



APPENDIX I RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

EUT Specification

EUT	4G/LTE Outdoor Router		
Model	BiPAC 6200ZUL-R6, BEC 6800RUL-R6		
Frequency band (Operating)	<input checked="" type="checkbox"/> LTE Band II: 1850.0MHz ~ 1910.0MHz <input checked="" type="checkbox"/> LTE Band IV: 1710.0MHz ~ 1755.0MHz <input checked="" type="checkbox"/> LTE Band XVII: 704.0MHz ~ 716.0MHz <input type="checkbox"/> Others		
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others		
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)		
Antenna Specification	Antenna Gain : 7.0 dBi (Numeric gain 5.01)		
Measurement Average output power	System	Power	
	LTE Band II	23.91 dBm	(246.04 mW)
	LTE Band IV	23.95 dBm	(248.31 mW)
	LTE Band XVII	23.78 dBm	(238.78 mW)
Power Target / Tolerance	System	Target Power	Tolerance
	LTE Band II	23.0 dBm	+/-1 dB
	LTE Band IV	23.0 dBm	+/-1 dB
	LTE Band XVII	23.0 dBm	+/-1 dB
Max tune up Power / Max time Average Power	System	Max Tune up Power	Time Average Power
	LTE Band II	24.0dBm (251.189mW)	24.0dBm (251.189mW)
	LTE Band IV	24.0dBm (251.189mW)	24.0dBm (251.189mW)
	LTE Band XVII	24.0dBm (251.189mW)	24.0dBm (251.189mW)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A		



Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2014/07/28	Initial Issue	ALL	Angel Cheng



TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²



Maximum Permissible Exposure

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where $P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power density in mW / cm²

LTE Band II mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
18900	1800	251.189	5.01	20	0.2504	1.000

LTE Band IV mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
20375	1752.5	251.189	5.01	20	0.2504	1.000

LTE Band XVII mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
23780	709	251.189	5.01	20	0.2504	1.000