

APPENDIX F: DOWNLINK LTE CA RF CONDUCTED POWERS

F.1 LTE Downlink Only Carrier Aggregation Test Reduction Methodology

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number of component carriers (CCs) supported by the product implementation. Per April 2018 TCBC Workshop Notes, the following test reduction methodology was applied to determine the combinations required for conducted power measurements.

LTE DLCA Test Reduction Methodology:

- The supported combinations were arranged by the number of component carriers in columns.
 - Any limitations on the PCC or SCC for each combination were identified alongside the combination (e.g. CA_2A-2A-4A-12A, but B12 can only be configured as a SCC).
 - Power measurements were performed for "supersets" (LTE CA combinations with multiple component carriers) and any "subsets" (LTE CA combinations with fewer component carriers) that were not completely covered by the supersets.
 - Only subsets that have the exact same components as a superset were excluded for measurement.
 - When there were certain restrictions on component carriers that existed in the superset that were not applied for the subset, the subset configuration was additionally evaluated.
 - Both inter-band and intra-band downlink carrier aggregation scenarios were considered.
 - Downlink CA combinations for SISO and 4x4 Downlink MIMO operations were measured independently, per May 2017 TCBC Workshop notes.

Table F-1 – Example of Exclusion Table for SISO Configurations

Table F-2 – Example of Exclusion Table for 4x4 Downlink MIMO Configurations

Note: [CC] indicates component carrier with 4x4 DL MIMO antenna configuration

FCC ID: A3LSMF711U		SAR EVALUATION REPORT	Reviewed by: Quality Manager
Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 1 of 18

F.2 LTE Downlink Only Carrier Aggregation Test Selection and Setup

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers (CCs) supported by the product implementation. For those configurations required by April 2018 TCBC Workshop Notes, conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

This device supports LAA with downlink carrier aggregation only. It uses carrier aggregation in the downlink to combine LTE in the unlicensed spectrum (i.e. LTE Band 46) with LTE in the licensed band (served as PCC). All uplink communications and acknowledgements on the PCC remain identical to specifications when downlink carrier aggregation is inactive.

Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the maximum average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive. All bands required for SAR testing per FCC KDB procedures were considered. Based on the measured maximum powers below, no additional SAR tests were required for DLCA SAR configurations.

General PCC and SCC configuration selection procedure

- PCC uplink channel, channel bandwidth, modulation and RB configurations were selected based on section C(3)b)ii) of KDB 941225 D05 V01r02. All LTE bandwidth conducted powers needed for PCC uplink configuration selection can be found in Section 9.4 and appendix H. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
- To maximize aggregated bandwidth, highest channel bandwidth available for that CA combination was selected for SCC. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
- All selected PCC and SCC(s) remained fully within the uplink/downlink transmission band of the respective component carrier.

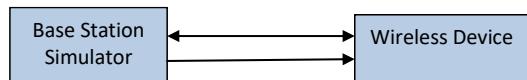


Figure F-1
DL CA Power Measurement Setup

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Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 2 of 18

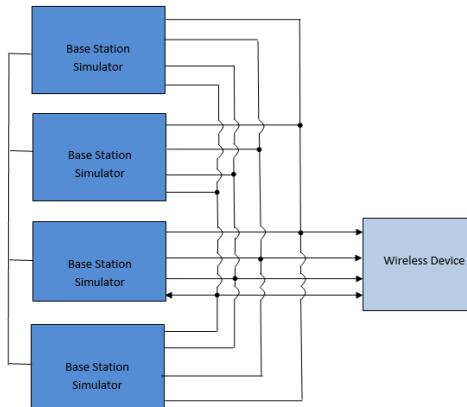


Figure F-2
DL CA with DL 4x4 MIMO Power Measurement Setup

F.3 Downlink Carrier Aggregation RF Conducted Powers

F.3.1 LTE Band 71 as PCC

Table F-3
Maximum Output Powers

Combination	PCC										SCC 1			SCC 2			SCC 3			Power			
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC ULL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx. Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]
CA_4A-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	24.28	24.38
CA_4B-4B-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B48	20	55990	3625	LTE B48	20	56640	3650	-	-	-	-	24.36	24.38
CA_4B-C71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	-	-	-	-	24.09	24.38
CA_2A-2A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	24.37	24.38
CA_2A-6B-A71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	24.09	24.38
CA_2A-6B-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	67236	2190	24.20	24.38
CA_2B-C71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	24.09	24.38

F.3.2 LTE Band 12 as PCC

LTE Band 12 as PCC

Table F-4
Maximum Output Powers

Combination	PCC										SCC 1			SCC 2			SCC 3			SCC 4			Power				
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC ULL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx. Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]				
CA_2A-12A (1)	LTE B12	3	23025	701.5	QPSK	1	14	6025	730.5	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	24.46	24.45				
CA_4A-12A (1)	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	24.54	24.41				
CA_4B-12A (1)	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	24.54	24.41				
CA_12-25A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	8365	1962.5	-	-	-	-	-	-	-	-	24.61	24.41				
CA_12A-4B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B46	20	50685	8637.5	-	-	-	-	-	-	-	-	24.57	24.41				
CA_12A-6B4A (1)	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B66	20	65795	2145	-	-	-	-	-	-	-	-	24.53	24.41				
CA_12B-6B4A (2)	LTE B12	5	23045	703.0	QPSK	1	14	6025	730.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	24.60	24.40				
CA_4A-4B12A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	24.51	24.41				
CA_12A-40C	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B46	20	50685	5057.5	LTE B46	20	50487	5017.7	-	-	-	-	24.57	24.43				
CA_2A-2A-12A (2)	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B4	20	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	24.17	24.41				
CA_2A-12B-12C	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	8107	1960	LTE B2	20	700	1940	LTE B2	20	2175	2132.5	24.17	24.41				
CA_12A-12B-12C	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	8107	1960	LTE B2	20	700	1940	LTE B2	20	2175	2132.5	24.17	24.41				
CA_2A-4A-4A-12A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	900	1960	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	24.18	24.41				
CA_2A-24A-12B	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	10	8107	738.7	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	24.26	24.41				
CA_2A-4B-12B	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	900	1960	LTE B2	20	65795	2145	LTE B4	20	2175	2132.5	24.11	24.41				
CA_4B-4B-12B	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	900	1960	LTE B2	20	65795	2145	LTE B4	20	2175	2132.5	24.20	24.41				
CA_12A-4B-12B	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B12	20	900	1960	LTE B2	20	65795	2145	LTE B4	20	2175	2132.5	24.20	24.41				
CA_12A-12A-30A-6B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	900	1960	LTE B46	20	50467	5017.7	LTE B46	20	50983	5057.3	24.43	24.41				
CA_3A-2A-12A-30A-6B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B66	20	66786	2145	24.54	24.41
CA_12A-12A-30A-6B4A-6B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	67235	2150	24.17	24.41				
CA_12A-12A-30A-6B4A-6B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	LTE B66	20	66786	2145	24.17	24.41				
CA_2A-12B-6B4A-6B4A	LTE B12	5	23035	701.5	QPSK	1	24	6025	731.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	LTE B66	20	67235	2150	24.22	24.41				

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Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 3 of 18

F.3.3

LTE Band 13 as PCC

Table F-5
Maximum Output Powers

F.3.4

LTE Band 14 as PCC

Table F-6
Maximum Output Powers

Combination	PCC								SCC 1						SCC 2						SCC 3						SCC 4						Power			
	PCC Band	PCC BW [MHz]	PCC [UL] Ch.	PCC [UL] Freq. [MHz]	Mod.	PCC UL# Offset	PCC UL RB	PCC [DL] Freq.	PCC [DL] Channel	PCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC [DL] Channel	SCC [DL] Freq. [MHz]	LTE Tx Power with DL CA Enabled (dBm)	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Power (dBm)							
CA_2G-2G-14A-30A-60A	LTE B14	5	23530	793	QPSK	1	24	5330	763	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	3355	LTE B66	20	65796	2145	14.74	24.63	14.74	24.63							
CA_2G-2A-14A-60A-60A	LTE B14	5	23330	793	QPSK	1	24	5330	763	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66796	2145	LTE B66	20	67236	2140	14.74	24.63	14.74	24.63							
CA_2A-14A-30A-60A-60A	LTE B14	5	23330	793	QPSK	1	24	5330	763	LTE B2	20	900	1960	LTE B30	10	9820	3355	LTE B66	20	67236	2140	LTE B66	20	67236	2140	14.74	24.63	14.74	24.63							

F.3.5

LTE Band 5 as PCC

Table F-7
Maximum Output Powers

F.3.6

LTE Band 26 as PCC

Table F-8
Maximum Output Powers

Combination	PCC								SCC 1				SCC 2				SCC 3				Power		
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL/RB	PCC UL/RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]		
CA_25A-25A-26A	LTE B26	5	26715	816.5	QPSK	1	24	8715	861.5	LTE B25	20	8365	1962.5	LTE B26	20	8590	1985	-	-	-	-	24.09	24.00
CA_25A-26A-41A	LTE B26	10	26990	844	QPSK	1	0	8950	889	LTE B25	20	8365	1962.5	LTE B41	20	40620	2593	-	-	-	-	23.94	24.10
CA_26A-41C	LTE B26	10	26990	844	QPSK	1	0	8950	889	LTE B41	20	40620	1962.5	LTE B41	20	40422	2573.2	-	-	-	-	24.03	24.10
CA_25A-26A-41C	LTE B26	10	26990	844	QPSK	1	0	8950	889	LTE B25	20	8365	1962.5	LTE B41	20	40620	2593	LTE B41	20	40422	2573.2	24.00	24.10



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F.3.7

LTE Band 66 as PCC

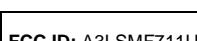
Table F-9
Maximum Output Powers

F.3.8

LTE Band 25 as PCC

Table F-10
Maximum Output Powers

Combination	PCC						SCC 1						SCC 2						SCC 3						Power	
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	PCC (DL) Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx Power [dBm]	LTE Single Carrier Tx Power [dBm]	
CA_3G-25A	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B5	10	2025	881.5	-	-	-	-	-	-	-	-	-	-	24.56	24.50	
CA_12A-25A	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	-	-	24.56	24.50	
CA_25A-40A	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B40	20	50605	5037.5	-	-	-	-	-	-	-	-	-	-	24.56	24.50	
CA_25A-25A-26A	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B25	20	8590	1885	LTE B26	5	8805	876.5	-	-	-	-	-	-	-	24.55	24.50
CA_25A-25A-41C	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B25	20	8590	1845	LTE B41	20	40620	2593.5	-	-	-	-	-	-	-	24.56	24.50
CA_25A-26A-41A	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B25	15	8865	876.5	LTE B41	20	40620	2593.5	-	-	-	-	-	-	-	24.56	24.50
CA_25A-41C	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B41	20	40620	2593.5	LTE B41	20	40422	2373.2	-	-	-	-	-	-	-	24.56	24.50
CA_25A-40D	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B40	20	50605	5037.5	LTE B40	20	50407	5017.7	-	-	-	-	-	-	-	24.49	24.45
CA_25A-40D-41C	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B40	20	50605	5017.7	LTE B41	20	40620	2593.5	LTE B41	20	40422	2373.2	-	-	-	24.48	24.45
CA_25A-25A-26A-41C	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B25	15	8865	876.5	LTE B41	20	40620	2593.5	LTE B41	20	40422	2373.2	-	-	-	24.49	24.45
CA_25A-25A-40D	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B40	20	50605	5037.5	LTE B40	20	50407	5017.7	-	-	-	-	-	-	-	24.53	24.50
CA_25A-25A-41D	LTE B25	10	26900	1855	QPSK	1	25	8090	1935	LTE B25	20	8590	1885	LTE B41	20	40422	2373.2	LTE B41	20	40360	2593.5	LTE B41	20	40818	2612.8	



SAR EVALUATION REPORT

Reviewed by:

Test Dates:

DUT Type:

APPENDIX F
Page 5 of 18

F.3.9

LTE Band 30 as PCC

Table F-11
Maximum Output Powers

F.3.10

LTE Band 41 as PCC

Table F-12
Maximum Output Powers

Combination	PCC										SCC 1				SCC 2				SCC 3				SCC 4				Power	
	PCC Band	PCC BW [MHz]	PCC UL Ch.	PCC UL Freq. [MHz]	Mod.	PCC ULLB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx Power with DL CA Enabled [dBm]	LTE Tx Power with DL CA Enabled [dBm]	
CA_410-41A_1(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	39750	2500	-	-	-	-	-	-	-	-	-	-	-	24.40	24.34		
CA_410-41C_1(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	39750	2500	-	-	-	-	-	-	-	-	-	-	-	24.40	24.34		
CA_410-41C_2(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41290	2680	LTE_B41	20	39750	2500	-	-	-	-	-	-	-	24.44	24.34		
CA_410-41D_1(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	40146	2680	LTE_B41	20	39548	2500	2500	2500	-	-	-	-	24.45	24.34			
CA_410-41D_2(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	41094	2640.4	2640.4	2640.4	LTE_B41	20	39750	2500	-	-	24.48	24.34	
CA_410-41D_3(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	39948	2500	2500	2500	LTE_B41	20	39750	2500	-	-	24.41	24.34	
CA_410-41D_4(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	40146	2680	2680	2680	LTE_B41	20	39750	2500	-	-	24.48	24.34	
CA_410-41D_5(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	40146	2645.6	2645.6	2645.6	LTE_B41	20	39750	2500	-	-	24.44	24.34	
CA_410-41D_6(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	41094	2640.4	2640.4	2640.4	LTE_B41	20	39750	2500	-	-	24.40	24.34	
CA_410-41D_7(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	39948	2500	2500	2500	LTE_B41	20	39750	2500	-	-	24.44	24.34	
CA_410-41D_8(1)	LTE_B41	20	41490	2680	QPSK	1	50	41490	2680	LTE_B41	20	41292	2680	LTE_B41	20	41094	2640.4	2640.4	2640.4	LTE_B41	20	39750	2500	-	-	24.40	24.34	

F.3.1

LTE Band 48 as PCC

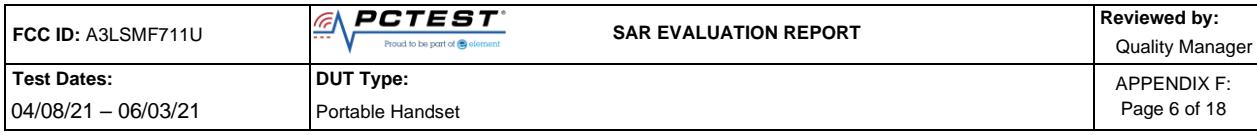
Table F-13
Maximum Output Powers

Combination	PCC								SCC 1				SCC 2				SCC 3				SCC 4				Power			
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL Rb	PCC UL Rb Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]	
CA_48A-48A	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	55340	3560	-	-	-	-	-	-	-	-	-	-	-	20.18	23.30		
CA_48A-48C	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	55340	3560	LTE B48	20	55338	3679.8	-	-	-	-	-	-	-	-	22.14	23.30	
CA_48C-48A	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55340	3560	-	-	-	-	-	-	-	-	20.18	22.30	
CA_48C-48C	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	56207	3646.7	LTE B48	20	56728	3600.0	-	-	-	-	-	20.18	22.30
CA_48D-48A	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	56207	3646.7	LTE B48	20	56640	3600.0	-	-	-	-	-	20.18	22.30
CA_48C-48D	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	56207	3646.7	LTE B48	20	56640	3600.0	-	-	-	-	-	20.18	22.30
CA_48B-48C	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55340	3560	LTE B48	20	55538	3679.8	-	-	-	-	-	20.18	22.30
CA_48A-48E	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	55340	3560	LTE B48	20	55338	3679.8	LTE B48	20	55736	3597.8	LTE B48	20	55934	3619.4	21.17	23.30	
CA_48E-48A	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55811	3670.1	LTE B48	20	55613	3597.8	LTE B48	20	56640	3600.0	22.11	23.30	
CA_48D-48E	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55811	3670.1	LTE B48	20	56640	3600.0	LTE B48	20	56442	3670.2	21.25	23.30	
CA_48C-48D	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55811	3670.1	LTE B48	20	56640	3600.0	LTE B48	20	56442	3670.2	21.25	23.30	
CA_48F-48A	LTE B48	20	56207	3646.7	QPSK	1	50	56207	3646.7	LTE B48	20	56039	3626.9	LTE B48	20	55811	3670.1	LTE B48	20	56548	3587.5	LTE B48	20	55415	3567.5	22.24	23.30	

F.4 DL CA with DL 4x4 MIMO RF Conduction Powers

This device supports downlink 4x4 MIMO operations for some LTE bands. Uplink transmission is limited to a single output stream. When carrier aggregation was applicable, the general test selection and setup procedures described in Section F.2 were applied.

Per May 2017 TCB Workshop Notes, SAR for 4x4 DL MIMO was not needed since the maximum average output power in 4x4 DL MIMO mode was not more than 0.25 dB higher than the maximum output power with 4x4 DL MIMO inactive. Additionally, SAR for 4x4 MIMO Downlink Carrier Aggregation was not needed since the maximum average output power in 4x4 MIMO Downlink Carrier Aggregation mode was not more than 0.25 dB higher than the maximum output power with 4x4 MIMO Downlink and downlink carrier aggregation inactive.



F.4.1

LTE 4x4 MIMO DL Standalone Powers

Table F-14
Maximum Output Powers

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]
66	15	132597	1772.5	QPSK	1	36	24.33	24.24
25	10	26090	1855	QPSK	1	25	24.30	24.50
30	10	27710	2310	QPSK	1	0	23.37	23.40
41	20	41490	2680	QPSK	1	50	24.56	24.54
48	20	56207	3646.7	QPSK	1	50	22.27	22.30

F.4.1

LTE Band 71 as PCC

Table F-15
Maximum Output Powers

Combination	PCC Band	PCC						SCC 1			SCC 2			SCC 3			Power											
		PCC BW [MHz]	PCC Freq. (UL Ch.)	PCC (UL) Freq. [MHz]	Mod.	PCC UL/RB	PCC UL/RB Offset	PCC DL Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx. Power Enabled by CA	LTE Single Carrier Tx Power [dBm]	
CA [4A]-[4A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	2x2	-	-	-	-	-	-	24.39	24.38
CA ([4A]-[4A]-71A)	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	-	24.34	24.38
CA ([4B4]-[4B4]-71A)	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B4B	20	55990	3625	4x4	LTE B4B	20	56640	3690	2x2	-	-	-	-	-	-	24.26	24.38
CA ([4B4]-[4B4]-71A)	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B4B	20	55990	3625	4x4	LTE B4B	20	55340	3560	4x4	-	-	-	-	-	-	24.38	24.38
CA ([4B4]-[4B4]-71A)	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B4B	20	55990	3625	4x4	LTE B4B	20	56188	3644.8	4x4	-	-	-	-	-	-	24.30	24.38
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B4	20	2175	2132.5	2x2	24.41	24.38	
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	2x2	LTE B4	20	2175	2132.5	4x4	24.29	24.38	
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B4	20	2175	2132.5	2x2	24.33	24.38	
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B4	20	2175	2132.5	4x4	24.39	24.38	
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B4	20	2175	2132.5	4x4	24.39	24.38	
CA [2A]-[2A]-4A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B4	20	2175	2132.5	4x4	24.39	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B6	20	66786	2145	4x4	24.43	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B6	20	66786	2145	2x2	24.27	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B6	20	66786	2145	4x4	24.32	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B6	20	66786	2145	4x4	24.28	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B6	20	66786	2145	4x4	24.28	24.38	
CA [2A]-[2A]-66A-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	66786	2145	2x2	LTE B6	20	67736	2190	2x2	24.31	24.38	
CA [2A]-[66A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	67736	2190	2x2	24.38	24.38	
CA [2A]-[66A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	2x2	LTE B6	20	66786	2145	4x4	LTE B6	20	67736	2190	4x4	24.28	24.38	
CA [2A]-[66A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	67736	2190	4x4	24.28	24.38	
CA [2A]-[66A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	67736	2190	4x4	24.28	24.38	
CA [2A]-[66A]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	67736	2190	4x4	24.28	24.38	
CA [2A]-[66C]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	66984	2164.8	4x4	24.27	24.38	
CA [2A]-[66C]-71A	LTE B71	5	133447	695.5	QPSK	1	0	68911	649.5	2x2	LTE B2	20	900	1960	4x4	LTE B6	20	66786	2145	4x4	LTE B6	20	66984	2164.8	4x4	24.37	24.38	

FCC ID: A3LSMF711U



SAR EVALUATION REPORT

Reviewed by:
Quality Manager

Test Dates:

04/08/21 – 06/03/21

DUT Type:

Portable Handset

APPENDIX F:

Page 7 of 18

F42

LTE Band 12 as PCC

Table F-16



FCC ID: A3LSMF711U

SAR EVALUATION REPORT

Reviewed by:
Quality Manager

Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset	APPENDIX F: Page 8 of 18
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F-4.3

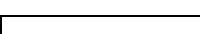
LTE Band 13 as PCC

Table F-17
Maximum Output Powers

E 14

LTE Band 14 as PCC

Table F-18
Maximum Output Powers



SAP EVALUATION REPORT

Reviewed by:

Test Dates:

DUT Type:

APPENDIX F:
Page 9 of 18

F-4.5

LTE Band 5 as PCC

Table F-19
Maximum Output Powers



FCC ID: A3I SME711U

SAR EVALUATION REPORT

Reviewed by:
Quality Manager

Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset	APPENDIX F: Page 10 of 18
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F.4.6

LTE Band 26 as PCC

Table F-20
Maximum Output Powers

Combination	PCC						SCC 1						SCC 2						SCC 3						Power							
	PCC Band	PCC BW [MHz]	PCC UL [DL] Ch.	PCC Freq. [MHz]	Mod.	PCC UL RBS Offset	PCC UL [DL] Ch.	PCC [DL] Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC DL [DL] Ch.	SCC DL Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC DL [DL] Ch.	SCC DL Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC DL [DL] Ch.	SCC DL Freq. [MHz]	DL Ant. Config.	LTE Tx-Power Enabled [dBm]	LTE Single Carrier Tx Power [dBm]						
CA [25A]-26A-28A	LTE B26	5	26715	816.5	QPSK	1	24	8715	863.5	2x2	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	2x2	-	-	-	-	-	24.00	24.00					
CA [25A]-25A-26A	LTE B26	5	26715	816.5	QPSK	1	24	8715	863.5	2x2	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	-	-	-	23.91	24.00					
CA [25A]-26A-41A	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B25	20	8365	1962.5	4x4	LTE B41	20	40620	2593	2x2	-	-	-	-	-	23.88	24.10					
CA [25A]-26A-[41A]	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B25	20	8365	1962.5	2x2	LTE B41	20	40620	2593	4x4	-	-	-	-	-	23.81	24.10					
CA [25A]-26A-[41A]	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B41	20	40620	2593	4x4	LTE B41	20	40620	2593	2x2	-	-	-	-	-	23.85	24.10					
CA [25A]-26A-41C	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B25	20	8365	1962.5	4x4	LTE B41	20	40620	2593	2x2	LTE B41	20	40620	2593	4x4	-	-	-	-	-	23.81	24.10
CA [25A]-26A-[41C]	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B25	20	8365	1962.5	4x4	LTE B41	20	40620	2593	4x4	LTE B41	20	40620	2593	2x2	-	-	-	-	-	23.81	24.10
CA [25A]-26A-[41C]	LTE B26	10	26990	844	QPSK	1	0	8990	889	2x2	LTE B20	20	8365	1962.5	4x4	LTE B41	20	40620	2593	4x4	LTE B41	20	40620	2593	2x2	-	-	-	-	-	23.83	24.10



SAR EVALUATION REPORT

Reviewed by:
Quality Manager

FCC ID: A3LSMF711U		SAR EVALUATION REPORT	Reviewed by: Quality Manager
Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 11 of 18

F.4.7

LTE Band 66 as PCC

Table F-21
Maximum Output Powers



Reviewed by:
Quality Manager

Test Dates:
04/08/21 – 06/03/21

DUT Type:
Portable Handset

APPENDIX F:
Page 12 of 18

Table F-22
Maximum Output Powers Continued

FCC ID: A3LSMF711U	 PCTEST® Proud to be part of element	SAR EVALUATION REPORT	Reviewed by: Quality Manager
Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 13 of 18

Table F-23
Maximum Output Powers Continued

FCC ID: A3LSMF711U	 PCTEST® Proud to be part of element	SAR EVALUATION REPORT	Reviewed by: Quality Manager
Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 14 of 18

F.4.8

LTE Band 25 as PCC

Table F-24
Maximum Output Powers



FCC ID: A3LSMF711U

SAR EVALUATION REPORT

Reviewed by:
Quality Manager

FCC ID: A3LSMF711U	 PCTEST® Proud to be part of Element	SAR EVALUATION REPORT	Reviewed by: Quality Manager
Test Dates: 04/08/21 – 06/03/21	DUT Type: Portable Handset		APPENDIX F: Page 15 of 18

F.4.9

LTE Band 30 as PCC

Table F-25
Maximum Output Powers

F.4.10

LTE Band 41 as PCC

Table E-26



FCC ID: A3LSMF711U

SAR EVALUATION REPORT

Reviewed by:

Test L

REV 21.3 M

02/15/2019

F.4.1

LTE Band 48 as PCC

Table F-27
Maximum Output Powers

F.5 Downlink Carrier Aggregation with CA_41C Uplink Carrier Aggregation enabled

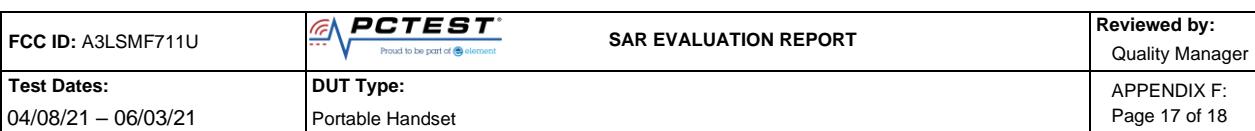
This device supports uplink carrier aggregation (ULCA) with additional Carrier Aggregation configurations active in the downlink. Power measurements were performed with ULCA active and additional CA configurations active in the downlink for the configuration per Fall 2017 TCB Workshop Notes.

Per FCC Guidance, additional SAR measurements for these configurations were not required since their maximum output power was not more than 0.25 dB higher than the maximum output power for with only ULCA active.

F.5.1

DL Carrier Aggregation RF Conducted Powers

Table F-28
Maximum Output Powers



F.5.2

DL Carrier Aggregation with DL 4x4 MIMO RF Conducted Powers

Note: 4x4 DL MIMO is only operating in the downlink. Uplink transmission is limited to a single output stream for each component carrier of ULCA.

Table F-29
Maximum Output Powers

Combination	PCC								SCC 1								Power				
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL# RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	SCC ULP RB	SCC ULP RB Offset	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	ULCA Tx Power with diff TCA config	ULCA Tx Power [dBm]
CA_ [66B]	LTE_B66	10	132622	1775	OPSK	1	0	67086	2175	4x4	LTE_B66	10	132523	1765.1	OPSK	1	49	66987	2165.1	4x4	24.19
CA_ [66C]	LTE_B66	20	132522	1770	OPSK	1	0	67036	2170	4x4	LTE_B66	20	132574	1765.1	OPSK	1	49	66838	2150.2	4x4	24.33
CA_ [66C]	LTE_B66	20	132522	1770	OPSK	1	0	67036	2170	4x4	LTE_B66	20	132574	1765.1	OPSK	1	49	66838	2150.2	4x4	24.33

Combination	PCC								SCC								Power				
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL#R	PCC UL R Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	DL Ant. Config.	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL#R	PCC UL RB Offset	PCC (DL) Freq. [MHz]	DL Ant. Config.	ULCA Tx Power with add'l CA config. active on DL (dBm)	LTE Single Carrier Tx Power (dBm)
CA 148C1	LTE B48	20	56207	3846.7	QPSK	50	56207	3646.5	4x4	LTE B48	20	56405	3666.5	QPSK	50	0	56405	3666.5	4x4	22.00	22.00