

Appendix I. Dynamic Antenna tuner testing

WCDMA Band II, IV, V & LTE Band 12, 13 Test results

Max/Reduce	Reduce	Max/Reduce	Reduce	Max/Reduce	Reduce	Max/Reduce	Reduce	Max/Reduce	MAX
Position	Rear	Position	Edge4	Position	Rear	Position	Edge 4	Position	REAR
Test distance	0 mm	Test distance	0mm	Test distance	0mm	Test distance	0mm	Test distance	19 mm
Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)	
WCDMA Band 2	0.573	WCDMA Band 4	0.615	WCDMA Band 5	0.670	LTE Band 12	0.801	LTE Band 13	0.603
Single point SAR (W/kg)		Single point SAR (W/kg)		Single point SAR (W/kg)		Single point SAR (W/kg)		Single point SAR (W/kg)	
Auto-tune code (0)	1.412	Auto-tune code (25)	1.784	Auto-tune code (7)	1.143	Auto-tune code (39)	2.204	Auto-tune code (39)	0.831
Default States		Default States		Default States		Default States		Default States	
0	1.410	0	1.687	0	0.506	0	1.859	0	0.370
1	1.340	1	1.686	6	0.917	1	2.103	8	0.759
2	1.356	2	1.682	7	1.141	2	2.114	9	0.488
3	1.374	3	1.660	24	0.412	3	1.658	10	0.086
4	1.357	4	1.659	25	0.307	4	1.644	27	0.054
5	1.245	5	1.606	26	0.185	5	2.116	28	0.026
6	1.169	6	1.544	44	0.890	6	1.997	47	0.481
7	0.934	7	1.420	45	0.700	7	1.632	48	0.095
8	0.612	8	1.133	46	0.343	8	0.920	66	0.026
9	0.402	9	0.871	63	0.273	9	0.521	67	0.060
10	1.275	10	1.508	64	0.167	10	0.417	68	0.074
11	1.306	11	1.601	65	0.071	11	0.549	85	0.334
12	1.314	12	1.584	82	0.697	12	0.559	86	0.144
13	1.400	13	1.636	83	0.459	13	0.541	87	0.140
14	1.332	14	1.664	84	0.201	14	0.498	102	0.081
15	1.280	15	1.716	99	0.385	15	0.331	103	0.034
16	1.011	16	1.551	100	0.254	16	0.107	104	0.018
17	0.632	17	1.039	101	0.932	17	0.043	120	0.733
18	0.391	18	0.649	118	0.932	18	0.022	121	0.757
19	1.346	19	1.631	119	0.853	19	0.835	122	0.547
20	1.349	20	1.675	138	0.236	20	1.159	141	0.031
21	1.341	21	1.705	139	0.143	21	1.216	142	0.016
22	1.349	22	1.722	140	0.083	22	1.293	37	0.003
23	1.328	23	1.700			23	1.095	39	0.829
24	1.247	24	1.730			24	1.050		
25	1.169	25	1.782			25	0.685		
26	0.980	26	1.621			26	0.383		
27	0.663	27	1.283			27	0.152		
28	0.432	28	0.944			28	0.077		
29	1.254	29	1.307			29	0.259		
30	1.246	30	1.402			30	0.325		
31	1.318	31	1.438			31	0.326		
32	1.278	32	1.489			32	0.299		
33	1.276	33	1.489			33	0.262		
34	1.237	34	1.515			34	0.168		
35	0.939	35	1.230			35	0.053		
36	0.557	36	0.736			36	0.021		
37	0.337	37	0.437			37	0.011		
38	1.262	38	1.461			38	1.543		
39	1.267	39	1.462			39	2.173		
40	1.221	40	1.455			40	1.840		
41	1.179	41	1.435			41	1.923		
42	1.220	42	1.420			42	1.983		
43	1.073	43	1.370			43	2.023		
44	0.984	44	1.297			44	1.879		
45	0.812	45	1.182			45	1.556		
46	0.499	46	0.915			46	0.836		
47	0.322	47	0.685			47	0.467		
48	1.247	48	1.481			48	0.409		
49	1.276	49	1.590			49	0.509		
50	1.288	50	1.638			50	0.506		
51	1.284	51	1.692			51	0.459		
52	1.281	52	1.713			52	0.409		
53	1.205	53	1.738			53	0.268		
54	0.887	54	1.463			54	0.089		
55	0.521	55	0.896			55	0.037		
56	0.314	56	0.532			56	0.019		
57	1.268	57	1.537			57	0.805		
58	1.273	58	1.597			58	1.076		
59	1.266	59	1.596			59	1.113		
60	1.237	60	1.616			60	1.147		
61	1.233	61	1.625			61	1.110		
62	1.131	62	1.616			62	0.858		
63	1.018	63	1.589			63	0.553		
64	0.840	64	1.460			64	0.315		
65	0.523	65	1.101			65	0.129		
66	0.333	66	0.772			66	0.066		
67	1.212	67	1.383			67	0.245		
68	1.254	68	1.504			68	0.283		
69	1.269	69	1.556			69	0.277		
70	1.269	70	1.608			70	0.244		
71	1.271	71	1.609			71	0.209		
72	1.186	72	1.583			72	0.131		
73	0.830	73	1.146			73	0.044		

WCDMA Band II, IV, V & LTE Band 12, 13 Test results (Continued)

74	0.480	74	0.618
75	0.273	75	0.351
76	0.404	76	0.397
77	0.443	77	0.432
78	0.429	78	0.426
79	0.400	79	0.413
80	0.415	80	0.429
81	0.348	81	0.399
82	0.296	82	0.375
83	0.221	83	0.328
84	0.116	84	0.227
85	0.068	85	0.152
86	0.439	86	0.455
87	0.551	87	0.609
88	0.557	88	0.639
89	0.559	89	0.706
90	0.590	90	0.708
91	0.537	91	0.853
92	0.325	92	0.658
93	0.159	93	0.291
94	0.078	94	0.129
95	0.427	95	0.387
96	0.496	96	0.520
97	0.486	97	0.525
98	0.467	98	0.533
99	0.488	99	0.584
100	0.422	100	0.569
101	0.376	101	0.566
102	0.266	102	0.506
103	0.135	103	0.333
104	0.076	104	0.205
105	0.445	105	0.503
106	0.591	106	0.733
107	0.607	107	0.788
108	0.655	108	0.900
109	0.662	109	1.017
110	0.600	110	1.054
111	0.043	111	0.546
112	0.072	112	0.203
113	1.397	113	0.098
114	1.408	114	0.349
115	0.400	115	0.383
116	0.389	116	0.376
117	0.382	117	0.364
118	0.380	118	0.410
119	0.321	119	0.352
120	0.281	120	0.327
121	0.201	121	0.282
122	0.105	122	0.195
123	0.060	123	0.130
124	0.380	124	0.366
125	0.476	125	0.490
126	0.485	126	0.517
127	0.494	127	0.573
128	0.521	128	0.617
129	0.481	129	0.702
130	0.291	130	0.557
131	0.132	131	0.244
132	0.072	132	0.117
133	0.388	133	0.339
134	0.441	134	0.400
135	0.435	135	0.403
136	0.419	136	0.408
137	0.439	137	0.431
138	0.381	138	0.435
139	0.328	139	0.434
140	0.242	140	0.389
141	0.123	141	0.257
142	0.069	142	0.159
143	0.392	143	0.366
144	0.521	144	0.538
145	0.539	145	0.604
146	0.565	146	0.686
147	0.599	147	0.748
148	0.550	148	0.847
149	0.294	149	0.449
150	0.126	150	0.161
151	0.068	151	0.076

74	0.019
75	1.413
76	1.413
77	1.625
78	1.650
79	1.696
80	1.719
81	1.638
82	1.405
83	1.049
84	0.548
85	0.306
86	0.518
87	0.463
88	0.423
89	0.330
90	0.272
91	0.161
92	0.056
93	0.025
94	0.014
95	1.035
96	1.196
97	1.114
98	1.040
99	0.903
100	0.583
101	0.355
102	0.205
103	0.089
104	0.049
105	0.323
106	0.253
107	0.228
108	0.174
109	0.140
110	0.083
111	0.030
112	0.014
113	0.008
114	1.398
115	1.614
116	1.666
117	1.710
118	1.727
119	1.626
120	1.380
121	1.006
122	0.515
123	0.285
124	0.559
125	0.471
126	0.422
127	0.318
128	0.255
129	0.148
130	0.147
131	0.023
132	0.013
133	1.079
134	1.230
135	1.191
136	1.020
137	0.870
138	0.538
139	0.321
140	0.183
141	0.080
142	0.044
143	0.340
144	0.247
145	0.218
146	0.162
147	0.127
148	0.074
149	0.027
150	0.013
151	0.007

LTE Band 25, 26, 66 & NR Band n5, n66 Test results

Max/Reduce	Reduce	Max/Reduce	Reduce	Max/Reduce	Reduce	Max/Reduce	Max	Max/Reduce	Reduce
Position	Rear	Position	Edge4	Position	Rear	Position	Rear	Position	Edge 4
Test distance	0mm	Test distance	0mm	Test distance	0 mm	Test distance	19mm	Test distance	0mm
Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)		Original data SAR (W/kg)	
LTE Band 26		LTE Band 66		LTE Band 25		NR 5		NR 66	
0.800		1.110		0.679		0.669		0.877	
single point SAR (W/kg)		single point SAR (W/kg)		single point SAR (W/kg)		single point SAR (W/kg)		single point SAR (W/kg)	
Auto-tune code (7)	1.344	Auto-tune code (25)	3.773	Auto-tune code (12)	1.596	Auto-tune code (44)	0.896	Auto-tune code (10)	2.588
Default States		Default States		Default States		Default States		Default States	
0	0.652	0	3.374	0	1.524	0	0.472	0	2.298
1	0.784	1	3.405	1	1.513	16	0.052	1	2.289
2	0.826	2	3.406	2	1.451	17	0.022	2	2.301
3	0.905	3	3.426	3	1.401	18	0.015	3	2.324
4	0.976	4	3.430	4	1.398	34	0.077	4	2.315
5	1.150	5	3.428	5	1.274	35	0.032	5	2.238
6	1.307	6	3.362	6	1.155	36	0.012	6	2.110
7	1.343	7	3.209	7	0.975	37	0.006	7	1.992
8	0.905	8	2.701	8	0.647	55	0.034	8	1.555
9	0.490	9	2.087	9	0.433	56	0.017	9	1.170
10	0.169	10	2.985	10	1.433	74	0.011	10	2.585
11	0.225	11	3.159	11	1.468	75	0.012	11	2.160
12	0.236	12	3.253	12	1.596	93	0.011	12	2.200
13	0.248	13	3.366	13	1.472	94	0.007	13	2.264
14	0.249	14	3.392	14	1.472	111	0.015	14	2.266
15	0.202	15	3.481	15	1.408	112	0.007	15	2.298
16	0.079	16	2.970	16	1.101	113	0.005	16	1.957
17	0.032	17	1.846	17	0.725	129	0.063	17	1.273
18	0.016	18	1.106	18	0.440	130	0.022	18	0.792
19	0.347	19	3.326	19	1.494	131	0.011	19	2.311
20	0.475	20	3.471	20	1.495	149	0.012	20	2.377
21	0.505	21	3.524	21	1.497	150	0.029	21	2.393
22	0.570	22	3.611	22	1.460	151	0.004	22	2.424
23	0.609	23	3.631	23	1.448	44	0.895	23	2.430
24	0.605	24	3.721	24	1.349			24	2.445
25	0.476	25	3.762	25	1.242			25	2.401
26	0.292	26	3.585	26	1.047			26	2.226
27	0.116	27	2.786	27	0.693			27	1.686
28	0.057	28	1.977	28	0.459			28	1.192
29	0.112	29	2.607	29	1.376			29	1.840
30	0.143	30	2.797	30	1.430			30	1.947
31	0.147	31	2.865	31	1.428			31	1.987
32	0.149	32	2.956	32	1.488			32	2.034
33	0.143	33	2.961	33	1.432			33	2.028
34	0.109	34	2.928	34	1.375			34	2.004
35	0.041	35	2.211	35	1.039			35	1.555
36	0.016	36	1.254	36	0.624			36	0.912
37	0.008	37	0.732	37	0.382			37	0.551
38	0.729	38	2.962	38	1.396			38	2.120
39	0.875	39	2.989	39	1.363			39	2.105
40	0.910	40	2.995	40	1.344			40	2.109
41	1.003	41	3.028	41	1.286			41	2.101
42	1.063	42	3.035	42	1.276			42	2.098
43	1.235	43	3.009	43	1.176			43	2.046
44	1.367	44	2.936	44	1.011			44	1.971
45	1.337	45	2.745	45	0.829			45	1.802
46	0.862	46	2.223	46	0.529			46	1.379
47	0.470	47	1.696	47	0.348			47	1.015
48	0.192	48	2.982	48	1.405			48	2.129
49	0.239	49	3.232	49	1.468			49	2.283
50	0.247	50	3.340	50	1.461			50	2.333
51	0.248	51	3.478	51	1.432			51	2.391
52	0.242	52	3.531	52	1.420			52	2.410
53	0.183	53	3.561	53	1.196			53	2.393
54	0.071	54	2.811	54	0.972			54	1.880
55	0.030	55	1.582	55	0.575			55	1.092
56	0.015	56	0.900	56	0.352			56	0.640
57	0.393	57	3.106	57	1.418			57	2.205
58	0.520	58	3.271	58	1.418			58	2.295
59	0.550	59	3.323	59	1.395			59	2.309
60	0.599	60	3.435	60	1.352			60	2.349
61	0.615	61	3.462	61	1.347			61	2.332
62	0.575	62	3.528	62	1.224			62	2.336
63	0.431	63	3.522	63	1.101			63	2.294
64	0.263	64	3.297	64	0.900			64	2.089
65	0.108	65	2.433	65	0.568			65	1.499
66	0.055	66	1.639	66	0.366			66	1.012
67	0.123	67	2.797	67	1.374			67	1.993
68	0.147	68	3.037	68	1.417			68	2.115
69	0.148	69	3.128	69	1.423			69	2.159
70	0.142	70	3.221	70	1.423			70	2.210
71	0.133	71	3.222	71	1.412			71	2.211
72	0.096	72	3.077	72	1.311			72	2.106
73	0.037	73	2.042	73	0.915			73	1.429

LTE Band 25, 26, 66 & NR Band n5, n66 Test results (Continued)

74	0.016	74	1.043	74	0.515
75	0.008	75	0.586	75	0.309
76	0.766	76	0.562	76	0.448
77	0.949	77	0.652	77	0.484
78	0.981	78	0.647	78	0.485
79	1.070	79	0.647	79	0.430
80	1.136	80	0.684	80	0.446
81	1.264	81	0.679	81	0.369
82	1.268	82	0.679	82	0.311
83	1.056	83	0.627	83	0.231
84	0.553	84	0.457	84	0.122
85	0.287	85	0.304	85	0.069
86	0.300	86	0.628	86	0.476
87	0.277	87	0.913	87	0.589
88	0.256	88	0.982	88	0.593
89	0.205	89	1.147	89	0.593
90	0.174	90	1.286	90	0.621
91	0.106	91	1.587	91	0.557
92	0.039	92	1.198	92	0.340
93	0.017	93	0.444	93	0.160
94	0.009	94	0.202	94	0.086
95	0.580	95	0.603	95	0.469
96	0.703	96	0.770	96	0.531
97	0.702	97	0.786	97	0.522
98	0.655	98	0.830	98	0.495
99	0.594	99	0.903	99	0.515
100	0.411	100	0.972	100	0.442
101	0.254	101	1.040	101	0.376
102	0.144	102	0.977	102	0.280
103	0.062	103	0.622	103	0.146
104	0.033	104	0.353	104	0.083
105	0.182	105	0.673	105	0.493
106	0.145	106	1.079	106	0.648
107	0.132	107	1.202	107	0.662
108	0.106	108	1.462	108	0.679
109	0.087	109	1.673	109	0.711
110	0.053	110	1.937	110	0.637
111	0.020	111	0.874	111	0.349
112	0.009	112	0.285	112	0.154
113	0.005	113	0.134	113	0.082
114	0.701	114	0.495	114	0.402
115	0.880	115	0.571	115	0.433
116	0.925	116	0.570	116	0.417
117	0.101	117	0.571	117	0.387
118	1.088	118	0.604	118	0.400
119	1.212	119	0.597	119	0.330
120	1.202	120	0.600	120	0.280
121	0.976	121	0.561	121	0.206
122	0.488	122	0.414	122	0.109
123	0.245	123	0.278	123	0.062
124	0.316	124	0.545	124	0.417
125	0.275	125	0.780	125	0.515
126	0.251	126	0.844	126	0.523
127	0.195	127	0.991	127	0.529
128	0.160	128	1.114	128	0.557
129	0.095	129	1.415	129	0.505
130	0.033	130	1.118	130	0.309
131	0.015	131	0.405	131	0.145
132	0.008	132	0.182	132	0.076
133	0.599	133	0.530	133	0.419
134	0.734	134	0.664	134	0.475
135	0.727	135	0.685	135	0.466
136	0.655	136	0.722	136	0.445
137	0.578	137	0.787	137	0.461
138	0.374	138	0.862	138	0.399
139	0.224	139	0.929	139	0.339
140	0.126	140	0.889	140	0.252
141	0.053	141	0.574	141	0.130
142	0.028	142	0.324	142	0.073
143	0.194	143	0.581	143	0.433
144	0.145	144	0.922	144	0.569
145	0.128	145	1.025	145	0.585
146	0.097	146	1.270	146	0.606
147	0.079	147	1.461	147	0.646
148	0.047	148	1.797	148	0.581
149	0.016	149	0.826	149	0.317
150	0.008	150	0.261	150	0.149
151	0.004	151	0.121	151	0.077

74	0.755
75	0.433
76	0.488
77	0.550
78	0.547
79	0.549
80	0.564
81	0.541
82	0.522
83	0.456
84	0.309
85	0.198
86	0.565
87	0.787
88	0.832
89	0.923
90	1.015
91	1.131
92	0.807
93	0.326
94	0.156
95	0.535
96	0.654
97	0.663
98	0.688
99	0.739
100	0.763
101	0.776
102	0.683
103	0.418
104	0.239
105	0.617
106	0.933
107	1.019
108	1.185
109	1.317
110	1.387
111	0.645
112	0.231
113	0.113
114	0.437
115	0.487
116	0.482
117	0.479
118	0.501
119	0.482
120	0.465
121	0.404
122	0.275
123	0.174
124	0.484
125	0.667
126	0.710
127	0.809
128	0.885
129	1.015
130	0.729
131	0.292
132	0.138
133	0.458
134	0.556
135	0.573
136	0.592
137	0.630
138	0.649
139	0.648
140	0.576
141	0.351
142	0.203
143	0.511
144	0.767
145	0.843
146	0.988
147	1.101
148	1.205
149	0.581
150	0.204
151	0.098

Note(s):

Find the NR auto tune code by LTE mode at the NR frequency with auto-tuning active according to TCB workshop note (Oct.2020).