



RF EXPOSURE EVALUATION REPORT

APPLICANT : Reliance Communications LLC
PRODUCT NAME : Orbic 5G Module
MODEL NAME : Orbic 5G Module
BRAND NAME : Orbic
FCC ID : 2ABGH-R100ML5
STANDARD(S) : FCC 47CFR Part 2(2.1091)
RECEIPT DATE : 2021-03-25
TEST DATE : 2021-04-21 to 2021-05-25
ISSUE DATE : 2021-06-23

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Shen Junsheng (Supervisor)

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Change History		
Version	Date	Reason for Change
1.0	2021-06-23	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F,HBC HuiLong Center Building-II Minzhi Street,Longhua, Shenzhen, P.R. China 518110

2.1 Equipment under Test (EUT) Description

Product Name:	Orbic 5G Module
Hardware Version:	V1.1
Software Version:	ORB100ML5_v1.0.9_VZ
Frequency Bands:	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5(ENDC): 824 MHz ~ 849 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n71: 663 MHz ~ 698 MHz 5G NR n77(ENDC): 3300 MHz ~ 4200 MHz 5G NR n78: 3300 MHz ~ 3800 MHz
Modulation Mode:	WCDMA: QPSK, 16QAM LTE: QPSK, 16QAM, 64QAM 5G NR: CP-OFDM/DFT-s-OFDM, PI/2 BPSK QPSK, 16QAM, 64QAM, 256QAM



EN-DC Combination:	Support
Antenna Type:	Fixed Internal Antenna
Antenna Gain:	WCDMA Band II: 3.80dBi WCDMA Band IV: 3.68dBi WCDMA Band V: -0.10dBi LTE Band 2: 3.80dBi LTE Band 4: 3.68dBi LTE Band 5: -0.10dBi LTE Band 12: -0.55dBi LTE Band 13: -0.10dBi LTE Band 41: 2.23dBi LTE Band 66: 3.68dBi LTE Band 71: -3.92dBi 5G NR n2: 3.80dBi 5G NR n5: -0.10dBi 5G NR n41: 2.23dBi 5G NR n66: 3.68dBi 5G NR n71: -3.92dBi 5G NR n77: 3.15dBi 5G NR n78: 3.15dBi

Note:

When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.



3.1 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method Determination /Remark
FCC 47 CFR Part 2(2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note 1: The test item is not applicable. Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		



2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz* = Plane-wave equivalent power density



3. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
R&S	Network Emulator	CMW500	165755	2021.02.25	2022.02.24
Anritsu	Network Emulator	MT8820C	6200985414	2020.10.28	2021.10.27
Anritsu	Network Emulator	MT8821C	6262094360	2020.07.27	2021.07.26
Anritsu	Network Emulator	MT8000A	6262012906	2020.06.08	2021.06.07

Note:

The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration. For the maximum power, it was established between EUT and Base Station with following setting:

1. For WCDMA testing, Power Ctrl Mode = All Up bits, and the transmitted maximum output power was recorded.
2. For LTE & NR testing, the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and different configurations which are requested to be reported to FCC.

4. RF Output Power

4.1 Output Power for WCDMA/LTE

<WCDMA Band II>

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	RMC 12.2Kbps	24.70	24.54	24.30	25.50
3GPP Rel 6	HSDPA Subtest-1	22.72	22.90	22.92	23.50
3GPP Rel 6	HSDPA Subtest-2	22.75	22.85	22.95	23.50
3GPP Rel 6	HSDPA Subtest-3	22.36	22.50	22.48	23.00
3GPP Rel 6	HSDPA Subtest-4	22.26	22.40	22.38	23.00
3GPP Rel 6	HSUPA Subtest-1	22.88	22.94	22.95	23.50
3GPP Rel 6	HSUPA Subtest-2	22.90	22.91	22.97	23.50
3GPP Rel 6	HSUPA Subtest-3	22.35	22.42	22.45	23.00
3GPP Rel 6	HSUPA Subtest-4	22.36	22.40	22.43	23.00
3GPP Rel 6	HSUPA Subtest-5	22.71	22.83	22.83	23.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	22.27	22.35	22.44	23.00

<WCDMA Band IV>

Band		WCDMA Band IV			Tune-up Limit (dBm)
TX Channel		1312	1413	1513	
Rx Channel		1537	1638	1738	
Frequency (MHz)		1712.4	1732.6	1752.6	
3GPP Rel 99	RMC 12.2Kbps	24.34	24.61	24.86	25.50
3GPP Rel 6	HSDPA Subtest-1	22.89	23.11	23.03	23.50
3GPP Rel 6	HSDPA Subtest-2	22.92	23.04	22.97	23.50
3GPP Rel 6	HSDPA Subtest-3	22.43	22.55	22.58	23.00
3GPP Rel 6	HSDPA Subtest-4	22.43	22.66	22.51	23.00
3GPP Rel 6	HSUPA Subtest-1	22.99	23.12	23.13	23.50
3GPP Rel 6	HSUPA Subtest-2	22.92	23.14	23.12	23.50
3GPP Rel 6	HSUPA Subtest-3	22.42	22.67	22.60	23.00
3GPP Rel 6	HSUPA Subtest-4	22.41	22.61	22.63	23.00
3GPP Rel 6	HSUPA Subtest-5	22.91	23.05	23.02	23.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	22.39	22.60	22.57	23.00



<WCDMA Band V>

Band		WCDMA Band V			Tune-up Limit (dBm)
TX Channel		4132	4182	4233	
Rx Channel		4357	4407	4458	
Frequency (MHz)		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	24.38	24.04	23.80	25.00
3GPP Rel 6	HSDPA Subtest-1	22.38	22.19	22.31	23.00
3GPP Rel 6	HSDPA Subtest-2	22.30	22.13	22.36	23.00
3GPP Rel 6	HSDPA Subtest-3	21.88	21.88	21.79	22.50
3GPP Rel 6	HSDPA Subtest-4	21.86	21.68	21.78	22.50
3GPP Rel 6	HSUPA Subtest-1	22.41	22.35	22.38	23.00
3GPP Rel 6	HSUPA Subtest-2	22.43	22.36	22.39	23.00
3GPP Rel 6	HSUPA Subtest-3	21.91	21.85	21.93	22.50
3GPP Rel 6	HSUPA Subtest-4	21.91	21.83	21.92	22.50
3GPP Rel 6	HSUPA Subtest-5	22.30	22.43	22.23	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	21.86	21.82	21.75	22.50

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.34	23.43	23.43	24
20	QPSK	1	49	23.28	23.29	23.26	
20	QPSK	1	99	23.24	23.42	23.36	
20	QPSK	50	0	22.33	22.39	22.38	23
20	QPSK	50	24	22.41	22.37	22.41	
20	QPSK	50	50	22.4	22.42	22.37	
20	QPSK	100	0	22.45	22.42	22.28	
20	16QAM	1	0	22.66	22.27	22.66	23.5
20	16QAM	1	49	22.33	22.85	22.62	
20	16QAM	1	99	22.54	22.92	22.11	
20	16QAM	50	0	21.32	21.44	21.37	22
20	16QAM	50	24	21.52	21.39	21.41	
20	16QAM	50	50	21.53	21.41	21.47	
20	16QAM	100	0	21.48	21.41	21.28	
20	64QAM	1	0	20.58	20.33	20.66	21.5
20	64QAM	1	49	20.34	20.39	20.48	



20	64QAM	1	99	20.38	20.72	20.78	21
20	64QAM	50	0	20.38	20.45	20.39	
20	64QAM	50	24	20.48	20.34	20.49	
20	64QAM	50	50	20.49	20.54	20.47	
20	64QAM	100	0	20.55	20.46	20.41	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.35	23.38	23.36	24
15	QPSK	1	37	23.37	23.37	23.37	
15	QPSK	1	74	23.31	23.36	23.37	
15	QPSK	36	0	22.47	22.46	22.39	23
15	QPSK	36	20	22.51	22.45	22.51	
15	QPSK	36	39	22.47	22.57	22.42	
15	QPSK	75	0	22.54	22.36	22.45	
15	16QAM	1	0	22.62	22.82	22.96	23.5
15	16QAM	1	37	22.75	22.67	22.50	
15	16QAM	1	74	22.56	22.87	22.82	
15	16QAM	36	0	21.48	21.46	21.37	22
15	16QAM	36	20	21.58	21.48	21.51	
15	16QAM	36	39	21.50	21.46	21.52	
15	16QAM	75	0	21.34	21.46	21.46	
15	64QAM	1	0	20.09	20.47	20.34	21.5
15	64QAM	1	37	20.64	20.49	20.49	
15	64QAM	1	74	20.64	20.57	20.58	
15	64QAM	36	0	20.42	20.47	20.38	21
15	64QAM	36	20	20.50	20.46	20.53	
15	64QAM	36	39	20.57	20.40	20.51	
15	64QAM	75	0	20.41	20.45	20.49	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	23.50	23.50	23.46	24
10	QPSK	1	25	23.26	23.31	23.30	
10	QPSK	1	49	23.14	23.29	23.38	
10	QPSK	25	0	22.43	22.30	22.21	23
10	QPSK	25	12	22.44	22.42	22.36	
10	QPSK	25	25	22.38	22.41	22.42	



10	QPSK	50	0	22.42	22.41	22.26	23.5
10	16QAM	1	0	22.60	22.36	22.67	
10	16QAM	1	25	22.69	22.86	22.71	
10	16QAM	1	49	22.86	22.54	22.63	
10	16QAM	25	0	21.43	21.36	21.28	22
10	16QAM	25	12	21.35	21.41	21.42	
10	16QAM	25	25	21.38	21.42	21.39	
10	16QAM	50	0	21.38	21.45	21.39	
10	64QAM	1	0	20.23	20.49	20.84	21.5
10	64QAM	1	25	20.35	20.72	20.47	
10	64QAM	1	49	20.63	20.61	20.83	
10	64QAM	25	0	20.57	20.29	20.41	21
10	64QAM	25	12	20.42	20.45	20.36	
10	64QAM	25	25	20.55	20.41	20.46	
10	64QAM	50	0	20.51	20.37	20.43	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.21	23.41	23.27	24
5	QPSK	1	12	23.40	23.38	23.26	
5	QPSK	1	24	23.37	23.26	23.26	
5	QPSK	12	0	22.36	22.37	22.36	23
5	QPSK	12	7	22.38	22.42	22.44	
5	QPSK	12	13	22.39	22.41	22.35	
5	QPSK	25	0	22.31	22.30	22.32	
5	16QAM	1	0	22.31	22.17	22.34	23
5	16QAM	1	12	22.28	22.40	22.31	
5	16QAM	1	24	22.26	22.81	22.28	
5	16QAM	12	0	21.45	21.36	21.40	22
5	16QAM	12	7	21.41	21.48	21.40	
5	16QAM	12	13	21.36	21.48	21.45	
5	16QAM	25	0	21.32	21.35	21.38	
5	64QAM	1	0	21.01	20.25	20.41	21.5
5	64QAM	1	12	20.48	20.63	20.67	
5	64QAM	1	24	20.21	20.69	20.42	
5	64QAM	12	0	20.48	20.41	20.54	21
5	64QAM	12	7	20.45	20.34	20.42	
5	64QAM	12	13	20.29	20.46	20.45	



5	64QAM	25	0	20.44	20.34	20.37	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.09	22.95	23.00	24
3	QPSK	1	8	23.05	23.15	23.16	
3	QPSK	1	14	23.00	22.94	23.08	
3	QPSK	8	0	22.12	22.08	22.08	23
3	QPSK	8	4	22.09	22.11	22.14	
3	QPSK	8	7	22.06	22.09	22.07	
3	QPSK	15	0	22.11	22.03	22.09	
3	16QAM	1	0	22.14	22.45	22.62	23
3	16QAM	1	8	22.44	22.47	22.46	
3	16QAM	1	14	22.14	22.15	22.43	
3	16QAM	8	0	21.24	21.16	21.12	22
3	16QAM	8	4	21.15	21.22	21.21	
3	16QAM	8	7	21.17	21.26	21.26	
3	16QAM	15	0	21.25	21.07	20.98	
3	64QAM	1	0	20.19	20.23	20.56	21
3	64QAM	1	8	20.50	20.51	20.59	
3	64QAM	1	14	20.30	20.09	20.52	
3	64QAM	8	0	20.15	20.06	20.07	21
3	64QAM	8	4	20.06	20.30	20.21	
3	64QAM	8	7	20.19	20.31	20.08	
3	64QAM	15	0	20.12	20.18	20.07	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.99	23.05	23.01	23.5
1.4	QPSK	1	3	22.98	23.02	22.99	
1.4	QPSK	1	5	22.95	22.99	22.95	
1.4	QPSK	3	0	22.99	22.96	22.93	
1.4	QPSK	3	1	23.03	23.05	22.95	
1.4	QPSK	3	3	22.95	22.97	22.94	
1.4	QPSK	6	0	21.98	22.14	21.99	22.5
1.4	16QAM	1	0	21.97	22.17	22.43	23
1.4	16QAM	1	3	22.23	22.41	22.09	
1.4	16QAM	1	5	22.20	22.26	22.03	



1.4	16QAM	3	0	22.02	22.09	22.21	
1.4	16QAM	3	1	22.14	22.13	22.15	
1.4	16QAM	3	3	22.05	22.01	22.13	
1.4	16QAM	6	0	21.07	21.27	21.09	22
1.4	64QAM	1	0	20.13	20.81	20.14	21
1.4	64QAM	1	3	20.14	20.21	20.41	
1.4	64QAM	1	5	20.74	20.01	20.63	
1.4	64QAM	3	0	20.34	20.18	20.12	
1.4	64QAM	3	1	20.02	20.05	20.13	
1.4	64QAM	3	3	20.24	20.28	19.96	
1.4	64QAM	6	0	20.21	20.22	20.02	21

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	23.05	23.35	23.34	24
20	QPSK	1	49	22.97	23.31	23.32	
20	QPSK	1	99	23.05	23.30	23.33	
20	QPSK	50	0	22.04	22.34	22.32	23
20	QPSK	50	24	22.26	22.25	22.26	
20	QPSK	50	50	22.15	22.31	22.27	
20	QPSK	100	0	22.22	22.35	22.29	
20	16QAM	1	0	22.39	22.42	22.78	23.5
20	16QAM	1	49	21.95	22.44	22.67	
20	16QAM	1	99	22.57	22.15	22.13	
20	16QAM	50	0	21.25	21.33	21.47	22
20	16QAM	50	24	21.18	21.31	21.31	
20	16QAM	50	50	21.12	21.32	21.33	
20	16QAM	100	0	21.14	21.30	21.42	
20	64QAM	1	0	20.16	20.49	20.62	21.5
20	64QAM	1	49	20.37	20.79	20.32	
20	64QAM	1	99	20.59	20.49	20.37	
20	64QAM	50	0	20.08	20.40	20.35	21
20	64QAM	50	24	20.29	20.39	20.38	
20	64QAM	50	50	20.29	20.25	20.20	
20	64QAM	100	0	20.30	20.25	20.38	



Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	23.17	23.55	23.51	24.5
15	QPSK	1	37	23.02	23.42	23.51	
15	QPSK	1	74	23.27	23.39	23.50	
15	QPSK	36	0	22.19	22.44	22.42	23
15	QPSK	36	20	22.28	22.38	22.35	
15	QPSK	36	39	22.27	22.44	22.43	
15	QPSK	75	0	22.28	22.46	22.48	
15	16QAM	1	0	22.78	22.48	23.06	23.5
15	16QAM	1	37	22.28	22.40	22.99	
15	16QAM	1	74	22.76	22.55	22.90	
15	16QAM	36	0	21.32	21.46	21.44	22
15	16QAM	36	20	21.34	21.47	21.34	
15	16QAM	36	39	21.24	21.46	21.40	
15	16QAM	75	0	21.31	21.34	21.55	
15	64QAM	1	0	20.44	20.63	20.24	21.5
15	64QAM	1	37	20.42	20.33	20.66	
15	64QAM	1	74	20.26	20.25	20.99	
15	64QAM	36	0	20.29	20.43	20.51	21
15	64QAM	36	20	20.34	20.43	20.35	
15	64QAM	36	39	20.25	20.51	20.38	
15	64QAM	75	0	20.38	20.41	20.39	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	23.12	23.39	23.38	24
10	QPSK	1	25	22.98	23.28	23.37	
10	QPSK	1	49	23.09	23.27	23.37	
10	QPSK	25	0	22.14	22.24	22.39	23
10	QPSK	25	12	22.09	22.36	22.44	
10	QPSK	25	25	22.21	22.42	22.42	
10	QPSK	50	0	22.19	22.36	22.27	
10	16QAM	1	0	22.60	22.82	22.61	23
10	16QAM	1	25	22.42	22.81	22.65	
10	16QAM	1	49	22.44	22.97	22.42	
10	16QAM	25	0	21.04	21.30	21.33	22



10	16QAM	25	12	21.16	21.43	21.48	
10	16QAM	25	25	21.20	21.54	21.44	
10	16QAM	50	0	21.13	21.35	21.45	
10	64QAM	1	0	20.32	20.41	20.76	21
10	64QAM	1	25	20.54	20.57	20.46	
10	64QAM	1	49	19.92	20.54	20.79	
10	64QAM	25	0	20.11	20.31	20.48	21
10	64QAM	25	12	20.13	20.29	20.42	
10	64QAM	25	25	20.36	20.51	20.40	
10	64QAM	50	0	20.28	20.40	20.24	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.99	23.36	23.35	24
5	QPSK	1	12	23.27	23.35	23.34	
5	QPSK	1	24	23.09	23.32	23.33	
5	QPSK	12	0	22.24	22.35	22.47	23
5	QPSK	12	7	22.27	22.38	22.46	
5	QPSK	12	13	22.22	22.46	22.45	
5	QPSK	25	0	22.24	22.35	22.42	
5	16QAM	1	0	22.42	22.52	23.00	23.5
5	16QAM	1	12	22.50	22.63	22.72	
5	16QAM	1	24	22.49	22.98	22.71	
5	16QAM	12	0	21.27	21.44	21.44	22
5	16QAM	12	7	21.31	21.51	21.51	
5	16QAM	12	13	21.41	21.50	21.51	
5	16QAM	25	0	21.21	21.44	21.44	
5	64QAM	1	0	20.80	20.43	20.75	21.5
5	64QAM	1	12	20.90	20.50	20.44	
5	64QAM	1	24	20.64	20.79	20.96	
5	64QAM	12	0	20.24	20.56	20.62	21.5
5	64QAM	12	7	20.23	20.51	20.44	
5	64QAM	12	13	20.20	20.57	20.56	
5	64QAM	25	0	20.20	20.36	20.48	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	23.37	23.72	23.70	24.5



3	QPSK	1	8	23.50	23.71	23.69	
3	QPSK	1	14	23.46	23.65	23.64	
3	QPSK	8	0	22.45	22.81	22.80	
3	QPSK	8	4	22.42	22.78	22.79	23.5
3	QPSK	8	7	22.42	22.76	22.78	
3	QPSK	15	0	22.47	22.70	22.76	
3	16QAM	1	0	22.75	22.87	22.88	23.5
3	16QAM	1	8	22.70	22.80	22.81	
3	16QAM	1	14	22.80	22.60	22.54	
3	16QAM	8	0	21.47	21.85	21.86	22.5
3	16QAM	8	4	21.38	21.84	21.85	
3	16QAM	8	7	21.51	21.83	21.83	
3	16QAM	15	0	21.51	21.82	21.81	
3	64QAM	1	0	20.47	21.08	21.03	21.5
3	64QAM	1	8	20.80	20.93	20.95	
3	64QAM	1	14	20.65	20.65	20.66	
3	64QAM	8	0	20.43	20.51	20.53	21.5
3	64QAM	8	4	20.49	20.50	20.49	
3	64QAM	8	7	20.52	20.51	20.50	
3	64QAM	15	0	20.53	20.67	20.61	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	23.17	23.56	23.52	24.5
1.4	QPSK	1	3	23.30	23.45	23.41	
1.4	QPSK	1	5	23.25	23.29	23.27	
1.4	QPSK	3	0	23.19	23.27	23.26	
1.4	QPSK	3	1	23.22	23.24	23.23	
1.4	QPSK	3	3	23.17	23.15	23.14	
1.4	QPSK	6	0	22.25	22.67	22.62	23.5
1.4	16QAM	1	0	22.74	22.64	22.60	23.5
1.4	16QAM	1	3	22.48	22.62	22.59	
1.4	16QAM	1	5	22.65	22.61	22.54	
1.4	16QAM	3	0	22.16	22.51	22.48	
1.4	16QAM	3	1	22.40	22.45	22.41	
1.4	16QAM	3	3	22.34	22.35	22.34	
1.4	16QAM	6	0	21.32	21.67	21.69	22.5
1.4	64QAM	1	0	20.98	20.87	20.97	21.5



1.4	64QAM	1	3	20.59	20.81	20.85	
1.4	64QAM	1	5	20.37	20.77	20.81	
1.4	64QAM	3	0	20.50	20.69	20.80	
1.4	64QAM	3	1	20.31	20.65	20.77	
1.4	64QAM	3	3	20.27	20.63	20.74	
1.4	64QAM	6	0	20.37	20.63	20.73	21.5

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	22.88	22.89	22.87	23.5
10	QPSK	1	25	22.80	22.84	22.79	
10	QPSK	1	49	22.88	22.81	22.69	
10	QPSK	25	0	21.81	21.74	21.89	22.5
10	QPSK	25	12	21.89	21.90	21.85	
10	QPSK	25	25	21.80	21.76	21.78	
10	QPSK	50	0	21.87	21.88	21.93	
10	16QAM	1	0	21.90	21.97	22.23	23
10	16QAM	1	25	21.82	22.20	22.24	
10	16QAM	1	49	21.94	22.22	21.85	
10	16QAM	25	0	20.85	20.70	20.83	21.5
10	16QAM	25	12	20.81	20.91	20.85	
10	16QAM	25	25	20.87	20.85	20.89	
10	16QAM	50	0	20.94	20.88	20.85	
10	64QAM	1	0	20.42	20.07	20.30	21
10	64QAM	1	25	19.79	20.06	20.00	
10	64QAM	1	49	19.93	20.28	19.49	
10	64QAM	25	0	19.85	19.92	19.87	20.5
10	64QAM	25	12	19.91	19.95	19.89	
10	64QAM	25	25	20.10	19.78	19.80	
10	64QAM	50	0	19.85	19.84	19.71	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	22.52	22.74	22.70	23.5
5	QPSK	1	12	22.42	22.66	22.69	



5	QPSK	1	24	22.50	22.59	22.69	
5	QPSK	12	0	21.66	21.67	21.76	22.5
5	QPSK	12	7	21.62	21.70	21.71	
5	QPSK	12	13	21.49	21.62	21.65	
5	QPSK	25	0	21.56	21.68	21.67	
5	16QAM	1	0	22.18	21.88	21.69	23
5	16QAM	1	12	21.90	21.95	22.20	
5	16QAM	1	24	21.83	21.94	22.08	
5	16QAM	12	0	20.73	20.58	20.84	21.5
5	16QAM	12	7	20.53	20.62	20.68	
5	16QAM	12	13	20.54	20.56	20.76	
5	16QAM	25	0	20.59	20.60	20.70	
5	64QAM	1	0	19.66	19.61	19.90	20.5
5	64QAM	1	12	19.61	19.59	19.90	
5	64QAM	1	24	19.57	19.56	19.90	
5	64QAM	12	0	19.53	19.60	19.84	20.5
5	64QAM	12	7	19.71	19.47	19.82	
5	64QAM	12	13	19.57	19.50	19.61	
5	64QAM	25	0	19.71	19.50	19.75	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.71	22.73	22.69	23.5
3	QPSK	1	8	22.60	22.62	22.67	
3	QPSK	1	14	22.59	22.59	22.60	
3	QPSK	8	0	21.81	21.67	21.85	22.5
3	QPSK	8	4	21.85	21.70	21.88	
3	QPSK	8	7	21.79	21.62	21.86	
3	QPSK	15	0	21.78	21.68	21.85	
3	16QAM	1	0	22.26	21.88	22.04	23
3	16QAM	1	8	21.97	21.95	22.01	
3	16QAM	1	14	21.80	21.77	21.89	
3	16QAM	8	0	20.90	20.58	20.89	21.5
3	16QAM	8	4	20.81	20.62	20.90	
3	16QAM	8	7	20.86	20.56	20.91	
3	16QAM	15	0	20.83	20.60	20.86	
3	64QAM	1	0	20.26	19.61	20.09	21
3	64QAM	1	8	20.31	19.47	20.33	



3	64QAM	1	14	20.00	19.30	20.03	
3	64QAM	8	0	19.92	19.60	19.92	20.5
3	64QAM	8	4	19.77	19.47	19.93	
3	64QAM	8	7	20.02	19.50	19.92	
3	64QAM	15	0	19.78	19.50	19.92	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	22.64	22.77	22.67	23.5
1.4	QPSK	1	3	22.76	22.65	22.66	
1.4	QPSK	1	5	22.59	22.61	22.58	
1.4	QPSK	3	0	22.69	22.59	22.61	
1.4	QPSK	3	1	22.75	22.56	22.73	
1.4	QPSK	3	3	22.70	22.51	22.69	
1.4	QPSK	6	0	21.78	21.69	21.71	22.5
1.4	16QAM	1	0	21.98	22.02	22.16	22.5
1.4	16QAM	1	3	22.00	22.01	22.00	
1.4	16QAM	1	5	21.92	21.93	21.93	
1.4	16QAM	3	0	21.75	21.83	21.81	
1.4	16QAM	3	1	21.79	21.80	21.78	
1.4	16QAM	3	3	21.91	21.92	21.90	
1.4	16QAM	6	0	20.93	20.76	20.92	21.5
1.4	64QAM	1	0	20.11	19.86	20.03	20.5
1.4	64QAM	1	3	19.88	19.84	19.85	
1.4	64QAM	1	5	20.18	19.83	19.88	
1.4	64QAM	3	0	19.87	19.79	19.83	
1.4	64QAM	3	1	19.96	19.80	19.90	
1.4	64QAM	3	3	19.90	19.81	19.88	
1.4	64QAM	6	0	19.98	19.81	19.87	20.5



<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				23060	23095	23130	23.5
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	22.77	22.79	22.76	23.5
10	QPSK	1	25	22.50	22.61	22.57	
10	QPSK	1	49	22.48	22.49	22.48	
10	QPSK	25	0	21.60	21.69	21.62	22.5
10	QPSK	25	12	21.77	21.57	21.51	
10	QPSK	25	25	21.72	21.52	21.60	
10	QPSK	50	0	21.61	21.63	21.64	22.5
10	16QAM	1	0	21.80	21.38	21.83	
10	16QAM	1	25	21.94	22.00	21.90	
10	16QAM	1	49	22.05	21.69	21.94	21.5
10	16QAM	25	0	20.68	20.67	20.68	
10	16QAM	25	12	20.82	20.56	20.61	
10	16QAM	25	25	20.86	20.58	20.72	20.5
10	16QAM	50	0	20.67	20.62	20.67	
10	64QAM	1	0	20.25	19.65	19.81	
10	64QAM	1	25	20.16	19.54	19.87	20.5
10	64QAM	1	49	19.80	19.90	19.65	
10	64QAM	25	0	19.72	19.70	19.64	20.5
10	64QAM	25	12	19.67	19.59	19.63	
10	64QAM	25	25	19.67	19.73	19.50	
10	64QAM	50	0	19.67	19.67	19.54	20.5
Channel				23035	23095	23155	
Frequency (MHz)				701.5	707.5	713.5	Tune-up limit (dBm)
5	QPSK	1	0	22.51	22.74	22.61	23.5
5	QPSK	1	12	22.63	22.67	22.54	
5	QPSK	1	24	22.72	22.51	22.48	
5	QPSK	12	0	21.71	21.58	21.54	22.5
5	QPSK	12	7	21.65	21.58	21.50	
5	QPSK	12	13	21.69	21.52	21.56	
5	QPSK	25	0	21.71	21.63	21.49	22.5
5	16QAM	1	0	21.97	21.30	21.61	
5	16QAM	1	12	21.80	22.27	21.61	22.5



5	16QAM	1	24	21.88	22.12	21.28	21.5
5	16QAM	12	0	20.72	20.67	20.66	
5	16QAM	12	7	20.86	20.68	20.64	
5	16QAM	12	13	20.67	20.66	20.52	
5	16QAM	25	0	20.61	20.55	20.50	
5	64QAM	1	0	20.05	19.60	19.93	21.5
5	64QAM	1	12	19.84	19.50	19.83	
5	64QAM	1	24	20.02	19.64	19.85	
5	64QAM	12	0	19.69	19.70	19.75	20.5
5	64QAM	12	7	19.84	19.62	19.50	
5	64QAM	12	13	19.62	19.68	19.48	
5	64QAM	25	0	19.74	19.62	19.60	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	22.56	22.73	22.63	23.5
3	QPSK	1	8	22.68	22.69	22.64	
3	QPSK	1	14	22.67	22.64	22.65	
3	QPSK	8	0	21.65	21.80	21.78	22.5
3	QPSK	8	4	21.69	21.79	21.73	
3	QPSK	8	7	21.62	21.78	21.67	
3	QPSK	15	0	21.67	21.76	21.65	
3	16QAM	1	0	21.89	22.32	22.22	23
3	16QAM	1	8	21.94	21.95	21.93	
3	16QAM	1	14	22.35	22.34	22.36	
3	16QAM	8	0	20.84	20.87	20.85	21.5
3	16QAM	8	4	20.74	20.76	20.73	
3	16QAM	8	7	20.60	20.63	20.61	
3	16QAM	15	0	20.74	20.84	20.64	
3	64QAM	1	0	20.00	20.14	20.11	21
3	64QAM	1	8	19.90	19.91	19.93	
3	64QAM	1	14	19.67	19.68	19.69	
3	64QAM	8	0	19.59	19.62	19.63	20.5
3	64QAM	8	4	19.78	19.97	19.81	
3	64QAM	8	7	19.74	19.96	19.80	
3	64QAM	15	0	19.67	19.95	19.78	
Channel				23017	23095	23173	Tune-up limit
Frequency (MHz)				699.7	707.5	715.3	



							(dBm)
1.4	QPSK	1	0	22.09	22.53	22.43	23.5
1.4	QPSK	1	3	22.21	22.23	22.24	
1.4	QPSK	1	5	22.07	22.09	22.08	
1.4	QPSK	3	0	22.14	22.16	22.15	
1.4	QPSK	3	1	22.21	22.23	22.21	
1.4	QPSK	3	3	22.17	22.18	22.19	
1.4	QPSK	6	0	21.22	21.68	21.62	22.5
1.4	16QAM	1	0	21.34	21.67	21.66	22.5
1.4	16QAM	1	3	21.53	21.54	21.56	
1.4	16QAM	1	5	21.20	21.23	21.24	
1.4	16QAM	3	0	21.29	21.30	21.30	
1.4	16QAM	3	1	21.30	21.34	21.32	
1.4	16QAM	3	3	21.43	21.42	21.40	
1.4	16QAM	6	0	20.27	20.70	20.65	21.5
1.4	64QAM	1	0	19.35	19.90	19.89	20.5
1.4	64QAM	1	3	19.49	19.51	19.50	
1.4	64QAM	1	5	19.37	19.42	19.49	
1.4	64QAM	3	0	19.46	19.45	19.47	
1.4	64QAM	3	1	19.47	19.78	19.61	
1.4	64QAM	3	3	19.56	19.75	19.59	
1.4	64QAM	6	0	19.38	19.72	19.58	20.5

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				23230			
Frequency (MHz)				782			
10	QPSK	1	0	23.26			24.5
10	QPSK	1	25	23.55			
10	QPSK	1	49	23.52			
10	QPSK	25	0	22.58			23.5
10	QPSK	25	12	22.62			
10	QPSK	25	25	22.72			
10	QPSK	50	0	22.69			
10	16QAM	1	0	22.79			23.5
10	16QAM	1	25	22.77			
10	16QAM	1	49	23.19			



10	16QAM	25	0	21.65			22.5
10	16QAM	25	12	21.68			
10	16QAM	25	25	21.67			
10	16QAM	50	0	21.74			
10	64QAM	1	0	22.95			23.5
10	64QAM	1	25	22.70			
10	64QAM	1	49	22.52			
10	64QAM	25	0	21.48			22.5
10	64QAM	25	12	21.73			
10	64QAM	25	25	21.69			
10	64QAM	50	0	21.72			
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	23.38	23.46	23.44	24.5
5	QPSK	1	12	23.54	23.52	23.57	
5	QPSK	1	24	23.69	23.62	23.73	
5	QPSK	12	0	22.55	22.56	22.68	23.5
5	QPSK	12	7	22.66	22.68	22.73	
5	QPSK	12	13	22.70	22.74	22.80	
5	QPSK	25	0	22.50	22.62	22.72	
5	16QAM	1	0	22.58	22.88	22.72	23.5
5	16QAM	1	12	22.74	22.76	22.88	
5	16QAM	1	24	23.23	22.78	23.22	
5	16QAM	12	0	21.65	21.66	21.79	22.5
5	16QAM	12	7	21.65	21.73	21.81	
5	16QAM	12	13	21.68	21.67	21.91	
5	16QAM	25	0	21.67	21.54	21.78	
5	64QAM	1	0	22.74	22.76	22.83	23.5
5	64QAM	1	12	22.35	22.63	22.93	
5	64QAM	1	24	22.64	22.77	22.60	
5	64QAM	12	0	21.51	21.55	21.63	22.5
5	64QAM	12	7	21.59	21.66	21.78	
5	64QAM	12	13	21.70	21.83	21.85	
5	64QAM	25	0	21.72	21.63	21.76	



<LTE Band 40>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Low Channel	Middle Channel	Middle High Channel	High Channel	Tune-up limit (dBm)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	25.93	26.00	26.27	25.82	25.79	26.5
20	QPSK	1	49	25.97	26.00	25.96	25.59	25.64	
20	QPSK	1	99	25.90	25.97	25.95	25.52	25.77	
20	QPSK	50	0	25.01	25.16	25.18	24.93	24.89	25.5
20	QPSK	50	24	25.10	25.29	25.21	24.74	24.97	
20	QPSK	50	50	25.07	25.29	25.20	24.72	24.93	
20	QPSK	100	0	25.10	25.24	25.21	24.80	24.84	
20	16QAM	1	0	25.30	25.35	25.47	25.20	25.09	26
20	16QAM	1	49	25.40	25.34	25.32	24.78	24.97	
20	16QAM	1	99	25.15	25.44	25.46	24.73	24.98	
20	16QAM	50	0	24.00	24.13	24.20	23.91	24.00	24.5
20	16QAM	50	24	24.07	24.20	24.21	23.96	23.96	
20	16QAM	50	50	24.07	24.21	24.22	23.83	24.04	
20	16QAM	100	0	24.09	24.17	24.26	23.80	23.94	
20	64QAM	1	0	25.18	25.14	25.55	24.97	24.86	26
20	64QAM	1	49	25.21	25.36	24.96	24.74	24.88	
20	64QAM	1	99	24.91	25.07	24.98	24.68	24.83	
20	64QAM	50	0	23.97	24.16	24.01	23.95	23.81	24.5
20	64QAM	50	24	24.17	24.18	24.26	23.77	23.91	
20	64QAM	50	50	24.17	24.22	24.20	23.75	23.99	
20	64QAM	100	0	24.16	24.15	24.25	23.81	23.98	
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	
15	QPSK	1	0	25.77	25.99	26.14	25.65	25.73	26.5
15	QPSK	1	37	25.82	26.00	25.81	25.49	25.73	
15	QPSK	1	74	25.68	25.99	25.80	25.49	25.66	
15	QPSK	36	0	25.01	25.08	25.14	24.90	24.88	25.5
15	QPSK	36	20	24.99	25.17	25.14	24.73	24.87	
15	QPSK	36	39	25.05	25.14	25.17	24.67	24.93	
15	QPSK	75	0	24.99	25.23	25.08	24.66	24.90	
15	16QAM	1	0	25.26	25.40	25.35	24.99	25.00	26



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15	16QAM	1	37	25.25	25.39	25.31	24.76	24.93	
15	16QAM	1	74	25.06	25.48	25.27	24.87	24.96	
15	16QAM	36	0	24.02	24.18	24.21	23.86	23.85	
15	16QAM	36	20	24.08	24.13	24.26	23.71	23.85	24.5
15	16QAM	36	39	24.03	24.22	24.24	23.63	23.84	
15	16QAM	75	0	23.95	24.21	24.20	23.67	23.95	
15	64QAM	1	0	25.18	25.29	25.00	24.84	24.88	26
15	64QAM	1	37	24.83	25.27	25.37	24.64	24.88	
15	64QAM	1	74	24.73	25.16	25.29	24.70	24.81	
15	64QAM	36	0	24.13	24.22	24.13	23.85	23.98	24.5
15	64QAM	36	20	24.07	24.21	24.20	23.72	23.76	
15	64QAM	36	39	23.99	24.21	24.19	23.65	23.93	
15	64QAM	75	0	24.04	24.15	24.15	23.64	23.89	
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	25.98	25.99	26.11	25.83	25.88	26.5
10	QPSK	1	25	25.92	25.96	25.99	25.81	25.72	
10	QPSK	1	49	25.80	25.81	25.89	25.68	25.84	
10	QPSK	25	0	25.04	25.12	25.15	24.79	24.97	25.5
10	QPSK	25	12	25.04	25.27	25.22	24.78	24.97	
10	QPSK	25	25	24.99	25.16	25.21	24.69	24.95	
10	QPSK	50	0	24.96	25.10	25.24	24.68	24.88	
10	16QAM	1	0	25.49	25.13	25.42	25.06	25.20	26
10	16QAM	1	25	25.42	25.12	25.31	24.93	25.13	
10	16QAM	1	49	25.19	25.07	25.49	24.84	25.06	
10	16QAM	25	0	24.02	24.13	24.10	23.81	24.00	24.5
10	16QAM	25	12	24.10	24.19	24.20	23.80	23.99	
10	16QAM	25	25	24.16	24.19	24.20	23.60	23.98	
10	16QAM	50	0	23.95	24.21	24.24	23.70	23.99	
10	16QAM	1	0	24.56	24.52	24.84	24.35	24.24	25.5
10	16QAM	1	25	24.59	24.65	24.34	24.21	24.26	
10	16QAM	1	49	24.29	24.45	24.36	24.20	24.21	
10	16QAM	25	0	23.97	24.21	24.08	23.85	23.65	25
10	16QAM	25	12	24.08	24.19	24.07	23.73	23.62	
10	16QAM	25	25	24.06	24.20	24.06	23.63	23.81	
10	16QAM	50	0	24.03	24.17	24.08	23.71	23.93	
Channel				39675	40148	40620	41093	41565	Tune-up



Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5	limit (dBm)
5	QPSK	1	0	26.00	26.00	26.16	25.78	25.91	26.5
5	QPSK	1	12	25.99	25.98	25.99	25.65	25.82	
5	QPSK	1	24	25.94	25.96	26.00	25.77	25.83	
5	QPSK	12	0	25.05	25.22	25.20	24.82	25.03	25.5
5	QPSK	12	7	25.04	25.16	25.22	24.86	24.99	
5	QPSK	12	13	25.08	25.22	25.27	24.83	24.91	
5	QPSK	25	0	25.08	25.21	25.17	24.79	25.02	
5	16QAM	1	0	25.39	25.29	25.36	24.94	25.26	26
5	16QAM	1	12	25.12	25.38	25.39	25.19	25.11	
5	16QAM	1	24	25.28	25.40	25.31	24.87	25.11	
5	16QAM	12	0	24.03	24.09	24.21	23.81	24.11	25
5	16QAM	12	7	24.13	24.26	24.34	23.88	24.01	
5	16QAM	12	13	24.06	24.14	24.11	23.72	23.91	
5	16QAM	25	0	24.07	24.26	24.20	24.16	24.15	
5	64QAM	1	0	25.24	25.21	25.37	25.13	25.15	26
5	64QAM	1	12	25.04	25.23	25.40	24.99	25.19	
5	64QAM	1	24	25.16	25.08	25.15	24.95	25.11	
5	64QAM	12	0	24.20	24.10	24.14	23.88	24.04	25
5	64QAM	12	7	24.12	24.32	24.28	23.83	24.06	
5	64QAM	12	13	24.20	24.16	24.24	23.66	23.97	
5	64QAM	25	0	23.99	24.14	24.21	23.84	23.97	

<LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				132072	132322	132572	24
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	23.21	23.45	23.37	
20	QPSK	1	49	23.19	23.43	23.18	23
20	QPSK	1	99	23.13	23.42	23.09	
20	QPSK	50	0	22.19	22.48	22.30	
20	QPSK	50	24	22.38	22.33	22.28	
20	QPSK	50	50	22.29	22.43	22.12	23
20	QPSK	100	0	22.35	22.31	22.35	
20	16QAM	1	0	22.27	22.81	22.77	
20	16QAM	1	49	22.08	22.25	22.51	23



20	16QAM	1	99	22.62	22.59	22.40	22
20	16QAM	50	0	21.16	21.43	21.32	
20	16QAM	50	24	21.39	21.38	21.40	
20	16QAM	50	50	21.41	21.40	21.21	
20	16QAM	100	0	21.31	21.37	21.33	
20	64QAM	1	0	20.27	20.70	20.40	21.5
20	64QAM	1	49	20.78	20.48	20.37	
20	64QAM	1	99	20.75	20.49	19.98	
20	64QAM	50	0	20.17	20.50	20.30	21
20	64QAM	50	24	20.34	20.48	20.33	
20	64QAM	50	50	20.35	20.33	20.28	
20	64QAM	100	0	20.29	20.38	20.25	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	23.03	23.39	23.21	24
15	QPSK	1	37	23.09	23.38	23.19	
15	QPSK	1	74	23.12	23.38	23.14	
15	QPSK	36	0	22.15	22.44	22.28	23
15	QPSK	36	20	22.28	22.34	22.31	
15	QPSK	36	39	22.29	22.44	22.13	
15	QPSK	75	0	22.17	22.39	22.30	
15	16QAM	1	0	22.46	22.96	22.77	23
15	16QAM	1	37	22.60	22.29	22.36	
15	16QAM	1	74	22.52	22.90	22.48	
15	16QAM	36	0	21.11	21.36	21.34	22
15	16QAM	36	20	21.27	21.49	21.30	
15	16QAM	36	39	21.29	21.39	21.11	
15	16QAM	75	0	21.29	21.43	21.26	
15	64QAM	1	0	20.10	20.32	20.40	21.5
15	64QAM	1	37	20.68	20.78	20.63	
15	64QAM	1	74	20.49	20.63	20.32	
15	64QAM	36	0	20.29	20.38	20.38	21
15	64QAM	36	20	20.34	20.41	20.31	
15	64QAM	36	39	20.24	20.42	20.26	
15	64QAM	75	0	20.25	20.46	20.24	
Channel				132022	132322	132622	Tune-up limit
Frequency (MHz)				1715	1745	1775	



							(dBm)
10	QPSK	1	0	23.12	23.53	23.42	24
10	QPSK	1	25	23.14	23.54	23.24	
10	QPSK	1	49	23.03	23.28	23.35	
10	QPSK	25	0	22.38	22.44	22.43	23
10	QPSK	25	12	22.33	22.51	22.32	
10	QPSK	25	25	22.31	22.46	22.38	
10	QPSK	50	0	22.40	22.52	22.38	
10	16QAM	1	0	22.60	22.67	22.74	23
10	16QAM	1	25	22.55	22.99	22.57	
10	16QAM	1	49	22.29	22.64	22.50	
10	16QAM	25	0	21.28	21.45	21.31	22
10	16QAM	25	12	21.50	21.56	21.44	
10	16QAM	25	25	21.35	21.48	21.32	
10	16QAM	50	0	21.27	21.50	21.29	
10	64QAM	1	0	20.38	20.51	20.44	21.5
10	64QAM	1	25	20.32	20.67	20.27	
10	64QAM	1	49	20.69	20.55	20.41	
10	64QAM	25	0	20.44	20.52	20.35	21
10	64QAM	25	12	20.41	20.59	20.41	
10	64QAM	25	25	20.33	20.38	20.39	
10	64QAM	50	0	20.28	20.56	20.22	
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	23.18	23.41	23.26	24
5	QPSK	1	12	23.19	23.40	23.25	
5	QPSK	1	24	23.22	23.40	23.24	
5	QPSK	12	0	22.26	22.51	22.34	23
5	QPSK	12	7	22.34	22.51	22.35	
5	QPSK	12	13	22.29	22.51	22.35	
5	QPSK	25	0	22.33	22.48	22.35	
5	16QAM	1	0	22.14	22.68	22.65	23
5	16QAM	1	12	22.33	22.94	22.74	
5	16QAM	1	24	22.47	22.60	23.28	
5	16QAM	12	0	21.37	21.64	21.33	22
5	16QAM	12	7	21.42	21.47	21.52	
5	16QAM	12	13	21.44	21.51	21.30	



5	16QAM	25	0	21.37	21.54	21.46	22
5	64QAM	1	0	20.33	20.91	20.40	
5	64QAM	1	12	20.11	20.98	20.66	
5	64QAM	1	24	20.61	21.05	20.53	
5	64QAM	12	0	20.34	20.58	20.31	21
5	64QAM	12	7	20.41	20.58	20.40	
5	64QAM	12	13	20.32	20.41	20.43	
5	64QAM	25	0	20.34	20.52	20.40	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	23.53	23.53	23.51	24
3	QPSK	1	8	23.46	23.47	23.45	
3	QPSK	1	14	23.31	23.34	23.32	
3	QPSK	8	0	22.55	22.56	22.51	23
3	QPSK	8	4	22.54	22.57	22.53	
3	QPSK	8	7	22.56	22.55	22.54	
3	QPSK	15	0	22.50	22.51	22.50	
3	16QAM	1	0	22.71	22.70	22.71	23
3	16QAM	1	8	22.41	22.78	22.77	
3	16QAM	1	14	22.99	22.98	22.97	
3	16QAM	8	0	21.66	21.67	21.66	22
3	16QAM	8	4	21.55	21.57	21.58	
3	16QAM	8	7	21.63	21.62	21.61	
3	16QAM	15	0	21.51	21.54	21.50	
3	64QAM	1	0	20.41	21.51	21.49	22
3	64QAM	1	8	20.29	21.45	21.41	
3	64QAM	1	14	20.38	21.37	21.38	
3	64QAM	8	0	20.57	20.54	20.54	21.5
3	64QAM	8	4	20.63	20.62	20.61	
3	64QAM	8	7	20.58	20.57	20.59	
3	64QAM	15	0	20.49	20.50	20.51	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	23.15	23.59	23.27	24.5
1.4	QPSK	1	3	23.35	23.58	23.30	
1.4	QPSK	1	5	23.29	23.57	23.28	



1.4	QPSK	3	0	23.24	23.52	23.26	
1.4	QPSK	3	1	23.29	23.53	23.25	
1.4	QPSK	3	3	23.27	23.50	23.26	
1.4	QPSK	6	0	22.33	22.65	22.35	23.5
1.4	16QAM	1	0	22.31	22.67	22.61	23.5
1.4	16QAM	1	3	22.55	22.56	22.54	
1.4	16QAM	1	5	22.25	22.51	22.27	
1.4	16QAM	3	0	22.25	22.48	22.26	
1.4	16QAM	3	1	22.40	22.39	22.21	
1.4	16QAM	3	3	22.42	22.51	22.20	
1.4	16QAM	6	0	21.53	21.68	21.52	22.5
1.4	64QAM	1	0	20.00	21.67	21.57	22.5
1.4	64QAM	1	3	20.59	21.57	21.51	
1.4	64QAM	1	5	20.87	21.51	21.47	
1.4	64QAM	3	0	20.54	21.19	21.26	
1.4	64QAM	3	1	20.63	21.14	21.18	
1.4	64QAM	3	3	20.74	21.04	21.05	
1.4	64QAM	6	0	20.45	20.71	20.38	21.5

<LTE Band 71>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				133222	133297	133372	
Frequency (MHz)				673	680.5	688	
20	QPSK	1	0	24.51	24.75	24.01	25
20	QPSK	1	49	24.30	23.98	23.59	
20	QPSK	1	99	23.75	23.62	23.34	
20	QPSK	50	0	23.77	23.30	22.92	24
20	QPSK	50	24	23.53	23.09	22.74	
20	QPSK	50	50	23.15	22.73	22.51	
20	QPSK	100	0	23.51	23.02	22.71	
20	16QAM	1	0	24.44	23.92	23.61	24
20	16QAM	1	49	23.89	23.61	23.23	
20	16QAM	1	99	23.54	23.16	22.77	
20	16QAM	50	0	22.80	22.31	21.90	23
20	16QAM	50	24	22.51	22.04	21.71	
20	16QAM	50	50	22.15	21.87	21.53	
20	16QAM	100	0	22.52	22.19	21.75	



20	64QAM	1	0	21.71	21.95	21.21	22.5
20	64QAM	1	49	21.50	21.18	21.16	
20	64QAM	1	99	21.43	21.15	21.14	
20	64QAM	50	0	20.97	20.50	20.12	21.5
20	64QAM	50	24	20.73	20.29	19.94	
20	64QAM	50	50	20.35	19.93	19.71	
20	64QAM	100	0	20.71	20.22	19.91	
Channel				133297	133397	133497	Tune-up limit (dBm)
Frequency (MHz)				670.5	680.5	690.5	
15	QPSK	1	0	24.21	24.37	23.60	25
15	QPSK	1	37	23.89	23.57	23.18	
15	QPSK	1	74	23.34	23.21	22.93	
15	QPSK	36	0	23.36	22.89	22.51	24
15	QPSK	36	20	23.12	22.68	22.33	
15	QPSK	36	39	22.74	22.32	22.10	
15	QPSK	75	0	23.10	22.61	22.30	
15	16QAM	1	0	23.52	23.51	23.20	24
15	16QAM	1	37	23.48	23.20	22.82	
15	16QAM	1	74	23.13	22.75	22.36	
15	16QAM	36	0	22.39	21.90	21.49	23
15	16QAM	36	20	22.10	21.63	21.30	
15	16QAM	36	39	21.74	21.46	21.12	
15	16QAM	75	0	22.11	21.78	21.34	
15	64QAM	1	0	21.23	20.71	20.40	22
15	64QAM	1	37	20.68	20.40	20.02	
15	64QAM	1	74	20.33	19.95	19.56	
15	64QAM	36	0	19.59	19.10	18.69	20
15	64QAM	36	20	19.30	18.83	18.50	
15	64QAM	36	39	18.94	18.66	18.32	
15	64QAM	75	0	19.31	18.98	18.54	
Channel				133272	133397	133522	Tune-up limit (dBm)
Frequency (MHz)				668	680.5	693	
10	QPSK	1	0	23.79	24.23	23.46	25
10	QPSK	1	25	23.75	23.43	23.04	
10	QPSK	1	49	23.20	23.07	22.79	
10	QPSK	25	0	23.22	22.75	22.37	24



10	QPSK	25	12	22.98	22.54	22.19	
10	QPSK	25	25	22.60	22.18	21.96	
10	QPSK	50	0	22.96	22.47	22.16	
10	16QAM	1	0	23.89	23.37	23.06	24
10	16QAM	1	25	23.34	23.06	22.68	
10	16QAM	1	49	22.99	22.61	22.22	
10	16QAM	25	0	22.25	21.76	21.35	23
10	16QAM	25	12	21.96	21.49	21.16	
10	16QAM	25	25	21.60	21.32	20.98	
10	16QAM	50	0	21.97	21.64	21.20	
10	64QAM	1	0	20.79	20.27	19.96	21.5
10	64QAM	1	25	20.24	19.96	19.58	
10	64QAM	1	49	19.89	19.51	19.12	
10	64QAM	25	0	19.15	18.66	18.25	19.5
10	64QAM	25	12	18.86	18.39	18.06	
10	64QAM	25	25	18.50	18.22	17.88	
10	64QAM	50	0	18.87	18.54	18.10	
Channel				133247	133397	133547	Tune-up limit (dBm)
Frequency (MHz)				665.5	680.5	695.5	
5	QPSK	1	0	23.81	24.10	23.33	25
5	QPSK	1	12	23.62	23.30	22.91	
5	QPSK	1	24	23.07	22.94	22.66	
5	QPSK	12	0	23.09	22.62	22.24	23.5
5	QPSK	12	7	22.85	22.41	22.06	
5	QPSK	12	13	22.47	22.05	21.83	
5	QPSK	25	0	22.83	22.34	22.03	
5	16QAM	1	0	23.76	23.24	22.93	24
5	16QAM	1	12	23.21	22.93	22.55	
5	16QAM	1	24	22.86	22.48	22.09	
5	16QAM	12	0	22.12	21.63	21.22	23
5	16QAM	12	7	21.83	21.36	21.03	
5	16QAM	12	13	21.47	21.19	20.85	
5	16QAM	25	0	21.84	21.51	21.07	
5	64QAM	1	0	20.81	20.29	19.98	21.5
5	64QAM	1	12	20.26	19.98	19.60	
5	64QAM	1	24	19.91	19.53	19.14	
5	64QAM	12	0	19.17	18.68	18.27	20



5	64QAM	12	7	18.88	18.41	18.08	
5	64QAM	12	13	18.52	18.24	17.90	
5	64QAM	25	0	18.89	18.56	18.12	
Channel				133237	133397	133557	Tune-up limit (dBm)
Frequency (MHz)				664.5	680.5	696.5	
3	QPSK	1	0	23.71	24.08	23.31	25
3	QPSK	1	8	23.60	23.28	22.89	
3	QPSK	1	14	23.05	22.92	22.64	
3	QPSK	8	0	23.07	22.60	22.22	23.5
3	QPSK	8	4	22.83	22.39	22.04	
3	QPSK	8	7	22.45	22.03	21.81	
3	QPSK	15	0	22.81	22.32	22.01	
3	16QAM	1	0	23.74	23.22	22.91	24
3	16QAM	1	8	23.19	22.91	22.53	
3	16QAM	1	14	22.84	22.46	22.07	
3	16QAM	8	0	22.10	21.61	21.20	22.5
3	16QAM	8	4	21.81	21.34	21.01	
3	16QAM	8	7	21.45	21.17	20.83	
3	16QAM	15	0	21.82	21.49	21.05	
3	64QAM	1	0	20.84	20.32	20.01	21.5
3	64QAM	1	8	20.29	20.01	19.63	
3	64QAM	1	14	19.94	19.56	19.17	
3	64QAM	8	0	19.20	18.71	18.30	20
3	64QAM	8	4	18.91	18.44	18.11	
3	64QAM	8	7	18.55	18.27	17.93	
3	64QAM	15	0	18.92	18.59	18.15	
Channel				133229	133397	133565	Tune-up limit (dBm)
Frequency (MHz)				663.7	680.5	697.3	
1.4	QPSK	1	0	23.61	23.88	23.11	24.5
1.4	QPSK	1	3	23.40	23.08	22.69	
1.4	QPSK	1	5	22.85	22.72	22.44	
1.4	QPSK	3	0	22.87	22.40	22.02	
1.4	QPSK	3	1	22.63	22.19	21.84	
1.4	QPSK	3	3	22.25	21.83	21.61	
1.4	QPSK	6	0	22.61	22.12	21.81	23.5
1.4	16QAM	1	0	23.54	23.02	22.71	24

1.4	16QAM	1	3	22.99	22.71	22.33	
1.4	16QAM	1	5	22.64	22.26	21.87	
1.4	16QAM	3	0	21.90	21.41	21.00	
1.4	16QAM	3	1	21.61	21.14	20.81	
1.4	16QAM	3	3	21.25	20.97	20.63	
1.4	16QAM	6	0	21.62	21.29	20.85	22.5
1.4	64QAM	1	0	20.64	20.12	19.81	21
1.4	64QAM	1	3	20.09	19.81	19.43	
1.4	64QAM	1	5	19.74	19.36	18.97	
1.4	64QAM	3	0	19.00	18.51	18.10	
1.4	64QAM	3	1	18.71	18.24	17.91	
1.4	64QAM	3	3	18.35	18.07	17.73	19.5
1.4	64QAM	6	0	18.72	18.39	17.95	

4.2 LTE Carrier Aggregation

➤ Uplink Carrier Aggregation Configuration

<Intra-band>

2CC Uplink Carrier Aggregation for Intra-band				
No.	Combination	2X2 MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_66B	66B	-	No
2	CA_66C	66C	-	No

Note:

- According to the 3GPP 36.101 table 6.2.2A-1 specifies that the aggregation maximum allowed output power is equivalent to the signal carrier scenario for intra-band contiguous carrier aggregation scenarios. When the non-contiguous RB allocation is applied the MPR shell complies with the table 6.2.3A defined in 3GPP 36.101.
- According to the TCB Workshop publication, the output power of uplink CA would be measured with the wideband signal integration over the component carriers. And SAR measurement would be performed at the worst exposure condition of each band.
- Additional SAR measurement for LTE UL CA with other DL CA combinations are not required when the maximum output power of this configuration is not $> 1/4$ dB higher than the maximum output power for UL CA active.

<Inter-band>

NO.	Combination	2X2 UL MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_2A-4A	2A-4A	-	No
2	CA_2A-5A	2A-5A	-	No
3	CA_2A-13A	2A-13A	-	No
4	CA_2A-66A	2A-66A	-	No
5	CA_4A-5A	4A-5A	-	No
6	CA_4A-13A	4A-13A	-	No
7	CA_5A-66A	5A-66A	-	No
8	CA_13A-66A	13A-66A	-	No

➤ Downlink Carrier Aggregation Configuration

2CC Downlink Carrier Aggregation				
NO.	Combination	2X2 DL MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_2A-2A	2A-2A	-	3CC-1
2	CA_2A-4A	2A, 4A, 2A-4A	-	3CC-6
3	CA_2A-5A	2A	-	3CC-12
4	CA_2A-13A	2A	-	3CC-14
5	CA_2A-66A	2A, 66A, 2A-66A	-	3CC-15
6	CA_2A-71A	2A	-	No
7	CA_4A-4A	4A-4A	-	3CC-16
8	CA_4A-5A	4A	-	3CC-20
9	CA_4A-13A	4A	-	3CC-18
10	CA_4A-71A	4A	-	No
11	CA_5A-5A	-	-	3CC-22
12	CA_5A-12A	-	-	No
13	CA_5A-66A	66A	-	3CC-23
14	CA_12B	-	-	3CC-21
15	CA_13A-66A	66A	-	3CC-26
16	CA_41A-41A	41A-41A	-	No
17	CA_66A-66A	66A-66A	-	3CC-26
18	CA_66B	66B	-	3CC-26
19	CA_66C	66C	-	3CC-26

3CC Downlink Carrier Aggregation				
NO.	Combination	2X2 DL MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_2A-2A-4A	2A-2A, 2A-4A	-	4CC-1
2	CA_2A-2A-5A	2A-2A	-	4CC-5
3	CA_2A-2A-12A	2A-2A	-	4CC-7
4	CA_2A-2A-13A	2A-2A	-	4CC-8
5	CA_2A-2A-66A	2A-2A, 2A-66A	-	4CC-9
6	CA_2A-4A-4A	2A-4A, 4A-4A	-	4CC-10
7	CA_2A-4A-5A	2A, 4A, 2A-4A	-	4CC-11
8	CA_2A-4A-12A	2A-4A	-	4CC-12
9	CA_2A-4A-13A	2A, 4A, 2A-4A	-	No
10	CA_2A-5B	2A	-	4CC-14
11	CA_2A-5A-12A	2A	-	4CC-4
12	CA_2A-5A-66A	2A, 66A, 2A-66A	-	4CC-14
13	CA_2A-12A-66A	2A-66A	-	4CC-15
14	CA_2A-13A-66A	2A, 66A, 2A-66A	-	4CC-16
15	CA_2A-66A-66A	2A-66A, 66A-66A	-	4CC-17
16	CA_4A-4A-5A	4A-4A	-	4CC-18
17	CA_4A-4A-12A	4A-4A	-	4CC-19
18	CA_4A-4A-13A	4A-4A	-	No
19	CA_4A-5A-12A	4A	-	4CC-12
20	CA_4A-5B	4A	-	4CC-18
21	CA_4A-12B	4A	-	4CC-19
22	CA_5A-5A-66A	66A	-	4CC-20
23	CA_5B-66A	66A	-	4CC-14
24	CA_5A-66A-66A	66A-66A	-	4CC-20
25	CA_12A-66A-66A	66A-66A	-	4CC-21
26	CA_13A-66A-66A	66A-66A	-	4CC-16

4CC Downlink Carrier Aggregation				
NO.	Combination	2X2 DL MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_2A-2A-4A-4A	2A-2A	-	No
2	CA_2A-2A-4A-5A	2A-2A	-	No
3	CA_2A-2A-4A-12A	2A-2A-4A	-	No
4	CA_2A-2A-5A-12A	2A-2A	-	No
5	CA_2A-2A-5B	2A-2A	-	No
6	CA_2A-2A-5A-12A	2A-2A	-	No
7	CA_2A-2A-12A-66A	2A-2A-66A	-	No
8	CA_2A-2A-13A-66A	2A-2A	-	No
9	CA_2A-2A-66A-66A	2A, 66A-66A	-	No
10	CA_2A-4A-4A-5A	4A-4A	-	No
11	CA_2A-4A-5B	2A, 4A, 2A-4A	-	No
12	CA_2A-4A-12B	2A-4A	-	No
13	CA_2A-5A-66A-66A	66A-66A	-	No
14	CA_2A-5B-66A	2A, 66A, 2A-66A	-	No
15	CA_2A-12A-66A-66A	2A-66A-66A	-	No
16	CA_2A-13A-66A-66A	66A-66A	-	No
17	CA_2A-66C-71A	2A, 66C	-	No
18	CA_4A-4A-5B	4A-4A	-	No
19	CA_4A-4A-12B	4A-4A	-	No
20	CA_5A-5A-66A-66A	66A-66A	-	No
21	CA_12B-66A-66A	66A-66A	-	No

Note:

1. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than $\frac{1}{4}$ dB higher than the maximum output measured without downlink carrier aggregation active.
2. Uplink maximum output power with downlink carrier aggregation active does not show more than $\frac{1}{4}$ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
3. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
4. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink

carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

5. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.
6. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy
7. 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1 |BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

➤ CA Power List

CA_66B											
Combination:10MHz+10MHz(50RB+50RB)											
PCC Channel	PCC Channel (3GPP)	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level(dB)	Measured Power(dBm)	Tune-up limit(dBm)
				RB Size	RB Offset	RB Size	RB Offset				
132072	132022	132121	QPSK	1	0	0	0	1	0	23.80	24.5
132322	132373	132472	QPSK	1	0	0	0	1	0	24.34	24.5
132572	132523	132622	QPSK	1	0	0	0	1	0	24.32	24.5
132072	132022	132121	16QAM	1	0	0	0	1	0	23.62	24
132322	132373	132472	16QAM	1	0	0	0	1	0	23.97	24.5
132572	132523	132622	16QAM	1	0	0	0	1	0	24.28	24.5
132072	132022	132121	64QAM	1	0	0	0	1	0	21.54	22
132322	132373	132472	64QAM	1	0	0	0	1	0	21.9	22.5
132572	132523	132622	64QAM	1	0	0	0	1	0	21.93	22.5
132072	132022	132121	QPSK	50	0	0	0	1	0	22.79	23
132322	132373	132472	QPSK	50	0	0	0	1	0	23.28	24
132572	132523	132622	QPSK	50	0	0	0	1	0	23.17	24
CA_66C											
Combination:20MHz+20MHz(100RB+100RB)											
PCC Channel	PCC Channel (3GPP)	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level(dB)	Measured Power(dBm)	Tune-up limit(dBm)
				RB Size	RB Offset	RB Size	RB Offset				
132072	132072	132270	QPSK	1	0	0	0	1	0	23.78	24.5
132322	132323	132521	QPSK	1	0	0	0	1	0	24.17	24.5



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132572	132374	132572	QPSK	1	0	0	0	1	0	24.2	24.5
132072	132072	132270	16QAM	1	0	0	0	1	0	23.62	24.5
132322	132323	132521	16QAM	1	0	0	0	1	0	23.94	24.5
132572	132374	132572	16QAM	1	0	0	0	1	0	24.07	24.5
132072	132072	132270	64QAM	1	0	0	0	1	0	23.38	24
132322	132323	132521	64QAM	1	0	0	0	1	0	23.84	24
132572	132374	132572	64QAM	1	0	0	0	1	0	23.89	24
132072	132072	132270	QPSK	50	0	0	0	1	0	22.88	23.5
132322	132323	132521	QPSK	50	0	0	0	1	0	23.24	23.5
132572	132374	132572	QPSK	50	0	0	0	1	0	23.28	23.5

2CC LTE Uplink												
Configure	CA Configuration	PCC					SCC				Power	
		Band	BW (MHz)	UL Channel	UL Fre. (MHz)	UL Mode (Modulation/RB/Offset)	Band	BW (MHz)	UL Channel	UL Fre. (MHz)	Measured Power(dBm)	Tune-up limit(dBm)
Inter-band	CA_2A-4A	2	20	19100	1900	QPSK/1#0	4	20	20175	1732.5	24.02	24.5
	CA_2A-5A	4	20	19100	1900	QPSK/1#0	5	20	20525	836.5	24.10	24.5
	CA_2A-13A	4	20	19100	1900	QPSK/1#0	13	10	23230	782	24.07	24.5
	CA_2A-66A	2	20	19100	1900	QPSK/1#0	66	20	132322	1745	24.07	24.5
	CA_4A-5A	4	20	20175	1732.5	QPSK/1#0	5	20	20525	836.5	23.89	24.5
	CA_4A-13A	4	20	20175	1732.5	QPSK/1#0	13	10	23230	782	23.62	24
	CA_5A-66A	5	20	20525	836.5	QPSK/1#0	66	20	132322	1745	23.57	24
	CA_13A-66A	13	10	23230	782	QPSK/1#0	66	20	132322	1745	23.54	24

2CC LTE Downlink																
Configure	CA Configuration	PCC				SCC			Power		/	/	/	/	/	/
		Band	BW (MHz)	UL Channel	UL Mode (Modulation/RB/Offset)	Band	BW (MHz)	DL Channel	CA TX (dBm)	Rel.8 TX (dBm)	/	/	/	/	/	/
Intra-band	CA_41A-41A	41	20	39750	QPSK/1#0	5	5	40712	25.79	26.27	/	/	/	/	/	/
Inter-band	CA_2A-71A	2	20	18900	QPSK/1#0	71	20	68786	23.86	23.43	/	/	/	/	/	/
	CA_4A-71A	4	20	20175	QPSK/1#0	71	20	68786	23.85	23.35	/	/	/	/	/	/
	CA_5A-12A	5	10	20525	QPSK/1#0	12	10	5095	23.52	22.89	/	/	/	/	/	/



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3CC LTE Downlink																
Configure	CA Configuration	PCC				SCC1			SCC2			Power		/	/	/
		Band	BW (MHz)	UL Channel	UL Mode (Modulation/RB/Offset)	Band	BW (MHz)	DL Channel	Band	BW (MHz)	DL Channel	CA TX (dBm)	Rel.8 TX (dBm)	/	/	/
Inter-band	CA_2A-4A-13A	2	20	19100	QPSK/1#0	4	20	2175	13	10	5230	23.45	23.43	/	/	/
	CA_4A-4A-13A	4	20	20175	QPSK/1#0	4	20	2175	13	10	5230	23.41	23.35	/	/	/
4CC LTE Downlink																
Configure	CA Configuration	PCC				SCC1			SCC2			SCC3			Power	
		Band	BW (MHz)	UL Channel	UL Mode (Modulation/RB/Offset)	Band	BW (MHz)	DL Channel	Band	BW (MHz)	DL Channel	Band	BW (MHz)	DL Channel	CA TX (dBm)	Rel.8 TX (dBm)
Inter-band	CA_2A-2A-4A-4A	2	20	19100	QPSK/1#0	2	20	1100	4	20	2175	4	20	2175	24.06	23.43
	CA_2A-2A-4A-5A	2	20	19100	QPSK/1#0	2	20	1100	4	20	2175	5	10	2450	24.05	23.43
	CA_2A-2A-4A-12A	2	20	19100	QPSK/1#0	2	20	1100	4	20	2175	12	10	5060	23.98	23.43
	CA_2A-2A-5A-12A	2	20	19100	QPSK/1#0	2	20	1100	5	10	2450	12	10	5060	24.02	23.43
	CA_2A-2A-5B	2	20	19100	QPSK/1#0	2	20	1100	5	10	2450	5	10	2450	24.06	23.43
	CA_2A-2A-12A-66A	2	20	19100	QPSK/1#0	2	20	1100	12	10	5060	66	20	66886	23.93	23.43
	CA_2A-2A-13A-66A	2	20	19100	QPSK/1#0	2	20	1100	13	10	5230	66	20	66886	24.09	23.43
	CA_2A-2A-66A-66A	2	20	19100	QPSK/1#0	2	20	1100	66	20	66886	66	20	66886	24.14	23.43
	CA_2A-4A-4A-5A	2	20	19100	QPSK/1#0	4	20	2175	4	20	2175	5	10	2450	23.83	23.43
	CA_2A-4A-5B	2	20	19100	QPSK/1#0	4	20	2175	4	20	2175	5	10	2450	23.8	23.43
	CA_2A-4A-12B	2	20	19100	QPSK/1#0	4	20	2175	4	20	2175	12	10	5060	23.87	23.43
	CA_2A-5A-66A-66A	2	20	19100	QPSK/1#0	5	10	2450	66	20	66886	66	20	66886	23.93	23.43



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CA_2A-5B -66A	2	20	19100	QPSK/1#0	5	10	2450	66	20	66886	66	20	66886	23.87	23.43
CA_2A-12 A-66A-66A	2	20	19100	QPSK/1#0	12	10	5060	66	20	66886	66	20	66886	23.84	23.43
CA_2A-13 A-66A-66A	2	20	19100	QPSK/1#0	13	10	5230	66	20	66886	66	20	66886	23.96	23.43
CA_2A-66 C-71A	2	20	19100	QPSK/1#0	66	20	66886	71	20	68768	71	20	68768	23.85	23.43
CA_4A-4A -5B	4	20	20175	QPSK/1#0	4	20	2175	5	10	2450	5	10	2450	23.85	23.35
CA_4A-4A -12B	4	20	20175	QPSK/1#0	4	20	2175	12	10	5060	12	10	5060	23.7	23.35
CA_5A-5A -66A-66A	5	10	20525	QPSK/1#0	5	10	2450	66	20	66886	66	20	66886	23.96	22.89
CA_12B-6 6A-66A	12	10	23060	QPSK/1#0	66	20	66886	66	20	66886	66	20	66886	23.91	22.79

4.3 5G NR EN-DC Consideration

➤ General Guidance

1. It is only limited to operate at EN-DC (NSA) for 5G NR implementation According to the character of the device. SAR measurement should be performed separately for the limitations of the probe calculation factors.
2. When the EN-DC is active the output power of the LTE anchors is equal or less than the standalone carrier, therefore the LTE output power and MPE were estimated based on the standalone carrier to performed sim-TX analysis with 5G NR.

➤ 5G NR Anchor Combination

5G-NR	EN-DC Combination	4G DL 4x4 MIMO (10L)	5G-NR DL 4x4 MIMO	4G UL	5G-NR UL
FDD	DC_2A-5A_n5A	2A	-	2A	n5A
FDD	DC_2A-66A_n5A	2A-66A	-	2A, 66A	n5A
FDD	DC_2A_n5A	2A	-	2A	n5A
FDD	DC_66A_n5A	66A	-	66A	n5A
FDD	DC_2A_n66A	2A	n66A	2A	n66A
FDD	DC_2A-2A_n5A	2A-2A	-	2A	n5A
FDD	DC_5A-66A_n5A	66A	-	66A	n5A
FDD	DC_66A-66A_n5A	66A-66A	-	66A	n5A
FDD	DC_2A-66A_n66A	2A, 66A	n66A	2A	n66A
FDD	DC_2A-2A-5A_n5A	2A-2A	-	2A	n5A
FDD	DC_2A-2A-66A_n5A	2A, 66A, 2A-2A	-	2A, 66A	n5A
FDD	DC_2A-66A-66A_n5A	2A, 66A, 66A-66A	-	2A, 66A	n5A
FDD	DC_5A-66A-66A_n5A	66A-66A	-	66A	n5A
FDD	DC_2A-2A-66A-66A_n5A	2A, 66A	-	2A, 66A	n5A
FDD	DC_66A_n2A	66A	n2A	66A	n2A
FDD	DC_2A-66A_n2A	2A, 66A	n2A	66A	n2A
TDD	DC_66A_n78A	66A	n78A	66A	n78A
TDD	DC_66A-66A_n78A	66A	n78A	66A	n78A
TDD	DC_2A_n78A	2A	n78A	2A	n78A
FDD	DC_13A-66A_n2A	66A	n2A	13A, 66A	n2A
FDD	DC_13A-66A_n5A	66A	-	66A	n5A
FDD	DC_2A-13A_n5A	2A	-	2A	n5A
FDD	DC_13A-66A-66A_n5A	66A-66A	-	66A	n5A



FDD	DC_2A-2A-13A_n5A	2A-2A	-	2A	n5A
FDD	DC_2A-2A_n66A	2A	n66A	2A	n66A
FDD	DC_13A_n66A	-	n66A	13A	n66A
FDD	DC_2A-13A_n66A	2A	n66A	2A, 13A	n66A
FDD	DC_13A-66A_n66A	66A	n66A	13A	n66A
FDD	DC_13A-66A-66A_n66A	66A-66A	n66A	13A	n66A
TDD	DC_2A_n77A	2A	n77A	2A	n77A
TDD	DC_5A_n77A	5A	n77A	5A	n77A
TDD	DC_13A_n77A	-	n77A	13A	n77A
TDD	DC_66A_n77A	66A	n77A	66A	n77A
TDD	DC_2A-5A_n77A	2A-5A	n77A	2A, 5A	n77A
TDD	DC_2A-13A_n77A	2A	n77A	2A, 13A	n77A
TDD	DC_2A-66A_n77A	2A-66A	n77A	2A, 66A	n77A
TDD	DC_5A-66A_n77A	5A-66A	n77A	5A, 66A	n77A
TDD	DC_13A-66A_n77A	66A	n77A	13A, 66A	n77A
TDD	DC_66A-66A_n77A	66A-66A	n77A	66A	n77A
TDD	DC_2A-2A_n77A	2A-2A	n77A	2A	n77A
TDD	DC_2A-5A-66A_n77A	2A-66A	n77A	2A, 5A, 66A	n77A
TDD	DC_2A-13A-66A_n77A	2A-66A	n77A	2A, 13A, 66A	n77A
TDD	DC_2A-66A-66A_n77A	2A-66A-66A	n77A	2A, 66A	n77A
TDD	DC_5A-66A-66A_n77A	66A-66A	n77A	5A, 66A	n77A
TDD	DC_13A-66A-66A_n77A	66A-66A	n77A	13A, 66A	n77A
TDD	DC_2A-2A-13A_n77A	2A-2A	n77A	2A, 13A	n77A
TDD	DC_2A-2A-66A_n77A	2A-2A-66A	n77A	2A, 66A	n77A
TDD	DC_66A-66A-66A_n77A	66A-66A-66A	n77A	66A	n77A
TDD	DC_2A-2A-5A_n77A	2A-2A	n77A	2A, 5A	n77A

Note:

The output power of SA/NSA is derived from the report SZ21010262W04/05.

5. RF Exposure Assessment

➤ Standalone Transmission Assessment

Bands	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	EIRP (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
WCDMA Band II	1910	25.5	3.80	851.138	0.169	1.0
WCDMA Band IV	1755	25.5	3.68	827.942	0.165	1.0
WCDMA Band V	849	25.0	-0.10	309.030	0.062	0.566
LTE Band 2	1910	24.0	3.80	602.560	0.120	1.0
LTE Band 4	1745	24.0	3.68	586.138	0.117	1.0
LTE Band 5	849	23.5	-0.10	218.776	0.044	0.477
LTE Band 12	716	23.5	-0.55	197.242	0.039	0.525
LTE Band 13	787	24.5	-0.10	275.423	0.055	0.525
LTE Band 41	2690	26.5	2.23	746.449	0.149	1.0
LTE Band 66	1780	24.0	3.68	586.138	0.117	1.0
LTE Band 71	698	25.0	-3.92	128.233	0.026	0.465
5G NR N2	1900	24.5	3.80	676.083	0.135	1.0
5G NR N5	839	23.5	-0.10	218.776	0.044	0.559
5G NR N41	2640	23.0	2.23	333.426	0.066	1.0
5G NR N66	1770	24.5	3.68	657.658	0.131	1.0
5G NR N71	688	25.5	-3.92	143.880	0.029	0.459
5G NR N77	3930	24.0	3.15	518.800	0.103	1.0
5G NR N78	3750	22.0	3.15	327.341	0.065	1.0

➤ LTE CA Transmission Assessment

<Intra-band>

Bands	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	EIRP (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
CA_66B	1780	24.5	3.80	676.083	0.016	1.0
CA_66C	1780	24.5	3.68	657.658	0.131	1.0

<Inter-band>

Bands	Carrier for LTE				CA	Limit for MPE (mW/cm ²)
	Band	PD(mW/cm ²)	Band	PD(mW/cm ²)	PD(mW/cm ²)	
CA_66B	66	0.117	66	0.117	0.234	1.0
CA_66C	66	0.117	66	0.117	0.234	1.0
CA_2A-4A	2	0.120	4	0.117	0.237	1.0
CA_2A-5A	2	0.120	5	0.044	0.164	1.0
CA_2A-13A	2	0.120	13	0.055	0.175	1.0
CA_2A-66A	2	0.120	66	0.117	0.237	1.0
CA_4A-5A	4	0.117	5	0.044	0.161	1.0
CA_4A-13A	4	0.117	13	0.055	0.172	1.0
CA_5A-66A	5	0.044	66	0.117	0.161	0.477
CA_13A-66A	13	0.055	66	0.117	0.172	0.525

➤ EN-DC Transmission Assessment

Bands	Carrier for LTE		Carrier for NR		ENDC	Limit for MPE (mW/cm ²)
	Band	PD(mW/cm ²)	Band	PD(mW/cm ²)	PD(mW/cm ²)	
DC_66A_n5A	66	0.117	n5	0.044	0.161	0.559
DC_13A_n66A	13	0.055	n66	0.131	0.186	1.0
DC_2A_n77A	2	0.120	n77	0.103	0.223	1.0

➤ Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

2. MPE calculate method

$$\text{Power Density} = \text{EIRP}/4\pi R^2$$

Where: EIRP = P+G

P = Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)

3. For EN-DC, only the maximum permissive exposure would be evaluated.



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➤ **Simultaneous Transmission Assessment**

There are only WWAN bands in this device, therefore simultaneous transmission analysis is not required.

➤ **Conclusion:**

According to 47 CFR §2.1091, this device complies with human exposure basic restrictions.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

_____ END OF REPORT _____