February 2, 2015

TUV SUD BABT
Octagon House, Concorde Way
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PO15 5RL

Attention: Director of Certification

RE: Analysis of RF Exposure for Portable use per Title 47, Part 1 Subpart I, §1.1310, Title 47, Part 2 Subpart J, §2.1091 and RSS-102 Issue 4 March 2010.

FCC ID: APV-4230HBT
IC: 5843C-4230HBT

1. Mobile MPE Calculation Summary using a 20cm separation distance:

Mode	Output Power	Antenna Gain	Power Density (mW/m^2)
GSM/GPRS 850	33.20 dBm (837.0 MHz)	-9.8 dBi*	0.0435
GSM/GPRS 1900	30.47 dBm (1880.0 MHz)	-4.5 dBi*	0.0787
WCDMA FDD V	23.84 dBm (826.40 MHz)	-9.8 dBi*	0.0050
WCDMA FDD II	24.80 dBm (1880.0 MHz)	-4.5 dBi*	0.0213
Bluetooth	100.4 dBµV/m @ 3 meters	0 dBi	0.00065441
Bluetooth LE	86.6 dBµV/m @ 3 meters	0 dBi	0.00002728

2. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
GSM/GPRS 850	Bluetooth
GSM/GPRS 850	Bluetooth LE
GSM/GPRS 1900	Bluetooth
GSM/GPRS 1900	Bluetooth LE
WCDMA FDD II	Bluetooth
WCDMA FDD II	Bluetooth LE
WCDMA FDD V	Bluetooth
WCDMA FDD V	Bluetooth LE

3. *Simultaneous Transmission MPE (Worst Case Combination):*

Transmitter type	MPE (mw/cm^2)	Limit (mW/cm^2)	MPE ratio (MPE/Limit)
GSM/GPRS 1900	0.0787	1.0	0.0787
Bluetooth	0.00065441	1.0	0.00065441
		Sum of the ratios (should be <1.0)	0.07935441

4. *Mobile MPE Calculation using a 20cm separation distance (GSM/GPRS 850):*

Using Power Density formula:

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

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to isotropic
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	**33.20**	(dBm)
Maximum peak output power at antenna input terminal:	**2089.30**	(mW)
Antenna gain(typical):	**-9.8**	(dBi)
Maximum antenna gain:	**0.105**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**837**	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	**0.558**	(mW/cm^2)
Power density at prediction frequency:	**0.0435**	(mW/cm^2)
Power density at prediction frequency:	**0.435**	(W/m^2)
Margin of Compliance:	**-11.08**	(dB)

5. *Mobile MPE Calculation using a 20cm separation distance (GSM/GPRS 1900):*

Maximum peak output power at antenna input terminal:	**30.47**	(dBm)
Maximum peak output power at antenna input terminal:	**1114.29**	(mW)
Antenna gain(typical):	**-4.5**	(dBi)
Maximum antenna gain:	**0.355**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1880**	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	**1.000**	(mW/cm^2)

Power density at prediction frequency:	**0.0787**	(mW/cm^2)
Power density at prediction frequency:	**0.787**	(W/m^2)
Margin of Compliance:	**-11.04**	(dB)

6. Mobile MPE Calculation using a 20cm separation distance (WCDMA FDD II):

Maximum peak output power at antenna input terminal:	**23.84**	(dBm)
Maximum peak output power at antenna input terminal:	**242.10**	(mW)
Antenna gain(typical):	**-9.8**	(dBi)
Maximum antenna gain:	**0.105**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**826.4**	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	**0.550**	(mW/cm^2)
Power density at prediction frequency:	**0.0050**	(mW/cm^2)
Power density at prediction frequency:	**0.050**	(W/m^2)
Margin of Compliance:	**-20.38**	(dB)

7. Mobile MPE Calculation using a 20cm separation distance (WCDMA FDD V):

Maximum peak output power at antenna input terminal:	**24.80**	(dBm)
Maximum peak output power at antenna input terminal:	**302.00**	(mW)
Antenna gain(typical):	**-4.5**	(dBi)
Maximum antenna gain:	**0.355**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1880**	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	**1.000**	(mW/cm^2)
Power density at prediction frequency:	**0.0213**	(mW/cm^2)
Power density at prediction frequency:	**0.213**	(W/m^2)
Margin of Compliance:	**-16.71**	(dB)

8. Mobile MPE Calculation using a 20cm separation distance (Bluetooth):

Measured Field Strength --Radiated:	**100.4**	(dBuV/m)
Maximum peak output power --Radiated:	**0.0032894**	(W)
Antenna gain(typical):	**0.00**	(dBi)
Maximum antenna gain:	**1.00**	(numeric)
Prediction distance:	**20.00**	(cm)
Prediction frequency:	**319.00**	(MHz)
Limit from table below:	**1**	(mW/cm^2)
Power density at prediction frequency:	**0.00065441**	(mW/cm^2)
Margin of Compliance:	**-31.84**	(dB)

9. Mobile MPE Calculation using a 20cm separation distance (Bluetooth LE):

Measured Field Strength --Radiated:	**86.6**	(dBuV/m)
Maximum peak output power --Radiated:	**0.0001371**	(W)
Antenna gain(typical):	**0.00**	(dBi)
Maximum antenna gain:	**1.00**	(numeric)
Prediction distance:	**20.00**	(cm)
Prediction frequency:	**319.00**	(MHz)
Limit from table below:	**1**	(mW/cm^2)
Power density at prediction frequency:	**0.00002728**	(mW/cm^2)
Margin of Compliance:	**-45.64**	(dB)

***Notes:** Power level and worst case channel information for the cellular radio were derived from the test reports of the original filing. Antenna gains information of the cellular radio were derived from a reference cellular module testing using CTIA Over The Air Performance Summation Test Report (7 layers, Inc. Project Name: MUS_CALAMP_1310) provided by the client.

Sincerely,

Juan M. Gonzalez
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Authorized Signatory
Title: Commercial/Wireless EMC Lab Manager