



June 18, 2015

TUV SUD BABT
Octagon House, Concorde Way
Segensworth Rd N, Fareham
PO15 5RL

Attention: Director of Certification

**RE: Analysis of RF Exposure for Portable and Mobile according to FCC 2.1091 and RSS-102 Issue 5
March 2015.**

FCC ID: IFU1001011

IC: N/A

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

Mode	Output Power (dBm)	Power Density (mW/cm ²)
CDMA BC0	23.85	0.0682
CDMA BC1	24.23	0.0874
802.11b	12.29	0.0066
802.11g	11.72	0.0058
802.11a	11.64	0.0057
802.11n	11.62	0.0056
Bluetooth Low Energy	9.77	0.0037
Bluetooth	12.49	0.0069
NFC	39.9 dB μ V/m @ 3 meters	0.00000000058
ISM900	89.0 dB μ V/m @ 3 meters	0.0474

2. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
CDMA	WiFi or BT/ BLE or NFC or ISM900
WiFi 802.11b/g/n/a	CDMA or NFC or ISM900
BLE	CDMA or NFC or ISM900
BT	CDMA or NFC or ISM900
NFC	CDMA or WiFi or BT/ BLE or ISM900
ISM900	CDMA or WiFi or BT/ BLE or NFC



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3. Simultaneous Transmission MPE:

Transmitter type	MPE (mw/cm ²)	Limit (mW/cm ²)	MPE ratio (MPE/Limit)
CDMA	0.0874	1.0	0.0874
WiFi (802.11b)	0.0069	1.0	0.0069
Sum of the ratios (should be <1.0)			0.094



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4. Mobile MPE Calculation using a 20cm separation distance (CDMA BC0):

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:	23.85	(dBm)
Maximum peak output power at antenna input terminal:	242.66	(mW)
Antenna gain(typical):	1.5	(dBi)
Maximum antenna gain:	1.413	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	836.52	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.558	(mW/cm ²)
Power density at prediction frequency:	0.0682	(mW/cm ²)
Power density at prediction frequency:	0.682	(W/m ²)
Margin of Compliance:	-9.13	(dB)

5. Mobile MPE Calculation using a 20cm separation distance (CDMA BC1):

Maximum peak output power at antenna input terminal:	24.23	(dBm)
Maximum peak output power at antenna input terminal:	264.85	(mW)
Antenna gain(typical):	2.2	(dBi)
Maximum antenna gain:	1.66	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	1851.25	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.000	(mW/cm ²)
Power density at prediction frequency:	0.0874	(mW/cm ²)
Power density at prediction frequency:	0.874	(W/m ²)
Margin of Compliance:	-10.58	(dB)



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6. Mobile MPE Calculation using a 20cm separation distance (802.11b):

Maximum peak output power at antenna input terminal:	12.29	(dBm)
Maximum peak output power at antenna input terminal:	16.94	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.000	(mW/cm ²)
Power density at prediction frequency:	0.0066	(mW/cm ²)
Power density at prediction frequency:	0.066	(W/m ²)
Margin of Compliance:	-21.82	(dB)

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

Maximum peak output power at antenna input terminal:	11.72	(dBm)
Maximum peak output power at antenna input terminal:	14.86	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.000	(mW/cm ²)
Power density at prediction frequency:	0.0058	(mW/cm ²)
Power density at prediction frequency:	0.058	(W/m ²)
Margin of Compliance:	-22.39	(dB)

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

Maximum peak output power at antenna input terminal:	11.64	(dBm)
Maximum peak output power at antenna input terminal:	14.59	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.000	(mW/cm ²)
Power density at prediction frequency:	0.0057	(mW/cm ²)
Power density at prediction frequency:	0.057	(W/m ²)
Margin of Compliance:	-22.47	(dB)



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9. Mobile MPE Calculation using a 20cm separation distance (802.11n):

Maximum peak output power at antenna input terminal:	11.62	(dBm)
Maximum peak output power at antenna input terminal:	14.52	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.000	(mW/cm ²)
Power density at prediction frequency:	0.0056	(mW/cm ²)
Power density at prediction frequency:	0.056	(W/m ²)
Margin of Compliance:	-22.49	(dB)

10. Mobile MPE Calculation using a 20cm separation distance (BLE):

Maximum peak output power at antenna input terminal:	9.77	(dBm)
Maximum peak output power at antenna input terminal:	9.48	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2440	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.00	(mW/cm ²)
Power density at prediction frequency:	0.0037	(mW/cm ²)
Power density at prediction frequency:	0.037	(W/m ²)
Margin of Compliance:	-24.34	(dB)

11. Mobile MPE Calculation using a 20cm separation distance (BT):

Maximum peak output power at antenna input terminal:	12.49	(dBm)
Maximum peak output power at antenna input terminal:	17.74	(mW)
Antenna gain(typical):	2.9	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2440	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1.00	(mW/cm ²)
Power density at prediction frequency:	0.0069	(mW/cm ²)
Power density at prediction frequency:	0.069	(W/m ²)
Margin of Compliance:	-21.62	(dB)



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12. Mobile MPE Calculation using a 20cm separation distance (NFC):

Maximum peak output power at antenna input terminal:	39.9	(dB μ V/m)
Maximum peak output power at antenna input terminal:	0.0000029	(mW)
Antenna gain(typical):	0	(dBi)
Maximum antenna gain:	1.0	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	13.56	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.9789	(mW/cm ²)
Power density at prediction frequency:	0.0000000058	(mW/cm ²)
Power density at prediction frequency:	0.0000000058	(W/m ²)
Margin of Compliance:	-92.25	(dB)

13. Mobile MPE Calculation using a 20cm separation distance (ISM900):

Maximum peak output power at antenna input terminal:	89.0	(dBm)
Maximum peak output power at antenna input terminal:	0.238	(mW)
Antenna gain(typical):	0	(dBi)
Maximum antenna gain:	1.0	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	907.892	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.61	(mW/cm ²)
Power density at prediction frequency:	0.0474	(mW/cm ²)
Power density at prediction frequency:	0.474	(W/m ²)
Margin of Compliance:	-41.09	(dB)

Sincerely,

Xiaoying Zhang

Name

Authorized Signatory

Title: EMC/Wireless Test Engineer