



# RF EXPOSURE EVALUATION REPORT

**FCC ID** : LHJ-FE4RW0110  
**Equipment** : FE4RW0110  
**Brand Name** : Continental  
**Model Name** : FE4RW0110  
**Applicant** : Continental Automotive Systems, Inc.  
21440 W Lake Cook Rd.  
**Manufacturer** : Continental Automotive Systems, Inc.  
21440 W Lake Cook Rd.  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

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## History of this test report

Report No.	Version	Description	Issued Date
FA150634-01	Rev. 01	Initial issue of report	Jun. 04, 2021



**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	FE4RW0110
Brand Name	Continental
Model Name	FE4RW0110
FCC ID	LHJ-FE4RW0110
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Mode	GPRS/EGPRS/GMSK RMC 12.2Kbps HSDPA : QPSK/16QAM/64QAM (Downlink) HSUPA : QPSK (Uplink) LTE: QPSK, 16QAM, 64QAM
EUT Stage	Identical Prototype

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

**Reviewed by: Jason Wang**

**Report Producer: Wan Liu**



**2. Maximum RF average output power among production units**

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	33.50	30.50
GPRS (GMSK, 2 Tx slots)	32.00	29.00
GPRS (GMSK, 3 Tx slots)	30.00	27.00
GPRS (GMSK, 4 Tx slots)	29.00	26.00
EDGE (8PSK, 1 Tx slot)	27.50	26.50
EDGE (8PSK, 2 Tx slots)	25.50	24.50
EDGE (8PSK, 3 Tx slots)	24.50	23.50
EDGE (8PSK, 4 Tx slots)	23.50	22.50

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.50
	Band IV	24.50
	Band V	24.50
LTE	Band 2	24.00
	Band 4	24.00
	Band 5	24.00
	Band 7	24.00
	Band 38	24.00
	Band 41	24.00



### **3. 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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



## **4. Radio Frequency Radiation Exposure Evaluation**

### **4.1. Standalone Power Density Calculation**

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum Output Power Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
GPRS 850 (1 Tx slot)	4.50	33.50	35.850	3.846	38.000	6.310	7.000	794.328	0.158	0.549
GPRS 850 (2 Tx slots)	4.50	32.00	34.350	2.723	36.500	4.467	7.000	1116.709	0.222	0.549
GPRS 850 (3 Tx slots)	4.50	30.00	32.350	1.718	34.500	1.718	7.000	1056.818	0.210	0.549
GPRS 850 (4 Tx slots)	4.50	29.00	31.350	1.365	33.500	1.365	7.000	1122.018	0.223	0.549
EGPRS 850 (1 Tx slot)	4.50	27.50	29.850	0.966	32.000	0.968	7.000	199.526	0.040	0.549
EGPRS 850 (2 Tx slots)	4.50	25.50	27.850	0.610	30.000	1.000	7.000	250.000	0.050	0.549
EGPRS 850 (3 Tx slots)	4.50	24.50	26.850	0.484	29.000	0.794	7.000	297.873	0.059	0.549
EGPRS 850 (4 Tx slots)	4.50	23.50	25.850	0.385	28.000	0.631	7.000	315.479	0.063	0.549
GPRS 1900 (1 Tx slot)	2.50	30.50	30.850	1.216	33.000	1.995	2.000	251.189	0.050	1.000
GPRS 1900 (2 Tx slots)	2.50	29.00	29.350	0.861	31.500	1.413	2.000	353.134	0.070	1.000
GPRS 1900 (3 Tx slots)	2.50	27.00	27.350	0.543	29.500	0.891	2.000	334.195	0.067	1.000
GPRS 1900 (4 Tx slots)	2.50	26.00	26.350	0.432	28.500	0.708	2.000	354.813	0.071	1.000
EGPRS 1900 (1 Tx slot)	2.50	26.50	26.850	0.484	29.000	0.794	2.000	100.000	0.020	1.000
EGPRS 1900 (2 Tx slots)	2.50	24.50	24.850	0.305	27.000	0.501	2.000	125.297	0.025	1.000
EGPRS 1900 (3 Tx slots)	2.50	23.50	23.850	0.243	26.000	0.398	2.000	149.290	0.030	1.000
EGPRS 1900 (4 Tx slots)	2.50	22.50	22.850	0.193	25.000	0.316	2.000	158.114	0.031	1.000
WCDMA Band 2	2.50	24.50	24.850	0.305	27.000	0.501	2.000	501.187	0.100	1.000
WCDMA Band 4	5.50	24.50	27.850	0.610	30.000	1.000	1.000	1000.000	0.199	1.000
WCDMA Band 5	4.50	24.50	26.850	0.484	29.000	0.794	7.000	794.328	0.158	0.549
LTE Band 2	2.50	24.00	24.350	0.272	26.500	0.447	2.000	446.684	0.089	1.000
LTE Band 4	5.50	24.00	27.350	0.543	29.500	0.891	1.000	891.251	0.177	1.000
LTE Band 5	4.50	24.00	26.350	0.432	28.500	0.708	7.000	707.946	0.141	0.549
LTE Band 7	9.00	24.00	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
LTE Band 38	9.00	24.00	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
LTE Band 41	9.00	24.00	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000

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



**Conclusion:**

Based on FCC OET Bulletin 65 Supplement C and 47 CFR §2.1091, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Band	Maximum Conducted Power (dBm)	Stanalone Maximum Antenna Gain (dBi)
FE4RW0110	GSM850	33.5	4.5
	GSM1900	30.5	2.5
	WCDMA Band 2	24.5	2.5
	WCDMA Band 4	24.5	5.5
	WCDMA Band 5	24.5	4.5
	LTE Band 2	24.0	2.5
	LTE Band 4	24.0	5.5
	LTE Band 5	24.0	4.5
	LTE Band 7	24.0	9.0
	LTE Band 38	24.0	9.0
	LTE Band 41	24.0	9.0