RF Exposure Report

Hui Zhou Gaoshengda Technology Co., Ltd

WIFI+BT Module

Model Number: WKCT27M2501

IC: 12290A-WKCT27

Applicant :	Hui Zhou Gaoshengda Technology Co.,LTD
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Report Number:	ESTE-R2201210
Date of Test:	Dec. 17, 2021~Jan. 18, 2022
Date of Report:	Jan. 24, 2022

Maximum Permissible Exposure

1. Applicable Standard

RSS-102 Issue 5, March 2015

1.1. Limit

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For example

Frequency (MHz)	EIRP (W)	EIRP (dBm)
920	1.39	31.43
850	1.32	31.19
1900	2.28	33.58
2450	2.71	34.33
5200	4.54	36.57

2. Conducted Power Result

Antenna 1

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	4.51	2.8249
	2441	3.15	2.0654
	2480	1.36	1.3677
8-DPSK	2402	4.28	2.6792
	2441	2.97	1.9815
	2480	1.17	1.3092
GFSK 1M(BLE)	2402	4.02	2.5235
	2440	2.71	1.8664
	2480	0.88	1.2246
IEEE 802.11b	2412	17.12	51.5229
	2437	17.38	54.7016
	2462	17.17	52.1195
IEEE 802.11g	2412	22.83	191.8669
	2437	22.83	191.8669
	2462	22.83	191.8669
IEEE 802.11n HT20 (2.4G)	2412	22.65	184.0772
	2437	22.47	176.6038
	2462	22.50	177.8279
IEEE 802.11n HT40 (2.4G)	2422	22.63	183.2314
	2437	22.46	176.1976
	2452	22.48	177.0109
IEEE 802.11a	5180	12.121	16.2967
	5200	12.222	16.6802
	5240	11.846	15.2968
	5260	12.441	17.5428
	5300	12.492	17.7501
	5320	12.465	17.6401
	5500	12.882	19.4178
	5580	13.151	20.6586
	5700	13.767	23.8067
	5745	11.490	14.0929
	5785	11.536	14.2430
	5825	11.551	14.2922

IEEE 802.11n HT20 (5G)	5180	10.483	11.1764
	5200	10.609	11.5054
	5240	10.853	12.1703
	5260	10.915	12.3453
	5300	12.747	18.8235
	5320	12.722	18.7154
	5500	13.156	20.6824
	5580	13.517	22.4750
	5700	11.098	12.8766
	5745	11.254	13.3475
	5785	11.345	13.6301
	5825	11.429	13.8963
IEEE 802.11ac VHT20	5180	10.573	11.4104
	5200	10.685	11.7085
	5240	10.903	12.3112
	5260	11.443	13.9412
	5300	11.430	13.8995
	5320	11.529	14.2200
	5500	11.860	15.3462
	5580	12.226	16.6955
	5700	12.802	19.0634
	5745	10.553	11.3580
	5785	10.563	11.3841
	5825	10.699	11.7463

IEEE 802.11n HT40 (5G)	5190	11.847	15.3003
	5230	12.092	16.1883
	5270	12.293	16.9551
	5310	12.364	17.2346
	5510	12.900	19.4984
	5670	13.605	22.9351
	5755	14.012	25.1884
	5795	14.043	25.3688
IEEE 802.11ac VHT40	5190	11.841	15.2792
	5230	12.163	16.4551
	5270	12.219	16.6686
	5310	12.379	17.2942
	5510	12.817	19.1293
	5670	13.602	22.9192
	5755	13.962	24.9000
	5795	14.109	25.7573
IEEE 802.11ac VHT80	5210	12.476	17.6848
	5290	12.878	19.3999
	5530	13.436	22.0597
	5775	14.470	27.9898

Antenna 2

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
IEEE 802.11b	2412	17.41	55.0808
	2437	17.82	60.5341
	2462	17.75	59.5662
IEEE 802.11g	2412	22.51	178.2379
	2437	22.36	172.1869
	2462	22.61	182.3896
IEEE 802.11n HT20 (2.4G)	2412	22.58	181.1340
	2437	22.39	173.3804
	2452	22.77	189.2344
IEEE 802.11n HT40 (2.4G)	2422	22.33	171.0015
	2437	22.46	176.1976
	2462	22.40	173.7801
IEEE 802.11a	5180	12.539	17.9432
	5200	12.748	18.8278
	5240	12.975	19.8381
	5260	13.201	20.8978
	5300	13.388	21.8172
	5320	13.398	21.8675
	5500	13.845	24.2382
	5580	14.219	26.4180
	5700	14.710	29.5801
	5745	13.160	20.7014
	5785	13.221	20.9942
	5825	13.209	20.9363
IEEE 802.11n HT20 (5G)	5180	10.726	11.8195
	5200	10.895	12.2885
	5240	11.086	12.8410
	5260	12.021	15.9258
	5300	12.102	16.2256
	5320	12.248	16.7803
	5500	12.598	18.1886
	5580	12.884	19.4267
	5700	12.093	16.1920
	5745	12.288	16.9356

	5785	12.422	17.4663
	5825	12.530	17.9061
IEEE 802.11ac VHT20	5180	11.335	13.5988
	5200	11.406	13.8229
	5240	11.636	14.5747
	5260	12.053	16.0435
	5300	12.234	16.7263
	5320	12.167	16.4702
	5500	12.629	18.3189
	5580	12.925	19.6110
	5700	13.487	22.3203
	5745	12.355	17.1989
	5785	12.339	17.1356
	5825	12.489	17.7378
IEEE 802.11n HT40 (5G)	5190	11.277	13.4184
	5230	11.611	14.4911
	5270	11.758	14.9899
	5310	11.848	15.3038
	5510	12.381	17.3021
	5670	13.079	20.3189
	5755	13.432	22.0394
	5795	13.581	22.8087
IEEE 802.11ac VHT40	5190	11.361	13.6804
	5230	11.541	14.2594
	5270	11.801	15.1391
	5310	11.895	15.4703
	5510	12.344	17.1554
	5670	13.155	20.6776
	5755	13.523	22.5061
	5795	13.593	22.8718
IEEE 802.11ac VHT80	5210	12.912	19.5524
	5290	13.237	21.0717
	5530	13.843	24.2270
	5775	14.898	30.8887

3. Calculated Result and Limit

Bluetooth

Mode	Peak output power (dBm)	Ant. gain (dBi)	E.I.R.P (dBm)	Ture-up power (dBm)	Max Ture-up power		Limit (W)	Test Result
					(dBm)	(W)		
2.4G Band								
GFSK	4.51	2.8	7.31	7±1	8	0.0063	2.676	Complies
Limited= 1.31 x 10-2 f0.6834 W (where f is in MHz); We choose 2402MHz(Lowest frequency operate at bluetooth) to calculate MPE limit as higher frequency will have higher MPE limits.								

WLAN 2.4G SISO

Antenna	Mode	Channal	Peak output power (dBm)	Ant. gain (dBi)	E.I.R.P (dBm)	Ture-up power (dBm)	Max Ture-up power		Limit (W)	Test Result
							(dBm)	(W)		
1	IEEE 802.11g	2462	22.83	1.5	24.33	24±1	25	0.3162	2.684	Complies
2	IEEE 802.11g	2462	22.61	1.5	24.11	24±1	25	0.3162	2.684	Complies
Limited= 1.31 x 10-2 f0.6834 W (where f is in MHz); We choose 2412MHz(Lowest frequency operate at 2.4G Wi-Fi) to calculate MPE limit as higher frequency will have higher MPE limits.										

WLAN 2.4G MIMO

Worst case	Channel	Ture-up power (dBm) Antenna 1	Ture-up power (dBm) Antenna 2	Max Ture-up power (W) Antenna 1	Max Ture-up power (W) Antenna 2	Total Ratio	Limit Ratio	Test Result
IEEE 802.11n HT20	2462	24±1	24±1	0.3162	0.3162	0.6322	1	Complies

WLAN 5G SISO

Antenna	Peak output power (dBm)	Ant. gain (dBi)	E.I.R.P (dBm)	Ture-up power (dBm)	Max Ture-up power		Limit (W)	Test Result
					(dBm)	(W)		
1	13.767	4.8	18.567	18±1	19	0.0794	4.525	Complies
2	14.710	4.8	19.510	19±1	20	0.1000	4.525	Complies
Limited= 1.31 x 10-2 f 0.6834 W (where f is in MHz); We choose 5180MHz(Lowest frequency operate at 5GHz Wi-Fi) to calculate MPE limit as higher frequency will have higher MPE limits.								

WLAN 5G MIMO

Worst case	Channel	Ture-up power (dBm) Antenna 1	Ture-up power (dBm) Antenna 2	Max Ture-up power (W) Antenna 1	Max Ture-up power (W) Antenna 2	Total Ratio	Limit Ratio	Test Result
IEEE 802.11ac VHT80	5775	19±1	19±1	0.1000	0.1000	0.2000	1	Complies

Bluetooth+ WLAN

MAX Ture-up power (W) Bluetooth	MAX Ture-up power Total ratio Wi-Fi	Total Ratio	Limit Ratio	Test Result
0.0063	0.6322	0.6385	1	Complies

Note:

2.4 and 5GHz bands are share an antenna, Cann't both the 2.4 and 5 GHz bands operate simultaneously.

End of Test Report