



RF Exposure Evaluation Report

APPLICANT : Wistron NeWeb Corporation
EQUIPMENT : Connected Cooler Radio Rest of World version
BRAND NAME : Wistron NeWeb Corporation
MODEL NAME : D52A1
FCC ID : NKRD52A1
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.

Prepared by: Mark Qu / Manager

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.

1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China



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1. Administration Data

1.1. Testing Laboratory

Testing Site	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C

Manufacturer	
Company Name	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Connected Cooler Radio Rest of World version
Brand Name	Wistron NeWeb Corporation
Model Name	D52A1
IMEI	353180080032736
FCC ID	NKRD52A1
Wireless Technology and Frequency Range	GPRS850: 824.2 MHz ~ 848.8 MHz GPRS1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	<ul style="list-style-type: none">• GPRS/EGPRS• RMC 12.2Kbps• HSDPA• HSUPA• HSPA+(16QAM uplink is not supported)• 802.11b/g/n HT20/HT40• Bluetooth v4.1 LE(Uplink Only)
HW Version	v1.0
SW Version	D52A1_v00.00
EUT Stage	Identical Prototype
Note: <ol style="list-style-type: none">1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.2. WLAN supports search capabilities, but unable to connect to other devices.3. The device supports GPRS/EGPRS Class 12.4. The device has no voice function.	



3. Maximum RF average output power among production units

<GSM>

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	34.00	30.80
GPRS (GMSK, 2 Tx slots)	33.00	30.00
GPRS (GMSK, 3 Tx slots)	33.00	30.00
GPRS (GMSK, 4 Tx slots)	33.00	30.00
EDGE (8PSK, 1 Tx slot)	28.00	27.00
EDGE (8PSK, 2 Tx slots)	28.00	27.00
EDGE (8PSK, 3 Tx slots)	28.00	27.00
EDGE (8PSK, 4 Tx slots)	28.00	27.00

<WCDMA>

Band		WCDMA Band II	WCDMA Band V
Mode		Tune-up	
3GPP Rel 99	RMC 12.2Kbps	25.00	25.00
3GPP Rel 6	HSDPA Subtest-1	24.00	24.00
3GPP Rel 6	HSDPA Subtest-2	24.00	24.00
3GPP Rel 6	HSDPA Subtest-3	24.00	24.00
3GPP Rel 6	HSDPA Subtest-4	24.00	24.00
3GPP Rel 6	HSUPA Subtest-1	24.00	24.00
3GPP Rel 6	HSUPA Subtest-2	23.00	23.00
3GPP Rel 6	HSUPA Subtest-3	23.00	23.00
3GPP Rel 6	HSUPA Subtest-4	23.00	23.00
3GPP Rel 6	HSUPA Subtest-5	24.00	24.00

<Bluetooth>

Mode	Maximum Average Power (dBm)
Bluetooth v4.1 LE	4.00

<2.4GHz WLAN>

Mode	Maximum Average Power (dBm)
2.4GHz WLAN	17.90



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/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



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
GPRS 850 (1 Tx slot)	824.2	1.0	34	35.000	3.162	398.107	0.079	0.549	0.144
GPRS 850 (2 Tx slots)	824.2	1.0	33	34.000	2.512	630.957	0.126	0.549	0.229
GPRS 850 (3 Tx slots)	824.2	1.0	33	34.000	2.512	941.890	0.187	0.549	0.341
GPRS 850 (4 Tx slots)	824.2	1.0	33	34.000	2.512	1258.925	0.251	0.549	0.456
EGPRS 850 (1 Tx slot)	824.2	1.0	28	29.000	0.794	100.000	0.020	0.549	0.036
EGPRS 850 (2 Tx slots)	824.2	1.0	28	29.000	0.794	199.526	0.040	0.549	0.072
EGPRS 850 (3 Tx slots)	824.2	1.0	28	29.000	0.794	297.852	0.059	0.549	0.108
EGPRS 850 (4 Tx slots)	824.2	1.0	28	29.000	0.794	398.107	0.079	0.549	0.144
GPRS 1900 (1 Tx slot)	1850.2	4.0	30.8	34.800	3.020	380.189	0.076	1.000	0.076
GPRS 1900 (2 Tx slots)	1850.2	4.0	30	34.000	2.512	630.957	0.126	1.000	0.126
GPRS 1900 (3 Tx slots)	1850.2	4.0	30	34.000	2.512	941.890	0.187	1.000	0.187
GPRS 1900 (4 Tx slots)	1850.2	4.0	30	34.000	2.512	1258.925	0.251	1.000	0.251
EGPRS 1900 (1 Tx slot)	1850.2	4.0	27	31.000	1.259	158.489	0.032	1.000	0.032
EGPRS 1900 (2 Tx slots)	1850.2	4.0	27	31.000	1.259	316.228	0.063	1.000	0.063
EGPRS 1900 (3 Tx slots)	1850.2	4.0	27	31.000	1.259	472.063	0.094	1.000	0.094
EGPRS 1900 (4 Tx slots)	1850.2	4.0	27	31.000	1.259	630.957	0.126	1.000	0.126
WCDMA Band V	826.4	1.0	25.0	26.000	0.398	398.107	0.079	0.551	0.144
WCDMA Band II	1852.4	4.0	25.0	29.000	0.794	794.328	0.158	1.000	0.158
Bluetooth	2402.0	1.0	4.0	5.000	0.003	3.162	0.001	1.000	0.001
WLAN	2412.0	1.0	17.9	18.900	0.078	77.625	0.015	1.000	0.015

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

Mode	Frequency	Maximum EIRP (dBm)	Calculated Power Density (mW/cm ²)	Limit (mW/cm ²)	Bluetooth Power Density / Limit	LTE Band 12 Power Density / Limit	Σ (Power Density / Limit) of WWAN+ Bluetooth/ WWAN+ WLAN
Bluetooth	2402MHz ~2480MHz	5.000	0.001	1	0.001	0.456	0.457
WLAN	2412MHz ~2462MHz	18.900	0.015	1	0.015		0.471

Note:

1. For collocation analysis, GPRS850 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + Bluetooth, WWAN + WLAN.
3. Bluetooth and WLAN share the same antenna, and cannot transmit simultaneously.

Conclusion:

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