

CE RF Exposure Test Report

Project No. : 2207C142
Equipment : AX1800 Wi-Fi 6 5G NR Router
Brand Name : Tenda
Test Model : 5G03
Series Model : N/A
Applicant : SHENZHEN TENDA TECHNOLOGY CO.,LTD.
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Manufacturer : SHENZHEN TENDA TECHNOLOGY CO.,LTD.
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Date of Receipt : Jul. 29, 2022
Date of Test : Aug. 02, 2022 ~ Sep. 03, 2022
Issued Date : Sep. 14, 2022
Report Version : R01
Test Sample : Engineering Sample No.: DG2022072964 for WIFI, DG2022072964 for WWAN.
Standard(s) : EN 50385:2017
EN IEC 62311:2020
EN 62232:2017

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Edward Li

Prepared by : Edward Li

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Approved by : Steven Lu



TESTING CERT #5123.02

BTL Inc.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-ETSP-6-2207C142	R00	Original Report.	Sep. 09, 2022	Invalid
BTL-ETSP-6-2207C142	R01	Updated the antenna gain and recalculated test results.	Sep. 14, 2022	Valid

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	AX1800 Wi-Fi 6 5G NR Router		
Brand Name	Tenda		
Test Model	5G03		
Series Model	N/A		
Model Difference(s)	N/A		
Power Source	DC Voltage supplied from AC adapter. 1# Model: BN026-A24012E (EU) 2# Model: BN026-A24012B (UK) Only differ in plug.		
Power Rating	I/P: 100-240V~ 50/60Hz 0.7A O/P: 12.0V  2.0A 24W		
Product Description for 2.4GHz	Operation Frequency	2412 MHz ~ 2472 MHz	
	Modulation Technology	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM IEEE 802.11ax: OFDMA	
	Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps IEEE 802.11ax: up to 573.6 Mbps	
	Max. e.i.r.p.	20 dBm (100.00 mW)	
Product Description for 5GHz Band 1	Operation Frequency Band	5150 MHz ~ 5250 MHz	
	Modulation Technology	IEEE 802.11a/n/ac: OFDM IEEE 802.11ax: OFDMA	
	Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps IEEE 802.11ac: up to 866.7 Mbps IEEE 802.11ax: up to 1201 Mbps	
	Max. e.i.r.p.	23 dBm (199.53 mW)	
Product Description for WCDMA	Operation Bands	WCDMA Band I / VIII	
	Operation Frequency Bands	Band I : UL:1920MHz ~ 1980MHz , DL: 2110MHz ~ 2170MHz Band VIII: UL: 880MHz ~ 915MHz , DL: 925MHz ~ 960MHz	
	Modulation Type	UL: QPSK DL: QPSK; 16QAM	
	Power Class	3	
	IMEI NO.	Radiated	869263050070535
	Max. Tune Up Power	Band I/VIII	25 dBm

Product Description for LTE	Operation Bands	LTE Band 1 / LTE Band 3 / LTE Band 7 / LTE Band 8 / LTE Band 20 / LTE Band 28 / LTE Band 32 / LTE Band 38 / LTE Band 40 / LTE Band 42 / LTE Band 43	
	Modulation Type	UL: QPSK; 16QAM; 64QAM; 256QAM DL: QPSK; 16QAM; 64QAM; 256QAM	
	Power Class	3	
	IMEI NO.	Radiated	869263050070535
	Operation Frequency Bands(Note 2)	LTE Band 1: Uplink: 1920-1980 MHz, Downlink: 2110-2170 MHz LTE Band 3: Uplink: 1710-1785 MHz, Downlink: 1805-1880 MHz LTE Band 7: Uplink: 2500-2570 MHz, Downlink: 2620-2690 MHz LTE Band 8: Uplink: 880-915 MHz, Downlink: 925-960 MHz LTE Band 20: Uplink: 832-862 MHz, Downlink: 791-821 MHz LTE Band 28: Uplink: 703-748 MHz, Downlink: 758-803 MHz LTE Band 32: Uplink: N/A, Downlink: 1452-1496 MHz LTE Band 38: Uplink: 2570-2620 MHz, Downlink: 2570-2620 MHz LTE Band 40: Uplink: 2300-2400 MHz, Downlink: 2300-2400 MHz LTE Band 42: Uplink: 3400-3600 MHz, Downlink: 3400-3600 MHz LTE Band 43: Uplink: 3600-3800 MHz, Downlink: 3600-3800 MHz	
Max. Tune Up Power	Band 1 / 3 / 7 / 8 / 20 / 28 / 38 / 40 / 42 / 43	25 dBm	
Product Description for 5G NR	Operation Bands	SA: n1 / n3 / n5 / n7 / n8 / n20 / n28 / n38 / n40 / n41 / n77 / n78	
		DC_3A_n7A	
		DC_1A_n28A / DC_3A_n28A / DC_7A_n28A / DC_20A_n28A	
		DC 1A_n40A / DC 3A_n40A / DC 8A_n40A	
		DC_1A_n77A / DC_3A_n77A / DC_8A_n77A / DC_20A_n77A / DC_28A_n77A / DC_40A_n77A	
		DC_1A_n78A / DC_3A_n78A / DC_7A_n78A / DC_8A_n78A / DC_20A_n78A / DC_28A_n78A / DC_38A_n78A	

Product Description for 5G NR	Operation Frequency Bands	Band n1: Uplink: 1920-1980 MHz, Downlink: 2110-2170 MHz Band n3: Uplink: 1710-1785 MHz, Downlink: 1805-1880 MHz Band n5: Uplink: 824-849 MHz, Downlink: 869-894 MHz Band n7: Uplink: 2500-2570 MHz, Downlink: 2620-2690 MHz Band n8: Uplink: 880-915 MHz, Downlink: 925-960 MHz Band n20: Uplink: 832-862 MHz, Downlink: 791-821 MHz Band n28: Uplink: 703-748 MHz, Downlink: 758-803 MHz Band n38: Uplink: 2570-2620 MHz, Downlink: 2570-2620 MHz Band n40: Uplink: 2300-2400 MHz, Downlink: 2300-2400 MHz Band n41: Uplink: 2496-2690 MHz, Downlink: 2496-2690 MHz Band n77: Uplink: 3300-4200 MHz, Downlink: 3300-4200 MHz Band n78: Uplink: 3300-3800 MHz, Downlink: 3300-3800 MHz	
Product Description for 5G NR	Modulation Type	DFT-s-OFDM PI/2 BPSK	
		DFT-s-OFDM QPSK	CP-OFDM QPSK
		DFT-s-OFDM 16QAM	CP-OFDM 16QAM
		DFT-s-OFDM 64QAM	CP-OFDM 64QAM
		DFT-s-OFDM 256QAM	CP-OFDM 256QAM
	Power Class	2	SA: n41 / n77 / n78
		3	SA: n1 / n3 / n5 / n7 / n8 / n20 / n28 / n38 / n40 / n41 / n77 / n78
	IMEI NO.	Radiated	869263050070535
	Max. Tune Up Power	SA: n1 / n3 / n5 / n7 / n8 / n20 / n28 / n38 / n40 / n41 / n77 / n78	25 dBm
		SA: n41 / n77 / n78	28 dBm

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. Radio equipment in band 32 is only allowed to operate between 1452 MHz and 1492 MHz.
3. Restricted to E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Pcell.
4. Channel List:

For 2.4GHz:

CH01 - CH13 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20), IEEE 802.11ax(HE20) CH03 - CH11 for IEEE 802.11n(HT40), IEEE 802.11ax(HE40)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

For 5GHz:

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
Band 1		Band 1		Band 1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

For WCDMA:

Bands	Sub-test	Channel	Frequency (MHz)	
WCDMA Band I	---	9613	Low	1922.6
		9750	Mid	1950.0
		9887	High	1977.4
WCDMA Band VIII	---	2713	Low	882.6
		2788	Mid	897.6
		2862	High	912.4

For LTE:

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
1	5	18025	18300	18575	1922.5	1950.0	1977.5
1	10	18050	18300	18550	1925.0	1950.0	1975.0
1	15	18075	18300	18525	1927.5	1950.0	1972.5
1	20	18100	18300	18500	1930.0	1950.0	1970.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
3	1.4	19207	19575	19943	1710.7	1747.5	1784.3
3	3	19215	19575	19935	1711.5	1747.5	1783.5
3	5	19225	19575	19925	1712.5	1747.5	1782.5
3	10	19250	19575	19900	1715.0	1747.5	1780.0
3	15	19275	19575	19875	1717.5	1747.5	1777.5
3	20	19300	19575	19850	1720.0	1747.5	1775.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
7	5	20775	21100	21425	2502.5	2535.0	2567.5
7	10	20800	21100	21400	2505.0	2535.0	2565.0
7	15	20825	21100	21375	2507.5	2535.0	2562.5
7	20	20850	21100	21350	2510.0	2535.0	2560.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
8	1.4	21457	21625	21793	880.7	897.5	914.3
8	3	21465	21625	21785	881.5	897.5	913.5
8	5	21475	21625	21775	882.5	897.5	912.5
8	10	21500	21625	21750	885.0	897.5	910.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
20	5	24175	24300	24425	834.5	847.0	859.5
20	10	24200	24300	24400	837.0	847.0	857.0
20	15	24225	24300	24375	839.5	847.0	854.5
20	20	24250	24300	24350	842.0	847.0	852.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
28	3	27225	27375	27645	704.5	719.5	746.5
28	5	27235	27385	27635	705.5	720.5	745.5
28	10	27260	27410	27610	708.0	723.0	743.0
28	15	27285	27435	27585	710.5	725.5	740.5
28	20	27310	27460	27560	713.0	728.0	738.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
38	5	37775	38000	38225	2572.5	2595.0	2617.5
38	10	37800	38000	38200	2575.0	2595.0	2615.0
38	15	37825	38000	38175	2577.5	2595.0	2612.5
38	20	37850	38000	38150	2580.0	2595.0	2610.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
40	5	38675	39150	39625	2302.5	2350.0	2397.5
40	10	38700	39150	39600	2305.0	2350.0	2395.0
40	15	38725	39150	39575	2307.5	2350.0	2392.5
40	20	38750	39150	39550	2310.0	2350.0	2390.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
42	5	41615	42590	43565	3402.5	3500.0	3597.5
42	10	41640	42590	43540	3405.0	3500.0	3595.0
42	15	41665	42590	43515	3407.5	3500.0	3592.5
42	20	41690	42590	43490	3410.0	3500.0	3590.0

Band	Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
43	5	43615	44590	45565	3602.5	3700.0	3797.5
43	10	43640	44590	45540	3605.0	3700.0	3795.0
43	15	43665	44590	45515	3607.5	3700.0	3792.5
43	20	43690	44590	45490	3610.0	3700.0	3790.0

For 5G NR:

5G NR n1 (1920-1980MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	384500	390000	395500	1922.5	1950	1977.5
10	385000	390000	395000	1925	1950	1975
15	385500	390000	394500	1927.5	1950	1972.5
20	386000	390000	394000	1930	1950	1970
30	387000	390000	393000	1935	1950	1965
40	388000	390000	392000	1940	1950	1960
50	389000	390000	391000	1945	1950	1955

5G NR n3 (1710-1785MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	342500	349500	356500	1712.5	1747.5	1782.5
10	343000	349500	356000	1715	1747.5	1780
15	343500	349500	355500	1717.5	1747.5	1777.5
20	344000	349500	355000	1720	1747.5	1775
25	344500	349500	354500	1722.5	1747.5	1772.5
30	345000	349500	354000	1725	1747.5	1770

5G NR n5 (824-849MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	165300	167300	169300	826.5	836.5	846.5
10	165800	167300	168800	829	836.5	844
15	166300	167300	168300	831.5	836.5	841.5
20	166800	167300	167800	834	836.5	839

5G NR n7 (2500-2570MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	500500	507000	513500	2502.5	2535	2567.5
10	501000	507000	513000	2505	2535	2565
15	501500	507000	512500	2507.5	2535	2562.5
20	502000	507000	512000	2510	2535	2560

5G NR n8 (880-915MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	176500	179500	182500	882.5	897.5	912.5
10	177000	179500	182000	885	897.5	910
15	177500	179500	181500	887.5	897.5	907.5
20	178000	179500	181000	890	897.5	905

5G NR n20 (832-862MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	166900	169400	171900	834.5	847	859.5
10	167400	169400	171400	837	847	857
15	167900	169400	170900	839.5	847	854.5
20	168400	169400	170400	842	847	852

5G NR n28 (703-748MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
5	141100	145100	149100	705.5	725.5	745.5
10	141600	145100	148600	708	725.5	743
15	142100	145100	148100	710.5	725.5	740.5
20	142600	145100	147600	713	725.5	738
30	143600	/	146600	718	/	733

5G NR n38 (2570-2620MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
10	515000	519000	523000	2575	2595	2615
15	515500	519000	522500	2577.5	2595	2612.5
20	516000	519000	522000	2580	2595	2610

5G NR n40 (2300-2400MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
10	461000	470000	479000	2305	2350	2395
20	462000	470000	478000	2310	2350	2390
30	463000	470000	477000	2315	2350	2385
40	464000	470000	476000	2320	2350	2380
50	465000	470000	475000	2325	2350	2375
60	466000	470000	474000	2330	2350	2370
80	468000	470000	472000	2340	2350	2360

5G NR n41 (2496-2690MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
10	500202	518598	537000	2501.01	2592.99	2685
20	501204	518598	535998	2506.02	2592.99	2679.99
30	502200	518598	534996	2511	2592.99	2674.98
40	503202	518598	534000	2516.01	2592.99	2670
50	504204	518598	532998	2521.02	2592.99	2664.99
60	505200	518598	531996	2526	2592.99	2659.98
80	507204	518598	529998	2536.02	2592.99	2649.99
90	508200	518598	528996	2541	2592.99	2644.98
100	509202	518598	528000	2546.01	2592.99	2640

5G NR n77 (3300-4200MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
10	620334	650000	679666	3305.01	3750	4194.99
20	620668	650000	679332	3310.02	3750	4189.98
40	621334	650000	678666	3320.01	3750	4179.99
50	621668	650000	678332	3325.02	3750	4174.98
60	622000	650000	678000	3330	3750	4170
70	622334	650000	677666	3335.01	3750	4164.99
80	622668	650000	677332	3340.02	3750	4159.98
90	623000	650000	677000	3345	3750	4155
100	623334	650000	676666	3350.01	3750	4149.99

5G NR n78 (3300-3800MHz)						
Bandwidth	Low Channel	Mid Channel	High Channel	Low Frequency	Mid Frequency	High Frequency
10	620334	636666	653000	3305.01	3549.99	3795
20	620668	636666	652666	3310.02	3549.99	3789.99
40	621334	636666	652000	3320.01	3549.99	3780
50	621668	636666	651666	3325.02	3549.99	3774.99
60	622000	636666	651332	3330	3549.99	3769.98
70	622334	636666	651000	3335.01	3549.99	3765
80	622668	636666	650666	3340.02	3549.99	3759.99
90	623000	636666	650332	3345	3549.99	3754.98
100	623334	636666	650000	3350.01	3549.99	3750

5. RB allocation:

Channel Bandwidth	SCS(kHz)	OFDM	RB allocation							
			Edge_Full_Left (Note 2)	Edge_Full_Right (Note 2)	Edge_1RB_Left	Edge_1RB_Right	Outer_Full	Inner_Full	Inner_1RB_Left	Inner_1RB_Right
5MHz	15	DFT-s	2@0	2@23	1@0	1@24	25@0	12@6	1@1	1@23
		CP	2@0	2@23	1@0	1@24	25@0	13@6	1@1	1@23
	30	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2 ¹	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2 ¹	1@1	1@9
	60	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10MHz	15	DFT-s	2@0	2@50	1@0	1@51	50@0	25@12	1@1	1@50
		CP	2@0	2@50	1@0	1@51	52@0	26@13	1@1	1@50
	30	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
	60	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2 ¹	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2 ¹	1@1	1@9
15MHz	15	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19 ¹	1@1	1@77
	30	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
	60	DFT-s	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
		CP	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
20MHz	15	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	30	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12 ¹	1@1	1@49
	60	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
25MHz	15	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	30	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
	60	DFT-s	2@0	2@29	1@0	1@30	30@0	15@7 ¹	1@1	1@29
		CP	2@0	2@29	1@0	1@30	31@0	15@7 ¹	1@1	1@29
30MHz	15	DFT-s	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
		CP	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
	30	DFT-s	2@0	2@76	1@0	1@77	75@0	36@18	1@1	1@76
		CP	2@0	2@76	1@0	1@77	78@0	39@19	1@1	1@76
	60	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
40MHz	15	DFT-s	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
		CP	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
	30	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	60	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12 ¹	1@1	1@49
45MHz	15	DFT-s	2@0	2@240	1@0	1@241	242@0	120@60	1@1	1@240
		CP	2@0	2@240	1@0	1@241	242@0	121@60	1@1	1@240
	30	DFT-s	2@0	2@117	1@0	1@118	119@0	60@30	1@1	1@117
		CP	2@0	2@117	1@0	1@118	119@0	60@30	1@1	1@117
	60	DFT-s	2@0	2@56	1@0	1@57	58@0	27@13	1@1	1@56
		CP	2@0	2@56	1@0	1@57	58@0	29@14	1@1	1@56

Channel Bandwidth	SCS(kHz)	OFDM	RB allocation							
			Edge_Full_Left (Note 2)	Edge_Full_Right (Note 2)	Edge_1RB_Left	Edge_1RB_Right	Outer_Full	Inner_Full	Inner_1RB_Left	Inner_1RB_Right
50MHz	15	DFT-s	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
		CP	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
	30	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	60	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
60MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
		CP	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
	60	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19	1@1	1@77
70MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@187	1@0	1@188	180@0	90@45	1@1	1@187
		CP	2@0	2@187	1@0	1@188	189@0	95@47	1@1	1@187
	60	DFT-s	2@0	2@91	1@0	1@92	90@0	45@22	1@1	1@91
		CP	2@0	2@91	1@0	1@92	93@0	47@23	1@1	1@91
80MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@215	1@0	1@216	216@0	108@54	1@1	1@215
		CP	2@0	2@215	1@0	1@216	217@0	109@54	1@1	1@215
	60	DFT-s	2@0	2@105	1@0	1@106	100@0	50@25	1@1	1@105
		CP	2@0	2@105	1@0	1@106	107@0	53@26	1@1	1@105
90MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@243	1@0	1@244	243@0	120@60	1@1	1@243
		CP	2@0	2@243	1@0	1@244	245@0	123@61	1@1	1@243
	60	DFT-s	2@0	2@119	1@0	1@120	120@0	60@30	1@1	1@119
		CP	2@0	2@119	1@0	1@120	121@0	61@30	1@1	1@119
100MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@271	1@0	1@272	270@0	135@67	1@1	1@271
		CP	2@0	2@271	1@0	1@272	273@0	137@68	1@1	1@271
	60	DFT-s	2@0	2@133	1@0	1@134	135@0	64@32	1@1	1@133
		CP	2@0	2@133	1@0	1@134	135@0	67@33	1@1	1@133

6. Table for Filed Antenna:
For 2.4GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	IPEX	4.22
2	N/A	N/A	PCB	IPEX	4.42

Note:

- 1) The EUT supports MIMO. Physically, the EUT provides two completed transmitters and receivers (2T2R).
- 2) Beamforming Gain: 3 dB.
- 3) Only Ant. 1 supports IEEE 802.11b mode and IEEE 802.11g mode.
- 4) The antenna gain and beamforming gain are provided by the manufacturer.

For 5GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	IPEX	3.53
2	N/A	N/A	PCB	IPEX	4.28

Note:

- 1) The EUT supports MIMO. Physically, the EUT provides two completed transmitters and receivers (2T2R).
- 2) Beamforming Gain: 3 dB.
- 3) Only Ant. 1 supports IEEE 802.11a mode.
- 4) The antenna gain and beamforming gain are provided by the manufacturer.

For WCDMA:

Ant. Model Name	Type	Antenna Brand	Antenna Gain(dBi)	Note
N/A	PCB	N/A	5.45	Band I
			1.50	Band VIII

Note: The antenna gain is provided by the manufacturer.

For LTE:

Ant. Model Name	Type	Antenna Brand	Antenna Gain (dBi)	Note
N/A	PCB	N/A	5.45	LTE Band 1
			5.45	LTE Band 3
			5.45	LTE Band 7
			1.50	LTE Band 8
			1.50	LTE Band 20
			1.50	LTE Band 28
			5.45	LTE Band 38
			5.45	LTE Band 40
			6.65	LTE Band 42
			6.65	LTE Band 43

Note: The antenna gain is provided by the manufacturer.

For 5G NR:

Ant. Model Name	Type	Antenna Brand	Antenna Gain (dBi)	Note
N/A	PCB	N/A	5.45	n1
			5.45	n3
			1.55	n5
			5.45	n7
			1.55	n8
			1.55	n20
			1.30	n28
			5.45	n38
			5.45	n40
			5.45	n41
			5.93	n77
			5.93	n78

Note: The antenna gain is provided by the manufacturer.

7. The worst case for 1TX/2TX as follow:

For 2.4GHz:

Non Beamforming:

Operating Mode \ TX Mode	1TX	2TX
IEEE 802.11b	V (Ant. 1)	-
IEEE 802.11g	V (Ant. 1)	-
IEEE 802.11n(HT20)	-	V (Ant. 1+Ant. 2)
IEEE 802.11n(HT40)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE20)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE40)	-	V (Ant. 1+Ant. 2)

Beamforming:

Operating Mode \ TX Mode	2TX
IEEE 802.11n(HT20)	V (Ant. 1+Ant. 2)
IEEE 802.11n(HT40)	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE20)	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE40)	V (Ant. 1+Ant. 2)

For 5GHz:

Non Beamforming:

Operating Mode \ TX Mode	1TX	2TX
IEEE 802.11a	V (Ant. 1)	-
IEEE 802.11n(HT20)	-	V (Ant. 1+Ant. 2)
IEEE 802.11n(HT40)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT20)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT40)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT80)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE20)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE40)	-	V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE80)	-	V (Ant. 1+Ant. 2)

Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11n(HT20)		V (Ant. 1+Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT20)		V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT40)		V (Ant. 1+Ant. 2)
IEEE 802.11ac(VHT80)		V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE20)		V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE40)		V (Ant. 1+Ant. 2)
IEEE 802.11ax(HE80)		V (Ant. 1+Ant. 2)

2. MAXIMUM PERMISSIBLE EXPOSURE

2.1 APPLICABLE STANDARD

According to its specifications, the EUT must comply with the requirements of the following standards:

EN 50385 - Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market

EN IEC 62311 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)

EN 62232 - Determination of RF field strength, power density and SAR in the vicinity of radio communication base stations for the purpose of evaluating human exposure

1 LIMIT

Council Recommendation 1999/519/EC Annex III

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μ T)	Equivalent plane wave power density Seq (W/m^2)
0-1 Hz	-	3.2×10^4	4×10^4	-
1-8 Hz	10000	$3.2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10000	$4000/f$	$4000/f$	-
0.025-0.8 KHz	$250/f$	$4/f$	$5/f$	-
0.8-3 KHz	$250/f$	5	6.25	-
3-150 KHz	87	5	6.25	-
0.15-1 MHz	87	$0.73/f$	$0.92/f$	-
1-10 MHz	$87/f^{1/2}$	$0.73/f$	$0.92/f$	-
10-400 MHz	28	0.073	0.092	2
400-2000 MHz	$1.375 f^{1/2}$	$0.0037 f^{1/2}$	$0.0046 f^{1/2}$	$f/200$
2-300 GHz	61	0.16	0.2	10

2 MPE Calculation Method

If a reflecting ground plane is present (e.g. see Figure B.14), use Equation (B.18):

$$S = (1 + |\Gamma|)^2 \frac{\bar{P}_{\text{net}} G_{\theta, \phi}}{4\pi r^2} \quad (\text{B.18})$$

with reflection coefficient $|\Gamma| = 1$ for the theoretical highest field strength scenario of a perfectly conducting ground plane (e.g. flat metallic roof) or with reflection coefficient $|\Gamma| = 0,6$ for typical [15] ground reflection conditions. Use of the far-field spherical formulas in the near-field region will overestimate the field strength levels.

$$|\Gamma| = 0.6$$

$$\bar{P}_{\text{net}} = \text{Output Power (W)}$$

$$G_{\theta, \phi} = \text{EUT Antenna gain (Linear ratio)}$$

$$\text{e.i.r.p. (W)} = \bar{P}_{\text{net}} * G_{\theta, \phi}$$

$r=0.30\text{m}$, as the calculated distance.

3. TEST RESULTS

For 2.4GHz:

Max. e.i.r.p. (dBm)	Max. e.i.r.p. (W)	Power density (W/m ²)	Limit (W/m ²)	Result
20	0.1000	0.2265	10	Pass

For 5GHz:

Max. e.i.r.p. (dBm)	Max. e.i.r.p. (W)	Power density (W/m ²)	Limit (W/m ²)	Result
23	0.1995	0.4519	10	Pass

For WCDMA:

Band	Frequency (MHz)	Max. Tune Up Power (dBm)	Max. Tune Up Power (W)	Antenna Gain (dBi)	Antenna Gain (Linear ratio)	Power density (W/m ²)	Limit (W/m ²)	Result
Band I	1922.6	25	0.3162	5.45	3.5075	2.5119	9.613	Pass
Band VIII	882.6	25	0.3162	1.50	1.4125	1.0116	4.413	Pass

For LTE:

Band	Frequency (MHz)	Max. Tune Up Power (dBm)	Max. Tune Up Power (W)	Antenna Gain (dBi)	Antenna Gain (Linear ratio)	Power density (W/m ²)	Limit (W/m ²)	Result
Band 1	1922.5	25	0.3162	5.45	3.5075	2.5119	9.6125	Pass
Band 3	1710.7	25	0.3162	5.45	3.5075	2.5119	8.5535	Pass
Band 7	2502.5	25	0.3162	5.45	3.5075	2.5119	10	Pass
Band 8	880.7	25	0.3162	1.50	1.4125	1.0116	4.4035	Pass
Band 20	834.5	25	0.3162	1.50	1.4125	1.0116	4.1725	Pass
Band 28	704.5	25	0.3162	1.50	1.4125	1.0116	3.5225	Pass
Band 38	2572.5	25	0.3162	5.45	3.5075	2.5119	10	Pass
Band 40	2302.5	25	0.3162	5.45	3.5075	2.5119	10	Pass
Band 42	3402.5	25	0.3162	6.65	4.6238	3.3114	10	Pass
Band 43	3602.5	25	0.3162	6.65	4.6238	3.3114	10	Pass

For 5G NR:

Band	Frequency (MHz)	Max. Tune Up Power (dBm)	Max. Tune Up Power (W)	Antenna Gain (dBi)	Antenna Gain (Linear ratio)	Power density (W/m ²)	Limit (W/m ²)	Result
SA n1	1922.5	25	0.3162	5.45	3.5075	2.5119	9.6125	Pass
SA n3	1712.5	25	0.3162	5.45	3.5075	2.5119	8.5625	Pass
SA n5	826.5	25	0.3162	1.55	1.4289	1.0233	4.1325	Pass
SA n7	2502.5	25	0.3162	5.45	3.5075	2.5119	10	Pass
SA n8	882.5	25	0.3162	1.55	1.4289	1.0233	4.4125	Pass
SA n20	834.5	25	0.3162	1.55	1.4289	1.0233	4.1725	Pass
SA n28	705.5	25	0.3162	1.30	1.3490	0.9661	3.5275	Pass
SA n38	2575	25	0.3162	5.45	3.5075	2.5119	10	Pass
SA n40	2305	25	0.3162	5.45	3.5075	2.5119	10	Pass
SA n41	2501.01	28	0.6310	5.45	3.5075	5.0120	10	Pass
SA n77	3305.01	28	0.6310	5.93	3.9174	5.5977	10	Pass
SA n78	3305.01	28	0.6310	5.93	3.9174	5.5977	10	Pass

Conclusion:

All of the 2.4GHz, 5GHz and 5G NR device can transmit simultaneously, the formula of calculated the exposure is:

$$(CPD1 / LPD1) + (CPD2 / LPD2) + \dots \text{etc.} < 1$$

CPD = Calculation Power Density

LPD = Limit of Power Density

Therefore, the calculation of this situation is $(0.2265 / 10) + (0.4519 / 10) + (5.5977 / 10) = 0.63$, which is less than the "1" limit.

RF exposure assessment has been performed above to prove that this unit will not generate the harmful EM emission above the reference level as specified in EC Council Recommendation (1999/519/EC).

End of Test Report