

1. Maximum Permissible Exposure (MPE)

Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

Maximum Permissible Exposure (MPE) Evaluation

2.4GHz mode:

The worst case of Average power: refer to FCC test report for detail measurement date.

Power measurement:

802.11g

Cable loss = 0 CH	Output Power		Limit (dBm)
	Detector		
	PK (dBm)	AV (dBm)	
Low	22.78	11.58	30.00
Mid	22.67	12.18	
High	22.81	12.46	

Prediction 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

Maximum output power at antenna input terminal:	22.81	(dBm)
Maximum output power at antenna input terminal:	190.9853259	(mW)
Tune-Up power Tolerance:	1	dB
Duty cycle:	100	(%)
Maximum Pav :	240.43628	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Measurement Result:

The predicted power density level at 20 cm is 0.0758491 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm²..

WCDMA (BAND V) Mode:

Maximum output power at antenna input terminal:	23.5	(dBm)
Maximum output power at antenna input terminal:	223.8721139	(mW)
Tune-Up power Tolerance:	0	dB
Duty cycle:	100	(%)
Maximum Pav :	223.8721139	(mW)
Antenna gain (typical):	-0.9	(dBi)
Maximum antenna gain:	0.812830516	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0362202	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0362202 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

WCDMA (BAND II) Mode:

Maximum output power at antenna input terminal:	23.5	(dBm)
Maximum output power at antenna input terminal:	223.8721139	(mW)
Tune-Up power Tolerance:	0	dB
Duty cycle:	100	(%)
Maximum Pav :	223.8721139	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0706237	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0706237mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

LTE (BAND II) Mode:

Maximum output power at antenna input terminal:	24	(dBm)
Maximum output power at antenna input terminal:	251.1886432	(mW)
Tune-Up power Tolerance:	0	dB
Duty cycle:	100	(%)
Maximum Pav :	251.1886432	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0792411	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0792411 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

LTE (BAND IV) Mode:

Maximum output power at antenna input terminal:	24	(dBm)
Maximum output power at antenna input terminal:	251.1886432	(mW)
Tune-Up power Tolerance:	0	dB
Duty cycle:	100	(%)
Maximum Pav :	251.1886432	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0792411	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0792411 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

LTE (BAND XII) Mode:

Maximum output power at antenna input terminal:	24	(dBm)
Maximum output power at antenna input terminal:	251.1886432	(mW)
Tune-Up power Tolerance:	0	dB
Duty cycle:	100	(%)
Maximum Pav :	251.1886432	(mW)
Antenna gain (typical):	-0.9	(dBi)
Maximum antenna gain:	0.812830516	(numeric)
Prediction distance:	20	(cm)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0406397	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0406397 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

Note :

(1) Target Power =the max power including Tune-up tolerance, the tune up power declared by manufacture as:

WCDMA Band V = 22.5±1dBm; WCDMA Band II =22.5±1dBm; FDD Band II=23±1dBm.

FDD Band IV= 23±1dBm ; FDD Band XII= 23±1dBm

Result: The device meet FCC MPE at 20 cm distance

Simultaneous transmission mode

2.4GHz mode + WCDMA (Band V) Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Prediction frequency:	824	(MHz)
Power density at predication frequency at 20 (cm)	0.0362202	(mW/cm ²)
2.4GHz + WCDMA (Band V) Power density at predication	0.1120693	(mW/cm ²)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)

The predicted power density level at 20 cm is 0.1120693mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

Simultaneous transmission mode

2.4GHz mode + WCDMA (Band II) Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Prediction frequency:	1850	(MHz)
Power density at predication frequency at 20 (cm)	0.0706237	(mW/cm ²)
2.4GHz + WCDMA (Band II) Power density at predication	0.1464728	(mW/cm ²)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)

The predicted power density level at 20 cm is 0.1464728 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

Simultaneous transmission mode

2.4GHz mode + LTE (Band II) Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Prediction frequency:	1850	(MHz)
Power density at predication frequency at 20 (cm)	0.0792411	(mW/cm ²)
2.4GHz + LTE (Band II) Power density at predication frequency at 20 (cm) distance	0.1550902	(mW/cm ²)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)

The predicted power density level at 20 cm is 0.1550902mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

Simultaneous transmission mode

2.4GHz mode + LTE (Band IV) Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Prediction frequency:	1755	(MHz)
Power density at predication frequency at 20 (cm)	0.0792411	(mW/cm ²)
2.4GHz + LTE (Band IV) Power density at predication frequency at 20 (cm) distance	0.1550902	(mW/cm ²)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)

The predicted power density level at 20 cm is 0.1550902 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

Simultaneous transmission mode

2.4GHz mode + LTE (Band XII) Mode:

Prediction frequency:	2.4	(GHz)
Power density at predication frequency at 20 (cm)	0.0758491	(mW/cm ²)

Prediction frequency:	699	(MHz)
Power density at predication frequency at 20 (cm)	0.0406397	(mW/cm ²)
2.4GHz + LTE (Band XII) Power density at predication frequency at 20 (cm) distance	0.1164888	(mW/cm ²)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)

The predicted power density level at 20 cm is 0.1164888 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm².

~ End of Report ~