

APPENDIX I: 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 components 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 I-1 – Example of Exclusion Table for SISO Configurations

Index	BCC	Supported Channel Bandwidth (MHz)				Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4		
CC#01	CA_2A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#02	CA_2A-2A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#03	CA_2A-2A-4A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#04	CA_2A-2A-4A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#05	CA_2A-2A-4A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#06	CA_2A-2A-4A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#07	CA_2A-2A-4A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#08	CA_2A-2A-4A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#09	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#10	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#11	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#12	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#13	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#14	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#15	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#16	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#17	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#18	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#19	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#20	CA_2A-2A-4A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes

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

Index	BCC	Supported Channel Bandwidth (MHz)				Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4		
CC#M01	CA_12C1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M02	CA_12A1-12A	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M03	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M04	CA_12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M05	CA_12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M06	CA_12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M07	CA_12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M08	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M09	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M10	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M11	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M12	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M13	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M14	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M15	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M16	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M17	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M18	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M19	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M20	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M21	CA_12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M22	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M23	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M24	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M25	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M26	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M27	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M28	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M29	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes
CC#M30	CA_12A1-12A1	5, 10, 15, 20	5, 10, 15, 20			None	Yes

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

I.1 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

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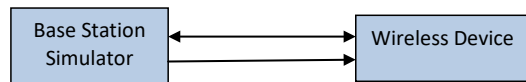
only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the 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 active 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 the RF Conducted Powers Section and LTE/NR Lower Bandwidth RF Conducted Power Appendix. 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 I-1
DL CA Power Measurement Setup**

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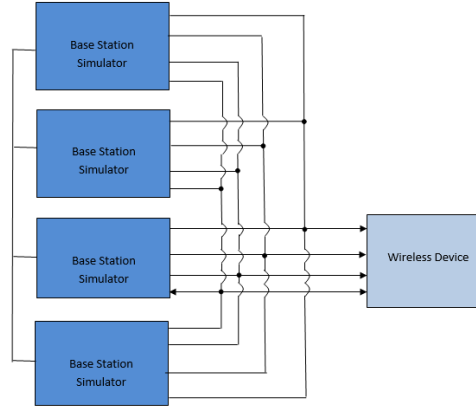


Figure I-2
DL CA with DL 4x4 MIMO Power Measurement Setup

I.2 Downlink Carrier Aggregation RF Conducted Powers

I.2.1 LTE Band 71 as PCC

Table I-3
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC				SCC 1				SCC 2				SCC 3				LTE Tx Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]								
				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 4A-4A-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	-	-	-	-	-	24.96	24.93	
CA 4B4-4B4-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B48	20	5590	3625	LTE B48	20	5640	3690	-	-	-	-	-	-	-	-	-	-	24.92	24.93
CA 4B-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B48	20	5590	3625	LTE B48	20	56188	3644.8	-	-	-	-	-	-	-	-	-	-	24.95	24.93
CA 2A-2A-4A-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	25.04	24.93						
CA 2A-2A-66A-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66766	2145	66766	2145	66766	2145	66766	2145	25.02	24.93
CA 2A-66A-66A-71A	LTE B71	10	133297	680.5	QPSK	1	25	68761	634.5	LTE B2	20	900	1960	LTE B66	20	66766	2145	LTE B66	20	66766	2145	66684	2164.8	25.14	24.93				

I.2.2 LTE Band 12 as PCC

Table I-4
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC				SCC 1				SCC 2				SCC 3				SCC 4				LTE Tx Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]					
				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]			
CA 2A-12A (1)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.97	24.82	
CA 4A-12A (1)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.56	24.40	
CA 4B4-12A (2)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.56	24.40	
CA 12A-12A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.77	24.60	
CA 12A-4A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	24.52	24.40
CA 12A-4B	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	LTE B66	20	66766	2145	-	-	-	-	-	-	-	-	-	-	-	24.56	24.40
CA 12A-66A (1)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.46	24.40
CA 12A-66A (2)	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.46	24.40
CA 12A-4B-4C	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B48	20	5590	3625	LTE B48	20	5590	3625	-	-	-	-	-	-	-	-	-	-	-	24.54	24.40
CA 12A-4B-4C-4D	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B48	20	5590	3625	LTE B48	20	5590	3625	-	-	-	-	-	-	-	-	-	-	-	24.04	24.40
CA 2A-2A-4A-12A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B4	20	2175	2132.5	24.47	24.40							
CA 2A-4A-4A-12A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B4	20	2175	2132.5	24.52	24.40							
CA 2A-4A-12B	LTE B12	5	23095	707.5	QPSK	1	12	5095	737.5	LTE B12	5	5047	732.7	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	24.40	24.56							
CA 2A-4B-4C-12B	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B48	20	5590	3625	-	-	-	-	-	-	-	-	-	-	-	24.52	24.40
CA 4A-4A-12B	LTE B12	5	23095	707.5	QPSK	1	12	5095	737.5	LTE B12	5	5047	732.7	LTE B4	20	2175	2132.5	LTE B4	20	2175	2132.5	24.46	24.56							
CA 12A-4B	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B48	20	5590	3625	LTE B48	20	5590	3625	-	-	-	-	-	-	-	-	-	-	-	24.48	24.40
CA 12A-4B-4C	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B48	20	5590	3625	LTE B48	20	5590	3625	-	-	-	-	-	-	-	-	-	-	-	24.48	24.40
CA 2A-2A-12A-30A-66A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B66	20	66766	2145	66766	2145	24.39	24.40	
CA 2A-2A-12A-66A-66A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66766	2145	LTE B66	20	66766	2145	66766	2145	24.49	24.40	
CA 2A-2A-12B-66A	LTE B12	10	23095	707.5	QPSK	1	12	5095	737.5	LTE B12	5	5047	732.7	LTE B2	20	900	1960	LTE B66	20	66766	2145	LTE B66	20	66766	2145	66766	2145	24.47	24.40	
CA 2A-12A-30A-66A-66A	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66766	2145	LTE B66	20	66766	2145	66766	2145	24.51	24.40	
CA 2A-12B-66A-66A	LTE B12	5	23095	707.5	QPSK	1	12	5095	737.5	LTE B12	5	5047	732.7	LTE B2	20	900	1960	LTE B66	20	66766	2145	LTE B66	20	66766	2145	66766	2145	24.47	24.56	
CA 12A-4B-4C	LTE B12	10	23095	707.5	QPSK	1	25	5095	737.5	LTE B66	20	66766	2145	LTE B66	20	66766	2145	-	-	-	-	-	-	-	-	-	-	-	24.51	24.40

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I.2.3 LTE Band 13 as PCC

**Table I-5
Maximum Output Powers**

Combination	PCC										SCC 1				SCC 2				SCC 3				SCC 4				Power	
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (DL) Freq. [MHz]	Mod.	PCC UL RB Offset	PCC UL RB 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_2A-2A-1A-30A-66A	LTE B13	5	2330	793	QPSK	1	23	5330	763	LTE B2	20	900	1960	LTE B2	20	2170	2330	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B13	5	2330	793	QPSK	1	23	5330	763	LTE B46	20	5660	5937	LTE B46	20	4920	5180	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B13	5	2330	793	QPSK	1	23	5330	763	LTE B46	20	5660	5937	LTE B46	20	4920	5180	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B13	5	2330	793	QPSK	1	23	5330	763	LTE B46	20	5660	5937	LTE B46	20	4920	5180	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B13	5	2330	793	QPSK	1	23	5330	763	LTE B46	20	5660	5937	LTE B46	20	4920	5180	-	-	-	-	-	-	-	-	24.55	24.68	

I.2.4 LTE Band 14 as PCC

**Table I-6
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 Offset	PCC UL RB 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-2A-1A-30A-66A	LTE B14	5	2330	793	QPSK	1	12	5330	763	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B56	20	66786	2345	24.55	24.68
CA_2A-2A-1A-30A-66A	LTE B14	5	2330	793	QPSK	1	12	5330	763	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B56	20	66786	2345	24.61	24.68
CA_2A-2A-1A-30A-66A	LTE B14	5	2330	793	QPSK	1	12	5330	763	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B56	20	66786	2345	24.68	24.68

I.2.5 LTE Band 5 as PCC

**Table I-7
Maximum Output Powers**

Combination	PCC										SCC 1				SCC 2				SCC 3				SCC 4				Power	
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (DL) Freq. [MHz]	Mod.	PCC UL RB Offset	PCC UL RB 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_2A-2A-1A-30A-66A	LTE B5	5	2425	824.5	QPSK	1	12	2425	824.5	LTE B46	20	5660	5937	LTE B46	20	5047	5317	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B5	5	2425	824.5	QPSK	1	12	2425	824.5	LTE B46	20	5660	5937	LTE B46	20	5047	5317	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B5	5	2425	824.5	QPSK	1	12	2425	824.5	LTE B46	20	5660	5937	LTE B46	20	5047	5317	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B5	5	2425	824.5	QPSK	1	12	2425	824.5	LTE B46	20	5660	5937	LTE B46	20	5047	5317	-	-	-	-	-	-	-	-	24.55	24.68	
CA_2A-2A-1A-30A-66A	LTE B5	5	2425	824.5	QPSK	1	12	2425	824.5	LTE B46	20	5660	5937	LTE B46	20	5047	5317	-	-	-	-	-	-	-	-	24.55	24.68	

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Technical Manager

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I.2.6 LTE Band 66 as PCC

Table I-8 Maximum Output Powers

Combination	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 1		SCC 2		SCC 3		SCC 4		LTE Tx Power [dBm]	LTE Single Carrier Tx Power [dBm]			
											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 2A-25A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B5	20	2525	881.5	-	-	-	-	-	-	23.60	23.64		
CA 12A-25A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B12	10	5095	737.5	-	-	-	-	-	-	23.60	23.64		
CA 25A-25A (T)	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B25	20	8065	1932.5	-	-	-	-	-	-	23.60	23.64		
CA 25A-41A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40620	2593	-	-	-	-	-	-	23.72	23.64		
CA 25A-41C	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40620	2593	LTE B41	20	40622	2593.2	-	-	23.63	23.64		
CA 25A-41D	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40622	2593.2	LTE B41	20	40620	2593	LTE B41	20	40818	2612.8	23.54	23.64

I.2.7 LTE Band 25 as PCC

Table I-9 Maximum Output Powers

Combination	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 1		SCC 2		SCC 3		LTE Tx Power [dBm]	LTE Single Carrier Tx Power [dBm]					
											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 2A-25A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B5	20	2525	881.5	-	-	-	-	-	-	23.62	23.64		
CA 12A-25A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B12	10	5095	737.5	-	-	-	-	-	-	23.60	23.64		
CA 25A-25A (T)	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B25	20	8065	1932.5	-	-	-	-	-	-	23.59	23.64		
CA 25A-41A	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40620	2593	-	-	-	-	-	-	23.72	23.64		
CA 25A-41C	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40620	2593	LTE B41	20	40622	2593.2	-	-	23.63	23.64		
CA 25A-41D	LTE B25	5	26065	1852.5	QPSK	1	12	8065	1932.5	LTE B41	20	40622	2593.2	LTE B41	20	40620	2593	LTE B41	20	40818	2612.8	23.54	23.64

I.2.8 LTE Band 30 as PCC

Table I-10 Maximum Output Powers

Combination	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 1		SCC 2		SCC 3		SCC 4		LTE Tx Power [dBm]	LTE Single Carrier Tx Power [dBm]							
											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 2A-2A-25A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B2	20	700	1940	LTE B20	10	9715	722.5	-	-	-	-	23.35	23.41
CA 2A-25A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B20	10	9715	722.5	LTE B20	20	66786	2145	20	66786	2145	23.35	23.43	
CA 25A-25A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B20	10	9715	722.5	LTE B20	20	66786	2145	LTE B20	20	62729	2169	-	-	-	-	23.44	23.48
CA 2A-2A-25A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B2	20	700	1940	LTE B5	10	9255	881.5	LTE B86	20	66786	2145	23.35	23.43
CA 2A-25A-25A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B2	20	700	1940	LTE B12	10	5095	737.5	LTE B86	20	66786	2145	23.45	23.43
CA 2A-2A-25A-30A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B2	20	700	1940	LTE B14	10	9330	763	LTE B86	20	66786	2145	23.43	23.43
CA 2A-25A-25A-30A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B5	10	9255	881.5	LTE B86	20	66786	2145	23.38	23.43				
CA 2A-2A-25A-30A-30A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B12	10	5095	737.5	LTE B86	20	60786	2145	23.39	23.43				
CA 2A-2A-25A-30A-30A-30A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B14	10	9330	763	LTE B86	20	66786	2145	23.36	23.43				
CA 2A-2A-25A-30A-30A-30A-30A-30A-30A	LTE B30	10	27710	2310	QPSK	1	0	9820	2395	LTE B2	20	900	1900	LTE B5	5	2453	874.3	LTE B86	20	66786	2145	23.38	23.43				

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I.2.9 LTE Band 41 as PCC

Table I-11
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC					SCC 1				SCC 2				Power			
			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]	LTE Tx. Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]
CA 41A-41A (1)	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	LTE B41	20	39750	2506	-	-	-	-	24.28	24.31
CA 41A-41C	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	LTE B41	20	39948	2525.8	LTE B41	20	39750	2506	24.22	24.31
CA 41C-41A	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	LTE B41	20	40911	2622.1	LTE B41	20	39750	2506	24.16	24.31
CA 41D	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	LTE B41	20	40911	2622.1	LTE B41	20	40713	2602.3	24.33	24.31

I.2.10 LTE Band 48 as PCC

Table I-12
Maximum Output Powers

Combination	PCC Band	PCC BW [MHz]	PCC					SCC 1				SCC 2				SCC 3				SCC 4				Power				
			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	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	55340	3590	-	-	-	-	-	-	-	-	-	-	-	-	-	21.17	21.18
CA 48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	10	56124	3638.4	-	-	-	-	-	-	-	-	-	-	-	-	-	21.24	21.18
CA 48A-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	55340	3590	LTE B48	20	55538	3579.8	-	-	-	-	-	-	-	-	-	21.20	21.18
CA 48C-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55340	3590	-	-	-	-	-	-	-	-	-	21.25	21.18
CA 48A-48D	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	55340	3590	LTE B48	20	55750	3599.6	LTE B48	20	55750	3599.6	-	-	-	-	-	21.17	21.18
CA 48C-48A	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55881	3614.1	LTE B48	20	55881	3614.1	-	-	-	-	-	21.12	21.18
CA 48C-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55340	3590	LTE B48	20	55538	3579.8	-	-	-	-	-	21.16	21.18
CA 48E	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55881	3614.1	LTE B48	20	55881	3614.1	-	-	-	-	-	21.20	21.18
CA 48C-48D	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55340	3590	LTE B48	20	55538	3579.8	LTE B48	20	55750	3599.6	21.11	21.18	
CA 48D-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55881	3614.1	LTE B48	20	55881	3614.1	LTE B48	20	56442	3670.2	21.08	21.18	
CA 48F	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	LTE B48	20	56079	3633.9	LTE B48	20	55881	3614.1	LTE B48	20	55881	3614.1	LTE B48	20	55485	3574.5	21.15	21.18	

I.3 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 I.1 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.

I.3.1 LTE 4x4 MIMO DL Standalone Powers

Table I-13
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]	Target Power [dBm]
66	5	132322	1745	QPSK	1	12	23.91	24.09	23.5
25	5	26065	1852.5	QPSK	1	12	23.32	23.64	23.5
30	10	27710	2310	QPSK	1	0	22.39	22.43	22.5
41	10	41055	2636.5	QPSK	1	25	24.27	24.31	24.0
48	10	56223	3648.3	QPSK	1	25	21.40	21.18	20.5

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I.3.9 LTE Band 41 as PCC

Table I-22
Maximum Output Powers

Combination	PCC										SCC 1				SCC 2				Power			
	PCC Band	PCC BW [MHz]	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)				
CA [41A]-41A (1)	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	39750	2506	2x2	-	24.37	24.31				
CA 41A-[41A] (1)	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	2x2	LTE B41	20	39750	2506	4x4	-	24.27	24.31				
CA [41A]-[41A] (1)	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	39750	2506	4x4	-	24.25	24.31				
CA [41A]-[41C]	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	2x2	LTE B41	20	39948	2525.8	4x4	LTE B41	20	39750	2506	4x4	24.23	24.31
CA [41C]-41A	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	40911	2622.1	4x4	LTE B41	20	39750	2506	2x2	24.24	24.31
CA [41A]-41C	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	39948	2525.8	2x2	LTE B41	20	39750	2506	2x2	24.20	24.31
CA [41A]-[41A]	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	2x2	LTE B41	20	40911	2622.1	2x2	LTE B41	20	39750	2506	4x4	24.24	24.31
CA [41A]-[41C]	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	39948	2525.8	4x4	LTE B41	20	39750	2506	4x4	24.21	24.31
CA [41C]-[41A]	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	40911	2622.1	4x4	LTE B41	20	39750	2506	4x4	24.20	24.31
CA [41D]	LTE B41	10	41055	2636.5	QPSK	1	25	41055	2636.5	4x4	LTE B41	20	40911	2622.1	4x4	LTE B41	20	40713	2602.3	4x4	24.27	24.31

I.3.10 LTE Band 48 as PCC

Table I-23
Maximum Output Powers

Combination	PCC										SCC 1				SCC 2				SCC 3				SCC 4				Power		
	PCC Band	PCC BW [MHz]	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)			
CA 48A-48A	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	55340	3560	4x4	-	-	-	-	-	-	-	-	-	-	-	21.13	21.18	
CA 48A-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	2x2	-	-	-	-	-	-	-	-	-	-	-	21.23	21.18	
CA 48A-[48A]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	4x4	-	-	-	-	-	-	-	-	-	-	-	21.21	21.18	
CA 48B-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	4x4	-	-	-	-	-	-	-	-	-	-	-	21.26	21.18	
CA 48B-[48B]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	55340	3560	4x4	-	-	-	-	-	-	-	-	-	-	-	21.16	21.18	
CA 48C-48A	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55340	3560	2x2	-	-	-	-	-	-	-	21.10	21.18
CA 48A-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	2x2	LTE B48	20	55338	3579.8	4x4	-	-	-	-	-	-	-	21.19	21.18
CA 48C-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	56079	3633.9	4x4	-	-	-	-	-	-	-	-	-	-	-	21.15	21.18	
CA 48A-[48C]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	4x4	-	-	-	-	-	-	-	-	-	-	-	21.13	21.18	
CA 48C-[48A]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	-	-	-	-	-	-	-	-	-	-	-	21.21	21.18	
CA 48A-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	55340	3560	4x4	LTE B48	20	55736	3599.6	4x4	LTE B48	20	55736	3599.6	2x2	-	-	20.93	21.18
CA 48B-48A	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	LTE B48	20	55640	3600	2x2	-	-	20.71	21.18
CA 48A-48D	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	2x2	LTE B48	20	55338	3579.8	2x2	-	-	-	-	-	-	-	20.90	21.18
CA 48B-48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	56079	3633.9	2x2	LTE B48	20	55883	3614.1	2x2	-	-	-	-	-	-	-	20.60	21.18
CA 48A-[48B]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	4x4	LTE B48	20	55736	3599.6	4x4	-	-	-	-	-	-	-	20.65	21.18
CA 48B-[48A]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	LTE B48	20	55640	3600	4x4	-	-	20.97	21.18
CA 48C-[48C]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55338	3579.8	4x4	-	-	-	-	-	-	-	20.87	21.18
CA 48B-[48C]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	55340	3560	4x4	LTE B48	20	55338	3579.8	2x2	-	-	-	-	-	-	-	20.88	21.18
CA 48C-[48B]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	-	-	-	-	-	-	-	20.28	21.18
CA 48C-[48D]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	55340	3560	4x4	LTE B48	20	55038	3579.8	4x4	-	-	-	-	-	-	-	21.04	21.18
CA 48B-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	LTE B48	20	55640	3600	2x2	-	-	21.16	21.18
CA 48B-48D	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55038	3579.8	2x2	LTE B48	20	55736	3599.6	2x2	-	-	21.10	21.18
CA 48C-48C	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	2x2	LTE B48	20	56079	3633.9	2x2	LTE B48	20	55883	3614.1	2x2	-	-	-	-	-	-	-	21.11	21.18
CA 48C-48D	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55038	3579.8	4x4	LTE B48	20	55736	3599.6	4x4	-	-	21.11	21.18
CA 48B-[48C]	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	LTE B48	20	55640	3600	4x4	-	-	21.12	21.18
CA 48B	LTE B48	10	56223	3648.3	QPSK	1	25	56223	3648.3	4x4	LTE B48	20	56079	3633.9	4x4	LTE B48	20	55883	3614.1	4x4	LTE B48	20	55640	3600	4x4	-	-	21.12	21.18

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I.4 Additional Downlink Carrier Aggregation with 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 CA_5B, CA_66B, CA_66C, CA_41C, or CA_48C ULCA active.

I.4.1 Additional DL Carrier Aggregation RF Conducted Powers with Uplink Carrier Aggregation Enabled

Table I-24
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 (UL) Ch.	SCC (UL) Freq. [MHz]	Mod.	SCC UL RB	SCC UL RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod.	SCC UL RB	SCC UL RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod.	SCC UL RB	SCC UL RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	ULCA Tx Power with add'l CA config. active (dBm)	ULCA Tx Power (dBm)				
CA_5B-45A	LTE B5	10	2025	836.5	QPSK	1	0	2025	836.5	LTE B5	5	2043	829.3	QPSK	1	24	2403	874.3	LTE B46	20	6065	6037.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.16	24.65				
CA_5B-46C	LTE B5	10	2025	836.5	QPSK	1	0	2025	836.5	LTE B5	5	2043	829.3	QPSK	1	24	2403	874.3	LTE B46	20	6065	6037.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.68	24.60				

I.4.2 Additional 4x4 MIMO DL Carrier Aggregation RF Conducted Powers with Uplink Carrier Aggregation Enabled

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 I-25
Maximum Output Powers

Combination	PCC										SCC 1										SCC 2										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]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod.	SCC UL RB	SCC UL RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod.	SCC UL RB	SCC UL RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	DL Ant. Config.	ULCA Tx Power with add'l CA config. active (dBm)	ULCA Tx Power (dBm)
CA [66B]	LTE B66	10	132622	1775	QPSK	1	0	67086	2175	4x4	LTE B66	20	132523	1765.1	QPSK	1	49	66987	2165.1	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.59	23.88
CA [66C]	LTE B66	20	132572	1770	QPSK	1	0	67036	2170	4x4	LTE B66	20	132374	1750.2	QPSK	1	99	66838	2150.2	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.46	23.67

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