



November 11, 2014

TUV SUD BABT
Octagon House, Concorde Way
Segensworth Rd N, Fareham
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-55BTW
IC: 5843C-55BTW

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

Mode	Output Power	Antenna Gain	Power Density (mW/m ²)
GSM/GPRS*	1119 mW (837.0 MHz)	3.24 dBi (1.09 dBd)*	0.4696
802.11g	97.3 dBμV/m @ 3 meters	5 dBi	0.00101356
Bluetooth	89.6 dBμV/m @ 3 meters	5 dBi	0.00017213

2. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
GSM/GPRS(worst case using Cinterion ALS3-US)	Bluetooth
GSM/GPRS(worst case using Cinterion ALS3-US)	Bluetooth LE
GSM/GPRS(worst case using Cinterion ALS3-US)	802.11g
802.11g	Bluetooth
802.11g	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	0.4696	0.471	0.99702760
Bluetooth	0.00017213	1.0	0.00017213
802.11g	0.00101356	1.0	0.00101356
Sum of the ratios (should be <1.0)			0.99821329



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:	30.49	(dBm)
Maximum peak output power at antenna input terminal:	1119.44	(mW)
Antenna gain(typical):	3.24	(dBi)
Maximum antenna gain:	2.109	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	837	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.471	(mW/cm ²)
Power density at prediction frequency:	0.4696	(mW/cm ²)
Power density at prediction frequency:	4.696	(W/m ²)
Margin of Compliance:	-0.01	(dB)

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

Measured Field Strength --Radiated:	89.6	(dBμV/m)
Maximum peak output power --Radiated:	0.0002736	(W)
Antenna gain(typical):	5.00	(dBi)
Maximum antenna gain:	3.16	(numeric)
Prediction distance:	20.00	(cm)
Prediction frequency:	2402.00	(MHz)
Limit from table below:	1	(mW/cm ²)
Power density at prediction frequency:	0.00017213	(mW/cm ²)
Margin of Compliance:	-37.64	(dB)



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

Measured Field Strength --Radiated:	84.9	(dB μ V/m)
Maximum peak output power --Radiated:	0.0000927	(W)
Antenna gain(typical):	5.00	(dBi)
Maximum antenna gain:	3.16	(numeric)
Prediction distance:	20.00	(cm)
Prediction frequency:	2402.00	(MHz)
Limit from table below:	1	(mW/cm ²)
Power density at prediction frequency:	0.00005832	(mW/cm ²)
Margin of Compliance:	-42.34	(dB)

7. Mobile MPE Calculation using a 20cm separation distance (802.11g):

Measured Field Strength --Radiated:	97.3	(dB μ V/m)
Maximum peak output power --Radiated:	0.0016111	(W)
Antenna gain(typical):	5.00	(dBi)
Maximum antenna gain:	3.16	(numeric)
Prediction distance:	20.00	(cm)
Prediction frequency:	2412.00	(MHz)
Limit from table below:	1	(mW/cm ²)
Power density at prediction frequency:	0.00101356	(mW/cm ²)
Margin of Compliance:	-29.94	(dB)

***Notes:** Since the EUT can use three (3) different approved cellular RF modules, only the worst MPE and operating mode presented. The antenna gain presented for cellular is the absolute maximum antenna gain that can be use in order to comply with the MPE and ERP limits as well as co-located transmitter requirement.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ferdie S. Custodio', written over a horizontal line.

Ferdie S. Custodio

Name

Authorized Signatory

Title: EMC/ Senior Wireless Test Engineer