FCC RF Test Report

APPLICANT	:	**Honeywell International Inc.** **Honeywell Safety and Productivity Solutions**
EQUIPMENT	:	**RT10A**
BRAND NAME	:	**Honeywell**
MODEL NAME	:	**RT10AL1N**
FCC ID	:	**HD5-RT10AL1N**
STANDARD	:	**47 CFR Part 2, and 90(S)**
CLASSIFICATION	:	**PCS Licensed Transmitter (PCB)**

The product was received on May 22, 2020 and completely tested on Jul. 13, 2020. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

This product installed a RF module (Brand Name: Honeywell, Model Name: SOM660W, FCC ID: HD5-660W) during the test, only conducted power and RSE test items are tested in this report, all the other test results are quoted on module RF report.

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

ACCREDITED Cert #5145.02

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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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW052222A	Rev. 01	Initial issue of report	Aug. 27, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting only	PASS	-
-	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	PASS	1
-	§2.1051 §90.691	Emission masks – In-band emissions	< $50+10\log_{10}$(P[Watts])	PASS	1
-	§2.1051 §90.691	Emission masks – Out of band emissions	< $43+10\log_{10}$(P[Watts])	PASS	1
3.2	§2.1053 §90.691	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 10.96 dB at 1646.000 MHz
-	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	1

Remark 1: All conducted test items were leveraged from module RF report which can refer to Report No. "RF171130C26-4".

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.

1 General Description

1.1 Applicant

Honeywell International Inc.
Honeywell Safety and Productivity Solutions
9680 Old Bailes Rd. Fort Mill, SC 29707 United States

1.2 Manufacturer

Honeywell International Inc.
Honeywell Safety and Productivity Solutions
9680 Old Bailes Rd. Fort Mill, SC 29707 United States

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	RT10A
Brand Name	Honeywell
Model Name	RT10AL1N
FCC ID	HD5-RT10AL1N
EUT supports Radios application	CDMA/GSM/WCDMA/LTE/NFC/GNSS WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
IMEI Code	990016020002208
HW Version	V1.0
SW Version	OS.03.003-HON.02.001.DO
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

Product Specification subjective to this standard	
Tx Frequency	BC10 : 817.9 ~ 823.1 MHz
Rx Frequency	BC10 : 862.9 ~ 868.1 MHz
Maximum Output Power to Antenna	23.92 dBm
Antenna Type	PIFA Antenna
Type of Modulation	CDMA2000 1xEV-DO: QPSK/8PSK

1.5 Modification of EUT

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

1.6 Maximum Conducted Power

FCC Rule	System	Type of Modulation	Frequency Tolerance (ppm)	Emission Designator	Maximum Conducted power(W)
Part 90S	CDMA2000 BC10 1xEV-DO	QPSK	-	-	0.2466

1.7 Testing Site

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.**
	03CH04-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.9 Applied Standards

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

- 47 CFR Part 2, 90(S)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

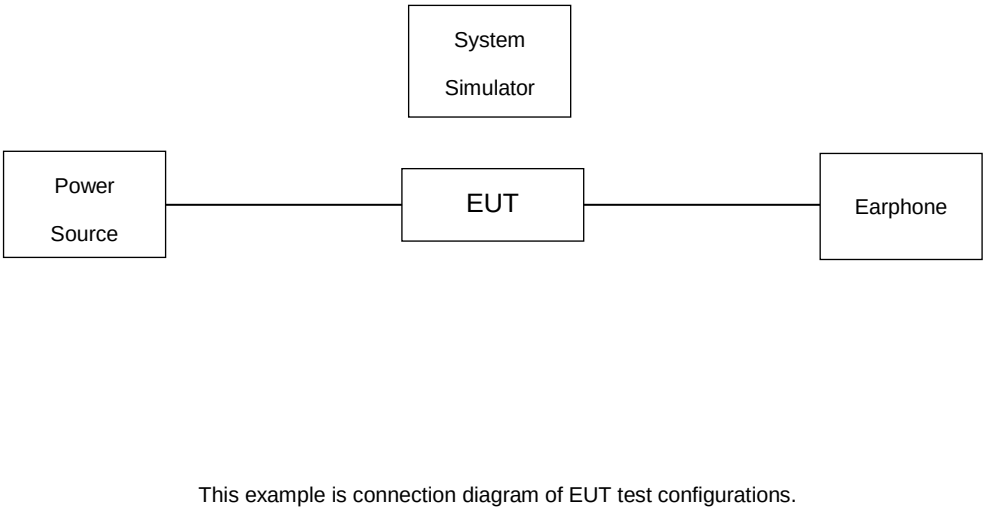
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is 30 MHz to 10th harmonic.

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
CDMA2000 BC10	■ 1xEV-DO Link	■ 1xEV-DO Link

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Earphone	Lenovo	P121	N/A	Unshielded,1.2m	N/A

2.4 Frequency List of Low/Middle/High Channels

Frequency List				
Band	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
CDMA200 BC10	Channel	476	580	684
	Frequency	817.9	820.5	823.1

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

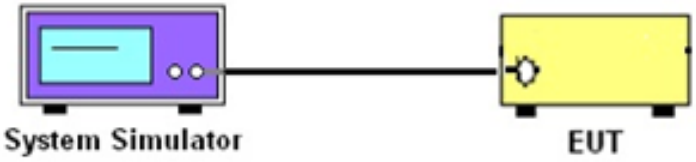
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Please refer to Appendix A.

3.2 Field Strength of Spurious Radiation Measurement

3.2.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.2.2 Measuring Instruments

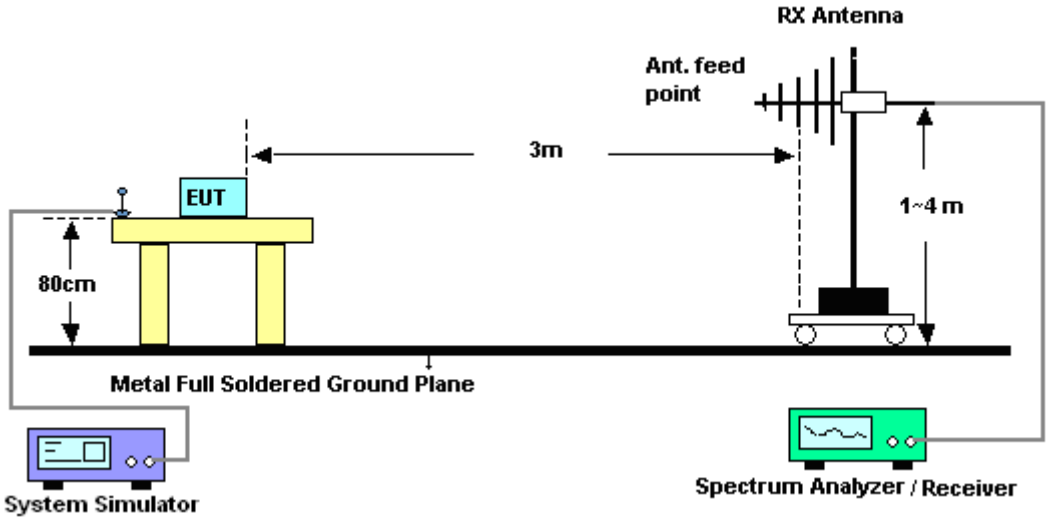
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

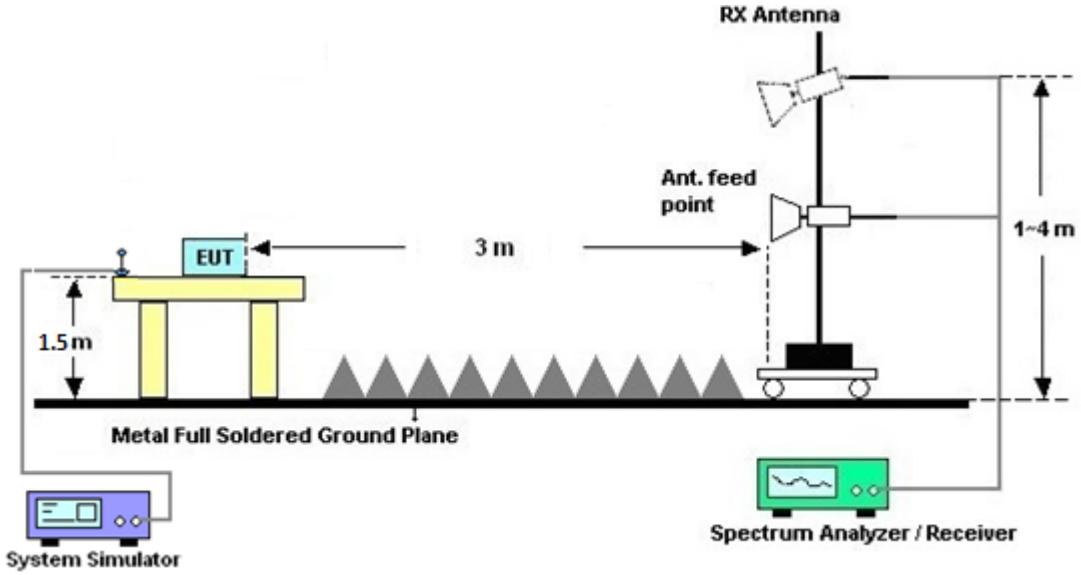
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the 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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (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 + 10log(P) dB below the transmitter power P(Watts)

3.2.4 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.2.5 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 15, 2020	Jul. 13, 2020	Apr. 14, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jan. 02, 2020	Jul. 13, 2020	Jan. 01, 2021	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 20, 2020	Jul. 13, 2020	Apr. 19, 2021	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 02, 2020	Jul. 13, 2020	Jan. 01, 2021	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1Ghz-18Ghz	Jan. 02, 2020	Jul. 13, 2020	Jan. 01, 2021	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 15, 2019	Jul. 13, 2020	Oct. 14, 2020	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 13, 2020	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 13, 2020	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 13, 2020	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3dB**

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power)

Conducted Power (*Unit: dBm)			
Band	**CDMA2000 BC10**		
Channel	**476**	**580**	**684**
Frequency	**817.9**	**820.5**	**823.1**
RTAP 153.6Kbps	23.91	**23.92**	23.86
RETAP 4096Bits	23.90	23.89	23.85

Appendix B. Test Results of Radiated Test

CDMA BC10 (1xEV-DO)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1636	-25.70	-13	-12.70	-32.67	1.58	10.70	H
	2454	-38.36	-13	-25.36	-46.61	2.102	12.50	H
	3270	-53.57	-13	-40.57	-62.46	2.856	13.90	H
	4092	-56.85	-13	-43.85	-65.31	2.689	13.30	H
	1636	-35.64	-13	-22.64	-42.61	1.58	10.70	V
	2454	-46.20	-13	-33.20	-54.45	2.10	12.50	V
	3270	-56.19	-13	-43.19	-65.08	2.86	13.90	V
	4092	-55.42	-13	-42.42	-63.88	2.69	13.30	V
Middle	1640	-26.01	-13	-13.01	-32.98	1.58	10.70	H
	2462	-37.10	-13	-24.10	-45.35	2.102	12.50	H
	3282	-54.50	-13	-41.50	-63.39	2.856	13.90	H
	4104	-58.11	-13	-45.11	-66.57	2.689	13.30	H
	1640	-35.38	-13	-22.38	-42.35	1.58	10.70	V
	2462	-43.79	-13	-30.79	-52.04	2.10	12.50	V
	3282	-56.45	-13	-43.45	-65.34	2.86	13.90	V
	4104	-56.88	-13	-43.88	-65.34	2.69	13.30	V
Highest	1646	-23.96	-13	-10.96	-30.93	1.58	10.70	H
	2470	-41.23	-13	-28.23	-49.48	2.102	12.50	H
	3294	-52.55	-13	-39.55	-61.44	2.856	13.90	H
	4116	-56.30	-13	-43.30	-64.76	2.689	13.30	H
	1646	-34.24	-13	-21.24	-41.21	1.58	10.70	V
	2470	-47.12	-13	-34.12	-55.37	2.10	12.50	V
	3294	-56.46	-13	-43.46	-65.35	2.86	13.90	V
	4116	-54.24	-13	-41.24	-62.70	2.69	13.30	V

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