



1 FCC § 1.1307 (b) (1) & § 2.1091-RF EXPOSURE

1.1 Applicable Standard

According to § 1.1310 and § 2.1091 (Mobile Devices) RF exposure is calculated.
Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (mW/cm ²)
Limits for General Population/Uncontrolled Exposure	
0.3-1.34	*(100)
1.34-30	*(180/f ²)
30-300	0.2
300 - 1,500	f/1500
1,500 - 100,000	1

Note: f= frequency in MHz

*=Plane-wave equivalent power density

1.2 MPE Prediction

1.2.1 Calculation of MPE at 20cm distance, Equation from OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

Where: S=power density

P=power input to antenna

G= maximum power gain of the antenna in the direction of interest relative to an isotropic radiator, subtract antenna's cable loss, (result is in numeric form)

R=distance to the center of radiation of the antenna (20cm in the following calculation)

1.2.2 Calculation formula of G (numeric)

$$G(\text{numeric}) = 10^{\frac{\{\text{Maximum Antenna Gain (dBi)} - \text{Cable Loss (dB)}\}}{10}}$$

Where: G (numeric) = Maximum power gain of the antenna in the direction of interest relative to an isotropic radiator, subtract antenna's cable loss, (result is converted from decibel into numeric form with above equation)

1.3 Test Result

Outdoor Antenna				
Outdoor Antenna	Outdoor Antenna Gain			
	At 1900MHz(dBi)	At 800MHz(dBi)	At 1700MHz(dBi)	At 700MHz(dBi)
CM288W	4	3	4	3
CM230W	10	10	10	10
MAX GAIN	10	10	10	10
Outdoor Cable				
Outdoor Cable	Outdoor Cable Loss			
	At 1900MHz(dB)	At 800MHz(dB)	At 1700MHz(dB)	At 700MHz(dBi)
CM400-65NN 65Feet	5.43	3.89	6.12	5.11
MIN LOSS	5.43	3.89	6.12	5.11
Indoor Antenna				
Indoor Antenna	Indoor Antenna Gain			
	At 1900MHz(dBi)	At 800MHz(dBi)	At 2100MHz(dBi)	At 700MHz(dBi)
CM222W	6	3	6	3
CM248W	10	7	10	7
MAX GAIN	10	7	10	7
Indoor Cable				
Indoor Cable	Indoor Cable Loss			
	At 1900MHz(dB)	At 800MHz(dB)	At 2100MHz(dB)	At 700MHz(dBi)
CM400-40NN 40Feet 20Feet	3.57	2.63	3.77	2.53
MIN LOSS	3.57	2.63	3.77	2.53



Cellular Band UL:	
Maximum peak output power at antenna input terminal(dBm):	17.51
Maximum peak output power at antenna input terminal(mW):	56.36
Prediction distance(cm):	20
Prediction frequency(MHz):	832.82
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	3.89
G(numeric) :	4.08
Power density at predication frequency and distance(mW/cm ²):	0.0458
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.5552

Cellular Band DL:	
Maximum peak output power at antenna input terminal(dBm):	18.51
Maximum peak output power at antenna input terminal(mW):	70.96
Prediction distance(cm):	20
Prediction frequency(MHz):	878.38
Maximum Antenna Gain (dBi):	7
Cable Loss(dB):	2.63
G(numeric) :	2.74
Power density at predication frequency and distance(mW/cm ²):	0.0386
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.5856

PCS Band UL:	
Maximum peak output power at antenna input terminal(dBm):	17.59
Maximum peak output power at antenna input terminal(mW):	57.41
Prediction distance(cm):	20
Prediction frequency(MHz):	1882.60
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	5.43
G(numeric) :	2.86
Power density at predication frequency and distance(mW/cm ²):	0.0327
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	1.0000

PCS Band DL:	
Maximum peak output power at antenna input terminal(dBm):	20.67
Maximum peak output power at antenna input terminal(mW):	116.68
Prediction distance(cm):	20
Prediction frequency(MHz):	1954.60
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	3.57
G(numeric) :	4.40
Power density at predication frequency and distance(mW/cm ²):	0.1021
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	1.0000

AWS Band UL:	
Maximum peak output power at antenna input terminal(dBm):	18.64
Maximum peak output power at antenna input terminal(mW):	73.11
Prediction distance(cm):	20
Prediction frequency(MHz):	1743.40
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	5.11
G(numeric) :	3.08
Power density at predication frequency and distance(mW/cm ²):	0.0449
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	1.0000

AWS Band DL:	
Maximum peak output power at antenna input terminal(dBm):	20.36
Maximum peak output power at antenna input terminal(mW):	108.64
Prediction distance(cm):	20
Prediction frequency(MHz):	2121.4
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	3.77
G(numeric) :	4.20
Power density at predication frequency and distance(mW/cm ²):	0.0908
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	1.0000

LTE-A Band UL:	
Maximum peak output power at antenna input terminal(dBm):	20.45
Maximum peak output power at antenna input terminal(mW):	110.92
Prediction distance(cm):	20
Prediction frequency(MHz):	708.34
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	3.74
G(numeric) :	4.23
Power density at predication frequency and distance(mW/cm ²):	0.0933
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.4722

LTE-A Band DL:	
Maximum peak output power at antenna input terminal(dBm):	21.23
Maximum peak output power at antenna input terminal(mW):	132.74
Prediction distance(cm):	20
Prediction frequency(MHz):	736.73
Maximum Antenna Gain (dBi):	7
Cable Loss(dB):	2.53
G(numeric) :	2.8
Power density at predication frequency and distance(mW/cm ²):	0.0740
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.4912

LTE-V Band UL:	
Maximum peak output power at antenna input terminal(dBm):	20.00
Maximum peak output power at antenna input terminal(mW):	100.00
Prediction distance(cm):	20
Prediction frequency(MHz):	781.02
Maximum Antenna Gain (dBi):	10
Cable Loss(dB):	3.74
G(numeric) :	4.23
Power density at predication frequency and distance(mW/cm ²):	0.0841
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.5207



LTE-V Band DL:	
Maximum peak output power at antenna input terminal(dBm):	21.68
Maximum peak output power at antenna input terminal(mW):	147.23
Prediction distance(cm):	20
Prediction frequency(MHz):	748.63
Maximum Antenna Gain (dBi):	7
Cable Loss(dB):	2.53
G(numeric) :	2.8
Power density at predication frequency and distance(mW/cm ²):	0.0820
MPE limit for uncontrolled exposure at predication frequency(mW/cm ²):	0.4991