



## Appendix G. Supplemental Antenna Tuner Tests Results

**General Note:**

1. This device implements antenna tuning techniques in the several frequency band and list as below. SAR test proposal was measured according to the normally required SAR configurations with the tuner active and worst tune state (auto tune) was used for SAR testing and this design will provide the highest power at different user scenarios and would not influence to the antenna characteristics other than impedance matching.
2. The following test procedure was followed to demonstrate that the SAR results in this report represent the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR will be measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements will be evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values.
3. The number of supported tune codes is different for each frequency band as shown in the following table.
4. Dynamic antenna tuning mechanism is available at Ant.0/1/2 for its < 3GHz LTE and NR band, details are illustrated in the operational description, all supported tuning states for each band are tested and it's verified that auto-tune state results in the highest SAR configuration.
5. The tuner state was established remotely through Wi-Fi so that the device is not moved for the entire series of single point SAR for the tuner states in each combination (band, mode, exposure conditions).

Antenna	Band	Number of tune states
Ant 0 (LB)	LTE B5	53
	LTE B12	41
	LTE B13	25
	LTE B14	27
	LTE B17	41
	LTE B26	53
	LTE B71	57
	NR n5	53
	NR n12	41
	NR n14	25
	NR n26	53
Ant 1 (LB)	LTE B5	50
	LTE B12	49
	LTE B13	24
	LTE B14	16
	LTE B17	49
	LTE B26	50
	LTE B71	44
	NR n5	50
	NR n12	49
	NR n14	16
	NR n26	50
Ant 2 (M/HB)	LTE B2	57
	LTE B4	62
	LTE B7	39
	LTE B25	57
	LTE B30	29
	LTE B66	62
	NR n2	52
	NR n7	39
	NR n25	57
	NR n30	29
	NR n66	62





<Supplemental SAR result for Ant 1>

RF exposure position							Average Value of Time Sweep Single Point SAR (W/kg)																											
Band	Test Position	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Auto-Tuner (State)	Auto-Tuner Single Point SAR (W/kg)	Default-Tuner (State)	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49			
LTE Band 12	Right Cheek	0.665	0.910	2	1.040	2	1.030	0.899	0.802	0.728	0.462	0.402	0.842	0.725	0.710	0.404	1.020	0.715	0.511	0.732	0.867	0.714	0.681	0.525	0.695	1.020	0.670	0.488	0.587	0.293	0.474			
	Left Side	0.267	0.350	21	0.357	2	0.254	0.183	0.168	0.305	0.164	0.149	0.195	0.004	0.162	0.137	0.350	0.209	0.226	0.201	0.210	0.098	0.090	0.311	0.198	0.286	0.303	0.176	0.281	0.007				
LTE Band 13	Right Cheek	0.676	0.883	8	0.772	2	0.771	0.629	0.744	0.517	0.644	0.552	0.601	0.693	0.721	0.328	0.413	0.514																
	Back	0.307	0.389	2	0.400	2	0.400	0.293	0.266	0.363	0.313	0.273	0.292	0.142	0.148	0.022	0.288	0.143																
LTE Band 14	Right Cheek	0.673	0.904	5	0.977	2	0.970	0.767	0.977	0.772	0.951	0.769	0.195	0.759																				
	Back	0.310	0.407	2	0.448	2	0.448	0.356	0.253	0.344	0.358	0.227	0.363	0.421																				
LTE Band 26	Right Cheek	0.718	0.906	24	1.180	5	1.170	1.040	1.130	0.941	0.405	0.712	1.060	0.618	1.010	0.719	0.312	1.090	0.691	1.120	1.140	0.872	0.926	0.862	0.868	1.160	1.060	1.150	1.010	0.803	1.000			
	Back	0.393	0.478	2	0.528	5	0.528	0.392	0.502	0.326	0.407	0.184	0.452	0.353	0.186	0.070	0.469	0.423	0.398	0.443	0.246	0.420	0.033	0.248	0.355	0.416	0.480	0.410	0.489	0.422	0.315			
LTE Band 71	Right Cheek	0.703	0.918	26	0.849	26	0.449	0.321	0.655	0.799	0.415	0.067	0.811	0.527	0.096	0.401	0.748	0.844	0.489	0.558	0.185	0.023	0.625	0.462	0.822	0.825	0.505	0.226						
	Back	0.268	0.304	26	0.320	26	0.194	0.069	0.076	0.177	0.038	0.024	0.311	0.152	0.092	0.114	0.099	0.045	0.320	0.127	0.058	0.043	0.180	0.261	0.057	0.315	0.057	0.175						
FR1 n12	Right Cheek	0.699	0.917	2	1.030	2	1.020	0.899	0.702	0.638	0.412	0.372	0.802	0.665	0.640	0.364	0.930	0.625	0.451	0.672	0.867	0.644	0.681	0.435	0.685	0.980	0.620	0.408	0.527	0.213	0.414			
	Left Side	0.260	0.315	21	0.316	2	0.234	0.173	0.088	0.255	0.144	0.079	0.175	0.002	0.132	0.097	0.280	0.179	0.216	0.141	0.130	0.018	0.000	0.301	0.198	0.196	0.283	0.166	0.211	0.007				
FR1 n14	Right Cheek	0.618	0.873	5	0.947	2	0.920	0.747	0.947	0.712	0.931	0.729	0.135	0.709																				
	Back	0.306	0.380	2	0.418	2	0.418	0.356	0.243	0.334	0.358	0.177	0.313	0.331																				
FR1 n26	Right Cheek	0.665	0.920	24	1.150	5	1.140	1.010	1.040	0.871	0.345	0.662	1.020	0.548	0.960	0.669	0.312	1.000	0.691	1.100	1.060	0.862	0.866	0.852	0.868	1.110	1.030	1.080	0.940	0.773	0.990			
	Back	0.354	0.435	2	0.495	5	0.495	0.372	0.482	0.296	0.337	0.124	0.402	0.273	0.116	0.070	0.459	0.373	0.318	0.383	0.176	0.380	0.013	0.198	0.315	0.326	0.440	0.390	0.419	0.362	0.275			
FR1 n71	Right Cheek	0.785	0.922	26	0.861	26	0.439	0.231	0.645	0.729	0.335	0.058	0.781	0.427	0.016	0.371	0.708	0.844	0.449	0.538	0.095	0.019	0.605	0.422	0.772	0.725	0.415	0.136						
	Back	0.301	0.350	26	0.315	26	0.194	0.049	0.046	0.157	0.032	0.021	0.311	0.132	0.092	0.074	0.089	0.048	0.315	0.067	0.061	0.045	0.180	0.231	0.051	0.275	0.055	0.125						





Appendix G. Supplemental SAR Tests Results

SAR test result

- 1. The test data is selected according to the worst case SAR configuration per cellular technology.
2. The test data is to demonstrate the device is in compliance with FCC requirements at 25mm when all power reduction mechanisms are OFF. The worst case body SAR at 10mm was used for simultaneous transmission SAR analysis since they are more conservative than the 25mm SAR.

Table with 15 columns: Band, Mode, Test Position, Gap (mm), Antenna, Power State, Ch., Freq. (MHz), 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). Rows include GSM1900, WCDMA II, LTE Band 7, FR1 n7, WLAN2.4GHz, WLAN5GHz, and Bluetooth.