

**Maximum Permissible Exposure Report****1. Product Information**

FCC ID	: 2BLXR-GULLIVER
Applicant	: BibeCoffee Ltd
Address	: 7 Bell Yard str., City of Westminster,London,United Kingdom,WC2A 2JR
EUT	: Gulliver
Test Model	: Gulliver
Power Supply	: DC 12-24V,5W DC 3.7V by Battery, 700mAh
Hardware Version	: 1.0
Software Version	: 15
WIFI(2.4G Band)	
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	: PCB Antenna, 3.37dBi(Max.)
2G	
Support Band	: ☒ GSM 900 (EU-Band) ☒ DCS 1800 (EU-Band) ☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)
Release Version	: R99
GPRS Class	: Class 12
EGPRS Class	: Class 12
Type Of Modulation	: GMSK for GSM/GPRS; GMSK/8PSK for EGPRS
Antenna Description	: FPC Antenna 4.07dBi (max.) For GSM 850 2.44dBi (max.) For PCS 1900
CatM1	
Support Band	: ☒ CatM1 Band 1 (Non U.S.-Band) ☒ CatM1 Band 2(U.S.-Band) ☒ CatM1 Band 3 (Non U.S.-Band) ☒ CatM1 Band 4(U.S.-Band) ☒ CatM1 Band 5(U.S.-Band) ☒ CatM1 Band 8 (Non U.S.-Band) ☒ CatM1 Band 12(U.S.-Band) ☒ CatM1 Band 13(U.S.-Band) ☒ CatM1 Band 18 (Non U.S.-Band)



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	☒ CatM1 Band 19 (Non U.S.-Band) ☒ CatM1 Band 20 (Non U.S.-Band) ☒ CatM1 Band 25(U.S.-Band) ☒ CatM1 Band 26(U.S.-Band) ☒ CatM1 Band 27 (Non U.S.-Band) ☒ CatM1 Band 28 (Non U.S.-Band) ☒ CatM1 Band 66(U.S.-Band) ☒ CatM1 Band 85(U.S.-Band)
Release Version	: R13
Type Of Modulation	: QPSK/16QAM
Antenna Description	: FPC Antenna 2.44dBi (max.) For CatM1 Band 2 2.44dBi (max.) For CatM1 Band 4 4.07dBi (max.) For CatM1 Band 5 4.07dBi (max.) For CatM1 Band 12 4.07dBi (max.) For CatM1 Band 13 2.44dBi (max.) For CatM1 Band 25 4.07dBi (max.) For CatM1 Band 26 2.44dBi (max.) For CatM1 Band 66 4.07dBi (max.) For CatM1 Band 85
Power Class	: Class 3
GPS function	: Support and only RX
Extreme temp. Tolerance	: -30°C to +50°C
Extreme vol. Limits	: 3.15VDC to 4.26VDC (nominal: 3.70VDC)
Exposure category	: General population/uncontrolled environment
EUT Type	: Production Unit
Device Type	: Mobile Devices
Date of Test	: October 23, 2024 ~ January 06, 2025
Date of Report	: January 07, 2025





2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3.1 Refer Evaluation Method

[ANSI C95.1-2019](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

[FCC KDB publication 447498 D01 General 1 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 2.1091](#): Radiofrequency radiation exposure evaluation: mobile 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



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4. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

6. Conducted Power

[2.4G WIFI Max Peak Power]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)	ANT Max. Tune Up Power (dBm)
IEEE 802.11b	1	2412	15.56	15.0±1.0
	6	2437	14.85	14.0±1.0
	11	2462	15.49	15.0±1.0
IEEE 802.11g	1	2412	14.08	14.0±1.0
	6	2437	13.86	13.0±1.0
	11	2462	13.96	13.0±1.0
IEEE 802.11n HT20	1	2412	13.63	13.0±1.0
	6	2437	13.39	13.0±1.0
	11	2462	13.49	13.0±1.0
IEEE 802.11n HT40	3	2422	11.97	11.0±1.0
	6	2437	12.19	12.0±1.0
	9	2452	12.86	12.0±1.0

[GSM Max Average Power]

Test Mode	Channel	Frequency (MHz)	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
GSM 850	Low	1850.2	30.68	30.0±1.0
	Middle	1880.0	30.73	30.0±1.0
	High	1909.8	30.67	30.0±1.0
PCS 1900	Low	824.2	29.66	29.0±1.0
	Middle	836.6	29.71	29.0±1.0
	High	848.8	29.62	29.0±1.0



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[CatM1 Max Average Power]

Test Mode		Channel	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
CatM1	Band 2	LCH	22.97	22.0±1.0
		MCH	22.99	22.0±1.0
		HCH	22.94	22.0±1.0
	Band 4	LCH	22.79	22.0±1.0
		MCH	22.77	22.0±1.0
		HCH	22.86	22.0±1.0
	Band 5	LCH	22.97	22.0±1.0
		MCH	22.92	22.0±1.0
		HCH	22.94	22.0±1.0
	Band 12	LCH	22.97	22.0±1.0
		MCH	22.98	22.0±1.0
		HCH	22.96	22.0±1.0
	Band 13	LCH	22.92	22.0±1.0
		MCH	22.91	22.0±1.0
		HCH	22.66	22.0±1.0
	Band 25	LCH	22.94	22.0±1.0
		MCH	22.95	22.0±1.0
		HCH	22.85	22.0±1.0
	Band 26	LCH	22.91	22.0±1.0
		MCH	22.78	22.0±1.0
		HCH	22.79	22.0±1.0
	Band 66	LCH	22.97	22.0±1.0
		MCH	22.98	22.0±1.0
		HCH	22.94	22.0±1.0
	Band 85	LCH	22.88	22.0±1.0
		MCH	22.94	22.0±1.0
		HCH	22.95	22.0±1.0



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7. Measurement Results

7.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r = 20\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[2.4GWLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11b	16.0	39.8107	3.37	2.1727	0.0172	1.0000
IEEE 802.11g	15.0	31.6228	3.37	2.1727	0.0137	1.0000
IEEE 802.11n HT20	14.0	25.1189	3.37	2.1727	0.0109	1.0000
IEEE 802.11n HT40	13.0	19.9526	3.37	2.1727	0.0086	1.0000

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
PCS 1900	20.97	1258.9254	2.44	1.7539	0.0436	1.0000
GSM 850	21.97	1000.0000	4.07	2.5527	0.0799	0.5495
CatM1 Band 2	23.0	199.5262	2.44	1.7539	0.0696	1.0000
CatM1 Band 4	23.0	199.5262	2.44	1.7539	0.0696	1.0000
CatM1 Band 5	23.0	199.5262	4.07	2.5527	0.1014	0.5493
CatM1 Band 12	23.0	199.5262	4.07	2.5527	0.1014	0.4660
CatM1 Band 13	23.0	199.5262	4.07	2.5527	0.1014	0.5180
CatM1 Band 25	23.0	199.5262	2.44	1.7539	0.0696	1.0000
CatM1 Band 26	23.0	199.5262	4.07	2.5527	0.1014	0.5427
CatM1 Band 66	23.0	199.5262	2.44	1.7539	0.0696	1.0000
CatM1 Band 85	23.0	199.5262	4.07	2.5527	0.1014	0.4653

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 20cm from user manual provide by manufacturer.
4. For GSM, Duty cycle=1/8.



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8.2 Simultaneous Transmission MPE Evaluation

The sample support one 2.4GWLAN Antenna and another one GSM&CatM1 transmit antenna, so need consider simultaneous transmission;
Simultaneous transmission MPE
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
 $\sum \sum$ of MPE ratios ≤ 1.0

Mode	MPE1 Max.	MPE2 Max.	$\sum$ MPE ratios	Limit	Results
2.4GWIFI+ GSM 850	0.0172	0.1454	0.1626	1.000	Pass
2.4GWIFI + CatM1 Band 12	0.0172	0.2176	0.2348	1.000	Pass

9. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

10. Description of Test Facility

NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.
Test Firm Registration Number: 254912.

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

