March 9, 2017

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 use per KDB 447498 D01 Mobile Portable RF Exposure v06 and RSS-102 Issue 5 March 2015.

FCC ID: YETG32-2451213
IC: 9298A- G322451213

1. Limits

Limits for General Population/Uncontrolled Exposure (Title 47 Subpart J §2.1091 and KDB 447498 D01 referring to limits under §1.1310)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Electric Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time (minutes)
0.3 - 1.34	614	1.63	*(100)	30
1.34 - 30	824/f	2.19/f	*($180/f^2$)	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f/1500	30
1500 - 100,000	-	-	1.0	30

f = frequency in MHz
**Plane-wave equivalent power density*

Limits for Devices Used by the General Public (Uncontrolled Environment (RSS-102 Issue 5 March 2015)

Frequency Range (MHz)	Electric Field Strength (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003 - 10^{21}	83	90	-	Instantaneous
0.1 - 10	-	0.73/f	-	6**
1.1 - 10	$87/f^{0.5}$	-	-	6**
10 - 20	27.46	0.0728	2	6
20 - 48	$-58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48 - 300	22.06	0.05852	1.291	6
300 - 6000	$3.142\ f^{0.3417}$	$0.008335\ f^{0.3417}$	$0.02619\ f^{0.6834}$	6
6000 - 15000	61.4	0.163	10	6
15000 - 150000	61.4	0.163	10	$616000/f^{1.2}$
150000 - 300000	$0.158f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000/f^{1.2}$

f is frequency in MHz
**Based on nerve stimulation (NS)*
*** Based on specific absorption rate (SAR)*

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

Downlink (CU)					
Mode	Output Power (dBm)*	Power Density (mW/cm^2)	Power Density (W/m^2)	FCC Limit (mW/cm^2)	ISED Limit (W/m^2)
WCDMA Band 2	17	0.0099708	0.099708	1	4.612
WCDMA Band 5	17	0.0099708	0.099708	0.581	2.676
LTE Band 2	17	0.0099708	0.099708	1	4.612
LTE Band 5	17	0.0099708	0.099708	0.581	2.676
LTE Band 12	17	0.0099708	0.099708	0.488	2.374
LTE Band 13	17	0.0099708	0.099708	0.499	2.412
LTE Band 4	17	0.0099708	0.099708	1	4.901

**Since the External Antenna is supplied by customer, the power limit of 17dBm was selected according to FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(D) as the maximum output power.*

Uplink (NU)					
Mode	Output Power (dBm)	Power Density (mW/cm^2)	Power Density (W/m^2)	FCC Limit (mW/cm^2)	ISED Limit (W/m^2)
WCDMA Band 2	30*	0.1989437	1.989437	1	4.480
WCDMA Band 5	30*	0.1989437	1.989437	0.551	2.581
LTE Band 2	30*	0.1989437	1.989437	1	4.480
LTE Band 5	30*	0.1989437	1.989437	0.551	2.581
LTE Band 12	30*	0.1989437	1.989437	0.468	2.307
LTE Band 13	30*	0.1989437	1.989437	0.520	2.480
LTE Band 4	30*	0.1989437	1.989437	1	4.246
2.4G BLE	30	0.1989437	1.989437	1	5.351

**Since the External Antenna is supplied by customer, the power limit of 30dBm was selected according to FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(D) as the maximum output power.*

3. Co-Located Transmitters transmission table:

Downlink	
Transmitter type	**Transmitter type that can transmit at the same time**
WCDMA B2	2.4G BLE and WCDMA B2 Uplink
WCDMA B5	2.4G BLE and WCDMA B5 Uplink
LTE Band 2	2.4G BLE and LTE B2 Uplink
LTE Band 5	2.4G BLE and LTE B5 Uplink
LTE B12	2.4G BLE and LTE B12 Uplink
LTE B13	2.4G BLE and LTE B13 Uplink
LTE B4	2.4G BLE and LTE B4 Uplink
2.4G BLE	WCDMA B2/B5 or LTE B2/5/1213/B4 Downlink and Uplink

Uplink	
Transmitter type	**Transmitter type that can transmit at the same time**
WCDMA B2	2.4G BLE
WCDMA B5	2.4G BLE
LTE Band 2	2.4G BLE
LTE Band 5	2.4G BLE
LTE B12	2.4G BLE
LTE B13	2.4G BLE
LTE B4	2.4G BLE
2.4G BLE	WCDMA B2/B5 or LTE B2/5/1213/B4 Downlink and Uplink

4. Simultaneous Transmission MPE:

Downlink and Uplink					
Transmitter type	**MPE (mw/cm^2)**	**FCC Limit (mW/cm^2)**	**IC Limit (W/m^2)**	**FCC MPE ratio (MPE/Limit)**	**ISED MPE ratio (MPE/Limit)**
LTE Band 12	0.0099708	0.488	2.374	0.0000029	0.042
LTE Band 12	0.1989437	1	2.307	0.1989437	0.086
2.4G BLE	0.1989437	1	5.351	0.1989437	0.372
Sum of the ratios (should be <1.0)				0.3978903	0.5

**Since the IC limit is related to the frequency, so Band 12 was selcted as the worst case.*

5. *Mobile MPE Calculation using a 20cm separation distance*

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

WCDMA Band 2 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1932.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1.0**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.612**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-20.01**	(dB)
IC Margin of Compliance:	**-16.65**	(dB)

WCDMA Band 5 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**871.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.581**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.676**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-17.65**	(dB)
IC Margin of Compliance:	**-14.29**	(dB)

LTE Band 2 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1932.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1.0**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.612**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-20.01**	(dB)
IC Margin of Compliance:	**-16.65**	(dB)

LTE Band 5 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**871.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.581**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.676**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-17.65**	(dB)
IC Margin of Compliance:	**-14.29**	(dB)

LTE Band 12 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**731.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.488**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.374**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-16.89**	(dB)
IC Margin of Compliance:	**-13.77**	(dB)

LTE Band 13 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**748.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.499**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.412**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-16.99**	(dB)
IC Margin of Compliance:	**-13.84**	(dB)

LTE Band 4 Downlink:

Maximum peak output power at antenna input terminal:	**17.0**	(dBm)
Maximum peak output power at antenna input terminal:	**50.12**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**2112.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.901**	(W/m^2)
Power density at prediction frequency:	**0.0099708**	(mW/cm^2)
Power density at prediction frequency:	**0.099708**	(W/m^2)
FCC Margin of Compliance:	**-20.01**	(dB)
IC Margin of Compliance:	**-16.92**	(dB)

WCDMA Band 2 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1852.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1.00**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.480**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-7.01**	(dB)
IC Margin of Compliance:	**-3.53**	(dB)

WCDMA Band 5 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**826.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.551**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.581**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-4.42**	(dB)
IC Margin of Compliance:	**-1.13**	(dB)

LTE Band 2 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1852.4**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1.00**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.480**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-7.01**	(dB)
IC Margin of Compliance:	**-3.53**	(dB)

LTE Band 5 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**826.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.551**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.581**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-4.42**	(dB)
IC Margin of Compliance:	**-1.13**	(dB)

LTE Band 12 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**701.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.468**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.307**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-3.71**	(dB)
IC Margin of Compliance:	**-0.64**	(dB)

LTE Band 13 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**779.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**0.520**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**2.480**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-4.17**	(dB)
IC Margin of Compliance:	**-0.96**	(dB)

LTE Band 4 Uplink:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**1712.5**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**4.246**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-7.01**	(dB)
IC Margin of Compliance:	**-3.29**	(dB)

2.4GHz BLE:

Maximum peak output power at antenna input terminal:	**30**	(dBm)
Maximum peak output power at antenna input terminal:	**1000**	(mW)
Antenna gain(typical):	**0**	(dBi)
Maximum antenna gain:	**1**	(numeric)
Prediction distance:	**20**	(cm)
Sourse Based Time Average Duty Cycle:	**100**	(%)
Prediction frequency:	**2402**	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	**1**	(mW/cm^2)
ISED MPElimit for uncontrolled exposure at prediction frequency:	**5.351**	(W/m^2)
Power density at prediction frequency:	**0.1989437**	(mW/cm^2)
Power density at prediction frequency:	**1.989437**	(W/m^2)
FCC Margin of Compliance:	**-7.01**	(dB)
IC Margin of Compliance:	**-4.30**	(dB)

Sincerely,

Xiaoying Zhang

Name
Authorized Signatory
Title: EMC/Wireless Test Engineer