

APPENDIX E: CELLULAR ANTENNA CLUSTERING VALIDATION

E.1 Introduction

This device supports cellular antenna clustering which are co-located cellular antennas with significant overlap of RF exposure hotspots grouped together in a single cluster. All RF exposure for cellular antennas in the same cluster are aggregated and always will be maintained less than an assigned budget cap that maintains overall device compliance. Cellular antennas proven spatially separated from all antennas in a cluster may be grouped in a separate cluster.

This evaluation report is to comply with Apple's validation method for proving spatial separation between cellular antennas assigned to separate clusters.

This device also supports a dynamic budget sharing algorithm. It enables separate budget caps for the cellular standalone and cellular simultaneous use conditions. In cellular standalone operation, only the cellular radio is active; in cellular simultaneous operation, other radios (i.e. connectivity antennas) are operational concurrently. Additionally, connectivity radios have two different budget conditions depending on the cellular budget caps. When the cellular budget is 1.0 W/kg, the connectivity budget is 0.6 W/kg. However, when the cellular budget is 1.2 W/kg, the connectivity budget is 0.4 W/kg. For the purposes of this evaluation, the highest cellular budget of 1.2 W/kg and connectivity budget of 0.4 W/kg was used.

In certain scenarios where power levels are reduced, SAR values measured at the maximum power level are used to ensure a conservative evaluation in simultaneous transmission analysis. When SPLSR evaluation is required, the most conservative peak separation distance is applied to represent the worst-case condition. Additionally, when multiple antennas are part of the same cluster, the highest SAR value and the shortest separation distance among them are used for the simultaneous transmission assessment.

When performing antenna clustering summation and SPLSR calculation, Total Exposure Ratio (TER) may be used for evaluation.

Exposure Ratio (ER) for different transmitters is calculated as following:

$$ER_{SAR,n} = \frac{SAR_n}{SAR_{limit,n}}$$

Where:

- SAR_n is the SAR value for the n -th transmitter/test frequency
- $SAR_{limit,n}$ is the basic restriction limit that is applicable to the n -th transmitter/test frequency

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E.2 (Step 1): Antenna Cluster Definition

The table below describes the antennas that are considered for each antenna cluster (AC).

Antenna Cluster	Cellular Antenna		Connectivity Antenna	
AC 1	Ant 3	Ant 4b	Ant 4a	
AC 2	Ant 1	Ant 2b	Ant 2a	Ant WF5B

E.3 (Step 2): Antenna Combinations for spatial separation analysis

Spatial separation will be assessed per combination of antennas per cluster that supports simultaneous transmission.

Simultaneous Operation Support	
AC 1	AC 2
Ant 3 + Ant 4a	Ant 1 + Ant 2a/WF5B
Ant 4b + Ant 4a	Ant 2b + Ant 2a/WF5B

Antenna Combination	AC 1	AC 1
1	Ant 3 + Ant 4a	Ant 1 + Ant 2a/WF5B
2	Ant 3 + Ant 4a	Ant 2b + Ant 2a/WF5B
3	Ant 4b + Ant 4a	Ant 1 + Ant 2a/WF5B
4	Ant 4b + Ant 4a	Ant 2b + Ant 2a/WF5B

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E.4 (Step 3, 4, &5): Antenna Clustering Analysis Summation and SPLSR

E.4.1 Combination 1: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.1.1 Back Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 12	Ant 4a 5 GHz WIFI	1.182 + 0.400	0.739 + 0.250	0.989
Ant 3 UMTS 1900	Ant 4a 5 GHz WIFI	0.657 + 0.400	0.411 + 0.250	0.661
Ant 3 LTE Band 41	Ant 4a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 3 NR Band n77	Ant 4a 5 GHz WIFI	1.125 + 0.400	0.703 + 0.250	0.953

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 LTE Band 26	Ant 2a 5 GHz WIFI	1.185 + 0.400	0.741 + 0.250	0.991
Ant 1 NR Band n25	Ant 2a 5 GHz WIFI	0.797 + 0.400	0.498 + 0.250	0.748
Ant 1 NR Band n7	Ant 2a 5 GHz WIFI	1.182 + 0.400	0.739 + 0.250	0.989
Ant 1 NR Band n77 DoD	Ant 2a 5 GHz WIFI	1.175 + 0.400	0.734 + 0.250	0.984

E.4.1.2 Back Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b			
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.989	0.991	1.980	202.6	0.01
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.989	0.748	1.737	202.6	0.01
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.989	0.989	1.978	202.6	0.01
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.989	0.984	1.973	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.661	0.991	1.652	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.661	0.748	1.409	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.661	0.989	1.650	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.661	0.984	1.645	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.990	0.991	1.981	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.990	0.748	1.738	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.990	0.989	1.979	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.990	0.984	1.974	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.953	0.991	1.944	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.953	0.748	1.701	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.953	0.989	1.942	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.953	0.984	1.937	202.6	0.01

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E.4.2 Combination 1: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.2.1 Top Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 NR Band n71	Ant 4a 2.4 GHz WIFI	0.913 + 0.220	0.571 + 0.138	0.709
Ant 3 UMTS 1900	Ant 4a 2.4 GHz WIFI	1.179 + 0.220	0.737 + 0.138	0.875
Ant 3 LTE Band 41	Ant 4a 2.4 GHz WIFI	1.067 + 0.220	0.667 + 0.138	0.805
Ant 3 NR Band n48	Ant 4a 2.4 GHz WIFI	1.169 + 0.220	0.731 + 0.138	0.869

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 LTE Band 71	Ant 2a 802.15.4	0.034 + 0.038	0.021 + 0.024	0.045
Ant 1 NR Band n70	Ant 2a 802.15.4	0.016 + 0.038	0.010 + 0.024	0.034
Ant 1 NR Band n30	Ant 2a 802.15.4	0.019 + 0.038	0.012 + 0.024	0.036
Ant 1 NR Band n77	Ant 2a 802.15.4	0.028 + 0.038	0.018 + 0.024	0.042

E.4.2.2 Top Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.709	0.045	0.754
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.709	0.034	0.743
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.709	0.036	0.745
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.709	0.042	0.751
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.875	0.045	0.920
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.875	0.034	0.909
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.875	0.036	0.911
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.875	0.042	0.917
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.805	0.045	0.850
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.805	0.034	0.839
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.805	0.036	0.841
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.805	0.042	0.847
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.869	0.045	0.914
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.869	0.034	0.903
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.869	0.036	0.905
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.869	0.042	0.911

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.3 Combination 1: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.3.1 Bottom Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 13	Ant 4a 2.4 GHz Bluetooth	0.026 + 0.040	0.016 + 0.025	0.041
Ant 3 NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.027 + 0.040	0.017 + 0.025	0.042
Ant 3 LTE Band 7	Ant 4a 2.4 GHz Bluetooth	0.006 + 0.040	0.004 + 0.025	0.029
Ant 3 NR Band n48	Ant 4a 2.4 GHz Bluetooth	0.016 + 0.040	0.010 + 0.025	0.035

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n26	Ant 2a 2.4 GHz WIFI	0.748 + 0.170	0.468 + 0.106	0.574
Ant 1 LTE Band 66	Ant 2a 2.4 GHz WIFI	1.193 + 0.170	0.746 + 0.106	0.852
Ant 1 NR Band n30	Ant 2a 2.4 GHz WIFI	1.180 + 0.170	0.738 + 0.106	0.844
Ant 1 LTE Band 48	Ant 2a 2.4 GHz WIFI	1.101 + 0.170	0.688 + 0.106	0.794

E.4.3.2 Bottom Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.041	0.574	0.615
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.041	0.852	0.893
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.041	0.844	0.885
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.041	0.794	0.835
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.042	0.574	0.616
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.042	0.852	0.894
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.042	0.844	0.886
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.042	0.794	0.836
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.029	0.574	0.603
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.029	0.852	0.881
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.029	0.844	0.873
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.029	0.794	0.823
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.035	0.574	0.609
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.035	0.852	0.887
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.035	0.844	0.879
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.035	0.794	0.829

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.4 Combination 1: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.4.1 Left Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 UMTS 850	Ant 4a 2.4 GHz WIFI	0.051 + 0.380	0.032 + 0.238	0.270
Ant 3 LTE Band 66	Ant 4a 2.4 GHz WIFI	0.046 + 0.380	0.029 + 0.238	0.267
Ant 3 NR Band n41	Ant 4a 2.4 GHz WIFI	0.036 + 0.380	0.023 + 0.238	0.261
Ant 3 NR Band n77 DoD	Ant 4a 2.4 GHz WIFI	0.028 + 0.380	0.018 + 0.238	0.256

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n14	Ant wf5b 5 GHz WIFI	0.325 + 0.047	0.203 + 0.029	0.232
Ant 1 NR Band n70	Ant wf5b 5 GHz WIFI	0.121 + 0.047	0.076 + 0.029	0.105
Ant 1 LTE Band 30	Ant wf5b 5 GHz WIFI	0.444 + 0.047	0.278 + 0.029	0.307
Ant 1 NR Band n77	Ant wf5b 5 GHz WIFI	1.173 + 0.047	0.733 + 0.029	0.762

E.4.4.2 Left Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b			
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.270	0.232	0.502	176.8	0.00
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.270	0.105	0.375	176.8	0.00
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.270	0.307	0.577	176.8	0.00
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.270	0.762	1.032	176.8	0.01
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.267	0.232	0.499	176.8	0.00
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.267	0.105	0.372	176.8	0.00
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.267	0.307	0.574	176.8	0.00
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.267	0.762	1.029	176.8	0.01
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.261	0.232	0.493	176.8	0.00
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.261	0.105	0.366	176.8	0.00
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.261	0.307	0.568	176.8	0.00
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.261	0.762	1.023	176.8	0.01
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.256	0.232	0.488	176.8	0.00
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.256	0.105	0.361	176.8	0.00
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.256	0.307	0.563	176.8	0.00
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.256	0.762	1.018	176.8	0.01

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E.4.5 Combination 1: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.5.1 Right Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 12	Ant 4a 2.4 GHz Bluetooth	0.387 + 0.006	0.242 + 0.004	0.246
Ant 3 NR Band n66	Ant 4a 2.4 GHz Bluetooth	0.276 + 0.006	0.173 + 0.004	0.177
Ant 3 NR Band n7	Ant 4a 2.4 GHz Bluetooth	0.364 + 0.006	0.228 + 0.004	0.232
Ant 3 NR Band n77	Ant 4a 2.4 GHz Bluetooth	1.176 + 0.006	0.735 + 0.004	0.739

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n26	Ant 2a 2.4 GHz WIFI	0.058 + 0.380	0.036 + 0.238	0.274
Ant 1 NR Band n70	Ant 2a 2.4 GHz WIFI	0.020 + 0.380	0.013 + 0.238	0.251
Ant 1 NR Band n30	Ant 2a 2.4 GHz WIFI	0.028 + 0.380	0.018 + 0.238	0.256
Ant 1 NR Band n77 DoD	Ant 2a 2.4 GHz WIFI	0.022 + 0.380	0.014 + 0.238	0.252

E.4.5.2 Right Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b			
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.246	0.274	0.520	160.15	0.00
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.246	0.251	0.497	160.15	0.00
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.246	0.256	0.502	160.15	0.00
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.246	0.252	0.498	160.15	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.177	0.274	0.451	160.15	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.177	0.251	0.428	160.15	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.177	0.256	0.433	160.15	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.177	0.252	0.429	160.15	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.232	0.274	0.506	160.15	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.232	0.251	0.483	160.15	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.232	0.256	0.488	160.15	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.232	0.252	0.484	160.15	0.00
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.739	0.274	1.013	160.15	0.01
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.739	0.251	0.990	160.15	0.01
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.739	0.256	0.995	160.15	0.01
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.739	0.252	0.991	160.15	0.01

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E.4.6 Combination 2: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.6.1 Back Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 12	Ant 4a 5 GHz WIFI	1.182 + 0.400	0.739 + 0.250	0.989
Ant 3 UMTS 1900	Ant 4a 5 GHz WIFI	0.657 + 0.400	0.411 + 0.250	0.661
Ant 3 LTE Band 41	Ant 4a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 3 NR Band n77	Ant 4a 5 GHz WIFI	1.125 + 0.400	0.703 + 0.250	0.953

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b UMTS 1900	Ant 2a 5 GHz WIFI	1.120 + 0.400	0.700 + 0.250	0.950
Ant 2b NR Band n41	Ant 2a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 2b NR Band n77	Ant 2a 5 GHz WIFI	1.111 + 0.400	0.694 + 0.250	0.944

E.4.6.2 Back Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b			
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.989	0.950	1.939	202.6	0.01
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.989	0.990	1.979	202.6	0.01
Ant 3 LTE Band 12 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.989	0.944	1.933	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.661	0.950	1.611	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.661	0.990	1.651	202.6	0.01
Ant 3 UMTS 1900 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.661	0.944	1.605	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.990	0.950	1.940	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.990	0.990	1.980	202.6	0.01
Ant 3 LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.990	0.944	1.934	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.953	0.950	1.903	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.953	0.990	1.943	202.6	0.01
Ant 3 NR Band n77 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.953	0.944	1.897	202.6	0.01

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E.4.7 Combination 2: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.7.1 Top Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 NR Band n71	Ant 4a 2.4 GHz WIFI	0.913 + 0.220	0.571 + 0.138	0.709
Ant 3 UMTS 1900	Ant 4a 2.4 GHz WIFI	1.179 + 0.220	0.737 + 0.138	0.875
Ant 3 LTE Band 41	Ant 4a 2.4 GHz WIFI	1.067 + 0.220	0.667 + 0.138	0.805
Ant 3 NR Band n48	Ant 4a 2.4 GHz WIFI	1.169 + 0.220	0.731 + 0.138	0.869

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b NR Band n70	Ant 2a 802.15.4	0.016 + 0.038	0.010 + 0.024	0.034
Ant 2b LTE Band 7	Ant 2a 802.15.4	0.024 + 0.038	0.015 + 0.024	0.039
Ant 2b NR Band n48	Ant 2a 802.15.4	0.010 + 0.038	0.006 + 0.024	0.030

E.4.7.2 Top Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.709	0.034	0.743
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.709	0.039	0.748
Ant 3 NR Band n71 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.709	0.030	0.739
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.875	0.034	0.909
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.875	0.039	0.914
Ant 3 UMTS 1900 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.875	0.030	0.905
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.805	0.034	0.839
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.805	0.039	0.844
Ant 3 LTE Band 41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.805	0.030	0.835
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.869	0.034	0.903
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.869	0.039	0.908
Ant 3 NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.869	0.030	0.899

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.8 Combination 2: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.8.1 Bottom Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 13	Ant 4a 2.4 GHz Bluetooth	0.026 + 0.040	0.016 + 0.025	0.041
Ant 3 NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.027 + 0.040	0.017 + 0.025	0.042
Ant 3 LTE Band 7	Ant 4a 2.4 GHz Bluetooth	0.006 + 0.040	0.004 + 0.025	0.029
Ant 3 NR Band n48	Ant 4a 2.4 GHz Bluetooth	0.016 + 0.040	0.010 + 0.025	0.035

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b UMTS 1900	Ant 2a 2.4 GHz WIFI	1.184 + 0.170	0.740 + 0.106	0.846
Ant 2b NR Band n41	Ant 2a 2.4 GHz WIFI	1.173 + 0.170	0.733 + 0.106	0.839
Ant 2b LTE Band 48	Ant 2a 2.4 GHz WIFI	1.173 + 0.170	0.733 + 0.106	0.839

E.4.8.2 Bottom Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.041	0.846	0.887
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.041	0.839	0.880
Ant 3 LTE Band 13 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.041	0.839	0.880
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.042	0.846	0.888
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.042	0.839	0.881
Ant 3 NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.042	0.839	0.881
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.029	0.846	0.875
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.029	0.839	0.868
Ant 3 LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.029	0.839	0.868
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.035	0.846	0.881
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.035	0.839	0.874
Ant 3 NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.035	0.839	0.874

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.9 Combination 2: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.9.1 Left Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 UMTS 850	Ant 4a 2.4 GHz WIFI	0.051 + 0.380	0.032 + 0.238	0.270
Ant 3 LTE Band 66	Ant 4a 2.4 GHz WIFI	0.046 + 0.380	0.029 + 0.238	0.267
Ant 3 NR Band n41	Ant 4a 2.4 GHz WIFI	0.036 + 0.380	0.023 + 0.238	0.261
Ant 3 NR Band n77 DoD	Ant 4a 2.4 GHz WIFI	0.028 + 0.380	0.018 + 0.238	0.256

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b NR Band n25	Ant wf5b 5 GHz WIFI	0.017 + 0.047	0.011 + 0.029	0.040
Ant 2b NR Band n7	Ant wf5b 5 GHz WIFI	0.061 + 0.047	0.038 + 0.029	0.067
Ant 2b NR Band n77	Ant wf5b 5 GHz WIFI	0.021 + 0.047	0.013 + 0.029	0.042

E.4.9.2 Left Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.270	0.040	0.310
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.270	0.067	0.337
Ant 3 UMTS 850 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.270	0.042	0.312
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.267	0.040	0.307
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.267	0.067	0.334
Ant 3 LTE Band 66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.267	0.042	0.309
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.261	0.040	0.301
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.261	0.067	0.328
Ant 3 NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.261	0.042	0.303
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.256	0.040	0.296
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.256	0.067	0.323
Ant 3 NR Band n77 DoD + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.256	0.042	0.298

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.10 Combination 2: AC1 (Ant 3 + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.10.1 Right Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 3 LTE Band 12	Ant 4a 2.4 GHz Bluetooth	0.387 + 0.006	0.242 + 0.004	0.246
Ant 3 NR Band n66	Ant 4a 2.4 GHz Bluetooth	0.276 + 0.006	0.173 + 0.004	0.177
Ant 3 NR Band n7	Ant 4a 2.4 GHz Bluetooth	0.364 + 0.006	0.228 + 0.004	0.232
Ant 3 NR Band n77	Ant 4a 2.4 GHz Bluetooth	1.176 + 0.006	0.735 + 0.004	0.739

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b LTE Band 66	Ant 2a 2.4 GHz WIFI	0.114 + 0.380	0.071 + 0.238	0.309
Ant 2b NR Band n30	Ant 2a 2.4 GHz WIFI	0.105 + 0.380	0.066 + 0.238	0.304
Ant 2b LTE Band 48	Ant 2a 2.4 GHz WIFI	0.060 + 0.380	0.038 + 0.238	0.276

E.4.10.2 Right Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b	a+b	D _{a-b}	(a+b) ^{1.5} /D _{a-b}
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.246	0.309	0.555	163.85	0.00
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.246	0.304	0.550	163.85	0.00
Ant 3 LTE Band 12 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.246	0.276	0.522	163.85	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.177	0.309	0.486	163.85	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.177	0.304	0.481	163.85	0.00
Ant 3 NR Band n66 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.177	0.276	0.453	163.85	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.232	0.309	0.541	163.85	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.232	0.304	0.536	163.85	0.00
Ant 3 NR Band n7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.232	0.276	0.508	163.85	0.00
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.739	0.309	1.048	163.85	0.01
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.739	0.304	1.043	163.85	0.01
Ant 3 NR Band n77 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.739	0.276	1.015	163.85	0.01

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E.4.11 Combination 3: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.11.1 Back Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n66	Ant 4a 5 GHz WIFI	1.087 + 0.400	0.679 + 0.250	0.929
Ant 4b LTE Band 41	Ant 4a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 4b NR Band n48	Ant 4a 5 GHz WIFI	0.852 + 0.400	0.533 + 0.250	0.783

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 LTE Band 26	Ant 2a 5 GHz WIFI	1.185 + 0.400	0.741 + 0.250	0.991
Ant 1 NR Band n25	Ant 2a 5 GHz WIFI	0.797 + 0.400	0.498 + 0.250	0.748
Ant 1 NR Band n7	Ant 2a 5 GHz WIFI	1.182 + 0.400	0.739 + 0.250	0.989
Ant 1 NR Band n77 DoD	Ant 2a 5 GHz WIFI	1.175 + 0.400	0.734 + 0.250	0.984

E.4.11.2 Back Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b	a+b	D _{a-b}	(a+b) ^{1.5} /D _{a-b}
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.929	0.991	1.920	256.58	0.01
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.929	0.748	1.677	256.58	0.01
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.929	0.989	1.918	256.58	0.01
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.929	0.984	1.913	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.990	0.991	1.981	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.990	0.748	1.738	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.990	0.989	1.979	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.990	0.984	1.974	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 1 LTE Band 26 + Ant 2a 5 GHz WIFI	0.783	0.991	1.774	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n25 + Ant 2a 5 GHz WIFI	0.783	0.748	1.531	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n7 + Ant 2a 5 GHz WIFI	0.783	0.989	1.772	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 1 NR Band n77 DoD + Ant 2a 5 GHz WIFI	0.783	0.984	1.767	256.58	0.01

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E.4.12 Combination 3: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.12.1 Top Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz WIFI	1.180 + 0.220	0.738 + 0.138	0.876
Ant 4b LTE Band 7	Ant 4a 2.4 GHz WIFI	1.066 + 0.220	0.666 + 0.138	0.804
Ant 4b LTE Band 48	Ant 4a 2.4 GHz WIFI	1.185 + 0.220	0.741 + 0.138	0.879

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 LTE Band 71	Ant 2a 802.15.4	0.034 + 0.038	0.021 + 0.024	0.045
Ant 1 NR Band n70	Ant 2a 802.15.4	0.016 + 0.038	0.010 + 0.024	0.034
Ant 1 NR Band n30	Ant 2a 802.15.4	0.019 + 0.038	0.012 + 0.024	0.036
Ant 1 NR Band n77	Ant 2a 802.15.4	0.028 + 0.038	0.018 + 0.024	0.042

E.4.12.2 Top Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.876	0.045	0.921
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.876	0.034	0.910
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.876	0.036	0.912
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.876	0.042	0.918
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.804	0.045	0.849
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.804	0.034	0.838
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.804	0.036	0.840
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.804	0.042	0.846
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 71 + Ant 2a 802.15.4	0.879	0.045	0.924
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant 2a 802.15.4	0.879	0.034	0.913
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n30 + Ant 2a 802.15.4	0.879	0.036	0.915
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant 2a 802.15.4	0.879	0.042	0.921

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.13 Combination 3: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.13.1 Bottom Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.019 + 0.040	0.012 + 0.025	0.037
Ant 4b NR Band n30	Ant 4a 2.4 GHz Bluetooth	0.014 + 0.040	0.009 + 0.025	0.034

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n26	Ant 2a 2.4 GHz WIFI	0.748 + 0.170	0.468 + 0.106	0.574
Ant 1 LTE Band 66	Ant 2a 2.4 GHz WIFI	1.193 + 0.170	0.746 + 0.106	0.852
Ant 1 NR Band n30	Ant 2a 2.4 GHz WIFI	1.180 + 0.170	0.738 + 0.106	0.844
Ant 1 LTE Band 48	Ant 2a 2.4 GHz WIFI	1.101 + 0.170	0.688 + 0.106	0.794

E.4.13.2 Bottom Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.037	0.574	0.611
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.037	0.852	0.889
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.037	0.844	0.881
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.037	0.794	0.831
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.034	0.574	0.608
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.034	0.852	0.886
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.034	0.844	0.878
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 1 LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.034	0.794	0.828

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.14 Combination 3: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.14.1 Left Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n66	Ant 4a 2.4 GHz WIFI	0.089 + 0.380	0.056 + 0.238	0.294
Ant 4b NR Band n41	Ant 4a 2.4 GHz WIFI	0.073 + 0.380	0.046 + 0.238	0.284
Ant 4b NR Band n48	Ant 4a 2.4 GHz WIFI	0.052 + 0.380	0.033 + 0.238	0.271

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n14	Ant wf5b 5 GHz WIFI	0.325 + 0.047	0.203 + 0.029	0.232
Ant 1 NR Band n70	Ant wf5b 5 GHz WIFI	0.121 + 0.047	0.076 + 0.029	0.105
Ant 1 LTE Band 30	Ant wf5b 5 GHz WIFI	0.444 + 0.047	0.278 + 0.029	0.307
Ant 1 NR Band n77	Ant wf5b 5 GHz WIFI	1.173 + 0.047	0.733 + 0.029	0.762

E.4.14.2 Left Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b	a+b	D _{a,b}	(a+b) ^{1.5} /D _{a,b}
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.294	0.232	0.526	212.3	0.00
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.294	0.105	0.399	212.3	0.00
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.294	0.307	0.601	212.3	0.00
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.294	0.762	1.056	212.3	0.01
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.284	0.232	0.516	212.3	0.00
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.284	0.105	0.389	212.3	0.00
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.284	0.307	0.591	212.3	0.00
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.284	0.762	1.046	212.3	0.01
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n14 + Ant wf5b 5 GHz WIFI	0.271	0.232	0.503	212.3	0.00
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n70 + Ant wf5b 5 GHz WIFI	0.271	0.105	0.376	212.3	0.00
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 LTE Band 30 + Ant wf5b 5 GHz WIFI	0.271	0.307	0.578	212.3	0.00
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 1 NR Band n77 + Ant wf5b 5 GHz WIFI	0.271	0.762	1.033	212.3	0.01

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E.4.15 Combination 3: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 1 + Ant WF5B,2a)

E.4.15.1 Right Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.016 + 0.006	0.010 + 0.004	0.014
Ant 4b LTE Band 7	Ant 4a 2.4 GHz Bluetooth	0.036 + 0.006	0.023 + 0.004	0.027
Ant 4b NR Band n48	Ant 4a 2.4 GHz Bluetooth	0.021 + 0.006	0.013 + 0.004	0.017

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 1 NR Band n26	Ant 2a 2.4 GHz WIFI	0.058 + 0.380	0.036 + 0.238	0.274
Ant 1 NR Band n70	Ant 2a 2.4 GHz WIFI	0.020 + 0.380	0.013 + 0.238	0.251
Ant 1 NR Band n30	Ant 2a 2.4 GHz WIFI	0.028 + 0.380	0.018 + 0.238	0.256
Ant 1 NR Band n77 DoD	Ant 2a 2.4 GHz WIFI	0.022 + 0.380	0.014 + 0.238	0.252

E.4.15.2 Right Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.014	0.274	0.288
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.014	0.251	0.265
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.014	0.256	0.270
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.014	0.252	0.266
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.027	0.274	0.301
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.027	0.251	0.278
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.027	0.256	0.283
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.027	0.252	0.279
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n26 + Ant 2a 2.4 GHz WIFI	0.017	0.274	0.291
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n70 + Ant 2a 2.4 GHz WIFI	0.017	0.251	0.268
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n30 + Ant 2a 2.4 GHz WIFI	0.017	0.256	0.273
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 1 NR Band n77 DoD + Ant 2a 2.4 GHz WIFI	0.017	0.252	0.269

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.16 Combination 4: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.16.1 Back Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n66	Ant 4a 5 GHz WIFI	1.087 + 0.400	0.679 + 0.250	0.929
Ant 4b LTE Band 41	Ant 4a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 4b NR Band n48	Ant 4a 5 GHz WIFI	0.852 + 0.400	0.533 + 0.250	0.783

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b UMTS 1900	Ant 2a 5 GHz WIFI	1.120 + 0.400	0.700 + 0.250	0.950
Ant 2b NR Band n41	Ant 2a 5 GHz WIFI	1.184 + 0.400	0.740 + 0.250	0.990
Ant 2b NR Band n77	Ant 2a 5 GHz WIFI	1.111 + 0.400	0.694 + 0.250	0.944

E.4.16.2 Back Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio 1:	Exposure Ratio 2:			
		a	b			
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.929	0.950	1.879	256.58	0.01
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.929	0.990	1.919	256.58	0.01
Ant 4b NR Band n66 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.929	0.944	1.873	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.990	0.950	1.940	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.990	0.990	1.980	256.58	0.01
Ant 4b LTE Band 41 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.990	0.944	1.934	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 2b UMTS 1900 + Ant 2a 5 GHz WIFI	0.783	0.950	1.733	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n41 + Ant 2a 5 GHz WIFI	0.783	0.990	1.773	256.58	0.01
Ant 4b NR Band n48 + Ant 4a 5 GHz WIFI	Ant 2b NR Band n77 + Ant 2a 5 GHz WIFI	0.783	0.944	1.727	256.58	0.01

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E.4.17 Combination 4: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.17.1 Top Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz WIFI	1.180 + 0.220	0.738 + 0.138	0.876
Ant 4b LTE Band 7	Ant 4a 2.4 GHz WIFI	1.066 + 0.220	0.666 + 0.138	0.804
Ant 4b LTE Band 48	Ant 4a 2.4 GHz WIFI	1.185 + 0.220	0.741 + 0.138	0.879

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b NR Band n70	Ant 2a 802.15.4	0.016 + 0.038	0.010 + 0.024	0.034
Ant 2b LTE Band 7	Ant 2a 802.15.4	0.024 + 0.038	0.015 + 0.024	0.039
Ant 2b NR Band n48	Ant 2a 802.15.4	0.010 + 0.038	0.006 + 0.024	0.030

E.4.17.2 Top Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.876	0.034	0.910
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.876	0.039	0.915
Ant 4b NR Band n25 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.876	0.030	0.906
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.804	0.034	0.838
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.804	0.039	0.843
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.804	0.030	0.834
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n70 + Ant 2a 802.15.4	0.879	0.034	0.913
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 2b LTE Band 7 + Ant 2a 802.15.4	0.879	0.039	0.918
Ant 4b LTE Band 48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n48 + Ant 2a 802.15.4	0.879	0.030	0.909

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.18 Combination 4: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.18.1 Bottom Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.019 + 0.040	0.012 + 0.025	0.037
Ant 4b NR Band n30	Ant 4a 2.4 GHz Bluetooth	0.014 + 0.040	0.009 + 0.025	0.034

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b UMTS 1900	Ant 2a 2.4 GHz WIFI	1.184 + 0.170	0.740 + 0.106	0.846
Ant 2b NR Band n41	Ant 2a 2.4 GHz WIFI	1.173 + 0.170	0.733 + 0.106	0.839
Ant 2b LTE Band 48	Ant 2a 2.4 GHz WIFI	1.173 + 0.170	0.733 + 0.106	0.839

E.4.18.2 Bottom Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.037	0.846	0.883
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.037	0.839	0.876
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.037	0.839	0.876
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 2b UMTS 1900 + Ant 2a 2.4 GHz WIFI	0.034	0.846	0.880
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n41 + Ant 2a 2.4 GHz WIFI	0.034	0.839	0.873
Ant 4b NR Band n30 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.034	0.839	0.873

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.19 Combination 4: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.19.1 Left Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n66	Ant 4a 2.4 GHz WIFI	0.089 + 0.380	0.056 + 0.238	0.294
Ant 4b NR Band n41	Ant 4a 2.4 GHz WIFI	0.073 + 0.380	0.046 + 0.238	0.284
Ant 4b NR Band n48	Ant 4a 2.4 GHz WIFI	0.052 + 0.380	0.033 + 0.238	0.271

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b NR Band n25	Ant wf5b 5 GHz WIFI	0.017 + 0.047	0.011 + 0.029	0.040
Ant 2b NR Band n7	Ant wf5b 5 GHz WIFI	0.061 + 0.047	0.038 + 0.029	0.067
Ant 2b NR Band n77	Ant wf5b 5 GHz WIFI	0.021 + 0.047	0.013 + 0.029	0.042

E.4.19.2 Left Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.294	0.040	0.334
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.294	0.067	0.361
Ant 4b NR Band n66 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.294	0.042	0.336
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.284	0.040	0.324
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.284	0.067	0.351
Ant 4b NR Band n41 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.284	0.042	0.326
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n25 + Ant wf5b 5 GHz WIFI	0.271	0.040	0.311
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n7 + Ant wf5b 5 GHz WIFI	0.271	0.067	0.338
Ant 4b NR Band n48 + Ant 4a 2.4 GHz WIFI	Ant 2b NR Band n77 + Ant wf5b 5 GHz WIFI	0.271	0.042	0.313

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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E.4.20 Combination 4: AC1 (Ant 4b + Ant 4a) and AC2 (Ant 2b + Ant WF5B,2a)

E.4.20.1 Right Antenna Cluster Summation

Antenna Cluster 1				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC1 Sum (ER)
Ant 4b NR Band n25	Ant 4a 2.4 GHz Bluetooth	0.016 + 0.006	0.010 + 0.004	0.014
Ant 4b LTE Band 7	Ant 4a 2.4 GHz Bluetooth	0.036 + 0.006	0.023 + 0.004	0.027
Ant 4b NR Band n48	Ant 4a 2.4 GHz Bluetooth	0.021 + 0.006	0.013 + 0.004	0.017

Antenna Cluster 2				
Ant "a"	Ant "b"	a + b (W/kg)	a + b (ER)	AC2 Sum (ER)
Ant 2b LTE Band 66	Ant 2a 2.4 GHz WIFI	0.114 + 0.380	0.071 + 0.238	0.309
Ant 2b NR Band n30	Ant 2a 2.4 GHz WIFI	0.105 + 0.380	0.066 + 0.238	0.304
Ant 2b LTE Band 48	Ant 2a 2.4 GHz WIFI	0.060 + 0.380	0.038 + 0.238	0.276

E.4.20.2 Right Antenna Cluster 1 + 2 SPLSR

AC1	AC2	Standalone Values		Standalone ER Sum
		Exposure Ratio 1:	Exposure Ratio 2:	
		a	b	a+b
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.014	0.309	0.323
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.014	0.304	0.318
Ant 4b NR Band n25 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.014	0.276	0.290
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.027	0.309	0.336
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.027	0.304	0.331
Ant 4b LTE Band 7 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.027	0.276	0.303
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 66 + Ant 2a 2.4 GHz WIFI	0.017	0.309	0.326
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b NR Band n30 + Ant 2a 2.4 GHz WIFI	0.017	0.304	0.321
Ant 4b NR Band n48 + Ant 4a 2.4 GHz Bluetooth	Ant 2b LTE Band 48 + Ant 2a 2.4 GHz WIFI	0.017	0.276	0.293

Any combination where the sum is less than or equal to the applicable Exposure Ratio limit is considered validated and can be excluded from further evaluation.

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