

## MPE Calculation : LTE Band 13

Frequency range :	777.00 MHz ~ 784.50 MHz
Target power :	23.00 dBm
Tolerance :	+ 1.50 dB ~ - 1.50 dB
Max Target power :	24.50 dBm
Measured Conducted power :	22.94 dBm
Maximum antenna gain(PK) :	6.49 dBi
Maximum EIRP :	30.99 dBm( 1256.637 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- Calculation of power density at the specific separation

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>1256.637 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.250</u> mW/cm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Note</li> <li>S = Maximum power density(mW/cm<sup>2</sup>)</li> <li>EIRP = Equivalent Isotropic Radiated Power(mW)</li> <li>R = Distance to the center of the radiation of the antenna(20cm)</li> </ul>
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- Requirement = **0.518** mW/cm<sup>2</sup>

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

## MPE Calculation : LTE Band 4

Frequency range :	1710.70 MHz ~ 1754.30 MHz
Target power :	23.00 dBm
Tolerance :	+ 1.50 dB ~ - 1.50 dB
Max Target power :	24.50 dBm
Measured Conducted power :	23.95 dBm
Maximum antenna gain(PK) :	5.49 dBi
Maximum EIRP :	29.99 dBm( 997.700 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- Calculation of power density at the specific separation

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>997.700 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.199</u> mW/cm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Note</li> <li>S = Maximum power density(mW/cm<sup>2</sup>)</li> <li>EIRP = Equivalent Isotropic Radiated Power(mW)</li> <li>R = Distance to the center of the radiation of the antenna(20cm)</li> </ul>
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- Requirement = **1** mW/cm<sup>2</sup>

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

## MPE Calculation : CDMA 1X (Cellular)

Frequency range :	824.70 MHz ~ 848.31 MHz
Target power :	24.00 dBm
Tolerance :	+ 1.50 dB ~ - 0.99 dB
Max Target power :	25.50 dBm
Measured Conducted power :	24.26 dBm
Maximum antenna gain(PK) :	6.00 dBi
Maximum EIRP :	31.50 dBm( 1412.460 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- **Calculation of power density at the specific separation**

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>1412.460 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.281</u> mW/cm<sup>2</sup></li> </ul>	<p><b>- Note</b></p> <p>S = Maximum power density(mW/cm<sup>2</sup>)</p> <p>EIRP = Equivalent Isotropic Radiated Power(mW)</p> <p>R = Distance to the center of the radiation of the antenna(20cm)</p>
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- **Requirment = 0.549 mW/cm<sup>2</sup>**

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

## MPE Calculation : CDMA 1X (PCS)

Frequency range :	1851.25 MHz ~ 1908.75 MHz
Target power :	24.00 dBm
Tolerance :	+ 1.50 dB ~ - 0.99 dB
Max Target power :	25.50 dBm
Measured Conducted power :	24.25 dBm
Maximum antenna gain(PK) :	7.50 dBi
Maximum EIRP :	33.00 dBm( 1995.262 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- **Calculation of power density at the specific separation**

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>1995.262 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.397</u> mW/cm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- <b>Note</b></li> <li>S = Maximum power density(mW/cm<sup>2</sup>)</li> <li>EIRP = Equivalent Isotropic Radiated Power(mW)</li> <li>R = Distance to the center of the radiation of the antenna(20cm)</li> </ul>
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- **Requirment = 1 mW/cm<sup>2</sup>**

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

## MPE Calculation : CDMA 1X EVDO (Cellular)

Frequency range :	824.70 MHz ~ 848.31 MHz
Target power :	24.00 dBm
Tolerance :	+ 1.50 dB ~ - 0.99 dB
Max Target power :	25.50 dBm
Measured Conducted power :	24.28 dBm
Maximum antenna gain(PK) :	6.00 dBi
Maximum EIRP :	31.50 dBm( 1412.460 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- **Calculation of power density at the specific separation**

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>1412.460 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.281</u> mW/cm<sup>2</sup></li> </ul>	<p><b>- Note</b></p> <p>S = Maximum power density(mW/cm<sup>2</sup>)</p> <p>EIRP = Equivalent Isotropic Radiated Power(mW)</p> <p>R = Distance to the center of the radiation of the antenna(20cm)</p>
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- **Requirment = 0.549 mW/cm<sup>2</sup>**

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

## MPE Calculation : CDMA 1X EVDO (PCS)

Frequency range :	1851.25 MHz ~ 1908.75 MHz
Target power :	24.00 dBm
Tolerance :	+ 1.50 dB ~ - 0.99 dB
Max Target power :	25.50 dBm
Measured Conducted power :	24.29 dBm
Maximum antenna gain(PK) :	7.50 dBi
Maximum EIRP :	33.00 dBm( 1995.262 )mW

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE calculation for this exposure is shown below.

- **Calculation of power density at the specific separation**

<ul style="list-style-type: none"> <li>▪ <math>S = \text{EIRP} / (4 R^2 \pi)</math></li> <li>= <math>1995.262 / (4 \times 20^2 \times \pi)</math></li> <li>= <u>0.397</u> mW/cm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- <b>Note</b></li> <li>S = Maximum power density(mW/cm<sup>2</sup>)</li> <li>EIRP = Equivalent Isotropic Radiated Power(mW)</li> <li>R = Distance to the center of the radiation of the antenna(20cm)</li> </ul>
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- **Requirment = 1 mW/cm<sup>2</sup>**

(FCC Part 1.1310 Table 1 Limits for maximum permissible exposure(MPE))

**Conclusion :** The exposure condition of this device is compliant with FCC rules.

# RF Exposure Compliance for simultaneous operations

▪ **Configurations for simultaneous operations**

- **Configuration 1:** CDMA Cellular or PCS(Voice) + LTE B4 or B13(Data)
- **Configuration 2:** CDMA Cellular(Voice) + EVDO PCS(Data)
- **Configuration 3:** CDMA PCS(Voice) + EVDO Cellular(Data)

Note: Above configuration was declared from applicant.

▪ **Configurations for simultaneous operations**

RF function	LTE		CDMA 1x		CDMA 1x EVDO		Σ of MPE ratios
Band	Band 13	Band 4	Cellular	PCS	Cellular	PCS	
Power Density (mW/cm <sup>2</sup> )	0.25	0.199	0.281	0.397	0.281	0.397	
Requirement (mW/cm <sup>2</sup> )	0.518	1.000	0.549	1.000	0.549	1.000	
MPE ratio (Power Density/Requirement)	0.483	0.199	0.512	0.397	0.512	0.397	
Configuration 1 (MPE ratio)	0.483		0.512				0.995
	0.483			0.397			0.880
		0.199	0.512				0.711
		0.199		0.397			0.596
Configuration 2 (MPE ratio)			0.512			0.397	0.909
Configuration 3 (MPE ratio)				0.397	0.512		0.909

Note: The maximum power density in each RF function was used for above table.

▪ Requirement =  $\Sigma$  of MPE ratios  $\leq$  1

**Conclusion :** The exposure condition of this device is compliant with FCC rules.