



Maximum Permissible Exposure Report

1. Product Information

FCC ID	: 2BCJI-COMPACT1
EUT	: NFT display
Test Model	: COMPACT 1
Additional Model No.	: COMPACT 2
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: Input: DC 9V, 2A; DC 12V, 1.5A DC 3.8V by Rechargeable Li-ion Battery, 5000mAh
Hardware Version	: DP108 V1.2
Software Version	: COMPACT_1_2023091815
Bluetooth	
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 79 channels for Bluetooth V5.0(DSS) 40 channels for Bluetooth V5.0 (DTS)
Channel Spacing	: 1MHz for Bluetooth V5.0 (DSS) 2MHz for Bluetooth V5.0 (DTS)
Modulation Type	: GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V5.0(DSS) GFSK for Bluetooth V5.0 (DTS)
Bluetooth Version	: V5.0
Antenna Description	: FPC Antenna, 2.8dBi(Max.)
2.4G WLAN	
Frequency Range	: 2412MHz~2462MHz
Channel Spacing	: 5MHz
Channel Number	: 11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
Modulation Type	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FPC Antenna, 2.8dBi(Max.)
5.2G WLAN	
Frequency Range	: 5180MHz~5240MHz
Channel Number	: 4 channels for 20MHz bandwidth(5180MHz~5240MHz) 2 channels for 40MHz bandwidth(5190MHz~5230MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)





	IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FPC Antenna, 3.6dBi(Max.)
5.8G WLAN	
Frequency Range	: 5745MHz~5825MHz
Channel Number	: 5 channels for 20MHz bandwidth(5745MHz~5825MHz) 2 channels for 40MHz bandwidth(5755MHz~5795MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FPC Antenna, 3.73dBi(Max.)
Exposure category	: General population/uncontrolled environment
EUT Type	: Production Unit
Device Type	: Mobile Devices

2. Evaluation Method

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.22 The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc."

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} \text{ (GHz)}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where:}$$

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter



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modules in host devices that operate in the mixed mobile and portable host platform exposure conditions. The grantee is responsible for documenting this according to Class I permissive change requirements. Antennas that qualify for standalone SAR test exclusion must apply the estimated standalone SAR to determine simultaneous transmission test exclusion.

- a) The $[\sum \text{ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg}] + [\sum \text{ of MPE ratios}]$ is ≤ 1.0 .
- b) The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04 , and the $[\sum \text{ of MPE ratios}]$ is ≤ 1.0 .

3. Limit

3.1 Refer Evaluation Method

[ANSI C95.1–1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB publication 447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1093](#): Radiofrequency radiation exposure evaluation: portable devices

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f ²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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





4. Antenna Information

EUT can only use antennas certificated as follows provided by manufacturer;

Internal/External Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Notes
Internal	FPC Antenna	2400-6000MHz	BT: 2.8dBi 2.4G WLAN: 2.8dBi 5.2G WLAN: 3.6dBi 5.8G WLAN: 3.73dBi	BT/WIFI Antenna

5. Conducted Power

[BT]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	3.78
	39	2441	4.12
	79	2480	4.07
$\pi/4$ -DQPSK	0	2402	3.46
	39	2441	4.17
	79	2480	3.8
8-DPSK	0	2402	3.56
	39	2441	4.32
	79	2480	3.86

[BT LE]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	0.39
	19	2440	0.58
	39	2480	0.54

[2.4G WLAN]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
IEEE 802.11b	1	2412	14.47
	6	2437	14.7
	11	2462	14.71
IEEE 802.11g	1	2412	14.4
	6	2437	14.25
	11	2462	14.14
IEEE 802.11n HT20	1	2412	13.13
	6	2437	13.22
	11	2462	13.76
IEEE 802.11n HT40	3	2422	12.18
	6	2437	12.1
	9	2462	11.94



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[5.2G WLAN]

Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
IEEE 802.11a	36	5180	11.66
	40	5200	11.11
	48	5240	11.95
IEEE 802.11n HT20	36	5180	11.03
	40	5200	9.99
	48	5240	10.73
IEEE 802.11n HT40	38	5190	10.97
	46	5230	10.86
IEEE 802.11ac VHT20	36	5180	11.02
	40	5200	10.95
	48	5240	9.74
IEEE 802.11ac VHT40	38	5190	10.13
	46	5230	10.74

[5.8G WLAN]

Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
IEEE 802.11a	149	5745	10.85
	157	5785	10.57
	165	5825	10.55
IEEE 802.11n HT20	149	5745	10.67
	157	5785	10.39
	165	5825	10.39
IEEE 802.11n HT40	151	5755	10.51
	159	5795	10.38
IEEE 802.11ac VHT20	149	5745	10.65
	157	5785	10.40
	165	5825	10.42
IEEE 802.11ac VHT40	151	5755	10.56
	159	5795	10.49





6. Manufacturing Tolerance

[BT]

GFSK(Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	3.0	4.0	4.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
$\pi/4$ -DQPSK(Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	3.0	4.0	3.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
8-DPSK(Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	3.0	4.0	3.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[BT LE]

GFSK(Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	0	0	0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[2.4G WLAN]

IEEE 802.11b(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	14.0	14.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11g(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	14.0	14.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n20(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	13.0	13.0	13.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n40(Peak)			
Channel	Channel 03	Channel 06	Channel 09
Target (dBm)	12.0	12.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0





[5.2G WLAN]

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	11.0	11.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	11.0	9.0	10.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	10.0	10.0	
Tolerance ± (dB)	1.0	1.0	
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	11.0	10.0	9.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	10.0	10.0	
Tolerance ± (dB)	1.0	1.0	

[5.8G WLAN]

IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	10.0	10.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	10.0	10.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 151		Channel 159
Target (dBm)	10.0		10.0
Tolerance ± (dB)	1.0		1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	10.0	10.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 151		Channel 159
Target (dBm)	10.0		10.0
Tolerance ± (dB)	1.0		1.0



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7. Measurement Results

7.1 Standalone MPE Evaluation

[BT]

Modulation Type	f (GHz)	Antenna Gain (dBi)	Output power		MPE (mW/cm ²)	MPE Limits (mW/cm ²)
			dBm	mW		
GFSK	2.480	2.8	5.0	3.1623	0.00120	1.0000
$\pi/4$ -DQPSK	2.441	2.8	5.0	3.1623	0.00120	1.0000
8-DPSK	2.441	2.8	5.0	3.1623	0.00120	1.0000

[BT LE]

Modulation Type	f (GHz)	Antenna Gain (dBi)	Output power		MPE (mW/cm ²)	MPE Limits (mW/cm ²)
			dBm	mW		
GFSK	2.480	2.8	1.0	1.2589	0.00048	1.0000

[2.4G WLAN]

Modulation Type	f (GHz)	Antenna Gain (dBi)	Output power		MPE (mW/cm ²)	MPE Limits (mW/cm ²)
			dBm	mW		
IEEE 802.11b	2.462	2.8	15.0	31.6228	0.011994	1.0000
IEEE 802.11g	2.462	2.8	15.0	31.6228	0.011994	1.0000
IEEE 802.11n HT20	2.462	2.8	14.0	25.1189	0.009527	1.0000
IEEE 802.11n HT40	2.437	2.8	13.0	19.9526	0.007567	1.0000

[5.2G WLAN]

Modulation Type	f (GHz)	Antenna Gain (dBi)	Output power		MPE (mW/cm ²)	MPE Limits (mW/cm ²)
			dBm	mW		
IEEE 802.11a	5.240	3.6	12.0	15.8489	0.007227	1.0000
IEEE 802.11n HT20	5.180	3.6	12.0	15.8489	0.007227	1.0000
IEEE 802.11n HT40	5.190	3.6	11.0	12.5893	0.005741	1.0000
IEEE 802.11ac VHT20	5.180	3.6	12.0	15.8489	0.007227	1.0000
IEEE 802.11ac VHT40	5.230	3.6	11.0	12.5893	0.005741	1.0000





[5.8G WLAN]

Modulation Type	f (GHz)	Antenna Gain (dBi)	Output power		MPE (mW/cm ²)	MPE Limits (mW/cm ²)
			dBm	mW		
IEEE 802.11a	5.825	3.73	11.0	12.5893	0.00587	1.0000
IEEE 802.11n HT20	5.825	3.73	11.0	12.5893	0.00587	1.0000
IEEE 802.11n HT40	5.795	3.73	11.0	12.5893	0.00587	1.0000
IEEE 802.11ac VHT20	5.825	3.73	11.0	12.5893	0.00587	1.0000
IEEE 802.11ac VHT40	5.795	3.73	11.0	12.5893	0.00587	1.0000

Remark:

1. Output power including tune-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20mm from user manual provide by manufacturer.

7.2 Simultaneous Transmission MPE Evaluation

The EUT equipped with one antenna. So no need consider simultaneous transmission.

8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

-----THE END OF REPORT-----

