PART 1 Test Under Static Transmission Scenario

Test Report No. 14809943H-B

Customer	**Panasonic Corporation of North America**
Description of EUT	**Radio Module (Tested inside of Panasonic Personal Computer FZ-40)**
Model Number of EUT	**WW21A**
FCC ID	**ACJ9TGWW21A**
Test Regulation	**FCC47CFR 2.1093**
Test Result	**Complied**
Reported TER	**Worst TER : 0.262**
Issue Date	**June 16, 2023**
Remarks	**-**

Representative test engineer	Approved by
Takeshi Hiyaji Engineer	Takayuki Shimada Leader
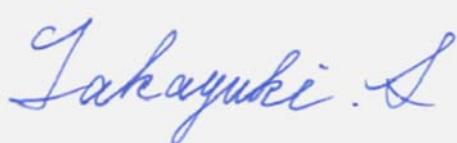
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CERTIFICATE 5107.02

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☒ There is no testing item of "Non-accreditation".

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Contents

1   Introduction

This device uses Qualcomm® Smart Transmit feature These modem(s) is enabled in Qualcomm® Smart Transmit Feature to control and manage transmitting power in real time and to ensure at all times the averaged RF exposure is in compliance with FCC/ISED requirements

This report (part 1) demonstrates that Qualcomm® Reference Design (QRD) complies with FCC/ISED RF exposure limits at these maximum time averaged power limits.
ote: WLAN operations are not enabled with Smart Transmit.

This report is for evaluation of n77 and Downlink CA Combination only, as it was added to the EUT. For the other test, please see original application (FCC ID: ACJ9TGWW21A).

2   Customer information

Company Name	Panasonic Corporation of North America
Address	Two Riverfront Plaza, 9th Floor Newark, NEW JERSEY, 07102-5940, USA
Telephone Number	+1-201-348-7760
Contact Person	Ben Botros

*Remarks:
Panasonic Connect Co., Ltd. is on behalf of the applicant: Panasonic Corporation of North America (Company incorporated abroad).

The information provided from the customer is as follows;
- Customer, Description of EUT, Model No. FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 2: Customer information
- SECTION 3: Equipment under test (EUT) other than the Receipt Date
- SECTION 11: Tune-up tolerance information and software information
* The laboratory is exempted from liability of any test results affected from the above information in section 3.

3   Equipment under test (EUT)

3.1   Identification of EUT

Description	Radio Module
Model Number	WW21A
Serial Number	1JTSA00112
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	May 22, 2023
Calculated Date	May 22 to May 31, 2023

<Information of Host device>

Type	Personal Computer FZ-40 Intel Core i7-1185G7 (1.2 GHz, Max 4.8 GHz) 14 inch LCD (1920 x 1080)

3.2   Product description

General Specification

Rating	DC 3.0 to 3.6 V

Radio Specification

Wireless technologi+C4:C41	Dup.	Band		Mode
WCDMA	FDD		2	UMTS Rel. 99 (Data) HSDPA (Rel. 5)
	FDD		4	HSUPA (Rel. 6), HSPA+ (Rel. 7), DC-HSDPA (Rel. 8)
	FDD		5	
LTE	FDD		2	QPSK, 16QAM, 64AQM, 256QAM
	FDD		4	
	FDD		5	Dow nlink MIMO Support: Yes(2x2, 4x4)
*B42: not used in US (FCC)	FDD		7	Supported band : B2, B4, B7, B25, B38, B41, B42, B48, B66
	FDD		12	
*B48: not used in	FDD		13	Uplink MIMO Support: No
Canada(ISED)	FDD		14	Uplink transmission is limited to a single output stream.
	FDD		17	
	FDD		25	
	FDD		26	
	FDD(Rx only)		29	
	TDD		38	
	TDD		41	
	TDD		42	
	TDD(Rx only)		46	
	TDD		48	
	FDD		66	
	FDD		71	

LTE CA	Dow nlink			Uplink *B42: not used in US (FCC) / B48: not used in Canada(ISED)		
	Maximum 7 carriers See Section 13.2.1 for supported Dow nlink CA combinations			Maximum 2 carriers Supported combination: <Inter-band contiguous> 7C, 41C, 42C, 48C <Inter-band> 2A-5A, 2A-12A, 2A-13A, 4A-5A, 4A-12A, 4A-13A, 5A-7A, 5A-66A, 12A-66A, 13A-66A		

5G NR (FR1)	FDD	15 kHz	n2	Pi/2 BPSK (DFT-s-OFDM),
	FDD	15 kHz	n5	QPSK (CP-OFDM/DFT-s-OFDM),
*n78: not used in US (FCC)	TDD	15 kHz	n41	16QAM (CP-OFDM/DFT-s-OFDM),
	FDD	15 kHz	n66	64QAM (CP-OFDM/DFT-s-OFDM),
	FDD	15 kHz	n71	256QAM (CP-OFDM/DFT-s-OFDM)
	TDD	30 kHz	n77	Dow nlink MIMO Support: Yes(2x2, 4x4)
	TDD	30 kHz	n78	Supported band : n2, n41, n66, n77, n78
	-	-	-	Uplink MIMO Support: No
	-	-	-	Uplink transmission is limited to a single output stream.

EN-DC(LTE-FR1 Sub6)	Supported combination	*n78: not used in US (FCC)
(NSA mode only)	LTE Anchor Bands for NR band n2	LTE Band 5/12/13
	LTE Anchor Bands for NR band n5	LTE Band 2/7/66
	LTE Anchor Bands for NR band n41	LTE Band 2/25/26/66
	LTE Anchor Bands for NR band n66	LTE Band 5/12/13/14/71
	LTE Anchor Bands for NR band n71	LTE Band 2/7/66
	LTE Anchor Bands for NR band n77	LTE Band 41
	LTE Anchor Bands for NR band n78*	LTE Band 2/5/7/12/38/66

Wireless module (Tested inside of Panasonic Personal Computer FZ-40)
Model: WL20B (FCC ID ACJ9TGWL20B / ISED certification number 216H-CFWL20B)

Wireless technologies	Dup.	Band		Mode
WLAN	TDD	2.4GHz	2412-2472 for US	802.11b
				802.11g
			2412-2462 for Canada	802.11n(20,40)
				802.11ax(20,40)
	TDD	5GHz	5180-5240	802.11a
			5260-5320	802.11n(20,40)
			5500-5720	802.11ac(20,40.80.160)
			5745-5825	802.11ax(20,40.80.160)
Bluetooth	TDD	2.4GHz	2402-2480	BR/EDR/LE

Host device: Personal Computer, Model: FZ-40

Wireless technologies	Dup.	Band		Mode
5G NR (FR2)	TDD	120 kHz	n258	Pi/2 BPSK (DFT-s-OFDM), QPSK (CP-OFDM/DFT-s-OFDM)
	TDD	120 kHz	n260	16QAM (CP-OFDM/DFT-s-OFDM),
	TDD	120 kHz	n261	64QAM (CP-OFDM/DFT-s-OFDM)
	-	-	-	
	-	-	-	MIMO Support: No
EN-DC(LTE-FR2 mmW)	Supported combination		*B48: not used in Canada(ISED)	
(NSA mode only)	LTE Anchor Bands for NR band n258		LTE Band 2/5/7/12/66	
	LTE Anchor Bands for NR band n260		LTE Band 2/5/12/13/14/48*/66	
	LTE Anchor Bands for NR band n261		LTE Band 2/5/13/48*/66	

3.3   mmW Antenna configuration

WWAN Antennas	5G NR(FR2) Tx/Rx
#0	n258, n260 and n261
#1	n258, n260 and n261
#2	n258, n260 and n261

4   References

Federal Communications Commission. (October 23, 2015). *447498 D04 Interim General RF Exposure Guidance v01.*
International Electrotechnical Commission. (2018). *IEC TR 63170:2018.*
SPEAG. (August 2018). *5G Module V1.2 Application Note: 5G Compliance Testing.*

5   Time averaging for SAR and PD

The Qualcomm® Smart Transmit algorithm controls and manages the instantaneous Tx power to maintain the time-averaged Tx power (in turn, time-averaged RF exposure) is in compliance with regulatory limits.

This device uses Qualcomm® Smart Transmit feature and cannot operate without RF exposure characterization at the device level, beforehand. The parameters obtained from SAR and PD characterization (char), if any, is used as input for Smart Transmit. Both SAR char and PD char will be entered via the Embedded File System (EFS) to enable the Smart Transmit feature.

6   General LTE SAR Test and Reporting Considerations

Frequency range, Channel Bandwidth, Numbers and Frequencies

		Frequency range:	1850	-	1910	MHz	
Band		Channel Bandwidth[MHz]					
2		20	15	10	5	3	1.4
Low	Ch	18700	18675	18650	18625	18625	18607
	Freq[MHz]	1860	1857.5	1855	1852.5	18625	1850.7
Mid	Ch	18900	18900	18900	18900	18900	18900
	Freq[MHz]	1880	1880	1880	1880	1880	1880
High	Ch	19100	19125	19150	19175	19185	19193
	Freq[MHz]	1900	1902.5	1905	1907.5	1908.5	1909.3
		Frequency range:	1710	-	1755	MHz	
Band		Channel Bandwidth[MHz]					
4		20	15	10	5	3	1.4
Low	Ch	20050	20025	20000	19975	19965	19957
	Freq[MHz]	1720	1717.5	1715	1712.5	1711.5	1710.7
Mid	Ch	20175	20175	20175	20175	20175	20175
	Freq[MHz]	1732.5	1732.5	1732.5	1732.5	1732.5	1732.5
High	Ch	20300	20325	20350	20375	20385	20393
	Freq[MHz]	1745	1747.5	1750	1752.5	1753.5	1754.3
		Frequency range:	824	-	849	MHz	
Band		Channel Bandwidth[MHz]					
5				10 *1	5	3	1.4
Low	Ch			20450	20425	20415	20407
	Freq[MHz]			829	826.5	825.5	824.7
Mid	Ch			20525	20525	20525	20525
	Freq[MHz]			836.5	836.5	836.5	836.5
High	Ch			20600	20625	20635	20643
	Freq[MHz]			844	846.5	847.5	848.3
		Frequency range:	2500	-	2570	MHz	
Band		Channel Bandwidth[MHz]					
7		20	15	10	5		
Low	Ch	20850	20825	20800	20775		
	Freq[MHz]	2510	2507.5	2505	2502.5		
Mid	Ch	21100	21100	21100	21100		
	Freq[MHz]	2535	2535	2535	2535		
High	Ch	21350	21375	21400	21425		
	Freq[MHz]	2560	2562.5	2565	2567.5		
		Frequency range:	699	-	716	MHz	
Band		Channel Bandwidth[MHz]					
12				10 *1	5	3	1.4
Low	Ch			23060	23035	23025	23017
	Freq[MHz]			704	701.5	700.5	699.7
Mid	Ch			23095	23095	23095	23095
	Freq[MHz]			707.5	707.5	707.5	707.5
High	Ch			23130	23155	23165	23173
	Freq[MHz]			711	713.5	714.5	715.3

		Frequency range:	777	-	787	MHz	
Band		Channel Bandwidth[MHz]					
13				10 *1	5 *1		
Low	Ch				23205		
	Freq[MHz]				779.5		
Mid	Ch			23230	23230		
	Freq[MHz]			782	782		
High	Ch				23255		
	Freq[MHz]				784.5		

		Frequency range:	788	-	798	MHz	
Band		Channel Bandwidth[MHz]					
14				10 *1	5 *1		
Low	Ch				23305		
	Freq[MHz]				790.5		
Mid	Ch			23330	23330		
	Freq[MHz]			793	793		
High	Ch				23355		
	Freq[MHz]				795.5		

		Frequency range:	704	-	716	MHz	
Band		Channel Bandwidth[MHz]					
17	20	15	10 *1	5 *1	3	1.4	
Low	Ch			23780	23755		
	Freq[MHz]			709	706.5		
Mid	Ch			23790	23790		
	Freq[MHz]			710	710		
High	Ch			23800	23825		
	Freq[MHz]			711	713.5		

		Frequency range:	1850	-	1915	MHz	
Band		Channel Bandwidth[MHz]					
25	20	15	10	5	3	1.4	
Low	Ch	26140	26115	26090	26065	26055	26047
	Freq[MHz]	1860	1857.5	1855	1882.5	1851.5	1850.7
Mid	Ch	26365	26365	26365	26365	26365	26365
	Freq[MHz]	1882.5	1882.5	1882.5	1882.5	1882.5	1882.5
High	Ch	26590	26615	26640	26665	26675	26683
	Freq[MHz]	1905	1907.5	1910	1912.5	1913.5	1914.3

		Frequency range:	814	-	849	MHz	
Band		Channel Bandwidth[MHz]					
26		15 *1	10	5	3	1.4	
Low	Ch		26765	26740	26715	26705	26697
	Freq[MHz]		821.5	819	816.5	815.5	814.7
Mid	Ch		26865	26865	26865	26865	26865
	Freq[MHz]		831.5	831.5	831.5	831.5	831.5
High	Ch		26965	26990	27015	27025	27033
	Freq[MHz]		841.5	844	846.5	847.5	848.3

		Frequency range:		2570	-	2620	MHz	
Band		Channel Bandwidth[MHz]						
38		20	15	10	5			
Low	Ch	37850	37825	37800	37775			
	Freq[MHz]	2580	2577.5	2575	2572.5			
Mid	Ch	38000	38000	38000	38000			
	Freq[MHz]	2595	2595	2595	2595			
High	Ch	38150	38175	38200	38225			
	Freq[MHz]	2610	2612.5	2615	2617.5			

		Frequency range:		2496	-	2690	MHz	
Band		Channel Bandwidth[MHz]						
41		20	15	10	5			
Low	Ch	39750	39725	39700	39675			
	Freq[MHz]	2506	2503.5	2501	2498.5			
Low-Mid	Ch	40185	40173	40160	40148			
	Freq[MHz]	2549.5	2548.3	2547	2545.8			
Mid	Ch	40620	40620	40620	40620			
	Freq[MHz]	2593	2593	2593	2593			
Mid-High	Ch	41055	41068	41080	41093			
	Freq[MHz]	2636.5	2637.8	2639	2640.3			
High	Ch	41490	41515	41540	41565			
	Freq[MHz]	2680	2682.5	2685	2687.5			

		Frequency range:		3550	-	3700	MHz	
Band		Channel Bandwidth[MHz]						
48		20	15	10	5			
Low	Ch	55340	55315	55290	55265			
	Freq[MHz]	3560	3557.5	3555	3552.5			
Low-Mid	Ch	55773	55765	55757	55748			
	Freq[MHz]	3603.3	3602.5	3601.7	3600.8			
Mid-High	Ch	56207	56215	56223	56232			
	Freq[MHz]	3646.7	3647.5	3648.3	3649.2			
High	Ch	56640	56665	56690	56715			
	Freq[MHz]	3690	3692.5	3695	3697.5			

		Frequency range:		1710	-	1780	MHz	
Band		Channel Bandwidth[MHz]						
66		20	15	10	5	3	1.4	
Low	Ch	132072	132047	132022	131997	131987	131979	
	Freq[MHz]	1720	1717.5	1715	1712.5	1711.5	1710.7	
Mid	Ch	132322	132322	132322	132322	132322	132322	
	Freq[MHz]	1745	1745	1745	1745	1745	1745	
High	Ch	132572	132597	132622	132647	132657	132665	
	Freq[MHz]	1770	1772.5	1775	1777.5	1778.5	1779.3	

		Frequency range:		663	-	698	MHz	
Band		Channel Bandwidth[MHz]						
71		20 *1	15 *1	10	5			
Low	Ch	133222	133197	133172	133147			
	Freq[MHz]	673	670.5	668	665.5			
Mid	Ch	133297	133297	133297	133297			
	Freq[MHz]	680.5	680.5	680.5	680.5			
High	Ch	133372	133397	133422	133447			
	Freq[MHz]	688	690.5	693	695.5			

*1 : This bandwidth does not support at least three non-overlapping channels. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 for LTE Devices.

LTE transmitter and antenna implementation

See section 6.4 WWAN Antenna configuration

Maximum power reduction (MPR)

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values. A-MPR (additional MPR) was disabled during SAR testing

Spectrum plots for RB configurations

A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

6.1 LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

LTE TDD Bands support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
5	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations & Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.3%
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.3%
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.3%
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.7%
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.7%
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.7%
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.3%

Calculated Duty Cycle = Extended cyclic prefix in uplink * (T_s) * # of S + # of U / period

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = {[(2+0) * 2560] * [1/(15000 * 2048)] * 2 + 6 ms} / 10 ms = 63.3%

Where
D = Downlink subframe
S = Special subframe
U = Uplink subframe
T_s = 1/(15000 x 2048) seconds
X = 0

Note(s):
This device supports uplink-downlink configurations 0-6. The configuration with highest duty cycle was used for SAR Testing: configuration 0 at 63.3% (Power Class 3) and Special Subframe 7 with Extended cyclic prefix in uplink.

6.2   General 5G NR(FR1) SAR Test and Reporting Considerations

Frequency range, Channel Bandwidth, Numbers and Frequencies

Band		Frequency range: 1850 - 1910 MHz											
n2		Channel Bandwidth[MHz]											
		100	90	80	70	60	50	40	30	25	20	15	10	5
Low	Ch										372000	371500	371000	370500
	Freq[MHz]										1860	1857.5	1855	1852.5
Mid	Ch										376000	376000	376000	376000
	Freq[MHz]										1880	1880	1880	1880
High	Ch										380000	380500	381000	381500
	Freq[MHz]										1900	1902.5	1905	1907.5

Band		Frequency range: 824 - 849 MHz											
n5		Channel Bandwidth[MHz]											
		100	90	80	70	60	50	40	30	25	20 *1	15 *1	10 *1	5
Low	Ch										166800	166300	165800	165300
	Freq[MHz]										834	831.5	829	826.5
Mid	Ch										167300	167300	167300	167300
	Freq[MHz]										836.5	836.5	836.5	836.5
High	Ch										167800	168300	168800	169300
	Freq[MHz]										839	841.5	844	846.5

Band		Frequency range: 2496 - 2690 MHz											
n41		Channel Bandwidth[MHz]											
		100 *1	90 *1	80 *1	70	60 *2	50 *2	40 *2	30	25	20	15	10	5
Low	Ch	509200	508200	507200		505200	504200	503200			501200			
	Freq[MHz]	2546	2541	2536		2526	2521	2516			2506			
Low-Mid	Ch	513900	513400	512900		511900	511400	510900			509900			
	Freq[MHz]	2569.5	2567	2564.5		2559.5	2557	2554.5			2549.5			
Mid	Ch	518600	518600	518600		518600	518600	518600			518600			
	Freq[MHz]	2593	2593	2593		2593	2593	2593			2593			
Mid-High	Ch	523300	523800	524300		525300	525800	526300			527300			
	Freq[MHz]	2616.5	2619	2621.5		2626.5	2629	2631.5			2636.5			
High	Ch	528000	529000	530000		532000	533000	534000			536000			
	Freq[MHz]	2640	2645	2650		2660	2665	2670			2680			

Band		Frequency range: 1710 - 1780 MHz											
n66		Channel Bandwidth[MHz]											
		100	90	80	70	60	50	40	30	25	20	15	10	5
Low	Ch										344000	343500	343000	342500
	Freq[MHz]										1720	1717.5	1715	1712.5
Mid	Ch										349000	349000	349000	349000
	Freq[MHz]										1745	1745	1745	1745
High	Ch										354000	354500	355000	355500
	Freq[MHz]										1770	1772.5	1775	1777.5

Band		Frequency range: 663 - 698 MHz											
n71		Channel Bandwidth[MHz]											
		100	90	80	70	60	50	40	30	25	20 *1	15 *1	10	5
Low	Ch										134600	134100	133600	133100
	Freq[MHz]										673	670.5	668	665.5
Mid	Ch										136100	136100	136100	136100
	Freq[MHz]										680.5	680.5	680.5	680.5
High	Ch										137600	138100	138600	139100
	Freq[MHz]										688	690.5	693	695.5

Band FCC		Frequency range: 3450 - 3550 MHz												
n77 block A		Channel Bandwidth[MHz]												
		100 *1	90 *1	80 *1	70	60 *1	50	40	30	25	20	15	10	5
Low	Ch	636666	633000	632666		632000	631666	631333			630666			
	Freq[MHz]	3550	3495	3490		3480	3475	3720			3460			
Low-Mid	Ch													
	Freq[MHz]													
Mid	Ch	633332	633332	633332		633332	633332	633332			633333			
	Freq[MHz]	3500	3500	3500		3500	3500	3500			3500			
Mid-High	Ch													
	Freq[MHz]													
High	Ch	636666	633666	634000		634666	635000	635333			635998			
	Freq[MHz]	3550	3505	3510		3520	3525	3960			3540			

Band FCC		Frequency range: 3700 - 3980 MHz												
n77 block C		Channel Bandwidth[MHz]												
		100 *1	90	80	70	60	50	40	30	25	20	15	10	5
Low	Ch	650000	649666	649333		648666	648333	648000			647333			
	Freq[MHz]	3750	3745	3740		3730	3725	3720			3710			
Low-Mid	Ch	652998	652832	652666		652332	652166	652000			651666			
	Freq[MHz]	3795	3792.5	3790		3785	3782.5	3780			3775			
Mid	Ch	656000	656000	656000		656000	656000	656000			656000			
	Freq[MHz]	3840	3840	3840		3840	3840	3840			3840			
Mid-High	Ch	658998	659166	659332		659666	659832	659998			660333			
	Freq[MHz]	3885	3887.5	3890		3895	3897.5	3900			3905			
High	Ch	662000	662333	662666		663333	663666	664000			664666			
	Freq[MHz]	3930	3935	3940		3950	3955	3960			3970			

* : SAR test for NR bands and LTE anchor Bands were performed separately due to limitations in SAR probe calibration factors. And, due to test setup limitations, SAR testing for NR was performed using test mode software to establish the connection.
*1 : This bandwidth does not support at least three non-overlapping channels. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 for LTE Devices.
*2 : For this channel bandwidth, available non-over-lapping channels were tested.

Sub-Carrier Spacing (SCS)

n2	n5	n66	n71	n41	n77	n78
15kHz				30kHz		

LTE transmitter and antenna implementation

See section 6.4 WWAN Antenna configuration

A-MPR(Additional MPR) disabled for SAR testing

Yes

EN-DC Carrier Aggregation Possible Combinations

See section 3.2 Product description

6.3 NR (FDD/TDD) Considerations

Factory Test Mode (FTM) is used for SAR testing, 100 % duty.

6.4 WWAN Antenna configuration

The WWAN transmitter operates independently of the WLAN/BT wireless transmitter in the device, and it only supports data transmission.

The 4G LTE antenna configuration consists of WWAN-main TX/RX antenna and WWAN-aux – 3rd RX only antennas.

The 5G NR(FR1) antenna configuration consists of
- WWAN-main antenna: Tx except n41, and Rx
- WWAN-4th antenna: Tx for n41 only, and Rx
- WWAN-aux – 3rd antennas: Rx only

WWAN Antennas	4G LTE		5G NR(FR1)	
	Tx	Rx	Tx	Rx
WWAN-Main	All bands	All bands	All bands except n41	All bands
WWAN-aux	-	All bands	-	All bands
WWAN-3rd	-	All bands	-	All bands
WWAN-4th	-	All bands	n41 only	All bands

7 Test standard information

7.1 Test Specification

	Title	
☒	FCC47CFR 2.1093	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices

7.2 Published RF exposure KDB procedures

	Name of documents	Title
☐	KDB447498D01(v06)	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
☒	KDB447498D04(v01)	Interim General RF Exposure Guidance
☐	KDB447498D02(v02r01)	SAR Measurement Procedures for USB Dongle Transmitters
☐	KDB648474D04(v01r04)	SAR Evaluation Considerations for Wireless Handsets
☒	KDB941225D01(v03r01)	3G SAR Measurement Procedures
☒	KDB941225D05(v02r05)	SAR Evaluation Considerations for LTE Devices
☐	KDB941225D06(v02r01)	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
☐	KDB941225D07(v01r02)	Hot Spot SAR
☒	KDB616217D04(v01r02)	SAR Evaluation Procedures for UMPC Mini-Tablet Devices
☒	KDB865664D01(v01r04)	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☒	KDB248227D01(v02r02)	SAR Measurement Requirements for 100 MHz to 6 GHz

7.3 SAR PD Work Procedures Procedure

	Name of documents	Title or details
☒	C/N: Work Instructions-ULID-003598 Name:13-EM-W0429	UL Japan, Inc.'s SAR Work Procedures Procedure
☒	C/N: Work Instructions-ULID-003599 Name:13-EM-W0430	UL Japan, Inc.'s SAR Work Procedures Procedure
☐	C/N: Work Instructions-ULID-003619 Name: 13-EM-W0863	UL Japan, Inc.'s PD Work Procedures Procedure
☒	IEEE Std 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
☐	IEC TR 63170 Edition 1.0	Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz

7.4 Additions or deviations to standard

A non-standard configuration was used for SAR testing based on guidance from the FCC.
The operational description contains additional information.
Other than above, no addition, exclusion nor deviation has been made from the standard.

7.5 References

SPEAG. (August 2018). *5G Module V1.2 Application Note: 5G Compliance Testing.*
SPEAG. (n.d.). *SPEAG uncertainty document (AN 15-7/AN19-17).*

7.6 Limit

7.6.1 Below 6 GHz

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1 g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body	Spatial Peak (averaged over any 1 g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)
0.08	1.6	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. because of employment or occupation).

General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

1.6 W/kg limit is applied

7.6.2 Above 6 GHz

Frequency Range [MHz]	Power Density [mW/cm^2]	Average Time [Minutes]
(A) Limits For Occupational / Controlled Environments		
1,500 – 100,000	5	6
(B) Limits For General Population / Uncontrolled Environments		
1,500 – 100,000	1	30

Note: 1.0 mW/cm^2 is 10 W/m^2

10 W/m^2 limit is applied

8 Location

UL Japan, Inc. Ise EMC Lab.
Shielded room for SAR testings
A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919
ISED SAR Lab Company Number: 2973C / CAB identifier: JP0002
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81-596-24-8999

9 Definitions, symbols, and abbreviations

9.1 Definitions

SAR_design_target	: The SAR_design_target shall be less than regulatory SAR limit (i.e., 1gSAR limit for FCC) after accounting for all device design related uncertainties.
SAR_design_target_extremity	: SAR_design_target for limbs
Tx_power_at_SAR_design_target	: Transmit level that matches SAR_design_target (P_{limit} in dBm)
Δmin	: housing material influence
PD_design_target	: The design target for PD compliance. It should be less than regulatory power density limit to account for all device design related uncertainties
input.power.limit	: For a PD characterized wireless device, the input power level at antenna port(s) for each beam corresponding to PD_design_target.
PD char	: the table that contains input.power.limit fed to antenna port(s) for all supported beams.
N beams	: The mmW device supports total N beams, where M out of N are single beams and the rest of (N-M) are beam pairs (where 2 single beams are excited at the same time).
power density (PD) or S_{av}	: energy per unit time and unit area crossing a surface of area *A* characterized by the normal unit vector ˆ**n** and averaging time.

$$S_{av} = \frac{1}{AT} \int \int (\mathbf{E} \times \mathbf{H}) \cdot \hat{n} \, dA \, dT$$

Specific Absorption Rate (SAR)	: The time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ), as shown in the following equation:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

Reported SAR	: Measured SAR is scaled to the maximum tune-up tolerance limit and the maximum duty by the following formulas.

$$Reported\ SAR[w/kg]$$
$$= Measured\ SAR\ [w/kg] \times scale\ factor\ for\ power$$
$$\times\ Scaled\ factor\ for\ duty(if\ needed)$$

Where

$$Scaled\ factor\ for\ power = \frac{Maximum\ tune\ up\ tolerance\ limit\ [mW]}{Measured\ power\ [mW]}$$

And

$$Scaled\ factor\ for\ duty = \frac{1}{Duty}$$

Maximum Tune-up tolerance limit   : Tolerance power specified by customer (P_{max} or P_{limit})

9.2 Symbols

Symbol	Quantity	Unit	Dimensions
E	Electric field	volt per meter	V / m
f	Frequency	hertz	Hz
H	Magnetic field	ampere per meter	A / m
λ	Wavelength	meter	m
S	Local power density	watt per square meter	W / m^2
PD or S$_{av}$	Spatial-average power density	watt per square meter	W / m^2 (mW / cm^2)
SAR	Specific Absorption Rate	watt per square meter	W / kg

9.3 Abbreviations

□	NOT applicable.	GPS	Global Positioning System
☒	applicable.	Hori.	Horizontal
A2LA	The American Association for Laboratory Accreditation	IEC	International Electrotechnical Commission
AC	Alternating Current	IEEE	Institute of Electrical and Electronics Engineers
AFH	Adaptive Frequency Hopping	IF	Intermediate Frequency
AM	Amplitude Modulation	ILAC	International Laboratory Accreditation Conference
Amp, AMP	Amplifier	ISED	Innovation, Science and Economic Development Canada
ANSI	American National Standards Institute	ISO	International Organization for Standardization
Ant, ANT	Antenna	KDB	Knowledge data base from Federal communication committee
AP	Access Point	LAN	Local Area Network
Atten., ATT	Attenuator	LIMS	Laboratory Information Management System
AV	Average	MCS	Modulation and Coding Scheme
BPSK	Binary Phase-Shift Keying	MRA	Mutual Recognition Arrangement
BR	Bluetooth Basic Rate	nG	n generation (e.g. 3G,4G and 5G)
BS	base station	NIST	National Institute of Standards and Technology
BT	Bluetooth	NR	New radio
BT LE	Bluetooth Low Energy	OBW	Occupied Band Width
BW	BandWidth	OFDM	Orthogonal Frequency Division Multiplexing
Cal Int	Calibration Interval	P/M	Power meter
CCK	Complementary Code Keying	PCB	Printed Circuit Board
Ch., CH	Channel	PD	Power density
CISPR	Comite International Special des Perturbations Radioelectriques	PER	Packet Error Rate
CW	Continuous Wave	PHY	Physical Layer
DBPSK	Differential BPSK	PK	Peak
DC	Direct Current	PN	Pseudo random Noise
DFS	Dynamic Frequency Selection	PRBS	Pseudo-Random Bit Sequence
DQPSK	Differential QPSK	PSD	Power Spectral Density
DSI	Device state index	QAM	Quadrature Amplitude Modulation
DSSS	Direct Sequence Spread Spectrum	QP	Quasi-Peak
DUT	Device under test	QPSK	Quadri-Phase Shift Keying
EDR	Enhanced Data Rate	RBW	Resolution Band Width
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	RDS	Radio Data System
EMC	ElectroMagnetic Compatibility	RE	Radio Equipment
EMI	ElectroMagnetic Interference	RF	Radio Frequency
EN	European Norm	RMS	Root Mean Square
ERP, e.r.p.	Effective Radiated Power	Rx	Receiving
EU	European Union	SA, S/A	Spectrum Analyzer
EUT	Equipment Under Test	SG	Signal Generator
Fac.	Factor	S_n	Surface number
FCC	Federal Communications Commission	SVSWR	Site-Voltage Standing Wave Ratio
FHSS	Frequency Hopping Spread Spectrum	TER	Total exposure ratio
FM	Frequency Modulation	TR	Test Receiver
Freq.	Frequency	Tx	Transmitting
GFSK	Gaussian Frequency-Shift Keying	VBW	Video BandWidth
GNSS	Global Navigation Satellite System	Vert.	Vertical
EN-DC	E-UTRAN New Radio - Dual Connectivity	WLAN	Wireless LAN

10   Test result

10.1   verdict
Complied
See Section 12.

10.2   Simultaneous transmission SAR result

Worst TER is 0.262

See section 14

10.3   PD simultaneous transmission compliance consideration

Note: This change does not affect PD.
Please refer to original application (FCC ID: ACJ9TGWW21A) for mmW and combined.

10.4 Measurement uncertainty

Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std.Unc. (10g)
Measurement System Errors							
Probe Calibration	± 14.00 %	N	2	1	1	±7.0%	±7.0%
Probe Calibration Drift	± 1.7 %	R	√3	1	1	±1.0%	±1.0%
Probe Linearity	± 4.7 %	R	√3	1	1	±2.7%	±2.7%
Broadband Signal	± 2.6 %	R	√3	1	1	±1.5%	±1.5%
Probe Isotropy	± 7.6 %	R	√3	1	1	±4.4%	±4.4%
Data Acquisition	± 0.3 %	N	1	1	1	±0.3%	±0.3%
RF Ambient	± 1.8 %	N	1	1	1	±1.8%	±1.8%
Probe Positioning	± 0.2 %	N	1	0.33	0.33	±0.1%	±0.1%
Data Processing	± 2.3 %	N	1	1	1	±2.3%	±2.3%
Phantom and Device Errors							
Conductivity (meas.)DAK	± 10.0 %	N	1	0.78	0.71	±7.8%	±7.1%
Conductivity (temp.)BB	± 3.4 %	R	√3	0.78	0.71	±1.5%	±1.4%
Phantom Permittivity	± 14.0 %	R	√3	0.25	0.25	±2.0%	±2.0%
Distance DUT - TSL	± 2.0 %	N	1	2	2	±4.0%	±4.0%
Device Positioning (+/- 0.5mm)	± 1.0 %	N	1	1	1	±1.0%	±1.0%
Device Holder	± 3.6 %	N	1	1	1	±3.6%	±3.6%
DUT Modulationm	± 2.4 %	R	√3	1	1	±1.4%	±1.4%
Time-average SAR	± 2.6 %	R	√3	1	1	±1.5%	±1.5%
DUT drift	± 2.5 %	N	1	1	1	±2.5%	±2.5%
Val Antenna Unc.val	± 0.0 %	N	1	1	1	±0.0%	±0.0%
Unc. Input Powerval	± 0.0 %	N	1	1	1	±0.0%	±0.0%
Correction to the SAR results							
Deviation to Target	± 1.9 %	N	1	1	0.84	±1.9%	±1.6%
SAR scalingp	± 0.0 %	R	√3	1	1	±0.0%	±0.0%
Combined Std. Uncertainty						±14.1%	±13.7%
Expanded STD Uncertainty (κ=2)						±28.2%	±27.4%

11 Software information, Tune up tolerance limit, Plimit and input.power.limit

11.1 Software information

*The power value of the EUT was set for testing as follows (setting value might be different from product specification value);
Software: QRCT version 4.0

*This setting of software is the worst case.
The test was performed with condition that obtained the maximum average power (Burst) in pre-check.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

11.2 Tune up tolerance limit and Plimit

The P_{limit} used in this report are determined and listed in Part 0 report.

> If $P_{max} < P_{limit}$ then
> > P_{max} is used for test
> > Else P_{limit} is used for test

Device uncertainty is 2.0 dB provided from customer.

DSI	SAR_design_target [W / kg]
0	1.0 All band

Table 11.2-1 $P_{limit\ FCC}$

RAT	Band	DSI=0 SAR_design_target [W/kg]	P_{limit} [dBm]	P_{max} (Tune up limit) (Burst power Average) [dBm] +/-1dB
WCDMA	2	1.0	24.5	24.5
WCDMA	4	1.0	24.5	24.5
WCDMA	5	1.0	24.5	24.5
LTE	2	1.0	24.0	24.0
LTE	4	1.0	24.0	24.0
LTE	5	1.0	24.0	24.0
LTE	7	1.0	24.0	24.0
LTE	12	1.0	24.0	24.0
LTE	13	1.0	24.0	24.0
LTE	14	1.0	24.0	24.0
LTE	17	1.0	24.0	24.0
LTE	25	1.0	24.0	24.0
LTE	26	1.0	24.0	24.0
LTE	38	1.0	24.0	24.0
LTE	41	1.0	24.0	24.0
LTE	48*	1.0	12.3	12.3
LTE	66	1.0	24.0	24.0
LTE	71	1.0	24.0	24.0
NR	n2	1.0	24.5	24.5
NR	n5	1.0	24.5	24.5
NR	n41	0.8	24.5	24.5
NR	n66	1.0	24.5	24.5
NR	n71	1.0	24.5	24.5
NR	n77	1.0	24.5	24.5

*Powers are specified as burst average.

For LTE B48

Uplink Downlink config (UDC)	Special sub frame (SSF)	Burst ave tune up DSI=0 [dBm]	Pmax burst ave [dBm]	Time ave DSI=0 [dBm]
0	0 to 7	12.3	11.09	9.4
1	0 to 7	13.8	12.66	9.4
2	0 to 7	16.6	15.57	9.4
3	0 to 7	15.3	14.10	9.4
4	0 to 7	16.8	15.69	9.4
5	0 to 7	19.7	18.56	9.4
6	0 to 7	12.9	11.64	9.4

LTE band 48 doesn't have a same burst tune up for UDC/SSF but has same time average tune up limit. Highest burst ave tune up limit is used for exclusion calculation and tested with highest time average details are shown in the power measurement section.

12   SAR Exposure Conditions (Test Configurations)

12.1   Summary of the distance between antenna and surface of EUT

Table 12.1-1 summary of distance

Test position	Distance[mm] WWAN-main	Distance[mm] WWAN-4th
Rear	5.2	4.6
Top	2.1	134.4
Left Side (Edge 2)	24.9	2.1
Right Side (Edge 4)	227.9	343.3
Bottom	276.8	96.4
Keyboard	233.7	53.3

Details are shown in appendix

12.2   Test Configurations for the WWAN-main

Test Configurations	Test distance	SAR Required	Note
Front	-	No	SAR is not required as this is not a typical use scenario and also the front side SAR test is not required because of overall diagonal dimension >20cm based on KDB 616217D04.
Rear	-	No	In normal use case this surface does not face to user.
Top	-	No	In normal use case this surface does not face to user
Left Side (Edge 2)	-	No	In normal use case this surface does not face to user.
Right Side (Edge 4)	-	No	Since distance from antenna to person is >20cm, so this surface is omitted from SAR testing.
Bottom	-	No	Since distance from antenna to person is >20cm, so this surface is omitted from SAR testing.
Keyboard	-	No	Since distance from antenna to person is >20cm, so this surface is omitted from SAR testing.

The added functionality only affects the WWAN-main antenna.

12.3   SAR-based Exemption - FCC section 1.1307

Exception condition as per section 1.1307 (b)(3)(i)(B)
the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th}\ (mW)\ =\ \begin{cases} ERP_{20dm}\ (d/20\ cm)^x & d \le 20\ cm \\ ERP_{20cm} & 20\ cm\ <\ d\ \le\ 40cm \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20dm}\sqrt{f}}\right) and\ f\ is\ in\ GHz;$$

And

$$ERP_{20cm}(mW) = \begin{cases} 2040\ f & 0.3\ GHz \le\ f\ < 1.5\ GHz \\ 3060 & 1.5\ GHz\ \le f \le 6\ GHz \end{cases}$$

d = the separation distance.

When separation distance is less than 0.5 cm, no exemption condition, so test is required.

As per section 1.1307 (b)(2)
Separation distance is the minimum distance in any direction from any part of a radiating structure and any part of the body of a nearby person.

Radiating structure is an unshielded RF current-carrying conductor that generates an RF reactive near electric or magnetic field and/or radiates an RF electromagnetic wave. It is the component of an RF source that transmits, generates, or reradiates an RF fields, such as an antenna, aperture, coil, or plate.

Table 12.3-1 For full power exemption FCC

Antenna	RAT	Band	Frequency [MHz]	Output Power or ERP		Separation Distances (mm)			Calculated Threshold Value	
				dBm	mW	Bottom	Keyboard	Rear	Bottom	Keyboard
WWAN-Main	NR	n77	3650	24.50	282	276.80	233.70	25.00	3060 mW -EXEMPT-	3060 mW -EXEMPT-

	: measurement is NOT required
	: measurement is required

13 Conducted Output Power / SAR / PD Measurements

13.1 Measurement configuration for conducted output power

WWAN average output power was measured with burst power (on time).

13.1.1 LTE single configuration

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.
UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A

13.1.2 LTE CA configuration

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

For intra-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power applicable to the DUT in table below. In case the modulation format is different on different component carriers then the MPR is determined by the rules applied to higher order of those modulations.

Modulation	CA bandwidth Class B and C / Smallest Component Carrier Transmission Bandwidth Configuration				MPR (dB)
	25 RB	**50 RB**	**75 RB**	**100 RB**	
QPSK	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 1
QPSK	> 25	> 50	> 75	> 100	≤ 2
16 QAM	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 8 and ≤ 25	> 12 and ≤ 50	> 16 and ≤ 75	> 18 and ≤ 100	≤ 2
16 QAM	> 25	> 50	> 75	> 100	≤ 3
64 QAM	≤ 8 and allocation wholly contained within a single CC	≤ 12 and allocation wholly contained within a single CC	≤ 16 and allocation wholly contained within a single CC	≤ 18 and allocation wholly contained within a single CC	≤ 2
64 QAM	> 8 or allocation extends across two CC's	> 12 or allocation extends across two CC's	> 16 or allocation extends across two CC's	> 18 or allocation extends across two CC's	≤ 3

For PUCCH and SRS transmissions, the allowed MPR is according to that specified for PUSCH WPDK modulation for the corresponding transmission bandwidth.

13.1.3   LTE CA power measurement combination

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.
- 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.
- All bands required for SAR testing per FCC KDB procedures were considered.

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. 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.

Downlink CA with Downlink 4x4 MIMO RF Conducted 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 above were applied.

Uplink CA Conducted Powers:
This device supports uplink carrier aggregation for some LTE bands with a maximum of two component carriers. For intra-band contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when noncontiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.

Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

Downlink CA with Uplink CA Enabled:
This device supports uplink carrier aggregation (ULCA) with additional Carrier Aggregation configurations active in the downlink. 4x4 DL MIMO is only operating in the downlink. Uplink transmission is limited to a single output stream for each component carrier of ULCA.
Power measurements were performed with ULCA active and additional CA configurations active in the downlink for the configuration per Fall 2017 TCB Workshop Notes.

13.1.4   New radio(NR) configuration

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.2-1 of the 3GPP TS36.101.

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$	$\leq 0.5^2$	0^2
	Pi/2 BPSK w Pi/2 BPSK DMRS	$\leq 0.5^2$	$\leq 0^2$	0^2
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

The allowed A-MPR values specified below in Table 6.2.3.1-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Network signalling label	Requirements (clause)	NR Band	Channel bandwidth (MHz)	Resources blocks (N_{RB})	A-MPR (dB)
NS_01		Table 5.2-1	5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100	Table 5.3.2-1	N/A

13.1.5   Output Power and SAR test required

According to KDB 248227 D01, The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1.   The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2.   If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3.   If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
4.   When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

13.2 LTE CA

13.2.1   SAR test exclusion for DL CA

The configurations that require power measurements as described in Section 15.1.4 "LTE DLCA Test Reduction Methodology" are highlighted in yellow in the table below. Only yellow highlighted cells need power measurement.

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC#1	CA_2C		3CC#12, 3CC#13, 3CC#14, 3CC#15, 3CC#45, 3CC#48, 4CC#7, 4CC#27, 4CC#30, 4CC#68, 4CC#99, 5CC#13, 5CC#44
2CC#2	CA_5B		3CC#5, 3CC#16, 3CC#27, 3CC#28, 4CC#7, 4CC#13, 4CC#14, 4CC#37, 4CC#42, 4CC#50, 4CC#69, 4CC#83, 5CC#19, 5CC#20, 5CC#36, 5CC#37, 5CC#57,
2CC#3	CA_7B		No
2CC#4	CA_7C		3CC#6, 3CC#17, 3CC#21, 3CC#31, 3CC#32, 3CC#33, 4CC#16, 4CC#43, 4CC#53, 4CC#54, 4CC#86, 4CC#87, 5CC#60, 5CC#61
2CC#5	CA_12B		3CC#18, 3CC#22, 3CC#29, 3CC#36, 3CC#7, 4CC#38, 4CC#44, 4CC#45, 4CC#51, 4CC#56, 4CC#70, 4CC#71, 4CC#85, 4CC#88, 5CC#53, 5CC#59, 5CC#62
2CC#6	CA_38C		No
2CC#7	CA_41C		3CC#41, 3CC#43, 3CC#44, 3CC#47, 4CC#26, 4CC#27, 4CC#96, 4CC#97, 4CC#98, 5CC#12
2CC#9	CA_48C		3CC#9, 3CC#20, 3CC#24, 3CC#38, 3CC#52, 3CC#55, 3CC#56, 4CC#33, 4CC#34, 4CC#35, 4CC#47, 4CC#58, 4CC#63, 4CC#64, 4CC#72, 4CC#74, 4CC#79, 4CC#80, 4CC#90, 4CC#93, 4CC#104, 4CC#105, 5CC#15, 5CC#28, 5CC#41, 5CC#47, 5CC#48, 5CC#50, 5CC#64, 5CC#65, 5CC#70
2CC#10	CA_66B		3CC#10, 3CC#25, 3CC#39, 3CC#53, 3CC#57, 4CC#13, 4CC#34, 4CC#40, 4CC#48, 4CC#59, 4CC#65, 4CC#75, 4CC#81, 4CC#91, 4CC#94, 4CC#102, 5CC#19, 5CC#36, 5CC#47, 5CC#51, 5CC#54, 5CC#66
2CC#11	CA_66C		3CC#11, 3CC#26, 3CC#35, 3CC#40, 3CC#49, 3CC#54, 3CC#58, 3CC#59, 4CC#14, 4CC#35, 4CC#41, 4CC#49, 4CC#55, 4CC#60, 4CC#66, 4CC#67, 4CC#76, 4CC#82, 4CC#92, 4CC#95, 4CC#103, 5CC#20, 5CC#37, 5CC#48, 5CC#52, 5CC#55, 5CC#67
2CC#12	CA_2A-2A		3CC#60, 3CC#61, 3CC#62, 3CC#63, 3CC#64, 3CC#65, 3CC#66, 3CC#67, 3CC#68, 3CC#69, 4CC#37, 4CC#38, 4CC#39, 4CC#40, 4CC#41, 4CC#106, 4CC#107, 4CC#108, 4CC#109, 4CC#110, 4CC#111, 4CC#112, 4CC#113, 4CC#114, 4CC#115, 4CC#116, 4CC#117, 4CC#118, 4CC#119, 4CC#120, 5CC#17, 5CC#51, 5CC#52, 5CC#53, 5CC#54, 5CC#55, 5CC#72, 5CC#73, 5CC#74, 5CC#75, 5CC#76
2CC#13	CA_2A-4A		3CC#60, 3CC#70, 3CC#71, 3CC#72, 3CC#73, 3CC#74, 3CC#75, 3CC#76, 4CC#42, 4CC#43, 4CC#44, 4CC#106, 4CC#107, 4CC#108, 4CC#109, 4CC#110, 4CC#121, 4CC#122, 4CC#123, 4CC#124, 4CC#125, 4CC#126
2CC#14	CA_2A-5A		3CC#61, 3CC#77, 3CC#78, 3CC#79, 3CC#80, 3CC#81, 4CC#45, 4CC#46, 4CC#47, 4CC#48, 4CC#49, 4CC#111, 4CC#112, 4CC#127, 4CC#128, 4CC#129, 4CC#130, 4CC#131, 5CC#18, 5CC#51, 5CC#52, 5CC#56, 5CC#72, 5CC#73, 5CC#77, 6CC#1, 6CC#8, 6CC#14, 7CC#1, 7CC#4
2CC#15	CA_2A-7A		3CC#62, 3CC#82, 3CC#83, 3CC#84, 3CC#85, 3CC#86, 3CC#87, 4CC#51, 4CC#52, 4CC#113, 4CC#114, 4CC#132, 4CC#133, 4CC#134, 4CC#135, 4CC#136, 4CC#137, 4CC#138, 4CC#139, 5CC#21, 5CC#58, 5CC#59, 5CC#74, 5CC#78, 5CC#79, 6CC#2,
2CC#16	CA_2A-12A		3CC#63, 3CC#88, 3CC#89, 3CC#110, 4CC#55, 4CC#115, 4CC#116, 4CC#126, 4CC#140, 4CC#153, 5CC#75, 6CC#1, 6CC#2, 6CC#3, 6CC#4, 6CC#5, 6CC#6, 6CC#7, 6CC#8, 6CC#9, 6CC#10, 6CC#11, 6CC#12, 6CC#13, 6CC#14, 6CC#15
2CC#17	CA_2A-13A		3CC#64, 3CC#90, 3CC#91, 3CC#92, 4CC#57, 4CC#58, 4CC#59, 4CC#60, 4CC#117, 4CC#141, 5CC#23, 5CC#24, 5CC#63, 5CC#64, 5CC#65, 5CC#66, 5CC#67, 5CC#80, 5CC#81, 6CC#10, 6CC#15, 7CC#5
2CC#18	CA_2A-14A		3CC#65, 3CC#93, 4CC#118, 4CC#145, 5CC#76, 5CC#82
2CC#19	CA_2A-17A		No
2CC#20	CA_2A-29A	B29 SCC only	3CC#66, 3CC#94

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC#21	CA_2A-46A	B46 SCC only	3CC#67, 3CC#95, 3CC#96, 4CC#61, 4CC#146, 4CC#147, 5CC#25, 5CC#68
2CC#22	CA_2A-48A		3CC#97, 3CC#98, 4CC#63, 4CC#148, 4CC#149, 5CC#27, 5CC#70
2CC#23	CA_2A-66A		3CC#68, 3CC#89, 3CC#99, 3CC#100, 3CC#117, 3CC#126, 3CC#130, 4CC#65, 4CC#66, 4CC#116, 4CC#119, 4CC#120, 4CC#127, 4CC#136, 4CC#140, 4CC#150, 4CC#151, 5CC#54, 5CC#55, 5CC#72, 5CC#74, 5CC#75
2CC#24	CA_2A-71A		3CC#69
2CC#25	CA_4A-4A		3CC#70, 3CC#101, 3CC#102, 3CC#103, 3CC#104, 3CC#105, 3CC#106, 4CC#69, 4CC#70, 4CC#106, 4CC#121, 4CC#122, 4CC#152, 4CC#153
2CC#26	CA_4A-5A		3CC#101, 3CC#107, 3CC#71, 4CC#107, 4CC#121, 4CC#123, 4CC#152, 4CC#71
2CC#27	CA_4A-7A		3CC#72, 3CC#102, 3CC#108, 3CC#109, 4CC#124, 4CC#125
2CC#28	CA_4A-12A		3CC#73, 3CC#103, 3CC#110, 4CC#108, 4CC#122, 4CC#126, 4CC#153
2CC#29	CA_4A-13A		3CC#74, 3CC#104, 3CC#111, 4CC#72, 4CC#109,
2CC#30	CA_4A-17A		No
2CC#31	CA_4A-29A	B29 SCC only	3CC#75, 3CC#105
2CC#32	CA_4A-46A	B46 SCC only	3CC#112, 4CC#73, 5CC#30
2CC#33	CA_4A-48A		3CC#113, 4CC#74
2CC#34	CA_4A-71A		3CC#76, 3CC#106, 4CC#110
2CC#35	CA_5A-5A		3CC#114, 4CC#75, 4CC#76, 4CC#154
2CC#36	CA_5A-7A		3CC#77, 3CC#115, 3CC#116, 4CC#77, 5CC#32
2CC#37	CA_5A-12A		3CC#78, 3CC#107, 3CC#117, 4CC#111, 4CC#123, 4CC#127, 4CC#152, 5CC#72
2CC#38	CA_5A-25A		No
2CC#39	CA_5A-38A		No
2CC#40	CA_5A-41A		No
2CC#41	CA_5A-46A	B46 SCC only	3CC#79, 3CC#116, 3CC#118, 4CC#128, 4CC#155, 5CC#77
2CC#42	CA_5A-48A		3CC#80, 3CC#119, 3CC#120, 4CC#79, 4CC#129, 4CC#130, 4CC#156, 5CC#34
2CC#43	CA_5A-66A		3CC#81, 3CC#114, 3CC#121, 4CC#81, 4CC#82, 4CC#112, 4CC#131, 4CC#154, 5CC#73
2CC#44	CA_7A-7A		3CC#82, 3CC#108, 3CC#115, 3CC#122, 3CC#123, 3CC#124, 3CC#125, 4CC#84, 4CC#124, 4CC#132, 4CC#133, 4CC#134, 4CC#135, 4CC#157, 4CC#158, 5CC#38, 5CC#58, 5CC#78, 5CC#79, 6CC#5, 6CC#9, 7CC#2
2CC#45	CA_7A-12A		3CC#83, 3CC#109, 3CC#126, 4CC#113, 4CC#125, 4CC#136, 5CC#74
2CC#46	CA_7A-13A		3CC#84, 3CC#122, 4CC#132
2CC#47	CA_7A-29A	B29 SCC only	3CC#85, 3CC#123, 3CC#127, 4CC#133, 4CC#137, 4CC#157, 5CC#78
2CC#49	CA_7A-46A	B46 SCC only	3CC#86, 3CC#116, 3CC#124, 3CC#128, 4CC#134, 4CC#138
2CC#50	CA_7A-66A		3CC#87, 3CC#125, 3CC#129, 4CC#114, 4CC#135, 4CC#139, 4CC#158, 5CC#79
2CC#51	CA_12A-12A		3CC#88, 3CC#110, 4CC#115, 4CC#126, 4CC#153
2CC#52	CA_12A-25A		No
2CC#53	CA_12A-46A	B46 SCC only	No
2CC#54	CA_12A-66A		3CC#89, 3CC#117, 3CC#126, 3CC#130, 4CC#116, 4CC#127, 4CC#136, 4CC#140, 5CC#72, 5CC#74, 5CC#75
2CC#55	CA_13A-46A	B46 SCC only	3CC#90, 3CC#131, 4CC#141, 4CC#159, 5CC#80
2CC#56	CA_13A-48A		3CC#90, 3CC#131, 4CC#141, 4CC#159, 5CC#80
2CC#57	CA_13A-66A		3CC#92, 3CC#134, 4CC#94, 4CC#95, 4CC#117, 4CC#144, 4CC#161, 5CC#66, 5CC#67
2CC#58	CA_14A-66A		3CC#93, 3CC#135, 4CC#118, 4CC#145, 4CC#162, 5CC#76, 5CC#82
2CC#59	CA_25A-25A		3CC#136, 3CC#137, 3CC#138, 4CC#96, 5CC#43
2CC#60	CA_25A-26A		3CC#137, 3CC#139, 4CC#97

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC#61	CA_25A-41A		3CC#138
2CC#62	CA_25A-46A	B46 SCC only	No
2CC#63	CA_26A-41A		3CC#139
2CC#64	CA_26A-46A	B46 SCC only	No
2CC#65	CA_29A-66A	B29 SCC only	3CC#94, 3CC#127, 3CC#140, 4CC#86, 4CC#137, 4CC#157, 5CC#60, 5CC#78
2CC#66	CA_41A-41A		3CC#141, 4CC#98
2CC#68	CA_41A-46A	B46 SCC only	No
2CC#69	CA_41A-48A		No
2CC#71	CA_46A-66A	B46 SCC only	3CC#96, 3CC#118, 3CC#128, 3CC#131, 3CC#143, 3CC#144, 4CC#128, 4CC#138, 4CC#141, 4CC#146, 4CC#147, 4CC#155, 4CC#159, 4CC#163, 5CC#77, 5CC#80
2CC#72	CA_46A-71A	B46 SCC only	No
2CC#73	CA_48A-48A		3CC#97, 3CC#113, 3CC#119, 3CC#132, 3CC#145, 3CC#146, 4CC#102, 4CC#103, 4CC#129, 4CC#142, 4CC#148, 4CC#156, 4CC#160, 4CC#164, 5CC#81
2CC#74	CA_48A-66A		3CC#98, 3CC#120, 3CC#133, 3CC#145, 3CC#147, 4CC#130, 4CC#143, 4CC#148, 4CC#149, 4CC#156, 4CC#160, 4CC#164, 4CC#165, 5CC#81
2CC#75	CA_48A-71A		3CC#146
2CC#76	CA_66A-66A		3CC#99, 3CC#121, 3CC#129, 3CC#130, 3CC#134, 3CC#135, 3CC#140, 3CC#144, 3CC#147, 3CC#148, 3CC#149, 4CC#68, 4CC#83, 4CC#87, 4CC#88, 4CC#101, 4CC#105, 4CC#119, 4CC#131, 4CC#139, 4CC#140, 4CC#144, 4CC#145, 4CC#147, 4CC#149, 4CC#150, 4CC#151, 4CC#154, 4CC#155, 4CC#158, 4CC#159, 4CC#161, 4CC#162, 4CC#163, 4CC#162, 4CC#163, 4CC#164, 4CC#165, 5CC#46, 5CC#57, 5CC#61, 5CC#62, 5CC#69, 5CC#71, 5CC#73, 5CC#75, 5CC#76, 5CC#77, 5CC#79, 5CC#80, 5CC#82, 6CC#7, 6CC#11, 6CC#12, 6CC#13, 6CC#14, 6CC#15, 7CC#3, 7CC#4, 7CC#5
2CC#77	CA_66A-71A		3CC#100, 3CC#149, 4CC#120, 4CC#151
2CC#78	CA_7A-26A		3CC#152

Index	3CC	Restriction	Completely Covered by Measurement Superset
3CC#1	CA_41D		4CC#120, 4CC#151
3CC#3	CA_48D		4CC#5, 4CC#9, 4CC#11, 4CC#19, 4CC#32, 4CC#36, 5CC#15, 5CC#23, 5CC#27, 5CC#29, 5CC#34, 5CC#35, 5CC#40, 5CC#42, 5CC#49
3CC#4	CA_66D		4CC#6, 4CC#12, 4CC#20, 5CC#24
3CC#5	CA_2A-5B		4CC#37, 4CC#50, 5CC#19, 5CC#20, 5CC#57
3CC#6	CA_2A-7C		4CC#53, 4CC#54, 5CC#60, 5CC#61
3CC#7	CA_2A-12B		4CC#38, 4CC#56, 5CC#53, 5CC#62
3CC#8	CA_2A-46C	B46 SCC only	4CC#39, 4CC#62, 4CC#62
3CC#9	CA_2A-48C		4CC#64, 5CC#28
3CC#10	CA_2A-66B		4CC#40
3CC#11	CA_2A-66C		4CC#41, 4CC#55, 4CC#67
3CC#12	CA_2C-5A		No
3CC#13	CA_2C-12A		No
3CC#14	CA_2C-29A	B29 SCC only	No
3CC#15	CA_2C-66A		4CC#68
3CC#16	CA_4A-5B		4CC#42, 4CC#69
3CC#17	CA_4A-7C		4CC#43
3CC#18	CA_4A-12B		4CC#44, 4CC#70
3CC#19	CA_4A-46C	B46 SCC only	5CC#31
3CC#20	CA_4A-48C		4CC#72, 4CC#74
3CC#21	CA_5A-7C		No
3CC#22	CA_5A-12B		4CC#45, 4CC#71
3CC#23	CA_5A-46C	B46 SCC only	4CC#46, 4CC#78, 5CC#56, 6CC#14
3CC#24	CA_5A-48C		4CC#47, 4CC#80
3CC#25	CA_5A-66B		4CC#48, 4CC#75, 5CC#51
3CC#26	CA_5A-66C		4CC#49, 4CC#76, 5CC#52
3CC#27	CA_5B-46A	B46 SCC only	No
3CC#28	CA_5B-66A		4CC#50, 4CC#83, 5CC#36, 5CC#37, 5CC#57
3CC#29	CA_7A-12B		4CC#51, 4CC#85, 5CC#59
3CC#30	CA_7A-46C	B46 SCC only	4CC#52, 4CC#77, 4CC#84, 5CC#58
3CC#31	CA_7C-29A	B29 SCC only	4CC#53, 4CC#86, 5CC#60
3CC#32	CA_7C-46A	B46 SCC only	No
3CC#33	CA_7C-66A		4CC#54, 4CC#87, 5CC#61
3CC#34	CA_12A-46C	B46 SCC only	No
3CC#35	CA_12A-66C		4CC#55
3CC#36	CA_12B-66A		4CC#56, 4CC#85, 4CC#88, 5CC#53, 5CC#59, 5CC#62
3CC#37	CA_13A-46C	B46 SCC only	4CC#57, 4CC#89, 5CC#63, 5CC#71, 6CC#15
3CC#38	CA_13A-48C		4CC#58, 4CC#72, 4CC#93, 5CC#41, 5CC#65
3CC#39	CA_13A-66B		4CC#59
3CC#40	CA_13A-66C		4CC#60
3CC#41	CA_25A-41C		4CC#96
3CC#42	CA_25A-46C	B46 SCC only	No
3CC#43	CA_26A-41C		4CC#97
3CC#44	CA_41A-41C		4CC#98
3CC#46	CA_41A-46C	B46 SCC only	No
3CC#49	CA_46A-66C	B46 SCC only	No
3CC#50	CA_46C-66A	B46 SCC only	4CC#62, 4CC#78, 4CC#89, 4CC#100, 4CC#101, 5CC#56, 5CC#63, 5CC#68, 5CC#69, 5CC#71, 6CC#14, 6CC#15

Index	3CC	Restriction	Completely Covered by Measurement Superset
3CC#51	CA_46C-71A	B46 SCC only	No
3CC#52	CA_48A-48C		4CC#63, 4CC#74, 4CC#79, 4CC#90, 4CC#104, 5CC#47, 5CC#48, 5CC#64, 5CC#70
3CC#53	CA_48A-66B		4CC#91, 4CC#102
3CC#54	CA_48A-66C		4CC#92, 4CC#103
3CC#55	CA_48C-66A		4CC#64, 4CC#80, 4CC#93, 4CC#104, 4CC#105, 5CC#50, 5CC#65, 5CC#70
3CC#56	CA_48C-71A		No
3CC#57	CA_66A-66B		4CC#65, 4CC#81, 4CC#94, 5CC#36, 5CC#54, 5CC#66
3CC#58	CA_66A-66C		4CC#66, 4CC#82, 4CC#95, 5CC#37, 5CC#55, 5CC#67
3CC#59	CA_66C-71A		4CC#67
3CC#60	CA_2A-2A-4A		4CC#106, 4CC#107, 4CC#108, 4CC#109, 4CC#110
3CC#61	CA_2A-2A-5A		4CC#111, 4CC#112, 5CC#51, 5CC#52, 5CC#72, 5CC#73
3CC#62	CA_2A-2A-7A		4CC#113, 4CC#114, 5CC#74
3CC#63	CA_2A-2A-12A		4CC#115, 4CC#116, 5CC#75
3CC#64	CA_2A-2A-13A		4CC#117
3CC#65	CA_2A-2A-14A		4CC#118, 5CC#76
3CC#66	CA_2A-2A-29A	B29 SCC only	No
3CC#67	CA_2A-2A-46A	B46 SCC only	No
3CC#68	CA_2A-2A-66A		4CC#119, 4CC#120, 5CC#54, 5CC#55
3CC#69	CA_2A-2A-71A		4CC#110, 4CC#120
3CC#70	CA_2A-4A-4A		4CC#106, 4CC#121, 4CC#122
3CC#71	CA_2A-4A-5A		4CC#107, 4CC#123
3CC#72	CA_2A-4A-7A		4CC#124, 4CC#125
3CC#73	CA_2A-4A-12A		4CC#108, 4CC#126
3CC#74	CA_2A-4A-13A		4CC#109
3CC#75	CA_2A-4A-29A	B29 SCC only	No
3CC#76	CA_2A-4A-71A		4CC#110
3CC#77	CA_2A-5A-7A		No
3CC#78	CA_2A-5A-12A		4CC#111, 4CC#127, 5CC#72
3CC#79	CA_2A-5A-46A	B46 SCC only	4CC#128, 5CC#77
3CC#80	CA_2A-5A-48A		4CC#129, 4CC#130
3CC#81	CA_2A-5A-66A		4CC#112, 4CC#131, 5CC#73
3CC#82	CA_2A-7A-7A		4CC#132, 4CC#133, 4CC#134, 4CC#135, 5CC#58, 5CC#78, 5CC#79, 6CC#9, 7CC#2
3CC#83	CA_2A-7A-12A		4CC#113, 4CC#136, 5CC#74
3CC#84	CA_2A-7A-13A		4CC#132
3CC#85	CA_2A-7A-29A	B29 SCC only	4CC#137
3CC#86	CA_2A-7A-46A	B46 SCC only	4CC#138
3CC#87	CA_2A-7A-66A		4CC#114, 4CC#139
3CC#88	CA_2A-12A-12A		4CC#115
3CC#89	CA_2A-12A-66A		4CC#116, 4CC#140, 5CC#75
3CC#90	CA_2A-13A-46A	B46 SCC only	4CC#141, 5CC#80
3CC#91	CA_2A-13A-48A		4CC#142, 4CC#143, 5CC#64, 5CC#81
3CC#92	CA_2A-13A-66A		4CC#117, 4CC#144, 5CC#66, 5CC#67
3CC#93	CA_2A-14A-66A		4CC#118, 4CC#145, 5CC#76, 5CC#82
3CC#94	CA_2A-29A-66A	B29 SCC only	4CC#137, 5CC#60, 5CC#78
3CC#95	CA_2A-46A-46A	B46 SCC only	4CC#146
3CC#96	CA_2A-46A-66A	B46 SCC only	4CC#147
3CC#97	CA_2A-48A-48A		4CC#148
3CC#98	CA_2A-48A-66A		4CC#149
3CC#99	CA_2A-66A-66A		4CC#119, 4CC#140, 4CC#150, 4CC#151, 5CC#75
3CC#100	CA_2A-66A-71A		4CC#120

Index	3CC	Restriction	Completely Covered by Measurement Superset
3CC#101	CA_4A-4A-5A		4CC#121, 4CC#152
3CC#102	CA_4A-4A-7A		No
3CC#103	CA_4A-4A-12A		4CC#122, 4CC#153
3CC#104	CA_4A-4A-13A		No
3CC#105	CA_4A-4A-29A	B29 SCC only	No
3CC#106	CA_4A-4A-71A		No
3CC#107	CA_4A-5A-12A		4CC#123, 4CC#152
3CC#108	CA_4A-7A-7A		4CC#124
3CC#109	CA_4A-7A-12A		4CC#125
3CC#110	CA_4A-12A-12A		4CC#126, 4CC#153
3CC#111	CA_4A-13A-48A		No
3CC#112	CA_4A-46A-46A	B46 SCC only	No
3CC#113	CA_4A-48A-48A		No
3CC#114	CA_5A-5A-66A		4CC#154
3CC#115	CA_5A-7A-7A		No
3CC#116	CA_5A-7A-46A	B46 SCC only	No
3CC#117	CA_5A-12A-66A		4CC#127, 5CC#72
3CC#118	CA_5A-46A-66A	B46 SCC only	4CC#128, 4CC#155, 5CC#77
3CC#119	CA_5A-48A-48A		4CC#129, 4CC#156
3CC#120	CA_5A-48A-66A		4CC#130, 4CC#156
3CC#121	CA_5A-66A-66A		4CC#131, 4CC#154, 4CC#155, 5CC#73, 5CC#77, 6CC#12, 6CC#14, 7CC#3, 7CC#4
3CC#122	CA_7A-7A-13A		4CC#132
3CC#123	CA_7A-7A-29A	B29 SCC only	4CC#133, 4CC#157, 5CC#78
3CC#124	CA_7A-7A-46A	B46 SCC only	4CC#134
3CC#125	CA_7A-7A-66A		4CC#135, 4CC#157, 4CC#158, 5CC#78, 5CC#79
3CC#126	CA_7A-12A-66A		4CC#136, 5CC#74
3CC#127	CA_7A-29A-66A	B29 SCC only	4CC#137, 4CC#157, 5CC#78
3CC#128	CA_7A-46A-66A	B46 SCC only	4CC#138
3CC#129	CA_7A-66A-66A		4CC#139, 4CC#158, 5CC#79
3CC#130	CA_12A-66A-66A		4CC#140, 5CC#75
3CC#131	CA_13A-46A-66A	B46 SCC only	4CC#141, 4CC#159, 5CC#80
3CC#132	CA_13A-48A-48A		4CC#142, 4CC#160, 5CC#81
3CC#133	CA_13A-48A-66A		4CC#143, 4CC#160, 5CC#81
3CC#134	CA_13A-66A-66A		4CC#144, 4CC#159, 4CC#161, 5CC#71, 5CC#80, 6CC#13, 6CC#15, 7CC#5
3CC#135	CA_14A-66A-66A		4CC#145, 4CC#162, 5CC#76, 5CC#82
3CC#136	CA_25A-25A-25A		No
3CC#137	CA_25A-25A-26A		No
3CC#138	CA_25A-25A-41A		No
3CC#139	CA_25A-26A-41A		No
3CC#140	CA_29A-66A-66A	B29 SCC only	No
3CC#141	CA_41A-41A-41A		No
3CC#143	CA_46A-46A-66A	B46 SCC only	4CC#146
3CC#144	CA_46A-66A-66A	B46 SCC only	4CC#147, 4CC#155, 4CC#159, 4CC#163, 5CC#77, 5CC#80
3CC#145	CA_48A-48A-66A		4CC#148, 4CC#156, 4CC#160, 4CC#164, 5CC#81
3CC#146	CA_48A-48A-71A		No
3CC#147	CA_48A-66A-66A		4CC#149, 4CC#164, 4CC#165
3CC#148	CA_66A-66A-66A		4CC#150, 4CC#161, 4CC#162, 4CC#163, 4CC#165, 5CC#82
3CC#149	CA_66A-66A-71A		4CC#151
3CC#150	CA_7C-13A		4CC#168
3CC#151	CA_5A-7A-66A		4CC#174
3CC#152	CA_7A-7A-26A		No
3CC#153	CA_13A-46A-46A	B46 SCC only	4CC#173

Index	4CC	Restriction	Completely Covered by Measurement Superset
4CC#1	CA_41E		No
4CC#3	CA_48E		5CC#3, 5CC#4, 5CC#10, 5CC#16, 6CC#6
4CC#4	CA_2A-46D	B46 SCC only	5CC#17, 5CC#18, 5CC#21, 5CC#22, 5CC#25, 5CC#26, 6CC#8, 6CC#9, 6CC#10, 6CC#11, 7CC#4, 7CC#5
4CC#5	CA_2A-48D		5CC#23, 5CC#27, 5CC#29
4CC#6	CA_2A-66D		5CC#24
4CC#7	CA_2C-5B		No
4CC#8	CA_4A-46D	B46 SCC only	5CC#30
4CC#9	CA_4A-48D		No
4CC#10	CA_5A-46D	B46 SCC only	5CC#18, 5CC#32, 5CC#33, 6CC#8, 6CC#12, 7CC#4
4CC#11	CA_5A-48D		5CC#34, 5CC#35
4CC#12	CA_5A-66D		No
4CC#13	CA_5B-66B		5CC#19, 5CC#36
4CC#14	CA_5B-66C		5CC#20, 5CC#37
4CC#15	CA_7A-46D	B46 SCC only	5CC#21, 5CC#32, 5CC#38, 6CC#9
4CC#16	CA_7C-46C	B46 SCC only	No
4CC#17	CA_12A-46D	B46 SCC only	No
4CC#18	CA_13A-46D	B46 SCC only	5CC#22, 5CC#39, 6CC#10, 6CC#13, 7CC#5
4CC#19	CA_13A-48D		5CC#23, 5CC#40, 5CC#42
4CC#20	CA_13A-66D		5CC#24
4CC#21	CA_25A-41D		5CC#43
4CC#22	CA_25A-46D	B46 SCC only	No
4CC#23	CA_41A-41D		No
4CC#25	CA_41A-46D	B46 SCC only	No
4CC#26	CA_41C-41C		No
4CC#31	CA_46D-66A	B46 SCC only	5CC#26, 5CC#33, 5CC#39, 5CC#45, 5CC#46, 6CC#8, 6CC#10, 6CC#11, 6CC#12, 6CC#13, 7CC#4, 7CC#5
4CC#32	CA_48A-48D		5CC#27, 5CC#34, 5CC#40, 5CC#49
4CC#33	CA_48C-48C		5CC#28, 5CC#41, 5CC#50
4CC#34	CA_48C-66B		5CC#47
4CC#35	CA_48C-66C		5CC#48
4CC#36	CA_48D-66A		5CC#29, 5CC#35, 5CC#42, 5CC#49
4CC#37	CA_2A-2A-5B		No
4CC#38	CA_2A-2A-12B		5CC#53
4CC#39	CA_2A-2A-46C	B46 SCC only	No
4CC#40	CA_2A-2A-66B		5CC#51, 5CC#54

Index	4CC	Restriction	Completely Covered by Measurement Superset
4CC#41	CA_2A-2A-66C		5CC#52, 5CC#55
4CC#42	CA_2A-4A-5B		No
4CC#43	CA_2A-4A-7C		No
4CC#44	CA_2A-4A-12B		No
4CC#45	CA_2A-5A-12B		No
4CC#46	CA_2A-5A-46C	B46 SCC only	5CC#56, 6CC#14
4CC#47	CA_2A-5A-48C		No
4CC#48	CA_2A-5A-66B		5CC#51
4CC#49	CA_2A-5A-66C		5CC#52
4CC#50	CA_2A-5B-66A		5CC#57
4CC#51	CA_2A-7A-12B		5CC#59
4CC#52	CA_2A-7A-46C	B46 SCC only	5CC#58
4CC#53	CA_2A-7C-29A	B29 SCC only	5CC#60
4CC#54	CA_2A-7C-66A		5CC#60
4CC#55	CA_2A-12A-66C		No
4CC#56	CA_2A-12B-66A		5CC#53, 5CC#59, 5CC#62
4CC#57	CA_2A-13A-46C	B46 SCC only	5CC#63, 6CC#15
4CC#58	CA_2A-13A-48C		5CC#64, 5CC#65
4CC#59	CA_2A-13A-66B		5CC#66
4CC#60	CA_2A-13A-66C		5CC#67
4CC#61	CA_2A-46A-46C	B46 SCC only	5CC#68
4CC#62	CA_2A-46C-66A	B46 SCC only	5CC#56, 5CC#63, 5CC#68, 5CC#69, 6CC#14, 6CC#15
4CC#63	CA_2A-48A-48C		5CC#64, 5CC#70
4CC#64	CA_2A-48C-66A		5CC#65, 5CC#70
4CC#65	CA_2A-66A-66B		5CC#54, 5CC#66
4CC#66	CA_2A-66A-66C		5CC#55, 5CC#67
4CC#67	CA_2A-66C-71A		No
4CC#68	CA_2C-66A-66A		No
4CC#69	CA_4A-4A-5B		No
4CC#70	CA_4A-4A-12B		No
4CC#71	CA_4A-5A-12B		No
4CC#72	CA_4A-13A-48C		No
4CC#73	CA_4A-46A-46C	B46 SCC only	No
4CC#74	CA_4A-48A-48C		No
4CC#75	CA_5A-5A-66B		No
4CC#76	CA_5A-5A-66C		No
4CC#77	CA_5A-7A-46C	B46 SCC only	No
4CC#78	CA_5A-46C-66A	B46 SCC only	5CC#56, 6CC#14
4CC#79	CA_5A-48A-48C		No
4CC#80	CA_5A-48C-66A		No

Index	4CC	Restriction	Completely Covered by Measurement Superset
4CC#81	CA_5A-66A-66B		No
4CC#82	CA_5A-66A-66C		No
4CC#83	CA_5B-66A-66A		5CC#57
4CC#84	CA_7A-7A-46C	B46 SCC only	5CC#58
4CC#85	CA_7A-12B-66A		5CC#59
4CC#86	CA_7C-29A-66A	B29 SCC only	5CC#60
4CC#87	CA_7C-66A-66A		5CC#61
4CC#88	CA_12B-66A-66A		5CC#62
4CC#89	CA_13A-46C-66A	B46 SCC only	5CC#63, 5CC#71, 6CC#15
4CC#90	CA_13A-48A-48C		5CC#64
4CC#91	CA_13A-48A-66B		No
4CC#92	CA_13A-48A-66C		No
4CC#93	CA_13A-48C-66A		5CC#65
4CC#94	CA_13A-66A-66B		5CC#65
4CC#95	CA_13A-66A-66C		5CC#67
4CC#96	CA_25A-25A-41C		No
4CC#97	CA_25A-26A-41C		No
4CC#98	CA_41A-41A-41C		No
4CC#100	CA_46A-46C-66A	B46 SCC only	5CC#68
4CC#101	CA_46C-66A-66A	B46 SCC only	5CC#69, 5CC#71, 6CC#14, 6CC#15
4CC#102	CA_48A-48A-66B		No
4CC#103	CA_48A-48A-66C		No
4CC#104	CA_48A-48C-66A		5CC#70
4CC#105	CA_48C-66A-66A		No
4CC#106	CA_2A-2A-4A-4A		No
4CC#107	CA_2A-2A-4A-5A		No
4CC#108	CA_2A-2A-4A-12A		No
4CC#109	CA_2A-2A-4A-13A		No
4CC#110	CA_2A-2A-4A-71A		No
4CC#111	CA_2A-2A-5A-12A		5CC#72
4CC#112	CA_2A-2A-5A-66A		5CC#72, 5CC#73
4CC#113	CA_2A-2A-7A-12A		5CC#74
4CC#114	CA_2A-2A-7A-66A		5CC#74
4CC#115	CA_2A-2A-12A-12A		No
4CC#116	CA_2A-2A-12A-66A		5CC#72, 5CC#74, 5CC#75
4CC#117	CA_2A-2A-13A-66A		No
4CC#118	CA_2A-2A-14A-66A		5CC#76
4CC#119	CA_2A-2A-66A-66A		5CC#73, 5CC#75, 5CC#76
4CC#120	CA_2A-2A-66A-71A		No

Index	4CC	Restriction	Completely Covered by Measurement Superset
4CC#121	CA_2A-4A-4A-5A		No
4CC#122	CA_2A-4A-4A-12A		No
4CC#123	CA_2A-4A-5A-12A		No
4CC#124	CA_2A-4A-7A-7A		No
4CC#125	CA_2A-4A-7A-12A		No
4CC#126	CA_2A-4A-12A-12A		No
4CC#127	CA_2A-5A-12A-66A		5CC#72
4CC#128	CA_2A-5A-46A-66A	B46 SCC only	5CC#77
4CC#129	CA_2A-5A-48A-48A		No
4CC#130	CA_2A-5A-48A-66A		No
4CC#131	CA_2A-5A-66A-66A		5CC#73, 5CC#77, 6CC#14, 7CC#4
4CC#132	CA_2A-7A-7A-13A		No
4CC#133	CA_2A-7A-7A-29A	B29 SCC only	5CC#78
4CC#134	CA_2A-7A-7A-46A	B46 SCC only	No
4CC#135	CA_2A-7A-7A-66A		5CC#78, 5CC#79
4CC#136	CA_2A-7A-12A-66A		5CC#74
4CC#137	CA_2A-7A-29A-66A	B29 SCC only	5CC#78
4CC#138	CA_2A-7A-46A-66A	B46 SCC only	No
4CC#139	CA_2A-7A-66A-66A		5CC#79
4CC#140	CA_2A-12A-66A-66A		5CC#75
4CC#141	CA_2A-13A-46A-66A	B46 SCC only	5CC#80
4CC#142	CA_2A-13A-48A-48A		5CC#81
4CC#143	CA_2A-13A-48A-66A		5CC#81
4CC#144	CA_2A-13A-66A-66A		5CC#80, 6CC#15, 7CC#5
4CC#145	CA_2A-14A-66A-66A		5CC#76, 5CC#82
4CC#146	CA_2A-46A-46A-66A	B46 SCC only	No
4CC#147	CA_2A-46A-66A-66A	B46 SCC only	5CC#77, 5CC#80
4CC#148	CA_2A-48A-48A-66A		5CC#81
4CC#149	CA_2A-48A-66A-66A		No
4CC#150	CA_2A-66A-66A-66A		5CC#82
4CC#151	CA_2A-66A-66A-71A		No
4CC#152	CA_4A-4A-5A-12A		No
4CC#153	CA_4A-4A-12A-12A		No
4CC#154	CA_5A-5A-66A-66A		No
4CC#155	CA_5A-46A-66A-66A	B46 SCC only	5CC#77
4CC#156	CA_5A-48A-48A-66A		No
4CC#157	CA_7A-7A-29A-66A	B29 SCC only	5CC#78
4CC#158	CA_7A-7A-66A-66A		5CC#79
4CC#159	CA_13A-46A-66A-66A	B46 SCC only	5CC#80
4CC#160	CA_13A-48A-48A-66A		5CC#81
4CC#161	CA_13A-66A-66A-66A		No
4CC#162	CA_14A-66A-66A-66A		5CC#82
4CC#163	CA_46A-66A-66A-66A	B46 SCC only	No
4CC#164	CA_48A-48A-66A-66A		No
4CC#165	CA_48A-66A-66A-66A		No

Index	4CC	Restriction	Completely Covered by Measurement Superset
4CC#166	CA_5B-46C	B46 SCC only	No
4CC#167	CA_2A-5A-7C		No
4CC#168	CA_2A-7C-13A		No
4CC#169	CA_5A-7C-66A		5CC#93
4CC#170	CA_13A-46A-46C	B46 SCC only	5CC#92
4CC#172	CA_2A-5A-7A-7A		No
4CC#173	CA_2A-13A-46A-46A	B46 SCC only	No
4CC#174	CA_5A-7A-66A-66A		No

Index	5CC	Restriction	Completely Covered by Measurement Superset
5CC#1	CA_48F		No
5CC#2	CA_2A-46E	B46 SCC only	6CC#1, 6CC#2, 6CC#3, 7CC#1, 7CC#2
5CC#3	CA_2A-48E		No
5CC#4	CA_4A-48E		No
5CC#5	CA_5A-46E	B46 SCC only	6CC#1, 6CC#4, 7CC#1, 7CC#3
5CC#6	CA_7A-46E	B46 SCC only	6CC#2, 6CC#5, 7CC#2
5CC#7	CA_7C-46D	B46 SCC only	No
5CC#8	CA_12A-46E	B46 SCC only	No
5CC#9	CA_13A-46E	B46 SCC only	No
5CC#10	CA_13A-48E		6CC#6
5CC#11	CA_41A-46E	B46 SCC only	No
5CC#12	CA_41C-41D		No
5CC#14	CA_46E-66A	B46 SCC only	6CC#3, 6CC#4, 6CC#7, 7CC#1, 7CC#3
5CC#15	CA_48C-48D		No
5CC#16	CA_48E-66A		6CC#6
5CC#17	CA_2A-2A-46D	B46 SCC only	No
5CC#18	CA_2A-5A-46D	B46 SCC only	6CC#8, 7CC#4
5CC#19	CA_2A-5B-66B		No
5CC#20	CA_2A-5B-66C		No
5CC#21	CA_2A-7A-46D	B46 SCC only	6CC#9
5CC#22	CA_2A-13A-46D	B46 SCC only	6CC#10, 7CC#5
5CC#23	CA_2A-13A-48D		No
5CC#24	CA_2A-13A-66D		No
5CC#25	CA_2A-46A-46D	B46 SCC only	No
5CC#26	CA_2A-46D-66A	B46 SCC only	6CC#8, 6CC#10, 6CC#11, 7CC#4, 7CC#5
5CC#27	CA_2A-48A-48D		No
5CC#28	CA_2A-48C-48C		No
5CC#29	CA_2A-48D-66A		No
5CC#30	CA_4A-46A-46D	B46 SCC only	No
5CC#31	CA_4A-46C-46C	B46 SCC only	No
5CC#32	CA_5A-7A-46D	B46 SCC only	No
5CC#33	CA_5A-46D-66A	B46 SCC only	6CC#8, 6CC#12, 7CC#4
5CC#34	CA_5A-48A-48D		No
5CC#35	CA_5A-48D-66A		No
5CC#36	CA_5B-66A-66B		No
5CC#37	CA_5B-66A-66C		No
5CC#38	CA_7A-7A-46D	B46 SCC only	6CC#9
5CC#39	CA_13A-46D-66A	B46 SCC only	6CC#10, 6CC#13, 7CC#5
5CC#40	CA_13A-48A-48D		No

Index	5CC	Restriction	Completely Covered by Measurement Superset
5CC#41	CA_13A-48C-48C		No
5CC#42	CA_13A-48D-66A		No
5CC#43	CA_25A-25A-41D		No
5CC#45	CA_46A-46D-66A	B46 SCC only	No
5CC#46	CA_46D-66A-66A	B46 SCC only	6CC#11, 6CC#12, 6CC#13, 7CC#4, 7CC#5
5CC#47	CA_48A-48C-66B		No
5CC#48	CA_48A-48C-66C		No
5CC#49	CA_48A-48D-66A		No
5CC#50	CA_48C-48C-66A		No
5CC#51	CA_2A-2A-5A-66B		No
5CC#52	CA_2A-2A-5A-66C		No
5CC#53	CA_2A-2A-12B-66A		No
5CC#54	CA_2A-2A-66A-66B		No
5CC#55	CA_2A-2A-66A-66C		No
5CC#56	CA_2A-5A-46C-66A	B46 SCC only	6CC#14
5CC#57	CA_2A-5B-66A-66A		No
5CC#58	CA_2A-7A-7A-46C	B46 SCC only	No
5CC#59	CA_2A-7A-12B-66A		No
5CC#60	CA_2A-7C-29A-66A	B29 SCC only	No
5CC#61	CA_2A-7C-66A-66A		No
5CC#62	CA_2A-12B-66A-66A		No
5CC#63	CA_2A-13A-46C-66A	B46 SCC only	6CC#15
5CC#64	CA_2A-13A-48A-48C		No
5CC#65	CA_2A-13A-48C-66A		No
5CC#66	CA_2A-13A-66A-66B		No
5CC#67	CA_2A-13A-66A-66C		No
5CC#68	CA_2A-46A-46C-66A	B46 SCC only	No
5CC#69	CA_2A-46C-66A-66A	B46 SCC only	6CC#14, 6CC#15
5CC#70	CA_2A-48A-48C-66A		No
5CC#71	CA_13A-46C-66A-66A	B46 SCC only	6CC#15
5CC#72	CA_2A-2A-5A-12A-66A		No
5CC#73	CA_2A-2A-5A-66A-66A		No
5CC#74	CA_2A-2A-7A-12A-66A		No
5CC#75	CA_2A-2A-12A-66A-66A		No
5CC#76	CA_2A-2A-14A-66A-66A		No
5CC#77	CA_2A-5A-46A-66A-66A	B46 SCC only	No
5CC#78	CA_2A-7A-7A-29A-66A	B29 SCC only	No
5CC#79	CA_2A-7A-7A-66A-66A		No
5CC#80	CA_2A-13A-46A-66A-66A	B46 SCC only	No

Index	5CC	Restriction	Completely Covered by Measurement Superset
5CC#81	CA_2A-13A-48A-48A-66A		No
5CC#82	CA_2A-14A-66A-66A-66A		No
5CC#83	CA_5A-46C-66A-66A	B46 SCC only	6CC#14
5CC#84	CA_5B-46D	B46 SCC only	No
5CC#85	CA_25A-41E		No
5CC#86	CA_2A-5A-48D		No
5CC#87	CA_13A-46A-46D	B46 SCC only	6CC#22
5CC#89	CA_2A-2A-5B-66A		No
5CC#90	CA_2A-2A-13A-66B		No
5CC#91	CA_2A-5A-48C-66A		No
5CC#92	CA_2A-13A-46A-46C	B46 SCC only	No
5CC#93	CA_5A-7C-66A-66A		No
5CC#94	CA_13A-48A-48C-66A		No
5CC#95	CA_2A-2A-13A-66A-66A		No

Index	6CC	Restriction	Completely Covered by Measurement Superset
6CC#1	CA_2A-5A-46E	B46 SCC only	7CC#1
6CC#2	CA_2A-7A-46E	B46 SCC only	7CC#2
6CC#3	CA_2A-46E-66A	B46 SCC only	7CC#1
6CC#4	CA_5A-46E-66A	B46 SCC only	7CC#1, 7CC#3
6CC#5	CA_7A-7A-46E	B46 SCC only	7CC#2
6CC#6	CA_13A-48E-66A		No
6CC#7	CA_46E-66A-66A	B46 SCC only	7CC#3
6CC#8	CA_2A-5A-46D-66A	B46 SCC only	7CC#4
6CC#9	CA_2A-7A-7A-46D	B46 SCC only	No
6CC#10	CA_2A-13A-46D-66A	B46 SCC only	7CC#5
6CC#11	CA_2A-46D-66A-66A	B46 SCC only	7CC#4, 7CC#5
6CC#12	CA_5A-46D-66A-66A	B46 SCC only	7CC#4
6CC#13	CA_13A-46D-66A-66A	B46 SCC only	7CC#5
6CC#14	CA_2A-5A-46C-66A-66A	B46 SCC only	No
6CC#15	CA_2A-13A-46C-66A-66A	B46 SCC only	No
6CC#16	CA_5B-46E	B46 SCC only	No
6CC#17	CA_7C-46E	B46 SCC only	No
6CC#18	CA_2A-13A-46E	B46 SCC only	No
6CC#19	CA_2A-48E-66A		No
6CC#20	CA_13A-46E-66A	B46 SCC only	No
6CC#22	CA_2A-13A-46A-46D	B46 SCC only	No

Index	7CC	Restriction	Completely Covered by Measurement Superset
7CC#1	CA_2A-5A-46E-66A	B46 SCC only	
7CC#2	CA_2A-7A-7A-46E	B46 SCC only	
7CC#3	CA_5A-46E-66A-66A	B46 SCC only	
7CC#4	CA_2A-5A-46D-66A-66A	B46 SCC only	
7CC#5	CA_2A-13A-46D-66A-66A	B46 SCC only	
7CC#6	CA_2A-46E-66A-66A	B46 SCC only	

13.2.2   DL CA power measurement

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.

Conducted power was evaluated as described in Sections 13.1.33 "General PCC and SCC configuration selection procedure:" and "Downlink CA with Downlink 4x4 MIMO RF Conducted Powers:".

Only the added Combination was measured this time.

13.2.3　LTE Band 2 as PCC

Index	Combination	PCC Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	SCC1 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC2 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC3 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC4 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC5 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC6 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO	Single Carrier	Delta PCC DL SISO	Delta PCC DL 4x4 MIMO
4CC#167	CA_2A-5A-7C	2	20	19100	1900	QPSK	1	0	1100	1980	5	10	2525	881.5	7	20	3100	2655	7	20	2902	2635.2	-	-	-	-	-	-	-	-	-	-	-	-	22.99	22.98	23.01	-0.02	-0.03
4CC#168	CA_2A-7C-13A	2	20	19100	1900	QPSK	1	0	1100	1980	7	20	3100	2655	7	20	2902	2635.2	13	10	5230	751	-	-	-	-	-	-	-	-	-	-	-	-	23.03	22.97	23.01	0.02	-0.04
4CC#172	CA_2A-5A-7A-7A	2	20	19100	1900	QPSK	1	0	1100	1980	5	10	2525	881.5	7	20	3350	2680	7	20	2850	2630	-	-	-	-	-	-	-	-	-	-	-	-	22.96	22.99	23.01	-0.05	-0.02
4CC#173	CA_2A-13A-46A-46A	2	20	19100	1900	QPSK	1	0	1100	1980	13	10	5230	751	46	20	54440	5915	46	20	46890	5160	-	-	-	-	-	-	-	-	-	-	-	-	22.96	22.92	23.01	-0.05	-0.09
5CC#86	CA_2A-5A-48D	2	20	19100	1900	QPSK	1	0	1100	1980	5	10	2525	881.5	48	20	55990	3625	48	20	55792	3605.2	48	20	56188	3644.8	-	-	-	-	-	-	-	-	23.06	23.04	23.01	0.05	0.03
5CC#89	CA_2A-2A-5B-66A	2	20	19100	1900	QPSK	1	0	1100	1980	2	20	700	1940	5	10	2450	874	5	10	2549	883.9	66	20	66786	2145	-	-	-	-	-	-	-	-	23.01	22.99	23.01	0.00	-0.02
5CC#90	CA_2A-2A-13A-66B	2	20	19100	1900	QPSK	1	0	1100	1980	2	20	700	1940	13	10	5230	751	66	10	66786	2145	66	10	66687	2135.1	-	-	-	-	-	-	-	-	23.02	23.00	23.01	0.01	-0.01
5CC#91	CA_2A-5A-48C-66A	2	20	19100	1900	QPSK	1	0	1100	1980	5	10	2525	881.5	48	20	55990	3625	48	20	55792	3605.2	66	20	66786	2145	-	-	-	-	-	-	-	-	23.01	22.99	23.01	0.00	-0.02
5CC#92	CA_2A-13A-46A-46C	2	20	19100	1900	QPSK	1	0	1100	1980	13	10	5230	751	46	20	50665	5537.5	46	20	46890	5160	46	20	47088	5179.8	-	-	-	-	-	-	-	-	23.03	23.01	23.01	0.02	0.00
5CC#95	CA_2A-2A-13A-66A-66A	2	20	19100	1900	QPSK	1	0	1100	1980	2	20	700	1940	13	10	5230	751	66	20	67236	2190	66	20	66536	2120	-	-	-	-	-	-	-	-	23.01	22.99	23.01	0.00	-0.02
6CC#18	CA_2A-13A-46E	2	20	19100	1900	QPSK	1	0	1100	1980	13	10	5230	751	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	-	-	-	-	23.00	23.00	23.01	-0.01	-0.01
6CC#19	CA_2A-48E-66A	2	20	19100	1900	QPSK	1	0	1100	1980	48	20	55990	3625	48	20	55792	3605.2	48	20	56188	3644.8	48	20	55594	3585.4	66	20	66786	2145	-	-	-	-	23.02	23.00	23.01	0.01	-0.01
6CC#22	CA_2A-13A-46A-46D	2	20	19100	1900	QPSK	1	0	1100	1980	13	10	5230	751	46	20	50665	5537.5	46	20	46890	5160	46	20	47088	5179.8	46	20	47286	5199.6	-	-	-	-	22.97	22.99	23.01	-0.04	-0.01
7CC#6	CA_2A-46E-66A-66A	2	20	19100	1900	QPSK	1	0	1100	1980	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	66	20	67236	2190	66	20	66536	2120	22.99	23.00	23.01	-0.02	-0.01

13.2.4　LTE Band 5 as PCC

Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	SCC1 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC2 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC3 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC4 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC5 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC6 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO	Single Carrier	Delta PCC DL SISO
5	5	20625	846.5	QPSK	1	12	2625	891.5	5	10	2553	884.3	46	20	50665	5537.5	46	20	50467	5517.7	-	-	-	-	-	-	-	-	-	-	-	-	23.13		23.12	0.01
5	5	20625	846.5	QPSK	1	12	2625	891.5	2	20	900	1960	7	20	3100	2655	7	20	2902	2635.2	-	-	-	-	-	-	-	-	-	-	-	-	23.15		23.12	0.03
5	5	20625	846.5	QPSK	1	12	2625	891.5	2	20	900	1960	7	20	3350	2680	7	20	2850	2630	-	-	-	-	-	-	-	-	-	-	-	-	23.12		23.12	0.00
5	5	20625	846.5	QPSK	1	12	2625	891.5	7	20	3100	2655	66	20	67236	2190	66	20	66536	2120	-	-	-	-	-	-	-	-	-	-	-	-	23.14		23.12	0.02
5	5	20625	846.5	QPSK	1	12	2625	891.5	5	10	2553	884.3	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	-	-	-	-	-	-	-	-	23.11		23.12	-0.01
5	5	20625	846.5	QPSK	1	12	2625	891.5	2	20	900	1960	48	20	55990	3625	48	20	55792	3605.2	48	20	56188	3644.8	-	-	-	-	-	-	-	-	23.12		23.12	0.00
5	5	20625	846.5	QPSK	1	12	2625	891.5	5	10	2553	884.3	2	20	1100	1980	2	20	700	1940	66	20	66786	2145	-	-	-	-	-	-	-	-	23.13		23.12	0.01
5	5	20625	846.5	QPSK	1	12	2625	891.5	2	20	900	1960	48	20	55990	3625	66	20	55792	3605.2	66	20	66786	2145	-	-	-	-	-	-	-	-	23.12		23.12	0.00
5	5	20625	846.5	QPSK	1	12	2625	891.5	7	20	3100	2655	7	20	2902	2635.2	66	20	67236	2190	66	20	66536	2120	-	-	-	-	-	-	-	-	23.14		23.12	0.02
5	5	20625	846.5	QPSK	1	12	2625	891.5	5	10	2553	884.3	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	-	-	-	-	23.13		23.12	0.01

13.2.5　LTE Band 7 as PCC

Index	Combination	PCC Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	SCC1 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC2 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC3 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC4 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC5 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	SCC6 Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO	Single Carrier	Delta PCC DL SISO	Delta PCC DL 4x4 MIMO
3CC#152	CA_7A-7A-26A	7	20	21350	2560	QPSK	1	0	3350	2680	7	20	2850	2630	26	15	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.18	23.16	23.13	0.05	0.03
4CC#167	CA_2A-5A-7C	7	20	21350	2560	QPSK	1	0	3350	2680	2	20	900	1960	5	10	2525	881.5	7	20	3152	2660.2	-	-	-	-	-	-	-	-	-	-	-	-	23.09	23.09	23.13	-0.04	-0.04
4CC#168	CA_2A-7C-13A	7	20	21350	2560	QPSK	1	0	3350	2680	2	20	900	1960	13	10	5230	751	7	20	3152	2660.2	-	-	-	-	-	-	-	-	-	-	-	-	23.08	23.07	23.13	-0.05	-0.06
4CC#172	CA_2A-5A-7A-7A	7	20	21350	2560	QPSK	1	0	3350	2680	2	20	900	1960	5	10	2525	881.5	7	20	2850	2630	-	-	-	-	-	-	-	-	-	-	-	-	23.06	23.05	23.13	-0.07	-0.08
4CC#174	CA_5A-7A-66A-66A	7	20	21350	2560	QPSK	1	0	3350	2680	5	10	2525	881.5	66	20	67236	2190	66	20	66536	2120	-	-	-	-	-	-	-	-	-	-	-	-	23.09	23.09	23.13	-0.04	-0.04
5CC#93	CA_5A-7C-66A-66A	7	20	21350	2560	QPSK	1	0	3350	2680	5	10	2525	881.5	66	20	67236	2190	66	20	66536	2120	7	20	3152	2660.2	-	-	-	-	-	-	-	-	23.09	23.09	23.13	-0.04	-0.04
6CC#17	CA_7C-46E	7	20	21350	2560	QPSK	1	0	3350	2680	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	7	20	3152	2660.2	-	-	-	-	23.15	23.13	23.13	0.02	0.00

13.2.6　LTE Band 13 as PCC

| PCC | | | | | | | | SCC 1 | | | | SCC 2 | | | | SCC 3 | | | | SCC 4 | | | | SCC 5 | | | | SCC 6 | | | | Power [dBm] | | | Delta [dB] | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DL CA Enabled | | Single Carrier | | |
Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO		PCC DL SISO	PCC DL 4x4 MIMO
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	900	1960	7	20	3100	2655	7	20	2902	2635.2	-	-	-	-	-	-	-	-	-	-	-	-	23.19		23.18	0.01	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	900	1960	46	20	46890	5160	46	20	54440	5915	-	-	-	-	-	-	-	-	-	-	-	-	23.18		23.18	0.00	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	1100	1980	2	20	700	1940	66	10	66786	2145	66	10	66687	2135.1	-	-	-	-	-	-	-	-	23.19		23.18	0.01	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	900	1960	46	20	50665	5537.5	46	20	46890	5160	46	20	47088	5179.8	-	-	-	-	-	-	-	-	23.20		23.18	0.02	
13	5	23205	779.5	QPSK	1	24	5205	748.5	48	20	55990	3625	48	20	55340	3560	48	20	55538	3579.8	-	-	-	-	-	-	-	-	-	-	-	-	23.20		23.18	0.02	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	1100	1980	2	20	700	1940	66	20	66536	2120	66	20	67236	2190	-	-	-	-	-	-	-	-	23.20		23.18	0.02	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	900	1960	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	-	-	-	-	23.19		23.18	0.01	
13	5	23205	779.5	QPSK	1	24	5205	748.5	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	66	20	66786	2145	-	-	-	-	23.20		23.18	0.02	
13	5	23205	779.5	QPSK	1	24	5205	748.5	2	20	900	1960	46	20	50665	5537.5	46	20	46890	5160	46	20	47088	5179.8	46	20	47286	5199.6	-	-	-	-	23.19		23.18	0.01	

13.2.7　LTE Band 25 as PCC

| Index | Combination | PCC | | | | | | | | SCC 1 | | | | SCC 2 | | | | SCC 3 | | | | SCC 4 | | | | SCC 5 | | | | SCC 6 | | | | Power [dBm] | | | Delta [dB] | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DL CA Enabled | | Single Carrier | | |
		Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO		PCC DL SISO	PCC DL 4x4 MIMO
5CC#85	CA_25A-41E	25	15	26615	1907.5	QPSK	1	0	8615	1987.5	41	20	40620	2593	41	20	40422	2573.2	41	20	40224	2553.4	41	20	40026	2533.6	-	-	-	-	-	-	-	-	23.04	23.03	23.01	0.03	0.02

13.2.8　LTE Band 26 as PCC

| Index | Combination | PCC | | | | | | | | SCC 1 | | | | SCC 2 | | | | SCC 3 | | | | SCC 4 | | | | SCC 5 | | | | SCC 6 | | | | Power [dBm] | | | Delta [dB] | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DL CA Enabled | | Single Carrier | | |
		Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO		PCC DL SISO	PCC DL 4x4 MIMO
3CC#152	CA_7A-7A-26A	26	5	27015	846.5	QPSK	1	0	9015	891.5	7	20	2850	2630	7	20	3350	2680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.06		23.06	0.00	

13.2.9　LTE Band 38 as PCC

| Index | Combination | PCC | | | | | | | | SCC 1 | | | | SCC 2 | | | | SCC 3 | | | | SCC 4 | | | | SCC 5 | | | | SCC 6 | | | | Power [dBm] | | | Delta [dB] | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DL CA Enabled | | Single Carrier | | |
		Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO		PCC DL SISO	PCC DL 4x4 MIMO
2CC#39	CA_5A-38A	38	15	37825	2577.5	QPSK	1	74	37825	2577.5	5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.05	23.07	23.07	-0.02	0.00

13.2.10　LTE Band 41 as PCC

| Index | Combination | PCC | | | | | | | | SCC 1 | | | | SCC 2 | | | | SCC 3 | | | | SCC 4 | | | | SCC 5 | | | | SCC 6 | | | | Power [dBm] | | | Delta [dB] | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DL CA Enabled | | Single Carrier | | |
		Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB / Offset	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	Band	BW [MHz]	DL Ch	DL Freq. [MHz]	PCC DL SISO	PCC DL 4x4 MIMO		PCC DL SISO	PCC DL 4x4 MIMO
3CC#43	CA_26A-41C	41	20	40620	2593	QPSK	1	0	40620	2593	41	20	40818	2612.8	26	15	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.13	23.14	23.12	0.01	0.02
2CC#63	CA_26A-41A	41	20	40620	2593	QPSK	1	0	40620	2593	26	15	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.15	23.16	23.12	0.03	0.04

13.2.11   LTE Band 48 as PCC

Combination	PCC Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB/Offset	DL Ch	DL Freq. [MHz]	SCC1 Band	BW	DL Ch	DL Freq.	SCC2 Band	BW	DL Ch	DL Freq.	SCC3 Band	BW	DL Ch	DL Freq.	SCC4 Band	BW	DL Ch	DL Freq.	SCC5 Band	BW	DL Ch	DL Freq.	PCC DL SISO	PCC DL 4x4 MIMO	Single Carrier	Δ PCC DL SISO	Δ PCC DL 4x4 MIMO
CA_48C-71A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	71	20	68761	634.5	-	-	-	-	-	-	-	-	-	-	-	-	11.5	11.51	11.54	-0.04	-0.03
CA_48A-48A-71A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	56640	3690	71	20	68761	634.5	-	-	-	-	-	-	-	-	-	-	-	-	11.53	11.52	11.54	-0.01	-0.02
CA_4A-48D	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55936	3619.6	48	20	56134	3639.4	4	20	2175	2132.5	-	-	-	-	-	-	-	-	11.58	11.58	11.54	0.04	0.04
CA_2A-5A-48C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	5	10	2525	881.5	48	20	55594	3585.4	-	-	-	-	-	-	-	-	11.58	11.46	11.54	0.04	-0.08
CA_5A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	5	20	2525	881.5	48	20	55594	3585.4	66	20	66786	2145	-	-	-	-	-	-	-	-	11.52	11.5	11.54	-0.02	-0.04
CA_13A-48A-66B	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	66	10	66786	2145	66	10	66687	2135.1	-	-	-	-	-	-	-	-	11.57	11.53	11.54	0.03	-0.01
CA_13A-48A-66C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	66	20	66786	2145	66	20	66588	2125.2	-	-	-	-	-	-	-	-	11.57	11.55	11.54	0.03	0.01
CA_48A-48A-66B	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	56640	3690	66	10	66786	2145	66	10	66687	2135.1	-	-	-	-	-	-	-	-	11.56	11.53	11.54	0.02	-0.01
CA_48A-48A-66C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	56640	3690	66	20	66786	2145	66	20	66588	2125.2	-	-	-	-	-	-	-	-	11.57	11.53	11.54	0.03	-0.01
CA_48C-66A-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	66	20	66786	2145	66	20	66536	2120	-	-	-	-	-	-	-	-	11.50	11.48	11.54	-0.04	-0.06
CA_2A-5A-48A-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	5	10	2525	881.5	66	20	66786	2145	-	-	-	-	-	-	-	-	11.55	11.54	11.54	0.01	0.00
CA_2A-48A-66A-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	66	20	66786	2145	66	20	66536	2120	-	-	-	-	-	-	-	-	11.54	11.52	11.54	0.00	-0.02
CA_48A-48A-66A-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	56640	3690	66	20	66786	2145	66	20	66536	2120	-	-	-	-	-	-	-	-	11.50	11.56	11.54	-0.04	0.02
CA_2A-48E	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	48	20	55936	3619.6	48	20	56134	3639.4	48	20	56332	3659.2	-	-	-	-	11.51	11.54	11.54	-0.03	0.00
CA_4A-48E	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	4	20	2175	2132.5	48	20	55936	3619.6	48	20	56134	3639.4	48	20	56332	3659.2	-	-	-	-	11.57	11.52	11.54	0.03	-0.02
CA_2A-13A-48D	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	13	10	5230	751	48	20	55936	3619.6	48	20	56134	3639.4	-	-	-	-	11.51	11.55	11.54	-0.03	0.01
CA_2A-48A-48D	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	48	20	55936	3619.6	48	20	56134	3639.4	48	20	56332	3659.2	-	-	-	-	11.55	11.54	11.54	0.01	0.00
CA_2A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	48	20	55594	3585.4	48	20	56442	3670.2	66	20	66786	2145	-	-	-	-	11.55	11.50	11.54	0.01	-0.04
CA_2A-48D-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	48	20	55936	3619.6	48	20	56134	3639.4	66	20	66786	2145	-	-	-	-	11.48	11.49	11.54	-0.06	-0.05
CA_5A-48D-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	5	10	2525	881.5	48	20	55936	3619.6	48	20	56134	3639.4	66	20	66786	2145	-	-	-	-	11.51	11.48	11.54	-0.03	-0.06
CA_13A-48A-48D	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	48	20	55936	3619.6	48	20	56134	3639.4	48	20	56332	3659.2	-	-	-	-	11.56	11.53	11.54	0.02	-0.01
CA_13A-48C-48C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	48	20	55594	3585.4	48	20	56640	3690	48	20	56442	3670.2	-	-	-	-	11.55	11.54	11.54	0.01	0.00
CA_13A-48D-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	48	20	55936	3619.6	48	20	56134	3639.4	66	20	66786	2145	-	-	-	-	11.50	11.56	11.54	-0.04	0.02
CA_48A-48C-66B	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	48	20	56640	3690	66	10	66786	2145	66	10	66687	2135.1	-	-	-	-	11.50	11.54	11.54	-0.04	0.00
CA_48A-48C-66C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	48	20	56640	3690	66	20	66786	2145	66	20	66588	2125.2	-	-	-	-	11.51	11.54	11.54	-0.03	0.00
CA_48A-48D-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	48	20	55396	3565.6	48	20	56640	3690	66	20	66786	2145	-	-	-	-	11.55	11.49	11.54	0.01	-0.05
CA_48C-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	48	20	56640	3690	48	20	56442	3670.2	66	20	66786	2145	-	-	-	-	11.54	11.51	11.54	0.00	-0.03
CA_2A-13A-48A-48C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	13	10	5230	751	48	20	55594	3585.4	48	20	56640	3690	-	-	-	-	11.48	11.51	11.54	-0.06	-0.03
CA_2A-13A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	13	10	5230	751	48	20	55594	3585.4	66	20	66786	2145	-	-	-	-	11.50	11.52	11.54	-0.04	-0.02
CA_2A-48A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	48	20	55594	3585.4	48	20	56640	3690	66	20	66786	2145	-	-	-	-	11.56	11.52	11.54	0.02	-0.02
CA_2A-13A-48A-48A-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	2	20	900	1960	13	10	5230	751	48	20	55594	3585.4	48	20	56640	3690	66	20	66786	2145	11.47	11.51	11.54	-0.07	-0.03
CA_13A-48E-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	13	10	5230	751	48	20	55936	3619.6	48	20	56134	3639.4	48	20	56332	3659.2	-	-	-	-	11.56	11.50	11.54	0.02	-0.04
CA_2A-5A-48D	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55936	3619.6	48	20	56134	3639.4	2	20	900	1960	5	10	2525	881.5	-	-	-	-	11.53	11.49	11.54	-0.01	-0.05
CA_2A-5A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	2	20	900	1960	5	10	2525	881.5	66	20	66786	2145	-	-	-	-	11.50	11.50	11.54	-0.04	-0.04
CA_13A-48A-48C-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	48	20	56640	3690	13	10	5230	751	66	20	66786	2145	-	-	-	-	11.50	11.49	11.54	-0.04	-0.05
CA_2A-48E-66A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55936	3619.6	48	20	56332	3659.2	2	20	900	1960	66	20	66786	2145	-	-	-	-	11.56	11.55	11.54	0.02	0.01
CA_4A-48C	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	48	20	55594	3585.4	4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	11.51	11.50	11.54	-0.03	-0.04
CA_4A-48A	48	15	55765	3602.5	QPSK	1 / 74	55765	3602.5	4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.56	11.54	11.54	0.02	0.00

13.2.12   LTE Band 66 as PCC

Index	Combination	PCC Band	BW [MHz]	UL Ch.	UL Freq. [MHz]	Mod.	UL#RB/Offset	DL Ch	DL Freq. [MHz]	SCC1 Band	BW	DL Ch	DL Freq.	SCC2 Band	BW	DL Ch	DL Freq.	SCC3 Band	BW	DL Ch	DL Freq.	SCC4 Band	BW	DL Ch	DL Freq.	SCC5 Band	BW	DL Ch	DL Freq.	SCC6 Band	BW	DL Ch	DL Freq.	PCC DL SISO	PCC DL 4x4 MIMO	Single Carrier	Δ PCC DL SISO	Δ PCC DL 4x4 MIMO
4CC#174	CA_5A-7A-66A-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	5	10	2525	881.5	7	20	3100	2655	66	20	66536	2120	-	-	-	-	-	-	-	-	-	-	-	-	22.99	23.00	22.95	0.04	0.05
5CC#89	CA_2A-2A-5B-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	1100	1980	2	20	700	1940	5	10	2450	874	5	10	2549	883.9	-	-	-	-	-	-	-	-	22.96	22.96	22.95	0.01	0.01
5CC#90	CA_2A-2A-13A-66B	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	1100	1980	2	20	700	1940	13	10	5230	751	66	5	66968	2163.2	-	-	-	-	-	-	-	-	22.98	22.99	22.95	0.03	0.04
5CC#91	CA_2A-5A-48C-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	900	1960	5	10	2525	881.5	48	20	55990	3625	48	20	55792	3605.2	-	-	-	-	-	-	-	-	22.95	22.95	22.95	0.00	0.00
5CC#93	CA_5A-7C-66A-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	5	10	2525	881.5	7	20	3100	2655	7	20	2902	2635.2	66	20	66536	2120	-	-	-	-	-	-	-	-	22.98	22.95	22.95	0.03	0.00
5CC#94	CA_13A-48A-48C-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	13	10	5230	751	48	20	55990	3625	48	20	55340	3560	66	20	66536	2120	-	-	-	-	-	-	-	-	22.94	22.97	22.95	-0.01	0.02
5CC#95	CA_2A-2A-13A-66A-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	1100	1980	2	20	700	1940	13	10	5230	751	66	20	66536	2120	-	-	-	-	-	-	-	-	22.96	22.97	22.95	0.01	0.02
6CC#19	CA_2A-48E-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	900	1960	48	20	55792	3605.2	48	20	56188	3644.8	48	20	55594	3585.4	-	-	-	-	-	-	-	-	22.95	22.95	22.95	0.00	0.00
6CC#20	CA_13A-46E-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	13	10	5230	751	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	-	-	-	-	22.94	22.95	22.95	-0.01	0.00
7CC#6	CA_2A-46E-66A-66A	66	15	132597	1772.5	QPSK	1 / 0	67061	2172.5	2	20	900	1960	46	20	50665	5537.5	46	20	50467	5517.7	46	20	50863	5557.3	46	20	50269	5497.9	66	20	66536	2120	22.95	22.94	22.95	0.00	-0.01

13.3 NR(new radio)

13.3.1 NR band n77 (Block A) DSI=0, full power

BW 100 MHz   ch/MHz

OFDM	Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	633332 / 3500 [dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	*23.38*
			0	137	1	24.5	23.30
			0	271	1	24.5	23.24
			0.5	0	135	24.0	22.81
			0	69	135	24.5	23.21
			0.5	138	135	24.0	22.74
			0.5	0	270	24.0	22.72
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.31
			0	137	1	24.5	23.19
			0	271	1	24.5	23.23
			1	0	135	23.5	22.31
			0	69	135	24.5	23.23
			1	138	135	23.5	22.24
			1	0	270	23.5	22.20
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.29
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	21.04
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	18.97
CP-OFDM	QPSK	30	1.5	1	1	23.0	21.80

BW 90 MHz   ch/MHz

OFDM	Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	633332 / 3500 [dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	*23.37*
			0	123	1	24.5	23.25
			0	243	1	24.5	23.24
			0.5	0	120	24.0	22.74
			0	63	120	24.5	23.26
			0.5	125	120	24.0	22.76
			0.5	0	243	24.0	22.74
DFTS-OFDM	QPSK	30	0	1	1	24.5	*23.37*
			0	123	1	24.5	23.35
			0	243	1	24.5	23.32
			1	0	120	23.5	22.34
			0	63	120	24.5	23.20
			1	125	120	23.5	22.24
			1	0	243	23.5	22.21
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.59
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	20.94
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	19.10
CP-OFDM	QPSK	30	1.5	1	1	23.0	21.79

BW	80 MHz						ch/MHz
OFDM	Modulation	SCS	Max. MPR	RB offset	RB size	Tune-up limit	633332 / 3500
		[kHz]	[dB]			[dBm]	[dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	*23.34*
			0	109	1	24.5	23.23
			0	215	1	24.5	23.19
			0.5	0	108	24.0	22.78
			0	55	108	24.5	23.24
			0.5	109	108	24.0	22.75
			0.5	0	216	24.0	22.72
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.33
			0	109	1	24.5	23.29
			0	215	1	24.5	23.24
			1	0	108	23.5	22.32
			0	55	108	24.5	23.26
			1	109	108	23.5	22.30
			1	0	216	23.5	22.23
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.58
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	20.97
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	19.08
CP-OFDM	QPSK	30	1.5	1	1	23.0	21.76

BW	60 MHz						ch/MHz
OFDM	Modulation	SCS	Max. MPR	RB offset	RB size	Tune-up limit	633332 / 3500
		[kHz]	[dB]			[dBm]	[dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	*23.31*
			0	81	1	24.5	23.24
			0	160	1	24.5	23.23
			0.5	0	81	24.0	22.72
			0	40	81	24.5	23.25
			0.5	81	81	24.0	22.76
			0.5	0	162	24.0	22.73
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.30
			0	81	1	24.5	23.29
			0	160	1	24.5	23.28
			1	0	81	23.5	22.23
			0	40	81	24.5	23.23
			1	81	81	23.5	22.26
			1	0	162	23.5	22.30
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.43
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	20.91
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	19.05
CP-OFDM	QPSK	30	1.5	1	1	23.0	21.74

BW	50 MHz						ch/MHz
OFDM	Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	633332 / 3500 [dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	23.25
			0	67	1	24.5	23.19
			0	131	1	24.5	23.28
			0.5	0	64	24.0	22.71
			0	35	64	24.5	23.27
			0.5	69	64	24.0	22.79
			0.5	0	128	24.0	22.74
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.27
			0	67	1	24.5	23.23
			0	131	1	24.5	*23.31*
			1	0	64	23.5	22.23
			0	35	64	24.5	23.24
			1	69	64	23.5	22.22
			1	0	128	23.5	22.23
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.45
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	20.84
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	18.99
CP-OFDM	QPSK	30	1.5	1	1	23.0	21.66

BW	40 MHz						ch/MHz
OFDM	Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	633332 / 3500 [dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	23.58
			0	53	1	24.5	23.56
			0	104	1	24.5	23.65
			0.5	0	50	24.0	23.08
			0	28	50	24.5	23.59
			0.5	56	50	24.0	23.14
			0.5	0	100	24.0	23.13
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.63
			0	53	1	24.5	23.59
			0	104	1	24.5	*23.68*
			1	0	50	23.5	22.57
			0	28	50	24.5	23.55
			1	56	50	23.5	22.60
			1	0	100	23.5	22.56
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.77
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	21.41
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	19.31
CP-OFDM	QPSK	30	1.5	1	1	23.0	22.15

BW		20 MHz					ch/MHz		
OFDM	Modulation	SCS	Max. MPR	RB offset	RB size	Tune-up limit	630666 / 3460	633332 / 3500	635998 / 3540
		[kHz]	[dB]			[dBm]	[dBm]	[dBm]	[dBm]
DFTS-OFDM	BPSK	30	0	1	1	24.5	*23.49*	*23.47*	*23.48*
			0	26	1	24.5	23.40	23.37	23.35
			0	49	1	24.5	23.46	23.43	23.37
			0.5	0	25	24.0	22.90	22.88	22.88
			0	13	25	24.5	23.37	23.35	23.27
			0.5	26	25	24.0	22.87	22.87	22.80
			0.5	0	50	24.0	22.89	22.90	22.79
DFTS-OFDM	QPSK	30	0	1	1	24.5	23.48	23.45	23.36
			0	26	1	24.5	23.36	23.36	23.29
			0	49	1	24.5	23.41	23.39	23.34
			1	0	25	23.5	22.40	22.41	22.30
			0	13	25	24.5	23.36	23.36	23.27
			1	26	25	23.5	22.41	22.42	22.33
			1	0	50	23.5	22.37	22.38	22.31
DFTS-OFDM	16QAM	30	1	1	1	23.5	22.58	22.59	22.49
DFTS-OFDM	64QAM	30	2.5	1	1	22.0	21.24	21.21	21.13
DFTS-OFDM	256QAM	30	4.5	1	1	20.0	19.16	19.13	19.08
CP-OFDM	QPSK	30	1.5	1	1	23.0	22.00	22.00	21.93

13.3.2 NR band n77 (Block C) DSI=0, full power

100 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	656000 / 3840 [dBm]
BPSK	30	0	1	1	24.5	*23.18*
		0	137	1	24.5	23.04
		0	271	1	24.5	22.97
		0.5	0	135	24.0	22.55
		0	69	135	24.5	22.95
		0.5	138	135	24.0	22.41
		0.5	0	270	24.0	22.50
QPSK	30	0	1	1	24.5	23.09
		0	137	1	24.5	23.00
		0	271	1	24.5	22.92
		1	0	135	23.5	22.04
		0	69	135	24.5	22.99
		1	138	135	23.5	21.98
		1	0	270	23.5	22.01
16QAM	30	1	1	1	23.5	22.08
64QAM	30	2.5	1	1	22.0	20.80
256QAM	30	4.5	1	1	20.0	18.78
QPSK	30	1.5	1	1	23.0	21.63

90 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	649666 / 3745 [dBm]	656000 / 3840 [dBm]	662333 / 3935 [dBm]
BPSK	30	0	1	1	24.5	*23.30*	*23.22*	*23.16*
		0	123	1	24.5	23.27	23.10	23.01
		0	243	1	24.5	23.22	23.02	23.00
		0.5	0	120	24.0	22.71	22.56	22.54
		0	63	120	24.5	23.24	23.05	23.00
		0.5	125	120	24.0	22.72	22.51	22.52
		0.5	0	243	24.0	22.72	22.58	22.51
QPSK	30	0	1	1	24.5	23.24	23.19	23.15
		0	123	1	24.5	23.19	23.09	23.00
		0	243	1	24.5	23.16	23.02	23.01
		1	0	120	23.5	22.23	22.13	22.00
		0	63	120	24.5	23.24	23.07	22.97
		1	125	120	23.5	22.21	22.04	22.03
		1	0	243	23.5	22.22	22.09	21.96
16QAM	30	1	1	1	23.5	22.44	22.29	22.14
64QAM	30	2.5	1	1	22.0	21.02	20.93	20.90
256QAM	30	4.5	1	1	20.0	18.97	18.93	18.76
QPSK	30	1.5	1	1	23.0	21.81	21.93	21.83

80 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	649333 / 3740 [dBm]	656000 / 3840 [dBm]	662666 / 3940 [dBm]
BPSK	30	0	1	1	24.5	*23.34*	23.20	*23.10*
		0	109	1	24.5	23.29	23.07	22.94
		0	215	1	24.5	23.20	23.00	22.91
		0.5	0	108	24.0	22.77	22.61	22.48
		0	55	108	24.5	23.30	23.08	22.94
		0.5	109	108	24.0	22.80	22.53	22.47
		0.5	0	216	24.0	22.78	22.58	22.45
QPSK	30	0	1	1	24.5	23.33	*23.21*	23.08
		0	109	1	24.5	23.30	23.09	22.95
		0	215	1	24.5	23.25	23.06	22.94
		1	0	108	23.5	22.27	22.09	21.96
		0	55	108	24.5	23.30	23.07	22.92
		1	109	108	23.5	22.29	22.05	21.98
		1	0	216	23.5	22.29	22.07	21.93
16QAM	30	1	1	1	23.5	22.20	22.03	21.89
64QAM	30	2.5	1	1	22.0	21.00	20.85	20.72
256QAM	30	4.5	1	1	20.0	18.95	18.80	18.66
QPSK	30	1.5	1	1	23.0	21.83	21.68	21.56

60 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	648666 / 3730 [dBm]	656000 / 3840 [dBm]	663333 / 3950 [dBm]
BPSK	30	0	1	1	24.5	23.28	*23.14*	22.96
		0	81	1	24.5	*23.33*	23.08	*23.04*
		0	160	1	24.5	23.30	23.05	22.95
		0.5	0	81	24.0	22.77	22.54	22.40
		0	40	81	24.5	23.29	23.05	23.00
		0.5	81	81	24.0	22.83	22.53	22.48
		0.5	0	162	24.0	22.79	22.55	22.37
QPSK	30	0	1	1	24.5	23.24	23.09	22.97
		0	81	1	24.5	23.28	23.08	23.03
		0	160	1	24.5	23.30	23.04	22.96
		1	0	81	23.5	22.24	22.06	21.90
		0	40	81	24.5	23.27	23.04	23.00
		1	81	81	23.5	22.26	22.03	21.96
		1	0	162	23.5	22.27	22.04	21.89
16QAM	30	1	1	1	23.5	22.10	21.90	21.80
64QAM	30	2.5	1	1	22.0	20.89	20.77	20.57
256QAM	30	4.5	1	1	20.0	18.82	18.67	18.49
QPSK	30	1.5	1	1	23.0	21.73	21.61	21.42

50 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	648333 / 3725 [dBm]	652166 / 3782.5 [dBm]	656000 / 3840 [dBm]	659832 / 3897.5 [dBm]	663666 / 3955 [dBm]
BPSK	30	0	1	1	24.5	*23.24*	*23.15*	23.00	*22.92*	*23.06*
		0	67	1	24.5	23.17	23.05	22.98	22.87	22.87
		0	131	1	24.5	23.21	23.11	*23.05*	22.88	23.02
		0.5	0	64	24.0	22.73	22.61	22.52	22.43	22.48
		0	35	64	24.5	23.17	23.11	23.02	22.91	22.92
		0.5	69	64	24.0	22.71	22.59	22.46	22.35	22.45
		0.5	0	128	24.0	22.70	22.58	22.47	22.38	22.44
QPSK	30	0	1	1	24.5	23.20	23.11	22.98	22.91	23.03
		0	67	1	24.5	23.23	23.10	22.99	22.88	22.92
		0	131	1	24.5	23.21	23.13	23.03	22.90	23.02
		1	0	64	23.5	22.14	22.12	22.05	21.92	21.93
		0	35	64	24.5	23.20	23.10	23.03	22.91	22.94
		1	69	64	23.5	22.17	22.11	21.98	21.88	21.92
		1	0	128	23.5	22.20	22.06	22.02	21.89	21.89
16QAM	30	1	1	1	23.5	22.20	22.11	22.04	21.89	22.00
64QAM	30	2.5	1	1	22.0	20.65	20.51	20.45	20.35	20.48
256QAM	30	4.5	1	1	20.0	18.69	18.55	18.41	18.32	18.46
QPSK	30	1.5	1	1	23.0	21.68	21.53	21.47	21.35	21.48

40 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	648000 / 3720 [dBm]	652000 / 3780 [dBm]	656000 / 3840 [dBm]	659998 / 3900 [dBm]	664000 / 3960 [dBm]
BPSK	30	0	1	1	24.5	*23.61*	*23.59*	*23.53*	23.34	23.28
		0	53	1	24.5	23.50	23.44	23.46	23.25	23.21
		0	104	1	24.5	23.59	23.52	23.47	*23.36*	*23.34*
		0.5	0	50	24.0	23.05	23.00	22.88	22.74	22.75
		0	28	50	24.5	23.54	23.43	23.46	23.20	23.26
		0.5	56	50	24.0	23.09	22.97	22.86	22.82	22.77
		0.5	0	100	24.0	23.06	22.96	22.81	22.77	22.79
QPSK	30	0	1	1	24.5	23.56	23.51	23.52	23.33	23.27
		0	53	1	24.5	23.46	23.46	23.47	23.24	23.24
		0	104	1	24.5	23.55	23.50	23.50	23.35	23.31
		1	0	50	23.5	22.56	22.48	22.43	22.27	22.24
		0	28	50	24.5	23.52	23.44	23.33	23.24	23.25
		1	56	50	23.5	22.53	22.50	22.33	22.32	22.31
		1	0	100	23.5	22.56	22.48	22.38	22.25	22.25
16QAM	30	1	1	1	23.5	22.60	22.56	22.50	22.36	22.33
64QAM	30	2.5	1	1	22.0	21.01	21.05	21.00	20.84	20.76
256QAM	30	4.5	1	1	20.0	19.09	19.04	18.99	18.82	18.73
QPSK	30	1.5	1	1	23.0	22.09	22.07	22.01	21.89	21.83

20 MHz   ch/MHz

Modulation	SCS [kHz]	Max. MPR [dB]	RB offset	RB size	Tune-up limit [dBm]	647333 / 3710 [dBm]	651666 / 3775 [dBm]	656000 / 3840 [dBm]	660333 / 3905 [dBm]	664666 / 3970 [dBm]
BPSK	30	0	1	1	24.5	23.30	23.23	23.12	23.12	*23.20*
		0	26	1	24.5	23.24	23.19	23.04	23.08	23.15
		0	49	1	24.5	*23.32*	*23.26*	*23.14*	*23.15*	23.09
		0.5	0	25	24.0	22.78	22.69	22.60	22.45	22.65
		0	13	25	24.5	23.22	23.15	23.04	23.01	23.13
		0.5	26	25	24.0	22.72	22.64	22.55	22.50	22.55
		0.5	0	50	24.0	22.72	22.68	22.58	22.51	22.54
QPSK	30	0	1	1	24.5	23.30	23.22	23.11	23.06	23.18
		0	26	1	24.5	23.27	23.20	23.08	23.04	23.11
		0	49	1	24.5	23.29	23.25	23.13	23.12	23.08
		1	0	25	23.5	22.26	22.20	22.04	21.96	22.07
		0	13	25	24.5	23.18	23.13	23.00	22.97	23.02
		1	26	25	23.5	22.20	22.13	22.06	22.00	22.02
		1	0	50	23.5	22.21	22.14	22.08	22.02	22.04
16QAM	30	1	1	1	23.5	22.31	22.24	22.08	22.11	22.19
64QAM	30	2.5	1	1	22.0	20.82	20.72	20.63	20.61	20.70
256QAM	30	4.5	1	1	20.0	18.79	18.68	18.62	18.50	18.62
QPSK	30	1.5	1	1	23.0	21.80	21.70	21.57	21.50	21.56

14 Total exposure ratio (TER)

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated$_k$ term) shall be used to determine exemption for simultaneous transmission according to Formula [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a} \frac{Pi}{Pth,i} + \sum_{j=1}^{b} \frac{ERPj}{ERPth,j} + \sum_{k=1}^{c} \frac{Ealuatedk}{Exposure\ Limitk} \leq 1$$

Where:

a: number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for Pth, including existing exempt transmitters and those being added.

b: number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula for Threshold ERP, including existing exempt transmitters and those being added.

c: number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance.

P_i: the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$: the exemption threshold power (Pth) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i. Also, The Pth is described at section "SAR Exposure Conditions"

ERP_j: the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j.

$ERP_{th,j}$: exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

$Evaluated_k$: the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation.

$Exposure\ Limit_k$: either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

14.1 Conclusion

All TER is less than 1, compliance.

14.2 TER Bottom condition
WWAN Main, WLAN Main and WLAN-BT antenna for bottom condition

RAT	Band	Frequency	Output Power		Ant Gain	ERP		Pth	WWAN Main	WLAN Main	WLAN-BT	Total
		[MHz]	dBm	mW	dBi	dBm	mW	mW	P/Pth	Eva./exp.limit	P/Pth	Sum of ratio
NR	n77	3450	24.50	281.84	1.34	23.70	234.42	3060	0.092	0.116	0.053	0.262

Note: The P/Pth value for WLAN-BT is from original application (FCC ID: ACJ9TGWW21A).

14.3 TER Limbs condition
WWAN Main, WLAN Main and WLAN-BT antenna for limbs condition

RAT	Band	Frequency	Output Power		Ant Gain	ERP		Pth	WWAN Main	WLAN Main	WLAN-BT	Total
		[MHz]	dBm	mW	dBi	dBm	mW	mW	P/Pth	Eva./exp.limit	P/Pth	Sum of ratio
NR	n77	3450	24.50	281.84	1.34	23.70	234.42	7650	0.037	0.201	0.021	0.259

Note: The P/Pth value for WLAN-BT is from original application (FCC ID: ACJ9TGWW21A).

14.4 PD simultaneous transmission compliance consideration

The content of this change does not affect PD.
See original application (FCC ID: ACJ9TGWW21A).

15   Test instrument

15.1   For power measurement

Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
MPSE-28	208185	RF Device, Active, Power Meter	Rohde & Schwarz	NRP8S	110600	2022/06/10	12
MAT-90	141223	Attenuator	Weinschel Associates	WA56-10	56100306	2023/05/18	12
MURC-13	196372	UXM 5G Wireless Test Platform	Keysight Technologies Inc	E7515B	MY59321679	2023/02/20	12
MHDC-32	206910	Directional Coupler	NARDA	4216-10	02871	2023/04/04	12
MPSE-30	208187	RF Device, Active, Power Meter	Rohde & Schwarz	NRP50S	101419	2022/06/10	12