

NR

Body SAR															
P-sensor	Band	Mode	Freq	channel	RB	Offset	distance (mm)	Ant Vendor	Ant	Test Position	Max Tune-up (dBm)	AVG Power (dBm)	SAR 1g	Reported SAR 1g	Note
on	NR n2	QPSK30M	1880.00	376000	1	1	0	SPEED	MIMO2	Bottom	18.00	17.85	0.185	0.192	
		QPSK30M	1880.00	376000	80	0	0			Bottom	17.00	16.96	0.191	0.193	
off		QPSK30M	1880.00	376000	1	1	14			Bottom	24.00	23.29	0.154	0.181	
		QPSK30M	1880.00	376000	80	0	14			Bottom	23.00	22.25	0.187	0.222	
on	NR n5	QPSK25M	836.50	167300	1	1	0	SPEED	Main	Bottom	21.00	20.76	0.471	0.498	
		QPSK25M	836.50	167300	64	0	0			Bottom	20.00	19.90	0.540	0.553	
off		QPSK25M	836.50	167300	1	1	14			Bottom	24.00	23.07	0.181	0.224	
		QPSK25M	836.50	167300	64	0	14			Bottom	23.00	22.28	0.212	0.250	
on	NR n7	QPSK50M	2535.00	507000	1	1	0	SPEED	MIMO2	Bottom	12.00	11.60	0.071	0.078	
		QPSK50M	2535.00	507000	135	0	0			Bottom	11.00	10.65	0.070	0.076	
off		QPSK50M	2535.00	507000	1	1	14			Bottom	24.00	23.48	0.293	0.330	
		QPSK50M	2535.00	507000	135	0	14			Bottom	23.00	22.39	0.365	0.420	
on	NR n12	QPSK15M	707.50	141500	1	1	0	SPEED	Main	Bottom	22.50	22.38	0.920	0.946	
		QPSK15M	706.50	141300	1	1	0			Bottom	22.50	22.26	0.921	0.973	1
		QPSK15M	708.50	141700	1	1	0			Bottom	22.50	22.20	0.919	0.985	1
		QPSK15M	707.50	141500	36	0	0			Bottom	21.50	21.33	1.070	1.113	
		QPSK15M	706.50	141300	36	0	0			Bottom	21.50	21.30	1.050	1.099	1
		QPSK15M	708.50	141700	36	0	0			Bottom	21.50	21.32	1.070	1.115	1
		QPSK15M	707.50	141500	75	0	0			Bottom	21.50	21.29	1.090	1.144	1
		QPSK15M	707.50	141500	1	1	14			Bottom	24.00	23.12	0.205	0.251	
off		QPSK15M	707.50	141500	36	0	14	Bottom	23.00	22.32	0.252	0.295			
on	NR n14	QPSK10M	793.00	158600	1	1	0	SPEED	Main	Bottom	21.50	21.34	0.571	0.592	
		QPSK10M	793.00	158600	25	0	0			Bottom	20.50	20.38	0.644	0.662	
off		QPSK10M	793.00	158600	1	1	14			Bottom	24.00	23.15	0.290	0.353	
		QPSK10M	793.00	158600	25	0	14			Bottom	23.00	22.35	0.276	0.321	
on	NR n25	QPSK45M	1882.50	376500	1	1	0	SPEED	MIMO2	Bottom	17.50	17.44	0.191	0.194	
		QPSK45M	1882.50	376500	120	0	0			Bottom	16.50	16.49	0.197	0.197	
off		QPSK45M	1882.50	376500	1	1	14			Bottom	24.00	23.45	0.200	0.227	
		QPSK45M	1882.50	376500	120	0	14			Bottom	23.00	22.35	0.197	0.229	
on	NR n26	QPSK20M	834.00	166800	1	1	0	SPEED	Main	Bottom	22.00	21.77	0.587	0.619	
		QPSK20M	834.00	166800	50	0	0			Bottom	21.00	20.92	0.681	0.694	
off		QPSK20M	834.00	166800	1	1	14			Bottom	24.00	22.98	0.229	0.290	
		QPSK20M	834.00	166800	50	0	14			Bottom	23.00	21.85	0.213	0.278	
on	NR n30	QPSK10M	2310.00	462000	1	1	0	SPEED	MIMO2	Bottom	14.00	13.72	0.109	0.116	
		QPSK10M	2310.00	462000	25	0	0			Bottom	13.00	12.77	0.110	0.116	
off		QPSK10M	2310.00	462000	1	1	14			Bottom	23.00	22.20	0.284	0.341	
		QPSK10M	2310.00	462000	25	0	14			Bottom	22.00	21.36	0.262	0.304	
on	NR n38	QPSK40M	2595.00	519000	1	1	0	SPEED	MIMO2	Bottom	18.00	17.99	0.124	0.124	
		QPSK40M	2595.00	519000	108	0	0			Bottom	17.00	16.87	0.135	0.139	
off		QPSK40M	2595.00	519000	1	1	14			Bottom	24.00	23.21	0.147	0.176	
		QPSK40M	2595.00	519000	108	0	14			Bottom	23.00	22.45	0.138	0.157	
on	NR n41	QPSK100M	2592.99	518598	1	1	0	SPEED	Main	Bottom	21.00	20.76	0.898	0.949	
		QPSK100M	2546.01	509202	1	1	0			Bottom	21.00	20.63	0.789	0.859	1
		QPSK100M	2640.00	528000	1	1	0			Bottom	21.00	20.32	0.893	1.044	1
		QPSK100M	2592.99	518598	135	0	0			Bottom	20.00	19.99	1.110	1.113	
		QPSK100M	2546.01	509202	135	0	0			Bottom	20.00	19.96	1.020	1.029	1
		QPSK100M	2640.00	528000	135	0	0			Bottom	20.00	19.93	1.160	1.179	1
		QPSK100M	2640.00	528000	135	0	0			Bottom	20.00	19.93	1.060	1.077	2
		QPSK100M	2592.99	518598	270	0	0			Bottom	20.00	19.97	1.110	1.118	1
		QPSK100M	2592.99	518598	1	1	14			Bottom	24.00	23.89	0.289	0.296	
		QPSK100M	2592.99	518598	135	0	14			Bottom	23.00	22.77	0.355	0.374	
	off	NR n41 (HPUE)	QPSK100M	2592.99	518598	1	1	14		Bottom	27.00	25.85	0.282	0.367	
	QPSK100M		2592.99	518598	135	0	14	Bottom		26.00	24.81	0.346	0.455		
on	NR n41	QPSK100M	2592.99	518598	1	1	0	SPEED	MIMO2	Bottom	16.00	15.92	0.103	0.105	
		QPSK100M	2592.99	518598	135	0	0			Bottom	15.00	14.96	0.102	0.103	
off		QPSK100M	2592.99	518598	1	1	14			Bottom	24.00	23.98	0.488	0.490	
		QPSK100M	2592.99	518598	135	0	14			Bottom	23.00	22.81	0.558	0.583	
	NR n41 (HPUE)	QPSK100M	2592.99	518598	1	1	14	Bottom	27.00	25.86	0.509	0.662			
		QPSK100M	2592.99	518598	135	0	14	Bottom	26.00	24.81	0.571	0.751			
on	NR n48 (For FCC)	QPSK40M	3624.99	641666	1	1	0	SPEED	MIMO2	Bottom	16.50	16.19	0.022	0.023	
		QPSK40M	3624.99	641666	108	0	0			Bottom	15.50	15.38	0.057	0.059	
off		QPSK40M	3624.99	641666	1	1	14			Bottom	22.00	20.98	0.057	0.072	
		QPSK40M	3624.99	641666	108	0	14			Bottom	21.00	19.87	0.054	0.070	
on	NR n66	QPSK45M	1745.00	349000	1	1	0	SPEED	MIMO2	Bottom	15.00	14.93	0.222	0.226	
		QPSK45M	1745.00	349000	120	0	0			Bottom	14.00	13.98	0.233	0.234	
off		QPSK45M	1745.00	349000	1	1	14			Bottom	24.00	23.33	0.345	0.403	
		QPSK45M	1745.00	349000	120	0	14			Bottom	23.00	22.36	0.362	0.419	
on	NR n71	QPSK20M	680.50	136100	1	1	0	SPEED	Main	Bottom	22.50	22.42	0.702	0.715	
		QPSK20M	680.50	136100	50	0	0			Bottom	21.50	21.48	0.831	0.835	
		QPSK20M	673.00	134600	50	0	0			Bottom	21.50	21.33	0.716	0.745	1
		QPSK20M	688.00	137600	50	0	0			Bottom	21.50	21.44	0.849	0.861	1
		QPSK20M	680.50	136100	100	0	0			Bottom	21.50	21.43	0.872	0.886	1
		QPSK20M	680.50	136100	1	1	14			Bottom	24.00	22.80	0.193	0.254	
		QPSK20M	680.50	136100	50	0	14			Bottom	23.00	21.76	0.189	0.251	
off			QPSK20M	680.50	136100	50	0			14	Bottom	23.00	21.76	0.189	0.251

Body SAR																	
P-sensor	Band	Mode	Freq	channel	RB	Offset	distance (mm)	Ant Vendor	Ant	Test Position	Max Tune-up (dBm)	AVG Power (dBm)	SAR 1g	Reported SAR 1g	Note		
on	NR n77/78	QPSK100M	3750.00	650000	1	1	0	SPEED	Main	Bottom	16.00	15.98	0.203	0.204			
		QPSK100M	3750.00	650000	135	0	0			Bottom	15.00	14.98	0.212	0.213			
QPSK100M		3750.00	650000	1	1	14	Bottom			24.00	23.93	0.643	0.653				
QPSK100M		3750.00	650000	135	0	14	Bottom			23.00	22.91	0.772	0.788				
off	NR n77/78 (HPUE)	QPSK100M	3750.00	650000	1	1	14			Bottom	27.00	25.67	0.576	0.782			
		QPSK100M	3750.00	650000	135	0	14			Bottom	26.00	24.87	0.694	0.900			
		QPSK100M	3500.01	633334	135	0	14			Bottom	26.00	24.71	0.479	0.645	1		
		QPSK100M	3930.00	662000	135	0	14			Bottom	26.00	24.72	0.738	0.991	1		
		QPSK100M	3750.00	650000	135	0	14			Bottom	26.00	24.71	0.722	0.972	1		
		QPSK100M	3750.00	650000	1	1	0			Bottom	14.00	13.78	0.261	0.275			
on	NR n77/78	QPSK100M	3750.00	650000	135	0	0			SPEED	MIMO2	Bottom	13.00	12.80	0.216	0.226	
QPSK100M		3750.00	650000	1	1	19	Bottom					24.00	23.86	0.448	0.463		
QPSK100M		3750.00	650000	135	0	19	Bottom	23.00	22.85			0.608	0.629				
QPSK100M		3750.00	650000	1	1	19	Bottom	27.00	25.85			0.456	0.594				
off	NR n77/78 (HPUE)	QPSK100M	3750.00	650000	135	0	19	Bottom	26.00			24.81	0.612	0.805			
		QPSK100M	3500.01	633334	135	0	19	Bottom	26.00			24.71	0.532	0.716	1		
		QPSK100M	3930.00	662000	135	0	19	Bottom	26.00			24.53	0.747	1.048	1		
		QPSK100M	3750.00	650000	270	0	19	Bottom	26.00			24.84	0.742	0.969	1		

Note:

- Highest reported SAR is > 0.8 W/kg. Added second highest power channel for this test position.
- Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg. If the measured SAR values are < 1.45 W/kg with $\leq 20\%$ variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns.

Original SAR = 1.160 W/kg, therefore second times repeat SAR is required.

Repeat SAR = 1.060 W/kg < 1.45 W/kg

SAR variation= -8.62% < 20%

11. SIMULTANEOUS TRANSMISSION CONDITIONS

11.1. Stand-alone SAR test exclusion

SAR compliance for simultaneous transmission must be considered when the maximum duration of overlapping transmissions, including network hand-offs, is greater than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis.

The Simultaneous Transmission Possibilities of this device are as below:

No.	Configuration	Body
1	WWAN + WiFi2.4G	Yes
2	WWAN + BT	Yes
3	WWAN + WiFi5G	Yes
4	WWAN + WiFi6G	Yes
5	WWAN(Main)+ WWAN(MIMO 2)	Yes
6	WiFi2.4G(Main) +BT	Yes
7	WiFi5G(Main) + BT	Yes
8	WiFi6G(Main) + BT	Yes
9	WiFi2.4G(Main) + WiFi2.4G(Aux)	Yes
10	WiFi5G(Main) + WiFi5G(Aux)	Yes
11	WiFi6G(Main) + WiFi 6G(Aux)	Yes

Note:

1. UMTS & LTE share the same antenna and can't transmit simultaneously.
2. Based on this report (No.: BTL-FCC SAR-1-2504T032) , to add Intel BE200NGW (FCC: PD9BE200NG) , to evaluate Sim-Tx analysis.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D04, simultaneous transmission SAR is compliant if.
 - 1) Scalar SAR summation < 1.6W/kg.
 - 2) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, 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.
 - 3) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - 4) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg
 - 5) The SPLSR calculated results please refer to section 11.3.

11.2. Simultaneous transmission conditions

SAR1g(W/kg)	Test Position
	Bottom
WLAN 2.4G WiFi_Main	1.590
WLAN 2.4G WiFi_Aux	1.590
UNII_1 & 2a WiFi_Main	1.590
UNII_1 & 2a WiFi_Aux	1.590
UNII_2c WiFi_Main	1.590
UNII_2c WiFi_Aux	1.590
UNII_3 WiFi_Main	1.590
UNII_3 WiFi_Aux	1.590
UNII_4 WiFi_Main	1.590
UNII_4 WiFi_Aux	1.590
UNII_5 WiFi_Main	1.590
UNII_5 WiFi_Aux	1.590
UNII_6 WiFi_Main	1.590
UNII_6 WiFi_Aux	1.590
UNII_7 WiFi_Main	1.590
UNII_7 WiFi_Aux	1.590
UNII_8 WiFi_Main	1.590
UNII_8 WiFi_Aux	1.590
BT	1.590
BLE	1.590

SAR1g(W/kg)	Test Position
	Bottom
WCDMA Band II	0.596
WCDMA Band IV	1.091
WCDMA Band V	0.498
LTE Band 2/25	0.365
LTE Band 4/66	0.682
LTE Band 5/26	0.430
LTE Band 7	0.643
LTE Band 12	1.006
LTE Band 13	0.792
LTE Band 14	0.599
LTE Band 17	0.928
LTE Band 30	0.394
LTE Band 38	0.213
LTE Band 41	0.242
LTE Band 42	0.223
LTE Band 43	0.136
LTE Band 48	0.100
LTE Band 71	1.047

SAR1g(W/kg)	Test Position	Bottom
NR n2		0.222
NR n5		0.553
NR n7		0.420
NR n12		1.144
NR n14		0.662
NR n25		0.229
NR n26		0.694
NR n30		0.341
NR n38		0.176
NR n41		1.179
NR n41 (MIMO 2)		0.751
NR n48		0.087
NR n66		0.419
NR n71		0.886
NR n77/78		0.991
NR n77/78 (MIMO 2)		1.048
WWAN+WLAN MAX Σ SAR _{10g}		2.769
WWAN+BT MAX Σ SAR _{10g}		2.769
WLAN_Main+WLAN_Aux MAX Σ SAR _{10g}		3.180
WLAN+BT MAX Σ SAR _{10g}		3.180
WWAN_Main+WLAN_Main MAX Σ SAR _{10g}		2.769

Test Position SAR1g(W/kg)	Bottom
WWAN_Main+WLAN_Aux MAX Σ SAR _{10g}	2.769
WWAN_MIMO 2+WLAN_Main MAX Σ SAR _{10g}	2.681
WWAN_MIMO 2+WLAN_Aux MAX Σ SAR _{10g}	2.681
WWAN_Main+WLAN_Main + WLAN_Aux MAX Σ SAR _{10g}	4.359
WWAN_MIMO 2+WLAN_Main + WLAN_Aux MAX Σ SAR _{10g}	4.271
WWAN_Main+WWAN_MIMO 2 + WLAN_Main MAX Σ SAR _{10g}	3.860
WWAN_Main+WWAN_MIMO 2 + WLAN_Aux MAX Σ SAR _{10g}	3.860
WWAN_Main+WWAN_MIMO 2 + WLAN_Main+ WLAN_Aux MAX Σ SAR _{10g}	5.450
WWAN 3G Main + WWAN 3G MIMO 2 MAX Σ SAR _{10g}	1.589
WWAN 3G Main + WWAN 4G MIMO 2 MAX Σ SAR _{10g}	1.773
WWAN 3G Main + WWAN 5G MIMO 2 MAX Σ SAR _{10g}	1.546
WWAN 3G MIMO 2 + WWAN 4G Main MAX Σ SAR _{10g}	2.138
WWAN 3G MIMO 2 + WWAN 5G Main MAX Σ SAR _{10g}	2.270

SAR1g(W/kg) / Test Position	Bottom
WWAN 4G Main + WWAN 4G MIMO 2 MAX Σ SAR ₁₀	1.729
WWAN 4G Main + WWAN 5G MIMO 2 MAX Σ SAR ₁₀	2.095
WWAN 4G MIMO 2 + WWAN 5G Main MAX Σ SAR _{10g}	1.861
WWAN 5G Main + WWAN 5G MIMO 2 MAX Σ SAR ₁₀	2.227

Note:

1. MAX. Σ SAR_{10g} = 5.450 W/Kg > 1.6 W/Kg, so Peak location SAR are required for WiFi, WWAN and Bluetooth.

11.3. SPLSR Evaluation and Analysis

Note:

1. According to antenna location the minimum distance between each transmit antenna is using for SPLSR analysis.
2. $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.

Band	Position	SAR (W/kg)	Summed SAR (W/kg)	Gap (mm)	Minimum distance (mm)	SPLSR Results	Simultaneous SAR
Maximum WWAN Main	Bottom Side	1.179	2.270	0mm	270.5	0.01	Not required
Maximum WWAN MIMO2		1.091		14mm			
WLAN_Main	Bottom Side	1.590	3.180	0mm	152	0.04	Not required
WLAN_Aux		1.590		0mm			
Maximum WWAN Main	Bottom Side	1.179	2.769	0mm	220	0.02	Not required
WLAN_Main		1.590		0mm			
Maximum WWAN Main	Bottom Side	1.179	2.769	0mm	262	0.02	Not required
WLAN_Aux		1.590		0mm			
Maximum WWAN MIMO2	Bottom Side	1.091	2.681	14mm	290	0.02	Not required
WLAN_Main		1.590		0mm			
Maximum WWAN MIMO2	Bottom Side	1.091	2.681	14mm	220	0.02	Not required
WLAN_Aux		1.590		0mm			
Maximum WWAN Main	Bottom Side	1.179	4.359	0mm	262	0.03	Not required
WLAN_Main		1.590		0mm			
WLAN_Aux		1.590		0mm			
Maximum WWAN MIMO2	Bottom Side	1.091	4.271	14mm	290	0.03	Not required
WLAN_Main		1.590		0mm			
WLAN_Aux		1.590		0mm			

Band	Position	SAR (W/kg)	Summed SAR (W/kg)	Gap (mm)	Minimum distance (mm)	SPLSR Results	Simultaneous SAR
Maximum WWAN Main	Bottom Side	1.179	3.860	0mm	290	0.03	Not required
Maximum WWAN MIMO2		1.091		14mm			
WLAN_Main		1.590		0mm			
Maximum WWAN Main	Bottom Side	1.179	3.860	0mm	270.5	0.03	Not required
Maximum WWAN MIMO2		1.091		14mm			
WLAN_Aux		1.590		0mm			
Maximum WWAN Main	Bottom Side	1.179	5.450	0mm	290	0.04	Not required
Maximum WWAN MIMO2		1.091		14mm			
WLAN_Main		1.590		0mm			
WLAN_Aux		1.590		0mm			

12. Test Layout

Specific Absorption Rate Test Layout

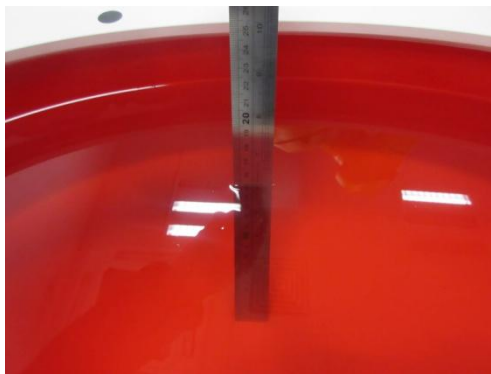


Liquid depth in the flat Phantom ($\geq 15\text{cm}$ depth)
HSL(750MHz)

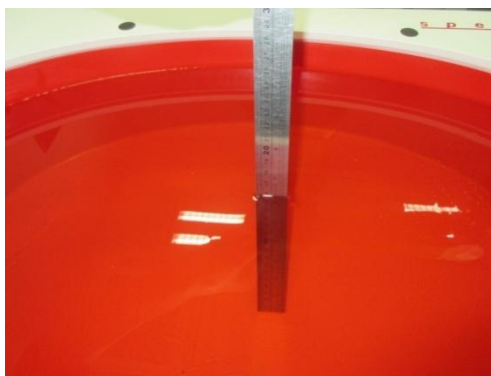
HSL(900MHz)



HSL(1750-2600MHz)



HSL(3500MHz)



Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-2504T032_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-2504T032_Appendix B.)

Appendix C. Calibration Certificate

(Pls See BTL-FCC SAR-1-2504T032_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-2504T032_Appendix D.)

End of Test Report