

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., Deer Park, IL 60010, USA
Manufacturer : Continental Automotive Systems, Inc.
21440 W Lake Cook Rd., Deer Park, IL 60010, USA
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

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Approved by: Cona Huang / Deputy Manager



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Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
3. DETERMINATION OF EXEMPTION	6
4. RF EXPOSURE EVALUATION	7
4.1. Standalone assessment	7



History of this test report

Report No.	Version	Description	Issued Date
FA2N0304B	Rev. 01	Initial issue of report	Jun. 02, 2023

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: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 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 RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM
HW Version	P4
EUT Stage	Identical Prototype

Host Information	
Equipment Name	G12R400G1
Brand Name	Continental
Model Name	G12R400G1
HW Version	P5.1
Internal Antenna Information	
Brand Name	Continental
Model Name	INTANT01, INTANT02
External Antenna Information	
Brand Name	Molex
Model Name	85597238
GM P/N	85597238

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Maximum RF average output power among production units

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	33.00	29.50
GPRS (GMSK, 2 Tx slots)	31.50	28.00
GPRS (GMSK, 3 Tx slots)	29.50	26.00
GPRS (GMSK, 4 Tx slots)	28.50	25.00
EDGE (8PSK, 1 Tx slot)	27.00	25.50
EDGE (8PSK, 2 Tx slots)	25.00	23.50
EDGE (8PSK, 3 Tx slots)	24.00	22.50
EDGE (8PSK, 4 Tx slots)	23.00	21.50

Mode		Maximum Average power(dBm)
WCDMA	Band II	23.50
	Band IV	23.50
	Band V	23.50
LTE	Band 2	22.50
	Band 4	22.50
	Band 5	22.50
	Band 7	22.50
	Band 38	22.50
	Band 41	22.50

3. Determination of exemption

Per 1.1307(b)(3), (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th} \text{ (mW)} = ERP_{20cm} (d / 20)^x \text{ for distance } d \leq 20cm$$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ for distance } 20cm < d \leq 40cm$$

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} \sqrt{f}} \right)$$

$$ERP_{20cm} \text{ (mW)} \begin{array}{ll} 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz:} & 2040 f \\ 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz:} & 3060 \end{array}$$

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.



4. RF Exposure Evaluation

4.1. Standalone assessment

General Note:

1. P_i is mean the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm
2. P_{th} is mean the exemption threshold power (P_{th}) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i .
3. In this report was used Part1.1307(b)(3)(i)(B) perform RF Exposure evaluation
4. The distance of 20cm is for this device

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	P_i (dBm)	P_i (mW)	Part1.1307 option(b) Threshold (mW)
GPRS 850 (1 Tx slot)	-0.10	33.00	23.9	21.75	245.47	149.62	24.00	251.19	1681.368
GPRS 850 (2 Tx slots)	-0.10	31.50	25.4	23.25	346.74	211.35	25.50	354.81	1680.960
GPRS 850 (3 Tx slots)	-0.10	29.50	25.1	22.99	326.59	199.07	25.24	334.20	1681.368
GPRS 850 (4 Tx slots)	-0.10	28.50	25.4	23.25	346.74	211.35	25.50	354.81	1681.368
EGPRS 850 (1 Tx slot)	-0.10	27.00	17.9	15.75	61.66	37.58	18.00	63.10	1681.368
EGPRS 850 (2 Tx slots)	-0.10	25.00	18.9	16.75	77.62	47.32	19.00	79.43	1680.960
EGPRS 850 (3 Tx slots)	-0.10	24.00	19.6	17.49	92.04	56.10	19.74	94.19	1680.960
EGPRS 850 (4 Tx slots)	-0.10	23.00	19.9	17.75	97.72	59.57	20.00	100.00	1680.960
GPRS 1900 (1 Tx slot)	2.60	29.50	23.1	20.95	204.17	124.45	20.50	112.20	3060.000
GPRS 1900 (2 Tx slots)	2.60	28.00	24.6	22.45	288.40	175.79	22.00	158.49	3060.000
GPRS 1900 (3 Tx slots)	2.60	26.00	24.3	22.19	271.64	165.58	21.74	149.28	3060.000
GPRS 1900 (4 Tx slots)	2.60	25.00	24.6	22.45	288.40	175.79	22.00	158.49	3060.000
EGPRS 1900 (1 Tx slot)	2.60	25.50	19.1	16.95	81.28	49.55	16.50	44.67	3060.000
EGPRS 1900 (2 Tx slots)	2.60	23.50	20.1	17.95	102.33	62.37	17.50	56.23	3060.000
EGPRS 1900 (3 Tx slots)	2.60	22.50	20.8	18.69	121.34	73.96	18.24	66.68	3060.000
EGPRS 1900 (4 Tx slots)	2.60	21.50	21.1	18.95	128.82	78.52	18.50	70.79	3060.000
WCDMA Band 2	2.60	23.50	26.1	23.95	407.38	248.31	23.95	248.31	3060.000
WCDMA Band 4	2.40	23.50	25.9	23.75	389.05	237.14	23.75	237.14	3060.000
WCDMA Band 5	-0.10	23.50	23.4	21.25	218.78	133.35	23.50	223.87	1680.960
LTE Band 2	2.60	22.50	25.1	22.95	323.59	197.24	22.95	197.24	3060.000
LTE Band 4	2.40	22.50	24.9	22.75	309.03	188.36	22.75	188.36	3060.000
LTE Band 5	-0.10	22.50	22.4	20.25	173.78	105.93	22.50	177.83	1680.960
LTE Band 7	2.20	22.50	24.7	22.55	295.12	179.89	22.55	179.89	3060.000
LTE Band 38	2.70	22.50	25.2	23.05	331.13	201.84	23.05	201.84	3060.000
LTE Band 41_PC3	2.70	22.50	25.2	23.05	331.13	201.84	23.05	201.84	3060.000

Conclusion:

According to 47 CFR §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.