

Maximum Permissible Exposure Report

1. Product Information

EUT : Real-time data logger

Model Number : FlashLink RTL 22370,FlashLink RTL 22371,FlashLink RTL 22372

Model Difference Declaration : FlashLink RTL 22370 with one temperature probe,
FlashLink RTL 22372 with dual temperature probe and
FlashLink RTL 22371 without temperature probe.

Test Model : FlashLink RTL 22372

Power Supply : DC 3.70V by Battery

Hardware version : T70MR41F

Software version : T72_3_DeltaTrak_L04

Sample ID : TZ210602335-1#, TZ210602335-2#

Bluetooth

Bluetooth Version : V5.0[only support BLE in this product]

Channel Number : 40 Channels

Modulation Technology : GFSK

Data Rates : 1Mbps

Antenna Type And Gain : Internal Antenna /0.0 dBi(Max)

GSM

Support Bands : ☒ GSM 850
☒ PCS 1900
☒ GSM 900
☒ PCS 1800

GSM FCC Operation Frequency : GSM 850(UL: 824 – 848 MHz/DL: 869 – 894 MHz)
GSM 1900(UL: 1850 –1910 MHz/DL: 1930 – 1990 MHz)

Channel Separation : 0.2MHz

Modulation Technology : GMSK, 8PSK

Antenna Type And Gain : Internal Antenna
GSM900: 0.3dBi
DCS1800: -0.9dBi
GSM850: -1.01dBi
PCS1900: 0.12dBi

UTRA

Support Bands : ☒ WCDMA BAND I
☒ WCDMA BAND II
☒ WCDMA BAND IV
☒ WCDMA BAND V
☒ WCDMA BAND VIII

UTRA FCC Operation Frequency : WCDMA BAND V (UL: 824 – 848 MHz/DL: 869 – 894 MHz)
WCDMA BAND II (UL: 1850 –1910 MHz/DL: 1930 – 1990 MHz)
WCDMA BAND IV(UL: 1710 –1755 MHz/DL: 2110 – 2155 MHz)

Channel Separation : 0.2 MHz

Modulation Technology : OFDM (16QAM, QPSK)

Antenna Type And Gain : Internal Antenna
WCDMA BAND I: +0.21dBi
WCDMA BAND II: -0.27dBi

WCDMA BAND IV: -0.53dBi
WCDMA BAND V: +0.32dBi
WCDMA BAND VIII: +0.86dBi

Note: Antenna position refer to EUT Photos.

2. 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 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.

3. 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/Controlled 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. 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

5. Antenna Information

This Product can only use antennas certificated as follows provided by manufacturer;

Note: The Antenna gain shows in section 1 of this file

6. Max Conducted Power

According to test report: TZ210602335-E

7. Manufacturing Tolerance

< GSM/GPRS/EGPRS >

Band	Mode	The Tune-up Maximum Power (Customer Declared)(dBm)
GSM 850	GPRS(GMSK, 1 Tx slot)	31.0+/-1
	GPRS(GMSK, 2 Tx slot)	29.5+/-1
	GPRS(GMSK, 3 Tx slot)	28.5+/-1
	GPRS(GMSK, 4 Tx slot)	26.5+/-1
	EDGE (8PSK, 1 Tx slot)	24.0+/-1
	EDGE (8PSK, 2 Tx slot)	22.5+/-1
	EDGE (8PSK, 3 Tx slot)	20.5+/-1
	EDGE (8PSK, 4 Tx slot)	19.0+/-1
GSM 1900	GPRS(GMSK, 1 Tx slot)	29.0+/-1
	GPRS(GMSK, 2 Tx slot)	27.0+/-1
	GPRS(GMSK, 3 Tx slot)	26.0+/-1
	GPRS(GMSK, 4 Tx slot)	25.0+/-1
	EDGE (8PSK, 1 Tx slot)	21.5+/-1
	EDGE (8PSK, 2 Tx slot)	21.0+/-1
	EDGE (8PSK, 3 Tx slot)	19.0+/-1
	EDGE (8PSK, 4 Tx slot)	17.5+/-1

< WCDMA >

Band	Mode	The Tune-up Maximum Power (Customer Declared)(dBm)
W-B2	RMC	21.5+/-1
	HSDPA Subtest-1	20.5+/-1
	HSDPA Subtest-2	20.0+/-1
	HSDPA Subtest-3	19.5+/-1
	HSDPA Subtest-4	20.0+/-1
	HSUPA Subtest-1	19.5+/-1
	HSUPA Subtest-2	21.0+/-1
	HSUPA Subtest-3	20.5+/-1
	HSUPA Subtest-4	21.5+/-1
	HSUPA Subtest-5	21.0+/-1
W-B4	RMC	21.5+/-1
	HSDPA Subtest-1	20.5+/-1
	HSDPA Subtest-2	20.0+/-1
	HSDPA Subtest-3	19.5+/-1
	HSDPA Subtest-4	20.0+/-1
	HSUPA Subtest-1	20.0+/-1
	HSUPA Subtest-2	21.0+/-1
	HSUPA Subtest-3	20.5+/-1
	HSUPA Subtest-4	21.5+/-1
W-B5	RMC	22.0+/-1
	HSDPA Subtest-1	20.5+/-1
	HSDPA Subtest-2	19.5+/-1
	HSDPA Subtest-3	19.5+/-1
	HSDPA Subtest-4	20.0+/-1
	HSUPA Subtest-1	20.0+/-1
	HSUPA Subtest-2	21.0+/-1
	HSUPA Subtest-3	20.5+/-1
	HSUPA Subtest-4	21.5+/-1
	HSUPA Subtest-5	21.0+/-1

< Bluetooth >

GFSK (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	-1.0	-1.0	0.5
Tolerance ±(dB)	1.0	1.0	1.0

8. Measurement Results

8.1 Standalone MPE

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.

GSM850:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
824.2	32.00	1584.8932	-1.01	0.7925	100%	0.2500	0.5495
836.6	32.00	1584.8932	-1.01	0.7925	100%	0.2500	0.5577
848.8	32.00	1584.8932	-1.01	0.7925	100%	0.2500	0.5659

GSM1900:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
1850.2	30.0	1000.0000	0.12	1.0280	100%	0.2046	1.0000
1880	30.0	1000.0000	0.12	1.0280	100%	0.2046	1.0000
1909.8	30.0	1000.0000	0.12	1.0280	100%	0.2046	1.0000

UMTS BAND II:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
1852.4	22.5	177.8279	-0.27	0.9397	100%	0.0333	1.0000
1880	22.5	177.8279	-0.27	0.9397	100%	0.0333	1.0000
1880	22.5	177.8279	-0.27	0.9397	100%	0.0333	1.0000

UMTS BAND IV:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
1712.4	22.5	177.8279	-0.53	0.8851	100%	0.03133	1.0000
1732.4	22.5	177.8279	-0.53	0.8851	100%	0.0313	1.0000
1752.6	22.5	177.8279	-0.53	0.8851	100%	0.0313	1.0000

UMTS BAND V:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
826.4	23.00	199.5262	0.32	1.0765	100%	0.0428	0.5509
836.4	23.00	199.5262	0.32	1.0765	100%	0.0428	0.5576
846.6	23.00	199.5262	0.32	1.0765	100%	0.0428	0.5644

Bluetooth:

Frequency(MHz)	Max Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
2402	0.0	1.0000	0.0	1.0000	100%	0.0002	1.0000
2440	0.0	1.0000	0.0	1.0000	100%	0.0002	1.0000
2480	1.5	1.4125	0.0	1.0000	100%	0.0003	1.0000

Remark:

1. Output power including tune-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;

8.2 Simultaneous Transmission MPE

WCDMA/GSM + Bluetooth

Maximum MPE(mW/cm ²) WCDMA/GSM Ant.	Maximum MPE(mW/cm ²) BT Ant.	ΣMPE (mW/cm ²)	Limit (mW/cm ²)	Results
0.25	0.0002	0.2502	0.5495	PASS

9. Conclusion

Compliance

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