APPENDIX I: MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES AND REGULATIONS PART 1.1307, 1.1310, 2.1091, 2.1093: RF EXPOSURE COMPLIANCE

1. GENERAL INFORMATION:

- FCCID: OW5BST850
- Environment: General Population/Uncontrolled Exposure
- Device category: Mobile per Part 2.1093

2. OPERATING CONFIGURATIONS AND TEST CONDITIONS:

2.1 ANTENNA TYPE(S):

Antenna/Cable Type	Type	Gain (dBi)/(numeric) or Cable Loss (dB)
MOBILE COMMUNICATIONS TECHNOLOGIES, INC	GLASS MOUNT 1/8 WAVE WIRE	2.9/1.95
MOBILE COMMUNICATIONS TECHNOLOGIES, INC.	FLEXIBLE DUAL COIL WIRE	4.0/2.51
MOBILE COMMUNICATIONS TECHNOLOGIES, INC.	RG 58-SEMR21 series-15 feet	4.6
MOBILE COMMUNICATIONS TECHNOLOGIES, INC.	RG 174-SEMR61 Serie-10 feet	5.4

3. OPERATING CONDITIONS:

The BST850 Amplifier is an automobile cellular band amplifier for uplink frequencies 824-849 MHz; the peak conducted and peak radiated (ERP) output power does not exceed 3 W. The cable losses measured include the loss of the cable and the antenna base.

4. TEST SIGNAL, TIME-AVERAGING, MAX. MEASURED OUTPUT POWER:

Modulation Type/Modes: GSM

Frequency Range	Frequency Tolerance (ppm)	Emission Designator
824-849 MHz	N/A	AMP

Output Power (Watt/dBm)	Highest Power (Watt)	High (dBm)	Time averaging (__% Duty Cycle)
Conducted	3.0	34.8	N/A

From FCC 1.1310 Table 1A, the maximum permissible RF exposure for an uncontrolled environment is f/1500 mW/cm^2 = 0.55 –0.57 mW/cm^2. The Electric field generated for a 0.57mW/cm^2 exposure (S) is calculated as follows:

$S = E^2/Z$

where:
S = Power density
E = Electric field
Z = Impedance.

$$E = \sqrt{S \cdot Z}$$

0.57 mW/cm^2 = 5.7 W/m^2

The impedance of free space is 377 ohms, where E and H fields are perpendicular.

Thus:

$E = \sqrt{5.7 \cdot 377}$ = 46.4 V/m which is equivalent to 0.57mW/cm^2

Using the relationship between Electric field E, Power in watts P, and distance in meters d, the corresponding Antenna numeric gain G and the transmitter output power:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power density: } P_d(mW/cm^2) = \frac{E^2}{2148.9}$$

MPE Calculation:
The maximum distance from the antenna at which MPE is met or exceeded is calculated from the equation relating field strength E in V/m, transmit power P in Watts, transmit antenna numeric gain G, and separation distance in meters above, and solving for d below:

$$d = \frac{\sqrt{30 \times EIRP}}{E} \qquad 0.19m = \frac{\sqrt{30x}2.6}{46.4}$$

The limit for general population/uncontrolled exposure environment from 300 to 1500 MHz is f/1500 mW/cm^2.

SEPARATION DISTANCE:

Max Conducted Power (Watt) = 3.0 **FLEXIBLE DUAL COIL WIRE ANTENNA NUMERIC GAIN (2.51)**	
Separation Distance	
(in)	(m)
7.5	0.19

POWER DENSITY:

The actual power density for the EUT at 20 cm is calculated as shown below.

$$S = (P \times G)/(4 \times \pi \times d^2)$$

where:
S = power density
P = transmitter conducted power in (W)
G = antenna numeric gain (including losses)
d = distance to radiation center (m)

Antenna	Numeric Gain	Power (W)	Separation Distance (m)	Power Density (W/m^2)	Power Density (mW/cm^2)
Flexible Dual Coil Wire Antenna	0.87	3.0	0.2	5.2	0.52