



# FCC EMI TEST REPORT

**FCC ID** : LHJ-WT50NA01  
**Equipment** : WT50NA01  
**Brand Name** : WT50NA01  
**Model Name** : WT50NA01  
**Applicant** : Continental Automotive Systems, Inc.  
21440 W Lake Cook Rd.  
**Manufacturer** : Continental Automotive Systems, Inc.  
21440 W Lake Cook Rd.  
**Standard** : FCC 47 CFR FCC Part 15 Subpart B

The product was received on Jun. 21, 2018 and testing was started from Jul. 09, 2018 and completed on Jul. 09, 2018. We, SPORTON INTERNATIONAL 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test 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: Jones Tsai

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## History of this test report

Report No.	Version	Description	Issued Date
FC862137	01	Initial issue of report	Jul. 23, 2018



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.107	AC Conducted Emission	Not Required	-
3.1	15.109	Radiated Emission	Pass	Under limit 6.65 dB at 729.100 MHz

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

**Reviewed by:** Louis Wu

**Report Producer:** Maggie Chiang

## 1. General Description

### 1.1. Product Feature of Equipment Under Test

GSM/WCDMA/LTE and GNSS

Product Specification subjective to this standard	
Antenna Type	WWAN: Fixed External Antenna GPS/Glonass/BDS/Galileo/SBAS: Fixed External Antenna

### 1.2. Modification of EUT

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

### 1.3. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1098 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH10-HY

### 1.4. Applicable Standards

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

- ♦ FCC 47 CFR FCC 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

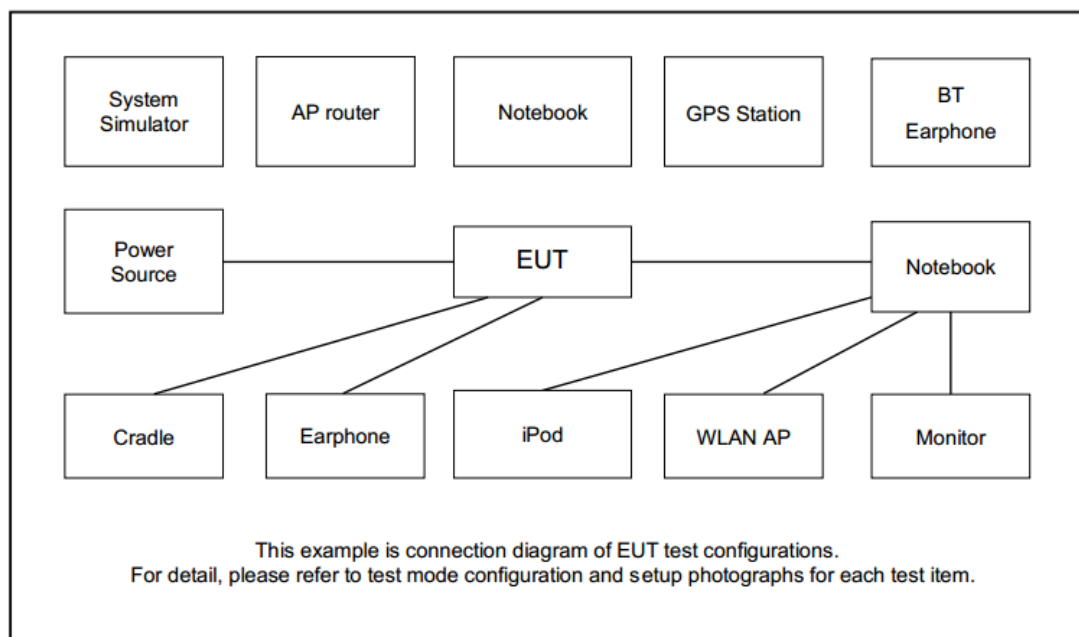
### 2.1. Test Mode

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
<b>Radiated Emissions</b>	Mode 1 : LTE Band 2 Idle + DC 12V
	Mode 2 : WCDMA Band V Idle + DC 12V
<b>Remark:</b> The worst case of RE is mode 2; only the test data of this mode was 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	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

### 2.4. EUT Operation Test Setup

The EUT was in LTE or WCDMA idle mode during the testing. The EUT was synchronized with the BCCH, and had been continuous receiving mode by setting paging reorganization of the system simulator.

### 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:

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

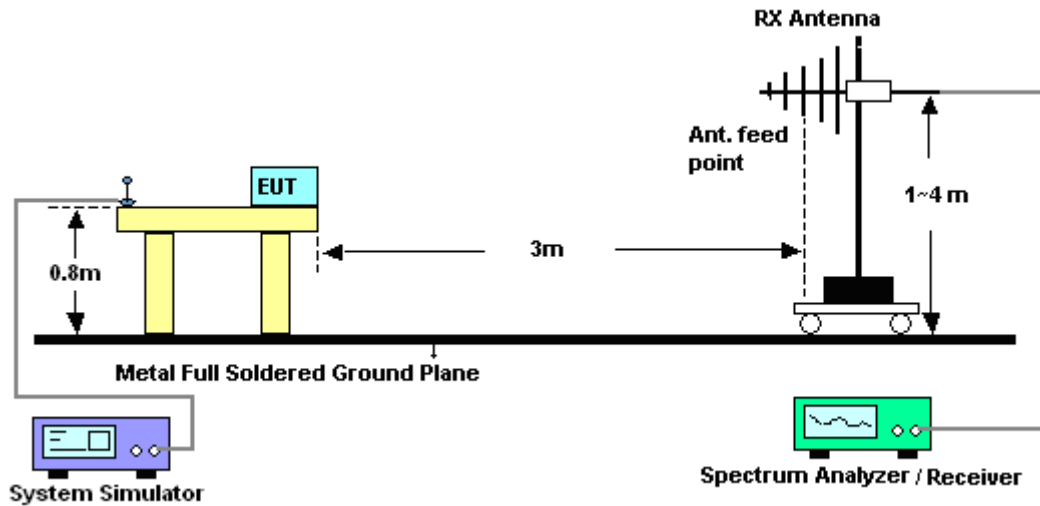
Refer a test equipment and calibration data table in this test report.

##### 3.1.3. Test Procedures

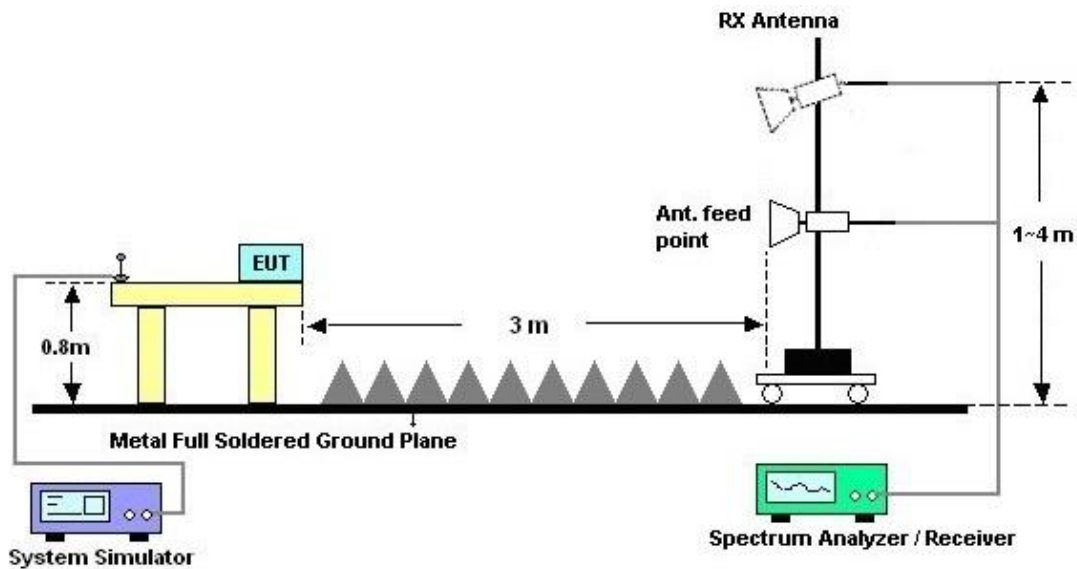
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBμV/m) = 20 log Emission level (μV/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

Please refer to Appendix A.





## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2017	Jul. 09, 2018	Oct. 18, 2018	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Dec. 18, 2017	Jul. 09, 2018	Dec. 17, 2018	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Sep. 27, 2017	Jul. 09, 2018	Sep. 26, 2018	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800 -30-10P	160118550004	1GHz~18GHz	Apr. 17, 2018	Jul. 09, 2018	Apr. 16, 2019	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 31, 2017	Jul. 09, 2018	Oct. 30, 2018	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jul. 09, 2018	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Jul. 09, 2018	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Jul. 09, 2018	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Jul. 09, 2018	Jan. 15, 2019	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/4PE, MY11693/4PE, MY2855/2	30M-1G	Nov. 14, 2017	Jul. 09, 2018	Nov. 13, 2018	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/4PE, MY11693/4PE, MY2855/2	1G-18G	Nov. 14, 2017	Jul. 09, 2018	Nov. 13, 2018	Radiation (03CH10-HY)

## 5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.6
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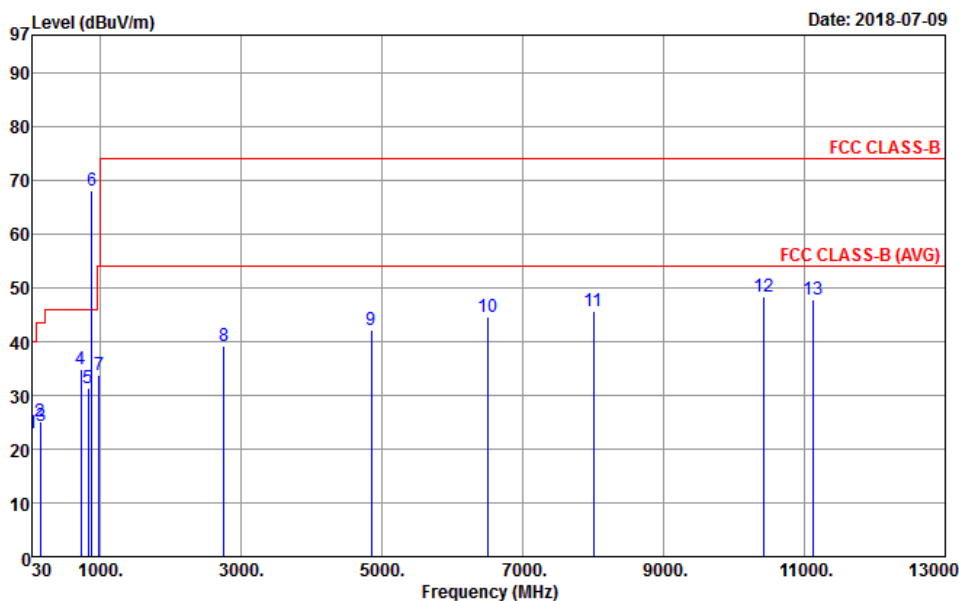
### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.9
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## Appendix A. Radiated Emission Test Result

Test Engineer :	Lewis Ho	Temperature :	23~24°C
		Relative Humidity :	52~53%
Test Distance :	3m	Polarization :	Horizontal
Remark :	#6 is system simulator signal which can be ignored.		

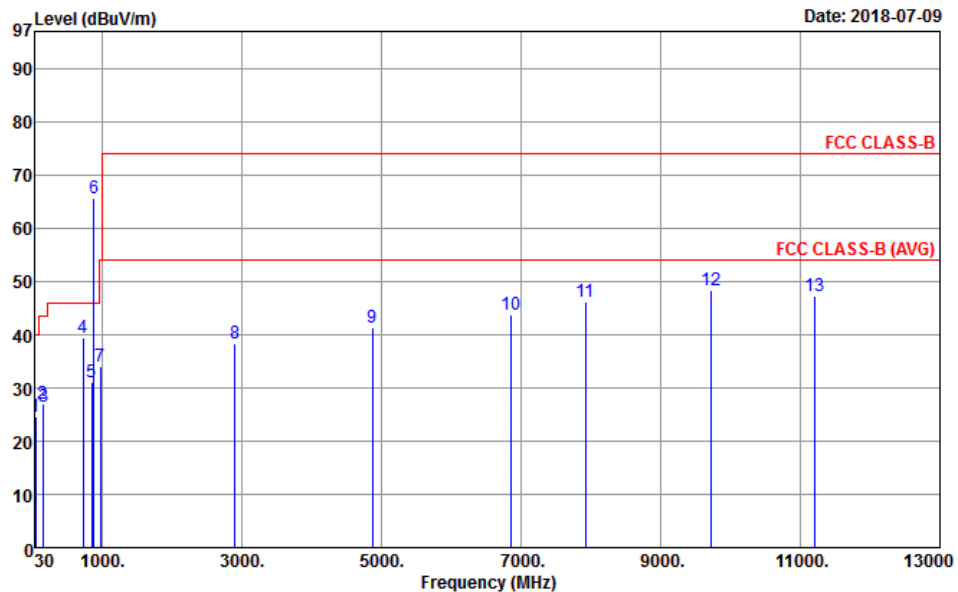


Site : 03CH10-HY  
 Condition : FCC CLASS-B 3m HORN 9120D-HF HORIZONTAL  
 Project : 862137  
 Power : DC 12V  
 Mode : 2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBUV/m	Limit	Line	Level	Factor	Loss	Factor	cm	deg
			dB	dBUV/m	dBuV	dB/m	dB	dB		
1	30.00	23.03	-16.97	40.00	30.56	24.57	0.60	32.78	---	Peak
2	150.96	25.03	-18.47	43.50	38.98	17.01	1.33	32.67	---	Peak
3	156.36	24.19	-19.31	43.50	38.31	16.82	1.33	32.67	---	Peak
4	730.50	34.86	-11.14	46.00	36.44	27.70	2.87	32.74	100	0 Peak
5	828.50	31.33	-14.67	46.00	31.72	28.41	3.04	32.49	---	Peak
6 *	881.70	68.01			67.26	29.09	3.16	32.19	---	Peak
7	982.50	33.91	-20.09	54.00	30.08	30.84	3.34	31.16	---	Peak
8	2758.00	39.16	-34.84	74.00	67.25	27.95	5.81	61.85	---	Peak
9	4852.00	42.19	-31.81	74.00	64.84	31.25	8.40	62.30	---	Peak
10	6506.00	44.69	-29.31	74.00	63.97	34.20	9.53	63.01	---	Peak
11	8008.00	45.68	-28.32	74.00	61.76	37.10	10.43	63.61	---	Peak
12	10428.00	48.45	-25.55	74.00	61.48	39.59	11.84	64.46	100	0 Peak
13	11132.00	47.71	-26.29	74.00	59.09	40.02	12.43	63.83	---	Peak



Test Engineer :	Lewis Ho	Temperature :	23~24°C
		Relative Humidity :	52~53%
Test Distance :	3m	Polarization :	Vertical
Remark :	#6 is system simulator signal which can be ignored.		



Site : 03CH10-HY  
Condition : FCC CLASS-B 3m HORN 9120D-HF VERTICAL  
Project : 862137  
Power : DC 12V  
Mode : 2

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	40.80	24.53	-15.47	40.00	37.47	18.94	0.78	32.77	---	---	Peak
2	150.69	27.02	-16.48	43.50	40.93	17.05	1.33	32.67	---	---	Peak
3	156.63	26.35	-17.15	43.50	40.50	16.78	1.33	32.67	---	---	Peak
4	729.10	39.35	-6.65	46.00	40.98	27.65	2.87	32.74	100	0	Peak
5	845.30	31.19	-14.81	46.00	30.96	28.88	3.09	32.40	---	---	Peak
6 *	881.70	65.55			64.80	29.09	3.16	32.19	---	---	Peak
7	976.20	33.98	-20.02	54.00	30.10	30.96	3.34	31.23	---	---	Peak
8	2902.00	38.50	-35.50	74.00	66.09	28.28	6.01	61.88	---	---	Peak
9	4870.00	41.25	-32.75	74.00	63.88	31.28	8.39	62.30	---	---	Peak
10	6856.00	43.72	-30.28	74.00	62.62	35.10	9.43	63.43	---	---	Peak
11	7918.00	46.14	-27.86	74.00	62.43	37.02	10.31	63.62	---	---	Peak
12	9714.00	48.41	-25.59	74.00	62.86	38.68	11.61	64.74	100	0	Peak
13	11206.00	47.40	-26.60	74.00	58.77	39.98	12.49	63.84	---	---	Peak