0.714	0.714	0.714	0.714	0.714
	Left Edge at 10 mm	Reported Value	0.113	0.238	0.377**	0.082	0.106	0.242*	0.367**	0.258	0.463						
		Ratio to Limit	0.071	0.149	0.236	0.051	0.066	0.151	0.229	0.161	0.463	0.683	0.770	0.585	0.751	0.829	0.687
LTE B66	Back Side at 10 mm	Reported Value	0.668	0.242	0.377	0.178	0.113	0.242	0.367	0.258	0.273						
		Ratio to Limit	0.418	0.151	0.236	0.111	0.071	0.151	0.229	0.161	0.273	0.842	0.927	0.802	0.913	0.991	0.923
	Front Side at 10 mm	Reported Value	0.699	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.273						
		Ratio to Limit	0.437	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.273	0.676	0.761	0.636	0.725	0.803	0.735
	Top Edge at 10 mm	Reported Value	0	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.189						
		Ratio to Limit	0	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.189	0.340	0.425	0.300	0.389	0.467	0.399
	Bottom Edge at 10 mm	Reported Value	1.133	0	0	0	0	0	0	0	0.006						
		Ratio to Limit	0.708	0	0	0	0	0	0	0	0.006	0.714	0.714	0.714	0.714	0.714	0.714
	Right Edge at 10 mm	Reported Value	0.082	0	0	0	0	0	0	0	0.593						
		Ratio to Limit	0.051	0	0	0	0	0	0	0	0.593	0.644	0.644	0.644	0.644	0.644	0.644
	Left Edge at 10 mm	Reported Value	0.093	0.238	0.377**	0.082	0.106	0.242*	0.367**	0.258	0.463						
		Ratio to Limit	0.058	0.149	0.236	0.051	0.066	0.151	0.229	0.161	0.463	0.670	0.757	0.572	0.738	0.816	0.674
LTE B2	Back Side at 10 mm	Reported Value	0.448	0.242	0.377	0.178	0.113	0.242	0.367	0.258	0.273						
		Ratio to Limit	0.280	0.151	0.236	0.111	0.071	0.151	0.229	0.161	0.273	0.704	0.789	0.664	0.775	0.853	0.785
	Front Side at 10 mm	Reported Value	0.448	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.273						
		Ratio to Limit	0.280	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.273	0.519	0.604	0.479	0.568	0.646	0.578
	Top Edge at 10 mm	Reported Value	0	0.242**	0.377**	0.178*	0.078	0.242*	0.367**	0.258*	0.189						
		Ratio to Limit	0.000	0.151	0.236	0.111	0.049	0.151	0.229	0.161	0.189	0.340	0.425	0.300	0.389	0.467	0.399
	Bottom Edge at 10 mm	Reported Value	1.239	0	0	0	0	0	0	0	0.006						
		Ratio to Limit	0.806	0	0	0	0	0	0	0	0.006	0.812	0.812	0.812	0.812	0.812	0.812
	Right Edge at 10 mm	Reported Value	0.077	0	0	0	0	0	0	0	0.593						
		Ratio to Limit	0.048	0	0	0	0	0	0	0	0.593	0.641	0.641	0.641	0.641	0.641	0.641
	Left Edge at 10 mm	Reported Value	0.101	0.238	0.377**	0.082	0.106	0.242*	0.367**	0.258	0.463						
		Ratio to Limit	0.063	0.149	0.236	0.051	0.066	0.151	0.229	0.161	0.463	0.675	0.762	0.577	0.743	0.821	0.679



1. The highest back side at 10 mm, and other surfaces at 2mm power density values were considered for Hotspot TER analysis.
2. Per FCC guidance, the device edges that are not required to be evaluated for SAR are indicated as 0 for TER analysis.

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**Table D-4
NR Band n261 Phablet Total Exposure Ratio**

Anchor Band		LTE Reported 10g SAR	5 GHz WLAN Ant 1 Reported 10g SAR	5 GHz WLAN Ant 2 Reported 10g SAR	5 GHz WLAN MIMO at 16 dBm Reported 10g SAR	n261 S	LTE + 5 GHz WLAN Ant1 + n261 S	LTE + 5 GHz WLAN Ant2 + n261 S	LTE + 5 GHz WLAN MIMO + n261 S	
		W/kg	W/kg	W/kg	W/kg	mW/cm ²				
Applicable Limit		1	2	3	4	5	1 + 2 + 5	1 + 3 + 5	1 + 4 + 5	
		4.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	
LTE B66	Back Side at 7 mm	Reported Value	1.320	0.559*	0.621*	0.122	0.473			
		Ratio to Limit	0.330	0.140	0.155	0.031	0.473	0.943	0.958	0.834
	Back Side at 0 mm	Reported Value	1.100	0.559	0.621	0.887	0.473			
		Ratio to Limit	0.275	0.140	0.155	0.222	0.473	0.888	0.903	0.970
	Front Side at 0 mm	Reported Value	1.432	0.559*	0.621*	0.887*	0.088			
		Ratio to Limit	0.358	0.140	0.155	0.222	0.088	0.586	0.601	0.668
	Top Edge at 0 mm	Reported Value	0	0.559*	0.621*	0.887*	0.189			
		Ratio to Limit	0	0.140	0.155	0.222	0.189	0.329	0.344	0.411
	Bottom Edge at 0 mm	Reported Value	1.656	0	0	0	0.006			
		Ratio to Limit	0.414	0	0	0	0.006	0.420	0.420	0.420
	Right Edge at 0 mm	Reported Value	0.471	0	0	0	0.593			
		Ratio to Limit	0.118	0	0	0	0.593	0.711	0.711	0.711
	Left Edge at 0 mm	Reported Value	0.567	0.559*	0.621*	0.273	0.463			
		Ratio to Limit	0.142	0.140	0.155	0.068	0.463	0.745	0.760	0.673
LTE B2	Back Side at 7 mm	Reported Value	1.173	0.559*	0.621*	0.122	0.473			
		Ratio to Limit	0.293	0.140	0.155	0.031	0.473	0.906	0.921	0.797
	Back Side at 0 mm	Reported Value	1.096	0.559	0.621	0.887	0.473			
		Ratio to Limit	0.274	0.140	0.155	0.222	0.473	0.887	0.902	0.969
	Front Side at 0 mm	Reported Value	1.341	0.559*	0.621*	0.887*	0.088			
		Ratio to Limit	0.335	0.140	0.155	0.222	0.088	0.563	0.578	0.645
	Top Edge at 0 mm	Reported Value	0	0.559*	0.621*	0.887*	0.189			
		Ratio to Limit	0	0.140	0.155	0.222	0.189	0.329	0.344	0.411
	Bottom Edge at 0 mm	Reported Value	1.828	0	0	0	0.006			
		Ratio to Limit	0.457	0	0	0	0.006	0.463	0.463	0.463
	Right Edge at 0 mm	Reported Value	0.396	0	0	0	0.593			
		Ratio to Limit	0.099	0	0	0	0.593	0.692	0.692	0.692
	Left Edge at 0 mm	Reported Value	0.467	0.559*	0.621*	0.273	0.463			
		Ratio to Limit	0.117	0.140	0.155	0.068	0.463	0.720	0.735	0.648

1. Per FCC guidance, the device edges that are not required to be evaluated for SAR are indicated as 0 for TER analysis.
2. Per FCC guidance, the bands/modes that are not required to be evaluated for Phablet SAR are not considered for TER analysis.
3. For back side at 7 mm, power density results for back side at 2 mm were considered as a more conservative evaluation.
4. Per FCC guidance, for power density measurements, a test separation distance of 2 mm was used for phablet configuration due to probe restraints.
5. For TER analysis for front at 0 mm and bottom at 0 mm, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

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