



# CTC Laboratories, Inc.

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## Maximum Permissible Exposure Evaluation

FCC ID: 2AYD5-I21M02

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

### EUT Specification

Product Name:	Mobile POS
Trade Mark:	iMin
Model/Type reference:	I21M02
Listed Model(s):	N/A
Frequency band (Operating)	BT/BLE: 2402MHz~2480MHz WLAN: 2412MHz~2462MHz U-NII-1: 5150MHz~5250MHz U-NII-2A: 5250MHz~5350MHz U-NII-2C: 5470MHz~5725MHz U-NII-3: 5725MHz~5850MHz GSM 850: UL: 824MHz~849MHz, DL: 869MHz~894MHz PCS 1900: UL: 1850MHz~1910, DL: 1930MHz~1990MHz WCDMA Band II: UL: 1852.4MHz~1907.6MHz, DL: 1932.6MHz~1987.4MHz WCDMA Band V: UL: 826.4MHz~846.6MHz, DL: 871.6MHz~1891.4MHz LTE FDD Band 5: UL: 824.7MHz~848.3MHz, DL: 869.7MHz~893.3MHz LTE FDD Band 7: UL: 2502.5MHz~2567.5MHz, DL: 2622.5MHz~2687.5MHz LTE TDD Band 41: UL: 2557.5MHz~2652.5MHz, DL: 2557.5MHz~2652.5MHz
Device category	<input type="checkbox"/> Portable (<5mm separation) <input type="checkbox"/> Mobile (>20cm separation) <input checked="" type="checkbox"/> Fixed (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S=5mW/cm2) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Antenna gain (Max)	BT: 1.67dBi 2.4GHz WIFI: 1.67dBi 5GHz WIFI: 2.59dBi GSM 850: 0.6dBi PCS 1900: 0.5dBi WCDMA II: 0.5dBi WCDMA V: 0.6dBi FDD Band 5: -0.6dBi FDD Band 7: -0.2dBi TDD Band 41: -0.2dBi
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

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## Limits for Maximum Permissible Exposure (MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, We will know the distance where the MPE limit is reached.

## Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Average Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
BLE	2440	1.67	5.99	/	6±1	7	0.00146	1.000
BT/EDR	2441	1.67	8.86	/	9±1	10	0.00292	1.000
WLAN 802.11b	2437	1.67	22.53	/	22±1	23	0.05831	1.000
WLAN 802.11g	2437	1.67	22.59	/	22±1	23	0.05831	1.000
WLAN 802.11n(HT20)	2437	1.67	22.38	/	22±1	23	0.05831	1.000
WLAN 802.11n(HT40)	2437	1.67	20.37	/	20±1	21	0.03679	1.000
RLAN U-NII-1	5180	2.59	/	15.95	16±1	17	0.01810	1.000
RLAN U-NII-2A	5260	2.59	/	15.05	15±1	16	0.01438	1.000
RLAN U-NII-2C	5580	2.59	/	12.40	12±1	13	0.00721	1.000
RLAN U-NII-3	5745	2.59	/	14.13	14±1	15	0.01142	1.000
GSM850	848.8	0.6	34.45	29.26	29±1	30	0.22842	0.566
GPRS850 (1 Tx slot)	848.8	0.6	34.33	29.15	29±1	30	0.22842	0.566
EGPRS850 (1 Tx slot)	824.2	0.6	28.47	24.62	24±1	25	0.07223	0.549
GSM1900	1909.8	0.5	29.74	25.15	25±1	26	0.08887	1.000
GPRS1900 (1 Tx slot)	1909.8	0.5	29.72	25.23	25±1	26	0.08887	1.000
EGPRS1900 (1 Tx slot)	1850.2	0.5	27.76	23.75	24±1	25	0.07059	1.000
WCDMA Band II	1907.6	0.5	22.70	/	23±1	24	0.05607	1.000
WCDMA Band V	826.4	0.6	21.79	/	22±1	23	0.04558	0.551
LTE Band 5	826.5	-0.6	25.38	/	25±1	26	0.06898	0.551
LTE Band 7	2560.0	-0.2	23.24	/	23±1	24	0.04772	1.000
LTE Band 41	2565.0	-0.2	25.38	/	25±1	26	0.07564	1.000

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The GSM 850, WLAN and BT can transmit simultaneously

GSM 850 Power density at 20cm (mW/cm <sup>2</sup> )	WLAN Power density at 20cm (mW/cm <sup>2</sup> )	BT Power density at 20cm (mW/cm <sup>2</sup> )	Total Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
0.22842	0.05831	0.00292	0.46480	1

**Note**

For a more detailed features description, Please refer to the RF Test Report.

\*\*\*\*\*THE END\*\*\*\*\*