



# FCC RADIO TEST REPORT

**FCC ID** : B94HNC09CMCL  
**Equipment** : Convertible PC  
**Brand Name** : HP  
**Model Name** : HSN-C09C  
**Applicant** : HP Inc.  
1501 Page Mill Road, Palo Alto CA  
94304 USA  
**Standard** : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)

The product was received on Aug. 21, 2020 and testing was started from Sep. 11, 2020 and completed on Sep. 14, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial 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.

Louis Wu

Approved by: Louis Wu

**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
FG082123A	01	Initial issue of report	Oct. 29, 2020

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	§2.1046	Conducted Output Power	-	See Note
	§22.913 (a)(2)	Effective Radiated Power (WCDMA Band V)		
	§24.232 (c)	Equivalent Isotropic Radiated Power (WCDMA Band II)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (WCDMA Band IV)		
-	§24.232 (d)	Peak-to-Average Ratio	-	See Note
-	§2.1049 §22.917 (b) §24.238 (b) §27.53 (g)	Occupied Bandwidth (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Band Edge Measurement (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Conducted Emission (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	-	See Note
3.4	§2.1053 §22.917 (a) §24.238 (a) §27.53 (h)	Field Strength of Spurious Radiation (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	Under limit 42.17 dB at 2509.000 MHz

**Note:** The module (Model: T77W968) makes no difference after verifying output power, this report reuses test data from the module report.

### Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Wii Chang**

**Report Producer: Celery Wei**

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, and GNSS.

Product Specification subjective to this standard	
<b>WWAN Module</b>	Brand Name: FOXCONN Model Name: T77W968
<b>Antenna Type</b>	WWAN <Ant. 1>: PIFA Antenna <Ant. 2>: PIFA Antenna (Rx only) <Ant. 3>: Couple Antenna <Ant. 4>: Couple Antenna (Rx only) WLAN <Ant. 1>: Couple Antenna <Ant. 2>: Couple Antenna Bluetooth: Couple Antenna GPS / Glonass / Galileo : PIFA Antenna

WWAN Antenna Information_NB Mode			
Antenna Part Number	Manufacture	Antenna Type	Peak Gain (dBi)
Tx1 Main Antenna 260-24315 DC33002FX20)	HONG-BO	PIFA	824-849MHz -5.33 dBi (peak)
			880-915MHz -5.19 dBi (peak)
			1710-1785MHz -3.50 dBi (peak)
			1850-1910MHz -1.81 dBi (peak)
			1920-1980MHz -0.23 dBi (peak)
			704-716MHz -5.56 dBi (peak)
			746-756MHz -3.93 dBi (peak)
			777-787MHz -5.35 dBi (peak)
			832-862MHz -4.85 dBi (peak)
			1710-1755MHz -4.61 dBi (peak)
			2500-2570MHz -1.34 dBi (peak)
			2570-2620MHz -3.21 dBi (peak)
			2300-2400MHz 0.40 dBi (peak)

WWAN Antenna Information_TB Mode			
Antenna Part Number	Manufacture	Antenna Type	Peak Gain loss (dBi)
Tx1 Main Antenna 260-24315 (DC33002FX20)	HONG-BO	PIFA	824-849MHz -4.92 dBi (peak)
			880-915MHz -5.52 dBi (peak)
			1710-1785MHz -0.09 dBi (peak)
			1850-1910MHz -0.45 dBi (peak)
			1920-1980MHz -0.17 dBi (peak)
			704-716MHz -8.11 dBi (peak)
			746-756MHz -7.17 dBi (peak)
			777-787MHz -6.54 dBi (peak)
			832-862MHz -4.92 dBi (peak)
			1710-1755MHz -0.31 dBi (peak)
			2500-2570MHz -3.24dBi (peak)
			2570-2620MHz -3.24 dBi (peak)
			2300-2400MHz -0.58 dBi (peak)



## 1.2 Modification of EUT

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

## 1.3 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	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
<b>Test Site No.</b>	<b>Sporton Site No.</b> 03CH11-HY
<b>Test Engineer</b>	Fu Chen and Troye Hsieh
<b>Temperature</b>	20.1~25.7℃
<b>Relative Humidity</b>	55.2~67.5%

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW0007

## 1.4 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z and Notebook type (Ant. Degree 45, Degree 90). The worst cases (Y plane) were recorded in this report.

Radiated emissions were investigated as following frequency range:

1. 30MHz to 9000 MHz for WCDMA Band V

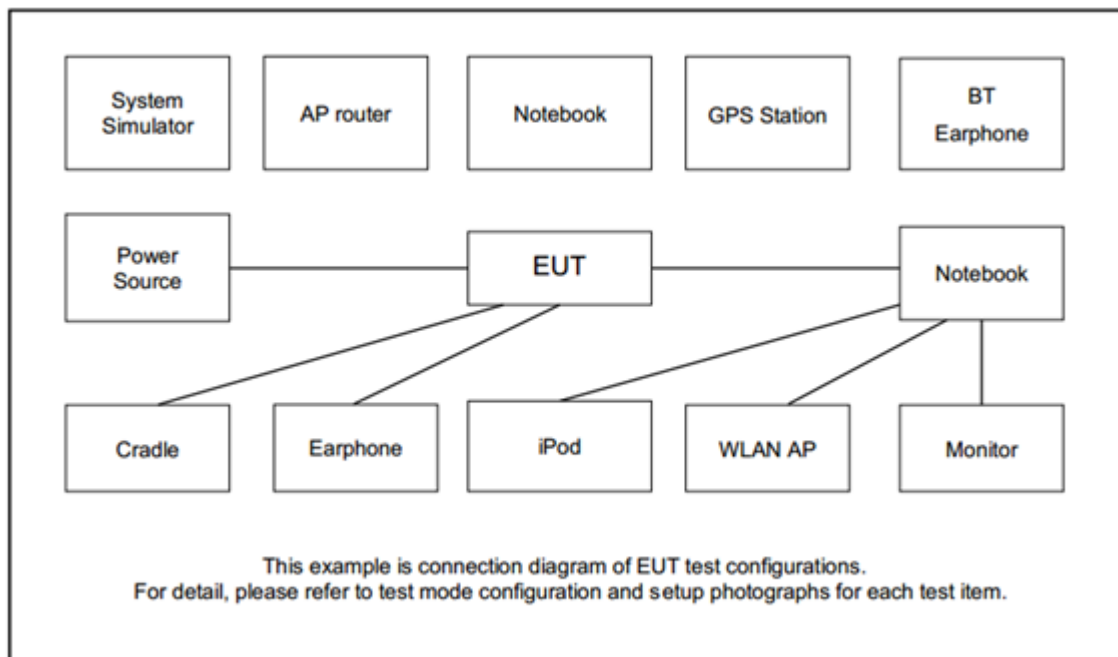
All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Radiated TCs
WCDMA Band V	■ RMC 12.2Kbps Link

**Remark:** All the radiated test cases were performed with Adapter 3.

### 2.2 Connection Diagram of Test System





## 2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

## 2.4 Frequency List of Low/Middle/High Channels

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6



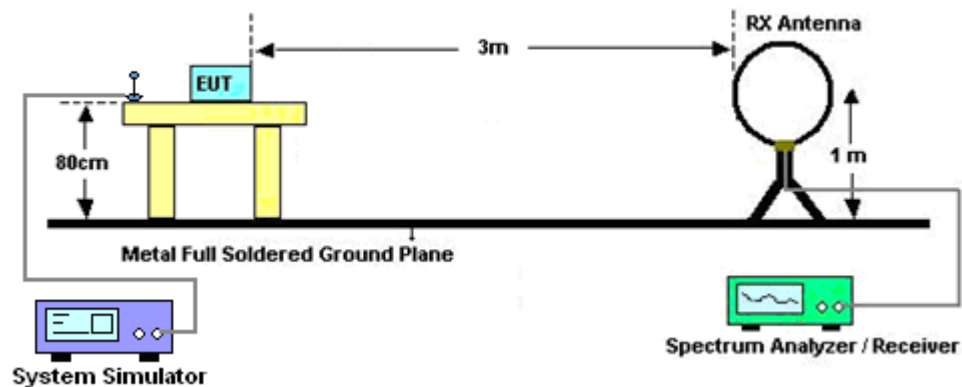
### 3 Radiated Test Items

#### 3.1 Measuring Instruments

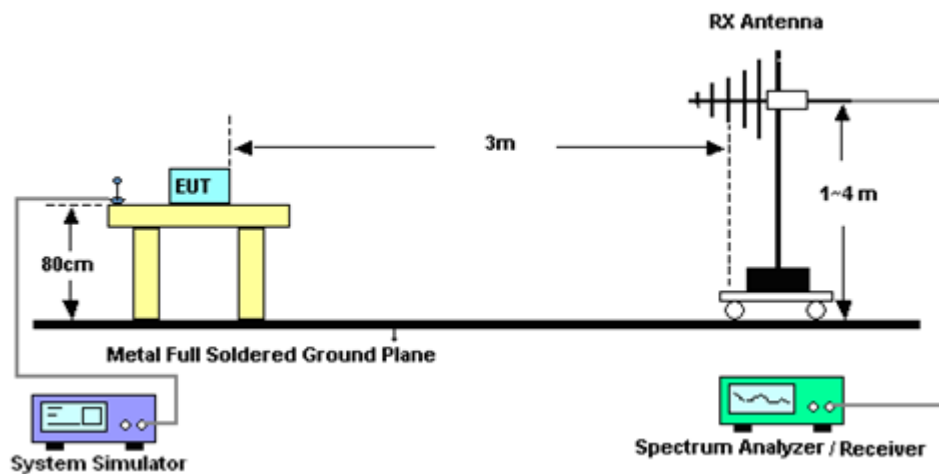
See list of measuring instruments of this test report.

#### 3.2 Test Setup

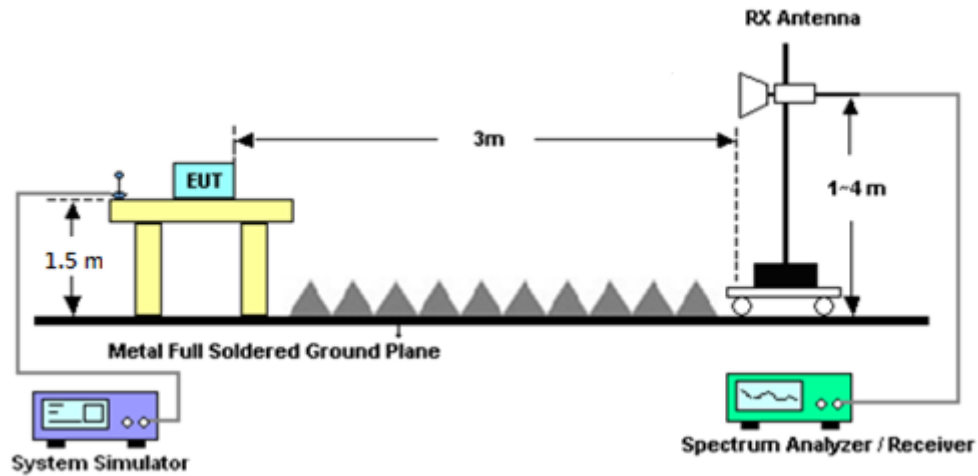
For radiated emissions below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



### 3.3 Test Result of Radiated Test

Please refer to Appendix A.

**Note:**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



### **3.4 Field Strength of Spurious Radiation Measurement**

#### **3.4.1 Description of Field Strength of Spurious Radiated Measurement**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### **3.4.2 Test Procedures**

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11.  $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 03, 2019	Sep. 11, 2020~ Sep. 14, 2020	Dec. 02, 2020	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT- N0602	30MHz~1GHz	Oct. 12, 2019	Sep. 11, 2020~ Sep. 14, 2020	Oct. 11, 2020	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Nov. 04, 2019	Sep. 11, 2020~ Sep. 14, 2020	Nov. 03, 2020	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 09, 2020	Sep. 11, 2020~ Sep. 14, 2020	Jan. 08, 2021	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 13, 2019	Sep. 11, 2020~ Sep. 14, 2020	Nov. 12, 2020	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Oct. 28, 2019	Sep. 11, 2020~ Sep. 14, 2020	Oct. 27, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1.53G Low Pass	Sep. 15, 2019	Sep. 11, 2020~ Sep. 13, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1.53G Low Pass	Sep. 14, 2020	Sep. 14, 2020	Sep. 13, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN3	3GHz High Pass	Sep. 15, 2019	Sep. 11, 2020~ Sep. 13, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN3	3GHz High Pass	Sep. 14, 2020	Sep. 14, 2020	Sep. 13, 2021	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Sep. 11, 2020~ Sep. 14, 2020	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Sep. 11, 2020~ Sep. 14, 2020	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Sep. 11, 2020~ Sep. 14, 2020	N/A	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY53290045	20MHz~8.4GHz	Jan. 18, 2020	Sep. 11, 2020~ Sep. 14, 2020	Jan. 17, 2021	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Sep. 11, 2020~ Sep. 14, 2020	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 12, 2020	Sep. 11, 2020~ Sep. 14, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	30M-18G	Mar. 12, 2020	Sep. 11, 2020~ Sep. 14, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 12, 2020	Sep. 11, 2020~ Sep. 14, 2020	Mar. 11, 2021	Radiation (03CH11-HY)
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	Feb. 15, 2020	Sep. 11, 2020~ Sep. 14, 2020	Feb. 14, 2021	Radiation (03CH11-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.29
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.32
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## Appendix A. Test Results of Radiated Test

### WCDMA 850

WCDMA 850									
Channel	Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1652	-62.43	-13	-49.43	-72.97	-69.39	0.53	9.63	H
	2479	-59.39	-13	-46.39	-73.36	-67.37	0.65	10.78	H
	3305	-57.88	-13	-44.88	-74.57	-66.99	0.76	12.02	H
	1652	-62.48	-13	-49.48	-72.73	-69.44	0.53	9.63	V
	2479	-57.86	-13	-44.86	-72.32	-65.84	0.65	10.78	V
	3305	-57.67	-13	-44.67	-74.31	-66.78	0.76	12.02	V
Middle	1672	-62.38	-13	-49.38	-73.04	-69.38	0.53	9.68	H
	2509	-58.28	-13	-45.28	-72.25	-66.28	0.66	10.81	H
	3345	-57.45	-13	-44.45	-74.25	-66.67	0.76	12.14	H
	1672	-62.80	-13	-49.80	-73.06	-69.8	0.53	9.68	V
	2509	-55.17	-13	-42.17	-69.54	-63.17	0.66	10.81	V
	3345	-58.05	-13	-45.05	-74.6	-67.27	0.76	12.14	V
Highest	1693	-62.12	-13	-49.12	-73.04	-69.16	0.53	9.72	H
	2539	-58.95	-13	-45.95	-72.99	-66.96	0.67	10.82	H
	3386	-58.11	-13	-45.11	-74.99	-67.45	0.77	12.26	H
	1693	-62.64	-13	-49.64	-72.92	-69.68	0.53	9.72	V
	2539	-57.00	-13	-44.00	-71.41	-65.01	0.67	10.82	V
	3386	-58.31	-13	-45.31	-74.77	-67.65	0.77	12.26	V

**Remark:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

—————THE END—————