



Honeywell Safety and Productivity Solutions

CN80L0N with IP30C

FCC 2.1093:2020

802.11, Bluetooth/BLE, Zigbee, 13.56 MHz NFC in CN80L0N

900 MHz RFID, Bluetooth in IP30C

Report: INMC1108.4



NVLAP Lab Code: 200630-0



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CERTIFICATE OF EVALUATION

Last Date of Evaluation: Wednesday, May 27, 2020
Honeywell Safety and Productivity Solutions
EUT: CN80L0N with IP30C

RF Exposure Evaluation

Standards

Specification	Method
FCC 2.1093:2020	FCC 447498 D01 General RF Exposure Guidance v06

Results

Method Clause	Description	Applied	Results	Comments
4.3.2	SAR Test Exclusion	Yes	Pass	None

Deviations From Evaluation Standards

None

Approved By:



Donald Facteau, Process Architect

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing

REVISION HISTORY



Revision Number		Description	Date (yyyy-mm-dd)	Page Number
00		None		

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SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



PRODUCT DESCRIPTION

Client and Equipment Under Evaluation Information

Company Name:	Honeywell Safety and Productivity Solutions
Address:	16201 25th Ave W
City, State, Zip:	Lynnwood, WA 98087
Evaluation Requested By:	Sean MacKellar
EUT:	CN80L0N with IP30C
Date of Evaluation:	Wednesday, May 27, 2020

Information Provided by the Party Requesting the Evaluation

Functional Description of the Equipment:

The IP30C is a handheld RFID reader that attaches to the back of the Honeywell Model: CN80L0N mobile computer. The Intermec IM11 is a previously certified RFID module (FCC ID:EHA-IM11) that is installed in the Intermec IP30C handheld RFID reader. The IP30C also contains a BlueGiga WT12 Bluetooth module (FCC ID:QOQWT12) used to communicate the data read by the IM11 to the Honeywell Model: CN80L0N mobile computer. CN80L0N mobile computer contains a 13.56 MHz NFC, a Bluetooth/Bluetooth Low Energy radio, and an 802.11 radio.

Objective:

To demonstrate compliance with FCC requirements for RF exposure for 2.1093 for portable devices

RF Exposure Condition



The following RF Exposure conditions were used for the assessment documented in this report:	
Intended Use	Portable (A Maximum Permissible Exposure assessment for mobile use of the same radios is documented in Element report INMC1108.1.)
Location on Body (if applicable)	Limb
How is the Device Used	Information from the RFID module is communicated to the handheld computer via a Bluetooth radio to a handheld computer. The handheld computer can communicate to the outside world by an 802.11 radio, a Bluetooth radio, or a Bluetooth Low Energy Radio.
Radios Contained in the Same Host Device	<p>IP30C contains:</p> <p>900 MHz RFID, FCC ID:EHA-IM11 Bluetooth, FCC ID:QOQWT12</p> <p>CN80L0N mobile computer (FCC ID:HD5-CN80L0N) contains:</p> <p>802.11 (supports b/g/a/n – referred to as 802.11 here) Bluetooth / Bluetooth Low Energy Zigbee 13.56 MHz NFC (exempt from evaluation)</p>
Simultaneous Transmitting Radios	<p>CN80L0N 802.11, IP30C 900 MHz RFID, IP30C Bluetooth</p> <p>Or</p> <p>CN80L0N Bluetooth, IP30C Bluetooth, IP30C 900 MHz RFID,</p> <p>Or</p> <p>CN80L0N Bluetooth Low Energy, IP30C Bluetooth, IP30C 900 MHz RFID</p> <p>Or</p> <p>CN80L0N Zigbee, IP30C Bluetooth, IP30C 900 MHz RFID</p>
Body Worn Accessories	Handheld enclosure
Environment	General Population/Uncontrolled Exposure

SAR TEST EXCLUSION



OVERVIEW

Human exposure to RF emissions from portable devices (47 CFR §2.1093) used with the radiating antenna closer than 20 cm to the user requires Specific Absorption Rate (SAR) to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation.

COMPLIANCE WITH FCC 2.1093

“Portable devices that operate in the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Service (PCS) pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, the 4.9 GHz Band Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; the Wireless Medical Telemetry Service (WMTS) and the Medical Device Radiocommunication Service (MedRadio), pursuant to subparts H and I of part 95 of this chapter, respectively, unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under §§15.253(f), 15.255(g), 15.257(g), 15.319(i), and 15.407(f) of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section. Technical information showing the basis for this statement must be submitted to the Commission upon request.”

The EUT will be used with a separation distance of less than 20 centimeters between the radiating antenna and the body of the user or nearby persons and must therefore be considered a portable transmitter per 47 CFR 2.1093(b). Photographs of the actual separation distances are contained in this report.

COMPLIANCE WITH FCC KDB 447498 D01 General RF Exposure Guidance v06

“KDB 447498 D01 General RF Exposure Guidance v06” provides the procedures, requirements, and authorization policies for mobile and portable devices.

Standalone radio SAR test exclusion is covered under section 4.3.1. Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Thresholds are met as shown in the Limits section below.

Simultaneous transmission SAR test exclusion is covered under section 4.3.2. SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.

SAR TEST EXCLUSION

LIMITS

Limits for General Population /Uncontrolled Exposure: 47 CFR 1.1310 (c)

The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the SAR test exclusion thresholds are 1-g for head and body SAR and 10-g SAR for extremity SAR.

EQUIPMENT OPERATIONAL DETAILS

The devices and radios subject to this report are as follows:

Intermec IP30C containing FCC ID: EHA-IM11 and FCC ID: QOQWT12 co-located with Intermec CN80L0N mobile computer FCC ID: HD5-CN80L0N

The IP30C is an RFID scan handle that clips to the backside of the CN80L0N mobile computer as an optional accessory. Communication between the computer and the scan handle is via Bluetooth. There is no electrical connection between the two devices.

The IM11 UHF RFID radio module is contained within the IP30C hand scanner and is co-located with the CN80L0N mobile computer radios when the mobile computer is mounted in the IP30C scan handle. The duty cycle of the 900 MHz radio is limited to 50% in the software.

The IP30C RFID reader cannot operate while worn next to the body. The user is instructed to operate the reader from the hand, aimed toward remove tags, and pull the trigger to engage the transmitter while maintaining at least a 20cm separation from the RFID antenna and the head or torso.

A Maximum Permissible Exposure assessment for mobile use of the same radios is documented in Element report INMC1108.1.

SAR TEST EXCLUSION ASSESSMENT – STANDALONE CONFIGURATION OF IP30C BLUETOOTH RADIO

The only radio in the current assessment which did not have SAR Evaluation performed is the Bluetooth radio in the IP30C.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 3.0$$
for 1-g SAR and = 7.5 for 10-g extremity SAR,
where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

SAR TEST EXCLUSION

- 3.0 and 7.5 are referred to as the numeric thresholds in the step b below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1f) is applied to determine SAR test exclusion.

The SAR Test Exclusion Threshold is summarized in the following table:

Radio	Transmit Frequency (MHz)	Measured Conducted Output Power (mW)	Duty Cycle	Minimum Separation Distance (mm)	Exclusion Threshold	Limit	Compliant
Bluetooth in IP30C: 2402-2480	2480	2.2	1	50	0.070	7.5	Yes

The information in the table above was obtained from:

From client supplied information for this application and SGS report# EF/2005/C0012 filed under FCC ID: QOQWT12 on 4/10/2006).

METHOD OF EVALUATION – SIMULTANEOUS TRANSMISSION CONFIGURATION

KDB 447498 D01 General RF Exposure Guidance v06, Section 4.3.2(b)

“When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- 1) $\frac{[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]}{[\sqrt{f(\text{GHz})}/x]}$, for test separation distances $\leq 50\text{mm}$;

where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

- 2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm.

This SAR estimation formula has been considered in conjunction with the SAR Test Exclusion Thresholds to result in substantially conservative SAR values of ≤ 0.4 W/kg. When SAR is estimated, the peak SAR location is assumed to be at the feed-point or geometric center of the antenna, whichever provides a smaller antenna separation distance, and this location must be clearly identified in test reports. The estimated SAR is used only to determine simultaneous transmission SAR test exclusion; it should not be reported as the standalone SAR. When SAR is estimated, it must be applied to determine the sum of 1-g SAR test exclusion. When SAR to peak location separation ratio test exclusion is applied, the highest reported SAR for simultaneous transmission can be an estimated standalone SAR if the estimated SAR is the highest among the simultaneously transmitting antennas (see also KDB Publication 690783 D01). For situations where the estimated SAR is overly conservative for certain conditions, the test lab may choose to perform standalone SAR measurements, then use the measured SAR to determine simultaneous transmission SAR test exclusion. Estimated SAR values at selected frequencies, distances, and power levels are illustrated in Appendix D.

In the table below, the estimated stand-alone SAR for the Bluetooth radio (FCC ID: QOQWT12) has been calculated, and is below the extremity limit of 4 W/kg.

SAR TEST EXCLUSION

Radio	Transmit Frequency (GHz)	Test Separation (mm)	Output Power (mW)	Duty Cycle	Estimated Standalone SAR (W/kg)	Specification (W/kg)
Bluetooth in IP30C	2.48	50	2.2	1	0.0037	4

The Bluetooth radio in the IP30C (FCC ID: QQQWT12) is co-located with the 900 MHz RFID radio and either the 802.11 radio or the Bluetooth radio in the CN80L0N mobile computer (FCC ID: HD5-CN80L0N). The highest reported SAR values for the radios in the CN80L0N mobile computer are listed in the table below. For the 802.11 and the Bluetooth radios, the highest reported SAR was measured from the 2.4 GHz band of the 802.11 radio.

Radio	Highest Reported 10-g SAR (W/kg)	Specification (W/kg)
900 MHz RFID in IP30C	3.17	4
CN80L0N 802.11	0.481	4
CN80L0N Bluetooth	0.00246	4

The highest report SAR of the 900 MHz RFID radio and the 802.11 radio are added to the estimated SAR of the Bluetooth radio in the IP30C (FCC ID: QQQWT12). In the table below, the sum is shown to be less than 4 W/kg, the limit for extremity exposure conditions.

Radio	Highest Reported 10-g SAR or Estimated 10-g SAR (W/kg)	Estimated Summed SAR (W/kg)	Specification (W/kg)
900 MHz RFID in IP30C	3.17	3.65	4
CN80L0N 802.11	0.481		
Bluetooth in IP30C	0.0037		

The information in the tables above was obtained from:

Reported SAR values for the radios in the CN80L0N mobile computer are from Bureau Veritas report# SA171130C28 filed under FCC ID: HD5-CN80L0N on 4/20/2020. Reported SAR values for the IP30C 900 MHz RFID radio are from NWEMC Report #INMC0920 Rev. 1 filed under FCC ID: EHA-IM11 on 5/13/2015.

RFID to Hand Separation Distance



Separation distance = 3.0 cm

Bluetooth to Hand Separation Distance



Separation distance = 5.2 cm

CN80 Antenna to Hand Separation Distance



Separation distance = 5.0 cm