# **RF Exposure Evaluation**

## of

- E.U.T. : E1 Spread Spectrum Radios
- FCC ID. : QZG5111R
- MODEL : SL5111R

### for

- APPLICANT : K-Best Technology Inc.
- ADDRESS : 2F1, -1, No. 185, Ko Wang Rd., Kau Yuan Tsun, Lung Tan Hsiang, Tao Yuan Hsien, Taiwan

Prepared by

#### **ELECTRONICS TESTING CENTER, TAIWAN**

NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG, TAIPEI HSIEN, TAIWAN, R.O.C. Tel:(02)26023052 Fax:(02)26010910 http://www.etc.org.tw ; e-mail: etcemi@seed.net.tw Report Number : ET93R-08-020-01

#### **Product Information:**

Type of EUT: E1 Spread Spectrum Radios

FCC ID: QZG5111R

Manufacturer: K-Best Technology Inc.

Model: BSL5111R

- Description: 1. High frequency microwave RF unit and other related RF components design technique (PA, LNA, MIX, DUX etc.)
  - 2. High frequency Synthesizer
  - 3. High amplifier gain control technique
  - 4. Advanced QPSK de/modulation
  - 5. Microwave frame multiplexer
  - 6. Digital equalizer

Channel	Frequency		
	А	В	
1	5816	5732	
2	5820	5736	
3	5824	5740	
4	5828	5744	
5	5832	5748	
6	5836	5752	
7	5840	5756	
8	5844	5760	

Maximum conducted output power (measured): <u>22.07</u> dBm or <u>161.07</u> mW

The following table lists the provided authorized antennas:

Model	Antenna Type	Antenna	Antenna Gain	
		(dBi)	Numeric	
KBNT5828-25	5.8GHz Solid Dish Antenna	28.5	707.95	
KBNT5822-16	5.8GHz Panel Antenna	22.0	158.49	

Below is an example of the RF Exposure Statement:

#### Notice:

To comply with the FCC RF exposure compliance requirements, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 5 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. No change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's authority to operate the device.

#### **Relative Requirement for Compliance**

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following:

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time		
(MHz)	Strength	Strength				
	(V/m)	(A/m)	(mW/cm <sup>2</sup> )	(minutes)		
(A) Limits for Occupational/Controlled Exposures						
0.3-3.0	614	1.63	*(100)	6		
3-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6		
30-300	61.4	0.163	1.0	6		
300-1500			f/300	6		
1500-100,000			5	6		
(B) Limits for General Population/Uncontrolled Exposure						
0.3-1.34	614	1.63	*(100)	30		
1.34-30	824/f	2.19/f	*(180/f2)	30		
30-300	27.5	0.073	0.2	30		
300-1500			f/1500	30		
1500-100,000			1.0	30		

TABLE 1 – LIMITS FOR MAXIMUN PERMISSIBLE EXPOSURE (MPE)

f = frequency in MHz

= Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

#### **RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1.0 mW/cm<sup>2</sup> uncontrolled exposure limit. The formula shown in OET Bulletin 65 is used in the calculation.

Equation from page 19 of OET Bulletin 65, Edition 97-01 is:

$$S = PG / 4 R^2$$

where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

- P = power input to the antenna (in appropriate units, e.g., mW)
  - 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 (appropriate units, e.g., cm)

hence

$$R = (PG / 4 S)^{1/2}$$

For our device

P = 161.07 mW G = 707.95 (max. gain) S = Exposure limit = 1.0 mW/cm<sup>2</sup>

 $R = ((161.07 * 707.95) / (4* *1.0))^{1/2}$ = <u>95.25 cm</u>

For complying the FCC limits for general population/uncontrolled exposure, the minimum MPE distance is 95.25 cm.