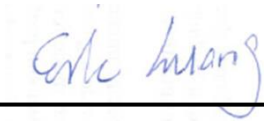
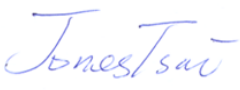
RF Exposure Evaluation Report

APPLICANT	**:**	**Shanghai Longcheer Technology Co. Ltd.**
EQUIPMENT	**:**	**Connected Media Applicance**
BRAND NAME	**:**	**Longcheer**
MODEL NAME	**:**	**CMA1000**
FCC ID	**:**	**WH7CMA1000**
STANDARD	**:**	**47 CFR Part 2.1091**

We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Manager



Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA750402	Rev. 01	Initial issue of report	Jun. 28, 2017

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Shanghai Longcheer Technology Co. Ltd.
Address	No.401, Building 1, Caobao, Xuhui District, Shanghai, China

Manufacturer	
Company Name	Shanghai Longcheer Technology Co. Ltd.
Address	No.401, Building 1, Caobao, Xuhui District, Shanghai, China

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Connected Media Applicance
Brand Name	Longcheer
Model Name	CMA1000
FCC ID	WH7CMA1000
IMEI Code	865464030000055
Wireless Technology and Frequency Range	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: 2502.5 MHz ~ 2567.5 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 66: 1710.7 MHz ~1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth v3.0 + EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE
Antenna Type	WWAN: Fixed External Antenna WLAN: IFA Antenna Bluetooth: IFA Antenna
HW Version	LLAM013C2-1
SW Version	0.1.6
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

<LTE>

Average Power (dBm)									
Modulation	BW (MHz)	RB Size	Target MPR	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 13	LTE Band 66
QPSK	20	≤ 18	0	23.0	23.5	-	23.5	-	23.5
QPSK	20	> 18	1	22.0	22.5	-	22.5	-	22.5
16QAM	20	≤ 18	1	22.0	22.5	-	22.5	-	22.5
16QAM	20	> 18	2	21.0	21.5	-	21.5	-	21.5
QPSK	15	≤ 16	0	23.0	23.5	-	23.5	-	23.5
QPSK	15	> 16	1	22.0	22.5	-	22.5	-	22.5
16QAM	15	≤ 16	1	22.0	22.5	-	22.5	-	22.5
16QAM	15	> 16	2	21.0	21.5	-	21.5	-	21.5
QPSK	10	≤ 12	0	23.0	23.5	23.5	23.5	23.5	23.5
QPSK	10	> 12	1	22.0	22.5	22.5	22.5	22.5	22.5
16QAM	10	≤ 12	1	22.0	22.5	22.5	22.5	22.5	22.5
16QAM	10	> 12	2	21.0	21.5	21.5	21.5	21.5	21.5
QPSK	5	≤ 8	0	23.0	23.5	23.5	23.5	23.5	23.5
QPSK	5	> 8	1	22.0	22.5	22.5	22.5	22.5	22.5
16QAM	5	≤ 8	1	22.0	22.5	22.5	22.5	22.5	22.5
16QAM	5	> 8	2	21.0	21.5	21.5	21.5	21.5	21.5
QPSK	3	≤ 4	0	23.0	23.5	23.5	-	-	23.5
QPSK	3	> 4	1	22.0	22.5	22.5	-	-	22.5
16QAM	3	≤ 4	1	22.0	22.5	22.5	-	-	22.5
16QAM	3	> 4	2	21.0	21.5	21.5	-	-	21.5
QPSK	1.4	≤ 5	0	23.0	23.5	23.5	-	-	23.5
QPSK	1.4	> 5	1	22.0	22.5	22.5	-	-	22.5
16QAM	1.4	≤ 5	1	22.0	22.5	22.5	-	-	22.5
16QAM	1.4	> 5	2	21.0	21.5	21.5	-	-	21.5

Remark: The mark "-" in gray means that this bandwidth is not supported.

<2.4GHz WLAN>

Frequency	Mode	Maximum Average Power (dBm)
WLAN 2.4GHz	802.11b	12.5
	802.11g	12.5
	802.11n-HT20	12.5
	802.11n-HT40	12.5

<5GHz WLAN>

Frequency	Mode	Maximum Average Power (dBm)
WLAN 5.2GHz	802.11a	12.0
	802.11n-HT20	12.0
	802.11n-HT40	12.0
WLAN 5.3GHz	802.11a	12.0
	802.11n-HT20	12.0
	802.11n-HT40	12.0
WLAN 5.8GHz	802.11a	9.5
	802.11n-HT20	4.0
	802.11n-HT40	4.5

<Bluetooth>

Frequency	Mode	Maximum Average Power (dBm)
Bluetooth	v3.0+EDR	9.0
	v4.0/4.1 LE	0.5

The table below summarized necessary items addressed in KDB 941225 D05 v02r05

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>WH7CMA1000</td></tr>
<tr><td>Equipment Name</td><td>Connected Media Applicance</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>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: 2502.5 MHz ~ 2567.5 MHz
LTE Band 13: 779.5 MHz ~ 784.5 MHz
LTE Band 66: 1710.7 MHz ~1779.3 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 13: 5MHz, 10MHz
LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>Uplink modulations used</td><td>QPSK and 16QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Data Only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<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>
<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>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.</td></tr>
</table>

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
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 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 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 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
LTE Band 13								
	Bandwidth 5 MHz				Bandwidth 10 MHz			
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23205		779.5		23230		782	
M	23230		782					
H	23255		784.5					
LTE Band 66												
	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	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

4. 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/f2)	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/f2)	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

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
LTE Band 2	1850.7	-1.3	23.0	21.700	0.148	147.911	0.0294	1.00	0.0294
LTE Band 4	1710.7	-1.4	23.5	22.100	0.162	162.181	0.0323	1.00	0.0323
LTE Band 5	824.7	-1.4	23.5	22.100	0.162	162.181	0.0323	0.55	**0.0587**
LTE Band 7	2502.5	-1.8	23.5	21.700	0.148	147.911	0.0294	1.00	0.0294
LTE Band 13	779.5	-2.6	23.5	20.900	0.123	123.027	0.0245	0.52	0.0471
LTE Band 66	1710.7	-1.4	23.5	22.100	0.162	162.181	0.0323	1.00	0.0323
WLAN2.4GHz 802.11b	2412.0	-1.9	12.5	10.600	0.011	11.482	0.0023	1.00	**0.0023**
WLAN2.4GHz 802.11g	2412.0	-1.9	12.5	10.600	0.011	11.482	0.0023	1.00	0.0023
WLAN2.4GHz 802.11n-HT20	2412.0	-1.9	12.5	10.600	0.011	11.482	0.0023	1.00	0.0023
WLAN2.4GHz 802.11n-HT40	2422.0	-1.9	12.5	10.600	0.011	11.482	0.0023	1.00	0.0023
WLAN5.2GHz 802.11a	5180.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	**0.0017**
WLAN5.2GHz 802.11n-HT20	5180.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	0.0017
WLAN5.2GHz 802.11n-HT40	5190.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	0.0017
WLAN5.3GHz 802.11a	5260.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	0.0017
WLAN5.3GHz 802.11n-HT20	5260.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	0.0017
WLAN5.3GHz 802.11n-HT40	5270.0	-2.6	12.0	9.400	0.009	8.710	0.0017	1.00	0.0017
WLAN5.8GHz 802.11a	5745.0	-3.1	9.5	6.400	0.004	4.365	0.0009	1.00	0.0009
WLAN5.8GHz 802.11n-HT20	5745.0	-3.1	4.0	0.900	0.001	1.230	0.0002	1.00	0.0002
WLAN5.8GHz 802.11n-HT40	5755.0	-3.1	4.5	1.400	0.001	1.380	0.0003	1.00	0.0003
Bluetooth v3.0+EDR	2402.0	-1.9	9.0	7.100	0.005	5.129	0.0010	1.00	**0.0010**
Bluetooth v4.0/4.1 LE	2402.0	-1.9	0.5	-1.400	0.001	0.724	0.0001	1.00	0.0001

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

5.2. Collocated Power Density Calculation

Power Density / Limit				Σ(Power Density / Limit) of		
1	2	3	4	1+2	1+3	1+4
WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
0.0587	0.0023	0.0017	0.0010	0.0610	0.0604	0.0597

Note:

1. For colocation analysis, LTE Band 5 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. ∑(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)].
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment though they have independent antenna.
4. WLAN and Bluetooth share the same antenna so can't transmit simultaneously.

Conclusion:

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