



RF Exposure Evaluation Report

APPLICANT : TCT Mobile Limited
EQUIPMENT : Module
BRAND NAME : ALCATEL
MODEL NAME : one touch M8000
FCC ID : RAD382
FILING TYPE : Certification
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.

No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C.



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA361310	Rev. 01	Initial issue of report	Dec. 02, 2013



1. Administration Data

1.1. Testing Laboratory

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

1.2. Applicant

Company Name	TCT Mobile Limited
Address	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.3. Manufacturer

Company Name	TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED
Address	70 Huifeng 4rd., ZhongKai Hi-tech Development District, Huizhou, Guangdong 516006 P. R. China (TCL Mobile Communication Co., LTD. Huizhou)

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Module
Brand Name	ALCATEL
Model Name	one touch M8000
FCC ID	RAD382
Wireless Technology and Frequency Range	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2506.5 MHz ~ 2534.5 MHz and 2556 MHz ~ 2567.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz
Mode	•GPRS/EGPRS •RMC 12.2Kbps Rel 99 •HSDPA Rel 7, Cat14 •HSUPA Rel 6, Cat6 •DC-HSDPA Rel 8 Cat24 •HSPA+ Rel 7, Cat 7 •LTE: QPSK, 16QAM, 64QAM
Antenna Type	IFA Antenna
HW Version	V3.0
SW Version	VL_131101_40J00B_40G000_070G0G_0041000(V)
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



3. Maximum RF average output power among production units

Mode	GSM 850	GSM 1900
	Average power(dBm)	
GPRS/EDGE (GMSK, 1 Tx slot)	33	30
GPRS/EDGE (GMSK, 2 Tx slots)	30	29
GPRS/EDGE (GMSK, 3 Tx slots)	28	25
GPRS/EDGE (GMSK, 4 Tx slots)	26.5	24
EDGE (8PSK, 1 Tx slot)	27	26.5
EDGE (8PSK, 2 Tx slots)	24	23
EDGE (8PSK, 3 Tx slots)	22	22
EDGE (8PSK, 4 Tx slots)	21	21

Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
	average power(dBm)		
RMC 12.2Kbps	23	23.5	22.5
HSDPA Subtest-1	22	22	22
HSDPA Subtest-2	22	22	22
HSDPA Subtest-3	22	22	22
HSDPA Subtest-4	22	22	22
DC-HSDPA Subtest-1	21	21	21
DC-HSDPA Subtest-2	21	21	21
DC-HSDPA Subtest-3	21	21	21
DC-HSDPA Subtest-4	21	20	20
HSUPA Subtest-1	21.5	21	20
HSUPA Subtest-2	21	21	20
HSUPA Subtest-3	20	20	19
HSUPA Subtest-4	21	22	21
HSUPA Subtest-5	21	21	20
HSPA+ (16QAM) Subtest-1	21	21	21

LTE Band 17				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	0	24.5
QPSK	10	> 12	1	23.5
16QAM	10	≤ 12	1	23.5
16QAM	10	> 12	2	22.5
QPSK	5	≤ 8	0	24.5
QPSK	5	> 8	1	23.5
16QAM	5	≤ 8	1	23.5
16QAM	5	> 8	2	22.5



LTE Band 5				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	0	23.5
QPSK	10	> 12	1	23
16QAM	10	≤ 12	1	23
16QAM	10	> 12	2	22
QPSK	5	≤ 8	0	23.5
QPSK	5	> 8	1	23
16QAM	5	≤ 8	1	23
16QAM	5	> 8	2	22
QPSK	3	≤ 4	0	23.5
QPSK	3	> 4	1	23
16QAM	3	≤ 4	1	23
16QAM	3	> 4	2	22
QPSK	1.4	≤ 5	0	23.5
QPSK	1.4	> 5	1	23
16QAM	1.4	≤ 5	1	23
16QAM	1.4	> 5	2	22

LTE Band 4				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23
QPSK	20	> 18	1	22
16QAM	20	≤ 18	1	22.5
16QAM	20	> 18	2	21.5
QPSK	15	≤ 16	0	23
QPSK	15	> 16	1	22
16QAM	15	≤ 16	1	22.5
16QAM	15	> 16	2	21.5
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22.5
16QAM	10	> 12	2	21.5
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22.5
16QAM	5	> 8	2	21.5
QPSK	3	≤ 4	0	23
QPSK	3	> 4	1	22
16QAM	3	≤ 4	1	22.5
16QAM	3	> 4	2	21.5
QPSK	1.4	≤ 5	0	23
QPSK	1.4	> 5	1	22
16QAM	1.4	≤ 5	1	22.5
16QAM	1.4	> 5	2	21.5



LTE Band 2				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	24.5
QPSK	20	> 18	1	23.5
16QAM	20	≤ 18	1	23.5
16QAM	20	> 18	2	22
QPSK	15	≤ 16	0	24.5
QPSK	15	> 16	1	23.5
16QAM	15	≤ 16	1	23.5
16QAM	15	> 16	2	22
QPSK	10	≤ 12	0	24.5
QPSK	10	> 12	1	23.5
16QAM	10	≤ 12	1	23.5
16QAM	10	> 12	2	22
QPSK	5	≤ 8	0	24.5
QPSK	5	> 8	1	23.5
16QAM	5	≤ 8	1	23.5
16QAM	5	> 8	2	22
QPSK	3	≤ 4	0	24.5
QPSK	3	> 4	1	23.5
16QAM	3	≤ 4	1	23.5
16QAM	3	> 4	2	22
QPSK	1.4	≤ 5	0	24.5
QPSK	1.4	> 5	1	23.5
16QAM	1.4	≤ 5	1	23.5
16QAM	1.4	> 5	2	22

LTE Band 7				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23.5
QPSK	20	> 18	1	23
16QAM	20	≤ 18	1	23
16QAM	20	> 18	2	23
QPSK	15	≤ 16	0	23.5
QPSK	15	> 16	1	23
16QAM	15	≤ 16	1	23
16QAM	15	> 16	2	23
QPSK	10	≤ 12	0	23.5
QPSK	10	> 12	1	23
16QAM	10	≤ 12	1	23
16QAM	10	> 12	2	23
QPSK	5	≤ 8	0	23.5
QPSK	5	> 8	1	23
16QAM	5	≤ 8	1	23
16QAM	5	> 8	2	23

Remark:

1. By design, maximum LTE RF power of smaller supported bandwidth does not exceed the RF power of largest supported bandwidth; the information is included in "tune-up procedure" exhibit
2. LTE MPR implementation is the same for normal mode and power reduction mode.



The table below summarized necessary items addressed in KDB 941225 D05 v02.

FCC ID		RAD382											
EUT		Module											
Operating Frequency Range of each LTE transmission band		LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 7: 2506.5 MHz ~ 2567.5 MHz											
Channel Bandwidth		1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz											
Transmission (H, M, L) channel numbers and frequencies in each LTE band													
Band 17													
	Bandwidth 5 MHz				Bandwidth 10 MHz								
	Channel #		Frequency (MHz)		Channel #		Frequency (MHz)						
L	23755		706.5		23780		709						
M	23790		710		23790		710						
H	23825		713.5		23800		711						
LTE Band 5													
	Bandwidth 1.4 MHz			Bandwidth 3 MHz			Bandwidth 5 MHz			Bandwidth 10 MHz			
	Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		
L	20407	824.7		20415	825.5		20425	826.5		20450	829		
M	20525	836.5		20525	836.5		20525	836.5		20525	836.5		
H	20643	848.3		20635	847.5		20625	846.5		20600	844		
LTE Band 4													
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720	
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745	
LTE Band 2													
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860	
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900	
LTE Band 7													
	Bandwidth 5 MHz			Bandwidth 10 MHz			Bandwidth 15 MHz			Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		
L	20775	2502.5		20800	2505		20825	2507.5		20850	2510		
M	21100	2535		21100	2535		21100	2535		21100	2535		
H	21425	2567.5		21400	2565		21375	2562.5		21350	2560		



E category, uplink modulations used	Category 3, QPSK, and 16QAM																																						
LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)	A antenna is used for LTE transmitting and receiving, standalone.																																						
LTE Voice / Data requirements	Data only																																						
LTE MPR permanently built-in by design	<p>Yes, per 3GPP TS 36.101 v11.0.0</p> <p>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing.																																						
Base station simulator used for Testing	Anritsu MT8820C																																						
Power reduction applied to satisfy SAR compliance	No, The EUT doesn't support power reduction.																																						



4. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

Band GSM850	Burst Average Power (dBm)			Frame-Average Power (dBm)		
	TX Channel	128	189	251	128	189
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
GPRS (GMSK, 1 Tx slot) – CS1	32.54	32.46	32.39	23.54	23.46	23.39
GPRS (GMSK, 2 Tx slots) – CS1	29.70	29.53	29.40	23.70	23.53	23.40
GPRS (GMSK, 3 Tx slots) – CS1	27.05	26.99	26.93	22.79	22.73	22.67
GPRS (GMSK, 4 Tx slots) – CS1	25.79	25.77	25.70	22.79	22.77	22.70
EDGE (GMSK, 1 Tx slot) – MCS1	32.39	32.29	32.30	23.39	23.29	23.30
EDGE (GMSK, 2 Tx slots) – MCS1	29.12	28.95	28.95	23.12	22.95	22.95
EDGE (GMSK, 3 Tx slots) – MCS1	26.90	26.80	27.14	22.64	22.54	22.88
EDGE (GMSK, 4 Tx slots) – MCS1	25.76	25.90	26.03	22.76	22.90	23.03
EDGE (8PSK, 1 Tx slot) – MCS5	26.34	26.35	26.38	17.34	17.35	17.38
EDGE (8PSK, 2 Tx slots) – MCS5	23.05	23.02	23.10	17.05	17.02	17.10
EDGE (8PSK, 3 Tx slots) – MCS5	21.70	21.77	21.74	17.44	17.51	17.48
EDGE (8PSK, 4 Tx slots) – MCS5	20.70	20.52	20.65	17.70	17.52	17.65
Band GSM1900	Burst Average Power (dBm)			Frame-Average Power (dBm)		
TX Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
GPRS (GMSK, 1 Tx slot) – CS1	29.24	29.58	29.64	20.24	20.58	20.64
GPRS (GMSK, 2 Tx slots) – CS1	28.18	28.45	28.56	22.18	22.45	22.56
GPRS (GMSK, 3 Tx slots) – CS1	24.13	24.46	24.55	19.87	20.20	20.29
GPRS (GMSK, 4 Tx slots) – CS1	23.01	23.28	23.35	20.01	20.28	20.35
EDGE (GMSK, 1 Tx slot) – MCS1	29.18	29.52	29.62	20.18	20.52	20.62
EDGE (GMSK, 2 Tx slots) – MCS1	28.19	28.43	28.53	22.19	22.43	22.53
EDGE (GMSK, 3 Tx slots) – MCS1	24.13	24.52	24.55	19.87	20.26	20.29
EDGE (GMSK, 4 Tx slots) – MCS1	23.04	23.30	23.38	20.04	20.30	20.38
EDGE (8PSK, 1 Tx slot) – MCS5	25.70	25.89	26.03	16.70	16.89	17.03
EDGE (8PSK, 2 Tx slots) – MCS5	22.49	22.76	22.99	16.49	16.76	16.99
EDGE (8PSK, 3 Tx slots) – MCS5	21.08	21.32	21.59	16.82	17.06	17.33
EDGE (8PSK, 4 Tx slots) – MCS5	19.82	20.02	20.38	16.82	17.02	17.38

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB



<WCDMA Conducted Power>

Band			WCDMA Band V			WCDMA Band II			WCDMA Band IV		
TX Channel			4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)			826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
3GPP MPR (dB)	3GPP Rel 99	RMC 12.2Kbps	22.85	22.28	21.85	22.57	22.91	22.75	21.75	21.74	21.92
0	3GPP Rel 6	HSDPA Subtest-1	21.02	21.26	20.86	21.13	21.28	21.22	20.15	20.35	20.95
0	3GPP Rel 6	HSDPA Subtest-2	21.02	21.19	20.90	20.98	21.42	21.17	20.23	20.15	20.98
0.5	3GPP Rel 6	HSDPA Subtest-3	21.14	21.25	20.96	21.14	21.44	21.15	20.25	20.21	21.17
0.5	3GPP Rel 6	HSDPA Subtest-4	21.08	21.32	20.86	21.19	21.33	21.14	20.28	20.18	21.14
0	3GPP Rel 8	DC-HSDPA Subtest-1	20.92	20.95	20.49	20.27	20.33	20.19	19.58	20.10	20.38
0	3GPP Rel 8	DC-HSDPA Subtest-2	20.78	20.67	20.28	20.21	20.18	20.14	19.43	19.83	20.22
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	20.46	20.44	20.16	20.11	19.97	19.93	19.29	19.61	20.02
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	20.44	20.40	20.02	19.94	19.84	19.81	19.09	19.43	19.73
0	3GPP Rel 6	HSUPA Subtest-1	21.12	20.90	20.34	20.47	20.58	20.55	19.96	19.96	19.81
2	3GPP Rel 6	HSUPA Subtest-2	19.87	20.30	19.69	20.06	20.21	20.13	19.79	19.77	19.64
1	3GPP Rel 6	HSUPA Subtest-3	19.63	19.95	19.37	19.72	19.81	19.75	18.92	18.93	18.77
2	3GPP Rel 6	HSUPA Subtest-4	19.92	20.23	19.67	20.92	21.07	21.05	20.09	20.08	19.95
0	3GPP Rel 6	HSUPA Subtest-5	19.94	20.24	19.66	20.08	20.14	20.12	19.82	19.78	19.64
2.5	3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.93	20.96	20.51	20.43	20.70	20.25	19.93	20.16	20.36



<LTE Band 17 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	23.64	23.60	23.46	0
10	QPSK	1	24	24.00	23.74	23.68	
10	QPSK	1	49	23.66	23.69	23.07	
10	QPSK	25	0	22.51	22.78	22.22	1
10	QPSK	25	12	22.38	22.43	22.43	
10	QPSK	25	24	22.52	22.70	22.62	
10	QPSK	50	0	22.39	22.43	22.37	1
10	16QAM	1	0	22.74	22.72	22.48	
10	16QAM	1	24	22.39	22.39	22.72	
10	16QAM	1	49	22.85	22.47	22.86	2
10	16QAM	25	0	21.36	21.58	21.39	
10	16QAM	25	12	21.49	21.45	21.54	
10	16QAM	25	24	21.64	21.59	21.73	2
10	16QAM	50	0	21.59	21.36	21.26	
Channel				23755	23790	23825	
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	23.68	23.56	23.53	0
5	QPSK	1	12	23.65	23.64	23.54	
5	QPSK	1	24	23.41	23.61	23.52	
5	QPSK	12	0	22.58	22.46	22.80	1
5	QPSK	12	6	22.60	22.56	22.84	
5	QPSK	12	11	22.59	22.57	22.83	
5	QPSK	25	0	22.43	22.47	22.62	1
5	16QAM	1	0	22.58	22.90	22.57	
5	16QAM	1	12	22.61	22.94	22.55	
5	16QAM	1	24	22.53	22.68	22.74	2
5	16QAM	12	0	21.53	21.58	21.88	
5	16QAM	12	6	21.88	21.54	21.84	
5	16QAM	12	11	21.64	21.71	22.03	2
5	16QAM	25	0	21.46	21.55	21.70	



<LTE Band 5 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	23.04	22.16	23.28	0
10	QPSK	1	24	23.13	22.76	23.23	
10	QPSK	1	49	22.62	22.61	22.77	
10	QPSK	25	0	22.43	22.68	22.28	1
10	QPSK	25	12	22.09	21.61	21.99	
10	QPSK	25	24	21.70	21.87	21.69	
10	QPSK	50	0	21.88	21.51	21.67	1
10	16QAM	1	0	21.78	21.21	22.13	
10	16QAM	1	24	22.32	21.54	22.43	
10	16QAM	1	49	21.51	21.75	22.09	2
10	16QAM	25	0	21.54	20.37	21.39	
10	16QAM	25	12	21.11	20.65	21.15	
10	16QAM	25	24	20.52	20.95	20.83	2
10	16QAM	50	0	20.92	20.53	20.72	
Channel				20425	20525	20625	
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	22.64	22.47	22.07	0
5	QPSK	1	12	23.11	22.73	22.22	
5	QPSK	1	24	23.07	22.72	22.04	
5	QPSK	12	0	22.70	21.59	21.49	1
5	QPSK	12	6	22.82	21.68	21.23	
5	QPSK	12	11	22.63	21.94	21.21	
5	QPSK	25	0	22.65	21.66	21.07	1
5	16QAM	1	0	21.59	21.70	21.02	
5	16QAM	1	12	22.16	21.78	21.15	
5	16QAM	1	24	22.15	22.21	21.31	2
5	16QAM	12	0	21.79	20.67	20.66	
5	16QAM	12	6	21.95	20.86	20.49	
5	16QAM	12	11	21.94	20.99	20.43	2
5	16QAM	25	0	21.94	20.75	20.52	
Channel				20415	20525	20635	
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.34	22.56	22.55	0
3	QPSK	1	7	22.89	22.55	22.38	
3	QPSK	1	14	22.79	22.61	22.08	
3	QPSK	8	0	22.68	21.72	22.35	1
3	QPSK	8	4	22.84	21.77	21.37	
3	QPSK	8	7	22.74	21.81	21.33	
3	QPSK	15	0	22.70	21.81	21.21	1
3	16QAM	1	0	21.72	21.87	21.59	
3	16QAM	1	7	21.94	21.77	21.62	
3	16QAM	1	14	21.89	21.82	21.05	2
3	16QAM	8	0	21.73	20.65	20.44	
3	16QAM	8	4	21.96	20.83	20.51	
3	16QAM	8	7	21.90	20.80	20.34	2
3	16QAM	15	0	21.89	20.77	20.39	



Channel				20407	20525	20643	Target MPR (dB)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	23.13	22.59	22.21	0
1.4	QPSK	1	2	23.03	22.60	22.19	
1.4	QPSK	1	5	23.14	22.61	22.15	
1.4	QPSK	3	0	23.06	22.55	22.17	
1.4	QPSK	3	1	23.08	22.53	22.16	
1.4	QPSK	3	2	23.06	22.56	22.07	
1.4	QPSK	6	0	22.57	21.88	21.19	1
1.4	16QAM	1	0	22.44	22.00	21.43	1
1.4	16QAM	1	2	22.48	21.84	21.55	
1.4	16QAM	1	5	22.81	21.90	21.21	
1.4	16QAM	3	0	22.23	22.07	21.39	
1.4	16QAM	3	1	22.36	22.14	21.45	
1.4	16QAM	3	2	22.26	22.07	21.30	
1.4	16QAM	6	0	21.95	20.89	20.32	2



<LTE Band 4 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.57	21.86	21.95	0
20	QPSK	1	49	22.54	21.92	22.19	
20	QPSK	1	99	22.29	22.10	22.15	
20	QPSK	50	0	21.20	20.79	21.22	1
20	QPSK	50	24	21.17	20.79	20.92	
20	QPSK	50	49	21.15	20.92	20.94	
20	QPSK	100	0	21.08	20.78	21.12	1
20	16QAM	1	0	21.54	21.38	21.00	
20	16QAM	1	49	21.78	21.24	21.16	
20	16QAM	1	99	21.10	21.61	21.07	2
20	16QAM	50	0	20.08	19.80	19.98	
20	16QAM	50	24	20.02	19.80	19.93	
20	16QAM	50	49	19.95	19.89	20.02	2
20	16QAM	100	0	20.09	19.74	20.04	
Channel				20025	20175	20325	
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.23	21.85	21.87	0
15	QPSK	1	37	22.39	21.80	22.14	
15	QPSK	1	74	22.05	21.85	22.04	
15	QPSK	36	0	21.17	20.86	21.02	1
15	QPSK	36	18	21.12	20.80	21.04	
15	QPSK	36	37	21.09	20.88	21.00	
15	QPSK	75	0	21.00	20.81	21.00	1
15	16QAM	1	0	21.31	21.07	21.64	
15	16QAM	1	37	21.56	21.34	21.81	
15	16QAM	1	74	21.43	21.33	21.40	2
15	16QAM	36	0	20.18	19.96	20.06	
15	16QAM	36	18	20.15	19.94	20.01	
15	16QAM	36	37	20.14	19.93	20.02	2
15	16QAM	75	0	19.92	19.84	20.04	
Channel				20000	20175	20350	
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	22.22	22.10	22.30	0
10	QPSK	1	24	22.37	21.96	22.15	
10	QPSK	1	49	22.26	21.98	22.22	
10	QPSK	25	0	21.17	20.82	21.24	1
10	QPSK	25	12	21.19	20.85	21.15	
10	QPSK	25	24	21.07	20.84	21.07	
10	QPSK	50	0	21.02	20.68	21.04	1
10	16QAM	1	0	21.15	20.90	21.00	
10	16QAM	1	24	21.47	20.58	21.19	
10	16QAM	1	49	21.38	20.93	21.12	2
10	16QAM	25	0	20.26	19.93	20.16	
10	16QAM	25	12	20.13	19.89	20.23	
10	16QAM	25	24	20.14	19.86	20.21	2
10	16QAM	50	0	20.00	19.75	20.06	



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Channel				19975	20175	20375	Target MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.14	21.85	22.20	0
5	QPSK	1	12	22.22	21.85	22.17	
5	QPSK	1	24	22.14	21.74	22.05	
5	QPSK	12	0	21.18	20.85	21.25	1
5	QPSK	12	6	21.24	20.95	21.22	
5	QPSK	12	11	21.23	20.97	21.25	
5	QPSK	25	0	21.17	20.81	21.34	1
5	16QAM	1	0	21.14	20.94	22.21	
5	16QAM	1	12	21.30	20.85	22.22	
5	16QAM	1	24	21.28	20.83	22.17	2
5	16QAM	12	0	20.37	19.95	21.21	
5	16QAM	12	6	20.13	20.11	21.20	
5	16QAM	12	11	20.33	20.09	21.22	2
5	16QAM	25	0	20.17	19.87	21.20	
Channel				19965	20175	20385	Target MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.16	21.79	22.27	0
3	QPSK	1	7	22.19	21.92	22.12	
3	QPSK	1	14	22.16	21.92	22.19	
3	QPSK	8	0	21.25	20.90	21.34	1
3	QPSK	8	4	21.10	20.91	21.28	
3	QPSK	8	7	21.13	20.89	21.21	
3	QPSK	15	0	21.09	20.83	21.22	1
3	16QAM	1	0	21.41	20.99	21.65	
3	16QAM	1	7	21.18	20.98	21.38	
3	16QAM	1	14	21.22	20.81	21.32	2
3	16QAM	8	0	20.07	20.13	20.24	
3	16QAM	8	4	20.09	19.98	20.18	
3	16QAM	8	7	20.22	19.94	20.24	2
3	16QAM	15	0	20.06	19.92	20.35	
Channel				19957	20175	20393	Target MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	22.07	21.90	22.37	0
1.4	QPSK	1	2	22.30	21.93	22.23	
1.4	QPSK	1	5	22.21	21.99	22.16	
1.4	QPSK	3	0	22.19	21.92	22.19	
1.4	QPSK	3	1	22.18	21.99	22.19	
1.4	QPSK	3	2	22.16	21.90	22.30	
1.4	QPSK	6	0	21.16	20.91	21.27	1
1.4	16QAM	1	0	21.24	20.77	21.05	1
1.4	16QAM	1	2	21.08	20.78	21.23	
1.4	16QAM	1	5	21.02	20.75	21.43	
1.4	16QAM	3	0	21.37	21.28	21.45	
1.4	16QAM	3	1	21.50	21.18	21.46	
1.4	16QAM	3	2	21.52	21.15	21.34	
1.4	16QAM	6	0	20.11	20.06	20.43	2



<LTE Band 2 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.70	23.87	23.39	0
20	QPSK	1	49	23.37	23.65	23.40	
20	QPSK	1	99	23.55	23.37	23.74	
20	QPSK	50	0	22.22	22.42	22.18	1
20	QPSK	50	24	22.21	22.53	22.10	
20	QPSK	50	49	22.24	22.46	22.09	
20	QPSK	100	0	22.26	22.40	22.15	
20	16QAM	1	0	22.59	22.69	22.79	1
20	16QAM	1	49	22.14	22.75	22.39	
20	16QAM	1	99	22.86	22.46	22.78	
20	16QAM	50	0	21.26	21.48	21.37	2
20	16QAM	50	24	21.33	21.69	21.08	
20	16QAM	50	49	21.42	21.37	21.11	
20	16QAM	100	0	21.32	21.48	21.15	
Channel				18675	18900	19125	Target MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.59	23.80	23.39	0
15	QPSK	1	37	23.42	23.77	23.40	
15	QPSK	1	74	23.49	23.70	23.56	
15	QPSK	36	0	22.39	22.57	22.05	1
15	QPSK	36	18	22.33	22.61	22.08	
15	QPSK	36	37	22.31	22.43	22.42	
15	QPSK	75	0	22.22	22.48	22.52	
15	16QAM	1	0	22.54	23.00	22.75	1
15	16QAM	1	37	22.83	23.06	22.72	
15	16QAM	1	74	22.34	22.55	22.80	
15	16QAM	36	0	21.31	21.57	21.25	2
15	16QAM	36	18	21.34	21.53	21.11	
15	16QAM	36	37	21.37	21.40	21.12	
15	16QAM	75	0	21.21	21.47	21.21	
Channel				18650	18900	19150	Target MPR (dB)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	23.59	23.85	23.29	0
10	QPSK	1	24	23.53	23.64	23.38	
10	QPSK	1	49	23.48	23.76	23.66	
10	QPSK	25	0	22.41	22.69	23.49	1
10	QPSK	25	12	22.38	22.66	22.61	
10	QPSK	25	24	22.39	22.65	22.60	
10	QPSK	50	0	22.19	22.46	22.56	
10	16QAM	1	0	22.76	23.06	22.35	1
10	16QAM	1	24	22.37	22.67	22.32	
10	16QAM	1	49	22.67	22.58	22.45	
10	16QAM	25	0	21.45	21.59	21.63	2
10	16QAM	25	12	21.38	21.64	21.31	
10	16QAM	25	24	21.33	21.59	21.71	
10	16QAM	50	0	21.32	21.47	21.22	



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Channel				18625	18900	19175	Target MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.59	23.77	23.36	0
5	QPSK	1	12	23.51	23.56	23.44	
5	QPSK	1	24	23.43	23.64	23.53	
5	QPSK	12	0	22.54	22.75	22.44	1
5	QPSK	12	6	22.60	22.60	22.65	
5	QPSK	12	11	22.57	22.71	22.57	
5	QPSK	25	0	22.44	22.62	22.48	1
5	16QAM	1	0	22.45	22.98	22.59	
5	16QAM	1	12	22.60	22.93	22.53	
5	16QAM	1	24	22.39	22.45	22.82	2
5	16QAM	12	0	21.56	21.90	21.60	
5	16QAM	12	6	21.63	21.79	21.78	
5	16QAM	12	11	21.68	21.70	21.73	2
5	16QAM	25	0	21.51	21.54	21.68	
Channel				18615	18900	19185	
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.37	23.59	23.84	0
3	QPSK	1	7	23.41	23.66	23.31	
3	QPSK	1	14	23.49	23.55	23.50	
3	QPSK	8	0	22.48	22.70	22.50	1
3	QPSK	8	4	22.45	22.62	22.59	
3	QPSK	8	7	22.46	22.69	22.49	
3	QPSK	15	0	22.51	22.66	22.51	1
3	16QAM	1	0	22.89	22.81	22.65	
3	16QAM	1	7	22.35	22.74	22.60	
3	16QAM	1	14	22.60	22.68	22.91	2
3	16QAM	8	0	21.32	21.64	21.69	
3	16QAM	8	4	21.39	21.61	21.35	
3	16QAM	8	7	21.45	21.55	21.31	2
3	16QAM	15	0	21.30	21.47	21.79	
Channel				18607	18900	19193	
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	23.45	23.72	23.54	0
1.4	QPSK	1	2	23.56	23.58	23.39	
1.4	QPSK	1	5	23.49	23.70	23.36	
1.4	QPSK	3	0	23.46	23.65	23.46	
1.4	QPSK	3	1	23.55	23.61	23.47	
1.4	QPSK	3	2	23.58	23.62	23.41	
1.4	QPSK	6	0	22.58	22.65	22.59	1
1.4	16QAM	1	0	22.68	22.40	22.65	1
1.4	16QAM	1	2	22.36	22.62	22.60	
1.4	16QAM	1	5	22.37	22.86	22.46	
1.4	16QAM	3	0	22.97	22.85	22.37	
1.4	16QAM	3	1	22.35	22.66	22.67	
1.4	16QAM	3	2	22.54	22.87	22.48	
1.4	16QAM	6	0	21.58	21.73	21.36	2



<LTE Band 7 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20890	21020		
Frequency (MHz)				2514	2527		
20	QPSK	1	0	21.96	22.56		0
20	QPSK	1	49	21.93	22.55		
20	QPSK	1	99	22.58	22.71		
20	QPSK	50	0	21.67	22.45		1
20	QPSK	50	24	21.77	22.55		
20	QPSK	50	49	21.87	22.59		
20	QPSK	100	0	21.89	22.46		1
20	16QAM	1	0	22.13	22.70		
20	16QAM	1	49	22.43	22.47		
20	16QAM	1	99	22.48	22.36		2
20	16QAM	50	0	22.05	22.57		
20	16QAM	50	24	22.11	22.33		
20	16QAM	50	49	22.24	22.51		2
20	16QAM	100	0	22.42	22.54		
Channel				20865	21045	21375	
Frequency (MHz)				2511.5	2529.5	2562.5	
15	QPSK	1	0	22.13	22.59	22.68	0
15	QPSK	1	37	22.32	22.61	22.30	
15	QPSK	1	74	22.18	22.69	22.32	
15	QPSK	36	0	22.12	22.42	22.37	1
15	QPSK	36	18	22.23	22.60	22.04	
15	QPSK	36	37	22.31	22.52	22.26	
15	QPSK	75	0	22.09	22.49	22.13	1
15	16QAM	1	0	22.31	22.53	22.22	
15	16QAM	1	37	22.29	22.45	22.46	
15	16QAM	1	74	22.30	22.62	22.67	2
15	16QAM	36	0	22.28	22.55	22.25	
15	16QAM	36	18	22.17	22.52	22.08	
15	16QAM	36	37	22.15	22.44	22.28	2
15	16QAM	75	0	22.16	22.40	22.17	
Channel				0	20840	21070	
Frequency (MHz)				0	2509	2532	
10	QPSK	1	0	22.48	22.61	22.44	0
10	QPSK	1	24	22.26	22.66	22.27	
10	QPSK	1	49	22.35	22.39	22.07	
10	QPSK	25	0	22.46	22.60	22.19	1
10	QPSK	25	12	22.35	22.58	22.65	
10	QPSK	25	24	22.21	22.57	22.14	
10	QPSK	50	0	22.33	22.43	22.16	1
10	16QAM	1	0	22.49	22.62	22.23	
10	16QAM	1	24	22.33	22.63	22.16	
10	16QAM	1	49	22.21	22.61	22.52	2
10	16QAM	25	0	22.13	22.47	22.03	
10	16QAM	25	12	22.19	22.61	22.65	
10	16QAM	25	24	22.37	22.40	22.60	2
10	16QAM	50	0	22.04	22.57	22.03	



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Channel				20815	21095	21425	Target MPR (dB)
Frequency (MHz)				2506.5	2534.5	2567.5	
5	QPSK	1	0	22.33	22.58	22.64	0
5	QPSK	1	12	22.55	22.67	22.12	
5	QPSK	1	24	22.39	22.47	22.35	
5	QPSK	12	0	22.16	22.65	22.54	1
5	QPSK	12	6	22.51	22.65	22.56	
5	QPSK	12	11	22.51	22.49	22.57	
5	QPSK	25	0	21.94	22.57	22.50	
5	16QAM	1	0	22.31	22.48	22.54	1
5	16QAM	1	12	22.23	22.55	22.66	
5	16QAM	1	24	22.51	22.59	22.57	
5	16QAM	12	0	22.48	22.56	22.60	2
5	16QAM	12	6	22.19	22.47	22.07	
5	16QAM	12	11	22.29	22.38	22.59	
5	16QAM	25	0	22.09	22.42	22.47	



5. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



6. Radio Frequency Radiation Exposure Evaluation

6.1. Standalone Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
GPRS 850 (1 Tx slot)	824.2	-3.5	33.0	112.20	0.02	0.55
GPRS 850 (2 Tx slots)	824.2	-3.5	30.0	112.20	0.02	0.55
GPRS 850 (3 Tx slots)	824.2	-3.5	28.0	105.68	0.02	0.55
GPRS 850 (4 Tx slots)	824.2	-3.5	26.5	100.00	0.02	0.55
EGPRS 850 (1 Tx slot)	824.2	-3.5	27.0	28.18	0.01	0.55
EGPRS 850 (2 Tx slots)	824.2	-3.5	24.0	14.13	0.00	0.55
EGPRS 850 (3 Tx slots)	824.2	-3.5	22.0	26.55	0.01	0.55
EGPRS 850 (4 Tx slots)	824.2	-3.5	21.0	28.18	0.01	0.55
GPRS 1900 (1 Tx slot)	1909.8	-2.9	30.0	64.57	0.01	1.00
GPRS 1900 (2 Tx slots)	1909.8	-2.9	29.0	102.33	0.02	1.00
GPRS 1900 (3 Tx slots)	1909.8	-2.9	25.0	60.81	0.01	1.00
GPRS 1900 (4 Tx slots)	1909.8	-2.9	24.0	64.57	0.01	1.00
EGPRS 1900 (1 Tx slot)	1909.8	-2.9	26.5	28.84	0.01	1.00
EGPRS 1900 (2 Tx slots)	1909.8	-2.9	23.0	25.70	0.01	1.00
EGPRS 1900 (3 Tx slots)	1909.8	-2.9	22.0	30.48	0.01	1.00
EGPRS 1900 (4 Tx slots)	1909.8	-2.9	21.0	32.36	0.01	1.00
WCDMA Band V	826.4	-3.6	23.0	87.10	0.02	0.55
WCDMA Band IV	1752.6	-2.8	22.5	93.33	0.02	1.00
WCDMA Band II	1880.0	-2.8	23.5	117.49	0.02	1.00
LTE Band 17	709.0	-3.0	24.5	141.25	0.03	0.47
LTE Band 5	844.0	-2.8	23.5	117.49	0.02	0.56
LTE Band 4	1720.0	-2.8	23.0	104.71	0.02	1.00
LTE Band 2	1880.0	-2.8	24.5	147.91	0.03	1.00
LTE Band 7	2527.0	-3.1	23.5	109.65	0.02	1.00

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.