



FCC Test Report

APPLICANT : Continental Automotive Systems, Inc.
EQUIPMENT : WT50RW02
BRAND NAME : Continental
MODEL NAME : WT50RW02
FCC ID : LHJ-WT50RW02
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Jun. 25, 2019 and testing was completed on Jul. 08, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.107	AC Conducted Emission	< 15.107 limits	Not Required	-
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 7.85 dB at 33.88 MHz

Note: Not required means after assessing, test items are not necessary to carry out.



1. General Description

1.1. Applicant

Continental Automotive Systems, Inc.
21440 W Lake Cook Rd.

1.2. Manufacturer

Continental Automotive Systems, Inc.
21440 W Lake Cook Rd.

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	WT50RW02
Brand Name	Continental
Model Name	WT50RW02
FCC ID	LHJ-WT50RW02
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/LTE GNSS
HW Version	WT50RW02
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.



1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	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 : 2502.5 MHz ~ 2567.5 MHz LTE Band 38 : 2572.5 MHz ~ 2617.5 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz GNSS : 1559 MHz ~ 1610 MHz
Antenna Type	WWAN : Fixed External Antenna GNSS: Fixed External Antenna
Type of Modulation	GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) LTE: QPSK / 16QAM / 64QAM GNSS : BPSK

Note: GNSS = BDS + Galileo + GLONASS + GPS + SBAS

1.5. Modification of EUT

No modifications are made to the EUT during all test items.



1.6. Test Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-KS	CN1257	314309

1.7. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2. Test Configuration of Equipment Under Test

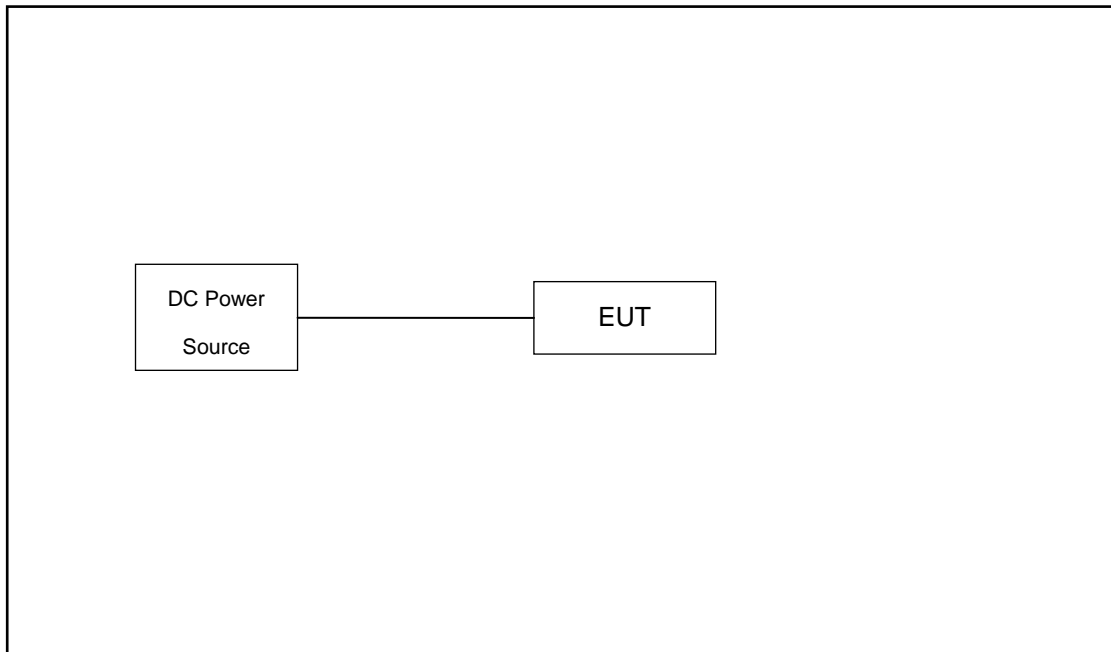
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
Radiated Emissions	Mode 1: GSM 850 Idle + DC 12V
	Mode 2: LTE Band 2 Idle + DC 12V
	Mode 3: LTE Band 38 Idle + DC 12V
Remark: The worst case of RE is mode 3; only the test data of this mode is reported.	

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritus	MT8820C	N/A	N/A	Unshielded, 1.8m
3.	DC Power	GW INSTEK	GPD-2303S	N/A	N/A	Unshielded, 1.8m

2.4. EUT Operation Test Setup

The EUT was in GSM or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.



3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.1.3. Test Procedures

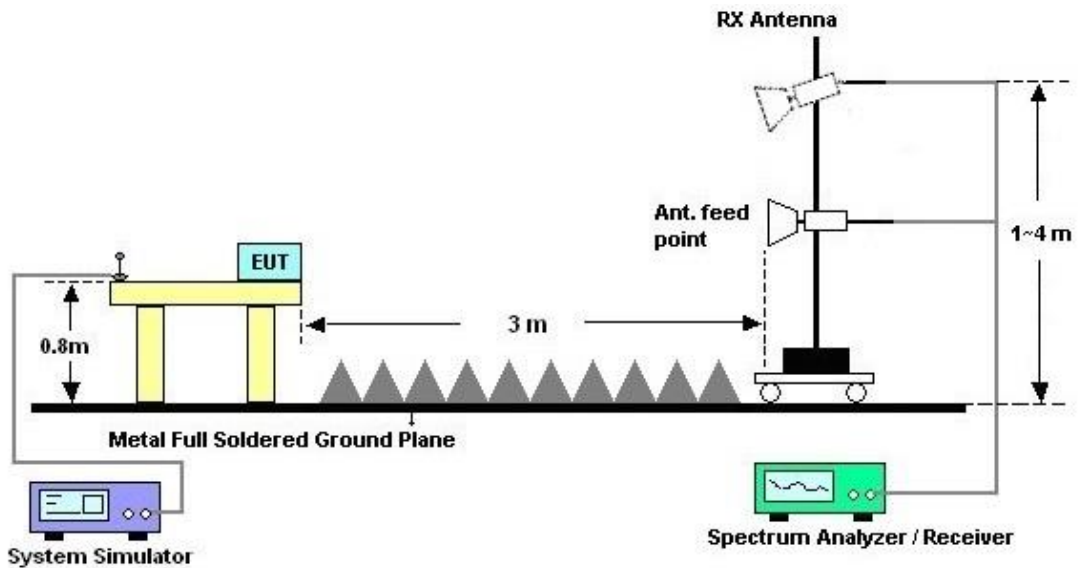
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



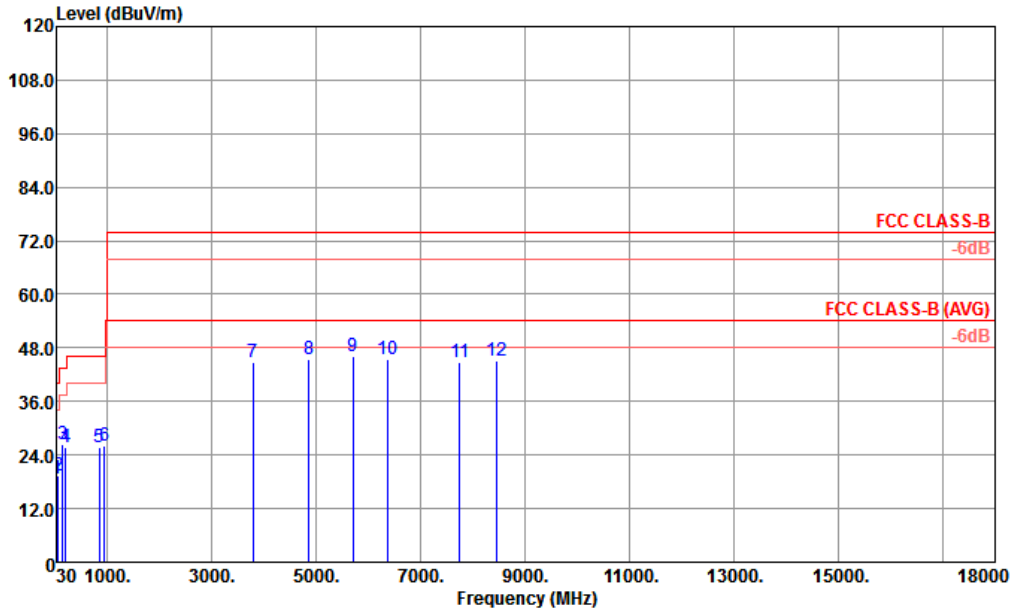
For radiated emissions above 1GHz





3.1.5. Test Result of Radiated Emission

Test Engineer :	Carl Ni	Temperature :	21~22°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Horizontal

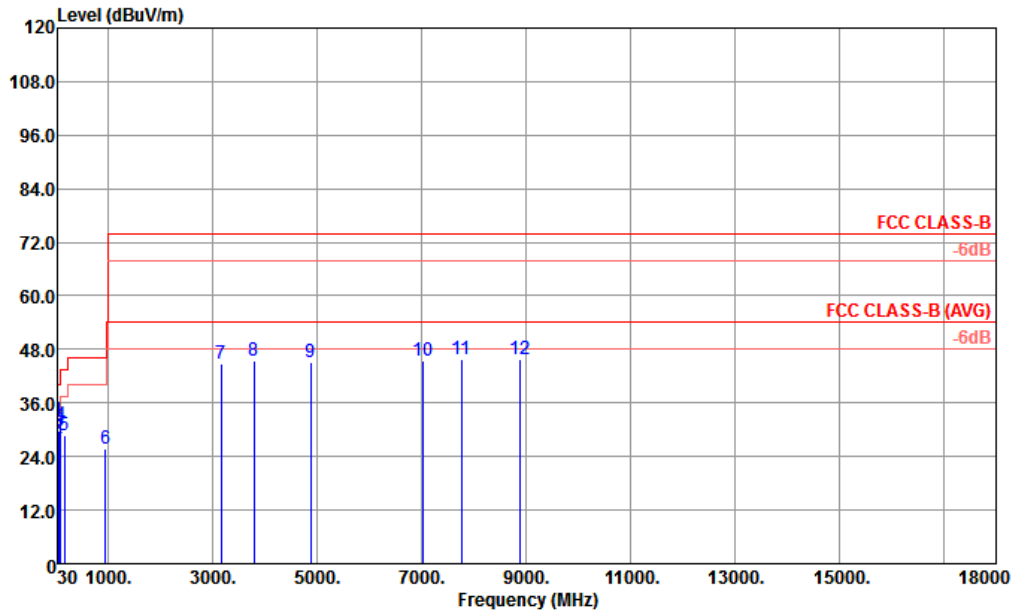


Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF 23182-3M HORIZONTAL
 Project : (FC)962519
 Mode : 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	18.84	-21.16	40.00	27.38	22.80	0.64	31.98	---	---	Peak
2	69.77	19.31	-20.69	40.00	38.67	11.60	0.97	31.93	---	---	Peak
3	152.22	26.26	-17.24	43.50	40.42	16.36	1.42	31.94	100	0	Peak
4	206.54	25.68	-17.82	43.50	40.23	15.69	1.67	31.91	---	---	Peak
5	846.74	25.70	-20.30	46.00	27.69	26.47	3.35	31.81	---	---	Peak
6	951.50	26.20	-19.80	46.00	26.40	27.22	3.55	30.97	---	---	Peak
7	3792.00	44.63	-29.37	74.00	35.81	33.62	7.21	32.01	---	---	Peak
8	4864.00	45.62	-28.38	74.00	35.06	33.75	8.17	31.36	---	---	Peak
9	5704.00	45.98	-28.02	74.00	33.40	34.76	8.96	31.14	---	---	Peak
10	6360.00	45.44	-28.56	74.00	32.39	35.14	9.48	31.57	---	---	Peak
11	7752.00	44.70	-29.30	74.00	29.84	36.15	10.72	32.01	---	---	Peak
12	8448.00	45.20	-28.80	74.00	29.56	36.46	11.14	31.96	---	---	Peak



Test Engineer :	Carl Ni	Temperature :	21~22°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical



Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF 23182-3M VERTICAL
 Project : (FC)962519
 Mode : 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	33.88	32.15	-7.85	40.00	42.12	21.28	0.71	31.96	100	0 Peak	
2	51.34	28.12	-11.88	40.00	45.94	13.28	0.84	31.94	---	---	Peak
3	64.92	29.76	-10.24	40.00	49.12	11.60	0.97	31.93	---	---	Peak
4	96.93	31.01	-12.49	43.50	45.60	16.20	1.14	31.93	---	---	Peak
5	169.68	28.68	-14.82	43.50	43.11	15.97	1.52	31.92	---	---	Peak
6	950.53	25.81	-20.19	46.00	26.03	27.21	3.55	30.98	---	---	Peak
7	3160.00	44.90	-29.10	74.00	37.73	33.13	6.56	32.52	---	---	Peak
8	3792.00	45.48	-28.52	74.00	36.66	33.62	7.21	32.01	---	---	Peak
9	4880.00	45.24	-28.76	74.00	34.61	33.77	8.20	31.34	---	---	Peak
10	7024.00	45.43	-28.57	74.00	31.39	35.33	9.97	31.26	---	---	Peak
11	7768.00	45.63	-28.37	74.00	30.74	36.15	10.76	32.02	---	---	Peak
12	8880.00	45.80	-28.20	74.00	29.50	36.27	11.60	31.57	---	---	Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Aug. 06, 2018	Jul. 08, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44G,MAX 30dB	Apr. 15, 2019	Jul. 08, 2019	Apr. 14, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Dec. 29, 2018	Jul. 08, 2019	Dec. 28, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Jul. 08, 2019	Jan. 26, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Jul. 08, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5G Hz	Apr. 15, 2019	Jul. 08, 2019	Apr. 14, 2020	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jul. 08, 2019	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 08, 2019	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 08, 2019	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required



5. Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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