



FCC SAR Test Report

APPLICANT : Honeywell International Inc.
EQUIPMENT : CN75LAN mobile computer
BRAND NAME : Honeywell
MODEL NAME : CN75LAN
MARKETING NAME : CN75
FCC ID : HD5-CN75LAN
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Manager

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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Revision History



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Honeywell International Inc., CN75LAN mobile computer, CN75LAN**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	
		Head (Separation 0mm)	Body-worn (Separation 10mm)
		1g SAR (W/kg)	
DTS	2.4GHz WLAN	0.08	0.07
NII	5GHz WLAN	0.09	0.44
DSS	Bluetooth		< 0.01

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Honeywell International Inc.
Address	9680 Old Bailes Road, Fort Mill, SC 29707 USA

Manufacturer	
Company Name	Honeywell International Inc.
Address	9680 Old Bailes Road, Fort Mill, SC 29707 USA

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02



4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	CN75LAN mobile computer
Brand Name	Honeywell
Model Name	CN75LAN
Marketing Name	CN75
FCC ID	HD5-CN75LAN
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	802.11a/b/g/n HT20 Bluetooth BR/EDR/LE
HW Version	v1.1
SW Version	3.00.05.0075
EUT Stage	Identical Prototype
Remark :	<ol style="list-style-type: none"> WLAN operation in 5600 MHz ~ 5650 MHz is notched. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.

Sample List	
Sample 1	CN75E non-WWAN-Q6 non-WWAN_Q6 keypad
Sample 2	CN75E non-WWAN-N7 non-WWAN_N7 keypad
Sample 3	CN75 non-WWAN-Q5 non-WWAN_Q5 keypad
Sample 4	CN75 non-WWAN-N5 non-WWAN_N5 keypad

Accessory Information	
Equipment	Model Name
CN75A/CN75E Dock	1000AV01
CK75 Dock	1001AV01
car charger	850-057-005
Snap-on(LAN)	1000AA01
Snap-on(RS232)	1000AA03
Snap-On(VoCollect)	1000AA05
Snap-on (USB)	1000AA07
Snap-on adapter	9001AE01
Holster for the CN75A	INZPT-2148-K
Holster for the CN75E	INZPT-2150-K
Holster for the CK75	INZPT-2152-K



5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.



6. Spot Check Evaluation

1. Introduction Section

The original model (FCC ID: HD5-CN75WAN) and the variant model (FCC ID: HD5-CN75LAN) has identical PCB layout, antenna, SW implementation for Bluetooth/Wi-Fi/NFC/GPS. Based on their similarity, the FCC SAR (equipment class: DTS, DSS, NII) test data of HD5-CN75LAN references the test data of HD5-CN75WAN.

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID (FCC ID: HD5-CN75LAN).

2. Difference Section

The difference between original model and the variant model is remove WWAN operation and spot-check WLAN/BT operation were performed on the head and body-worn condition to ensure that the SAR measurement for both device are the same, and the original model please refer to appendix A.

3. Spot Check Verification Data Section

The spot check verification shows the WLAN/BT SAR performance of HD5-CN75WAN represents the performance of HD5-CN75LAN.

<Head SAR>

Band	Mode	Test Position	Gap (mm)	Sample	Ch.	Freq. (MHz)	Original Model (HD5-CN75WAN)						Spot Check Mode (HD5-CN75LAN)						Deviation
							Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	
WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Sample 3	11	2462	17.27	18.00	100.000	0.050	0.070	0.083	17.11	18.00	100.000	0.120	0.057	0.070	-15.7%
WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Sample 1	64	5320	13.39	14.00	98.900	0.143	0.076	0.088	13.06	14.00	98.900	0.190	0.066	0.083	-5.7%
WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Sample 3	140	5700	13.15	14.00	98.900	0.159	0.064	0.079	13.00	14.00	98.900	0.180	0.065	0.083	5.1%
WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Sample 2	165	5825	13.41	14.00	98.810	0.097	0.07	0.081	13.10	14.00	98.810	0.160	0.057	0.071	-12.3%

<Body-Worn SAR>

Band	Mode	Test Position	Gap (mm)	Sample	Ch.	Freq. (MHz)	Original Model (HD5-CN75WAN)						Spot Check Mode (HD5-CN75LAN)						Deviation
							Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	
WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Sample 4	6	2437	17.20	18.00	100.000	0.039	0.057	0.069	17.18	18.00	100.000	-0.059	0.048	0.058	-15.9%
WLAN5GHz	802.11a 6Mbps	Back	10mm	Sample 4	64	5320	13.39	14.00	98.900	0.136	0.376	0.437	13.06	14.00	100.000	-0.066	0.325	0.404	-7.6%
WLAN5GHz	802.11a 6Mbps	Back	10mm	Sample 4	100	5500	13.19	14.00	98.900	-0.065	0.329	0.401	13.05	14.00	100.000	-0.127	0.271	0.337	-16.0%
WLAN5GHz	802.11a 6Mbps	Back	10mm	Sample 3	165	5825	13.41	14.00	98.810	-0.191	0.364	0.422	13.10	14.00	100.000	-0.061	0.333	0.410	-2.8%
Bluetooth	1Mbps	Back	10mm	Sample 2	39	2441	7.11	8.00	77.130	-0.128	0.003	0.004	6.47	8.00	77.130	-0.158	0.002	0.004	0.0%

4. Reference detail Section

Rule Part	Frequency Band (MHz)	Wireless Technology	Reference FCC ID	Reference Report Title	Reference Report No.	Reference Report Sections
15C	2400~2483.5	Bluetooth	HD5-CN75WAN	FCC SAR Test Report	FA6D2819-01	Sections related to Bluetooth test data
15C	2400~2483.5	Wi-Fi	HD5-CN75WAN	FCC SAR Test Report	FA6D2819-01	Sections related to WiFi test data
15E	5150~5250 5250~5350 5470~5725 5725~5850	Wi-Fi	HD5-CN75WAN	FCC SAR Test Report	FA6D2819-01	Sections related to WiFi test data



7. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observations is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacturer's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	$1/k^{(b)}$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

- (a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity
- (b) k is the coverage factor

Table 7.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.00	N	1	1	1	6.0	6.0
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.00	R	1.732	1	1	0.6	0.6
Linearity	4.70	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	2.90	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.00	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.03	N	1	1	1	3.0	3.0
Device Holder	3.60	N	1	1	1	3.6	3.6
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.10	R	1.732	1	1	3.5	3.5
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.71	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.71	1.7	1.5
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.6%	11.6%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						23.2%	23.1%

Table 7.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	7.00	N	1	1	1	7.0	7.0
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.00	R	1.732	1	1	1.2	1.2
Linearity	4.70	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	6.70	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.00	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.03	N	1	1	1	3.0	3.0
Device Holder	3.60	N	1	1	1	3.6	3.6
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.60	R	1.732	1	1	3.8	3.8
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.71	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.71	1.7	1.5
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.9%	12.9%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.9%	25.8%

Table 7.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz



8. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [6] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [7] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [9] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.