# Prediction of MPE Limit

## 1. Description of EUT

- FCC ID : STENRPCS20A
- Model No. : RTNR 1900CA-20S
- Freq. Range :
  - Downlink: 1930 ~ 1945MHz
  - Uplink: 1850 ~ 1865MHz
- Power Rating : AC110V, 50/60Hz
- EUT Type : RF Repeater(CDMA), 1900MHz PCS Block A

## 2. Friis Formula

Friis transmission formula : $S = (P_{out} * G) / (4 * \pi * r^2)$

$$R = \sqrt{\frac{PG}{4 \pi S}}$$

S = power density in $mW/cm^2$

$P_{out}$ = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

## 3. EUT Operating condition

The software provided by Manufacturer enabled the EUT to Maximum Output Power with downlink and uplink mode.

# 4. Test Results

## 4.1 Antenna Gain

The maximum Gain measured in Fully Anechoic Chamber is 20.15dBi or 103.514 (numeric).

## 4.2 Output Power into Antenna & Distance at RF Exposure value(1mW/cm$^2$) :

MODE: Downlink

| Channel | Channel Frequency (MHz) | Maximum Output Power to Antenna (mW) | R (m) |
|---|---|---|---|
| 150 | 1937.50 | 19998.619 | 4.059 |

MODE: Uplink

| Channel | Channel Frequency (MHz) | Maximum Output Power to Antenna (mW) | R (m) |
|---|---|---|---|
| 150 | 1857.50 | 623.735 | 0.717 |