NORTHWEST EMC

Intermec Technologies Corporation

IP30C

FCC 2.1091:2015

Report # INMC0898.1

NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: March 18, 2015
Intermec Technologies Corporation
Model: IP30C

Radio Equipment Testing

Standards

Specification	Method
FCC 2.1091:2015	FCC KDB 447498 D01 v05r02

Results

Method Clause	Test Description	Applied	Results	Comments
7.2	Maximum Permissible Exposure	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Don Facteau, IT Manager

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.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2015.2.19

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

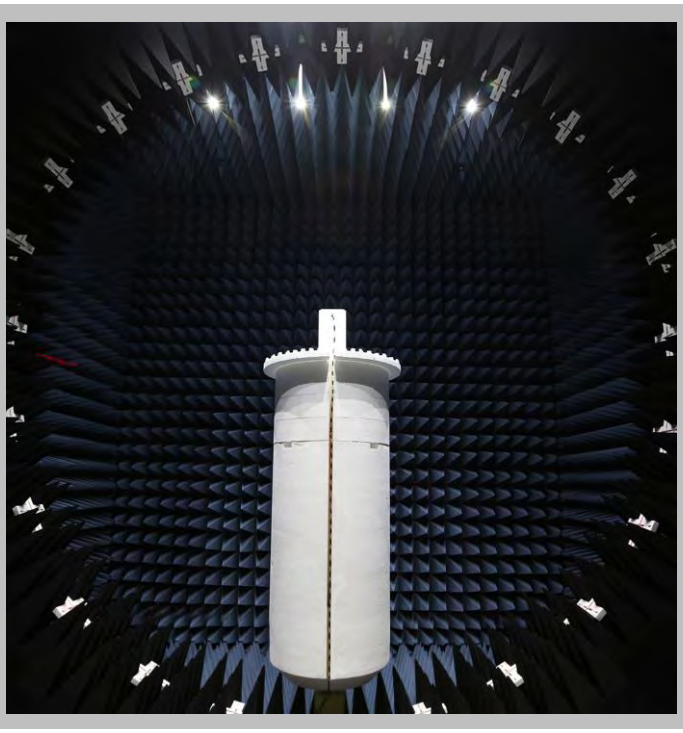
SCOPE

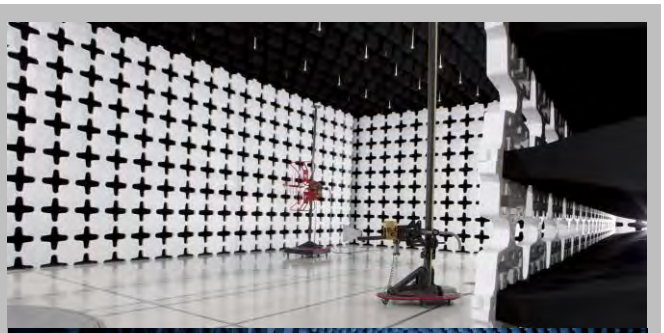
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

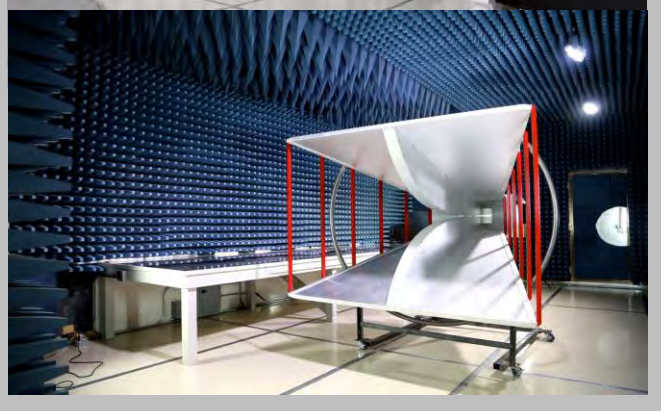
FACILITIES

NORTHWEST EMC
REV 2015.2.19

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 9801 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Industry Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







PRODUCT DESCRIPTION

NORTHWEST EMC
2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Intermec Technologies Corporation
Address:	6001 36th Avenue West
City, State, Zip:	Everett, WA 98203-1264
Test Requested By:	Sean MacKellar
Model:	IP30C
Evaluation Date:	March 05, 2015

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The IP30C is an RFID scan handle that clips to the backside of the Intermec 70 series handheld computers. The Intermec IM11 is a previously certified RFID module that will be installed in the Intermec IP30C handheld RFID reader. The IP30C also contains a WT12 (Bluegiga) Bluetooth module use to communicate the data read by the IM11 to the Intermec 70 series handheld.

Testing Objective:
To demonstrate compliance with FCC requirements for RF exposure for 2.1091 mobile devices

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

OVERVIEW

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons. ANSI C95.1-1992 specifies a minimum separation distance of 20 cm for performing reliable field measurements to determine adherence to MPE limits. If the minimum separation distance between a transmitter and nearby persons is more than 20 cm under normal operating conditions, compliance with MPE limits may be determined at such distance from the transmitter. When applicable, operation instructions and prominent warning labels may be used to alert the exposed persons to maintain a specified distance from the transmitter or to limit their exposure durations and usage conditions to ensure compliance. If the use of warning labels on a transmitter is not effective or desirable, the alternative of performing SAR evaluation with the device at its closest range to persons under normal operating conditions may be used. The field strength and power density limits adopted by the FCC are based on whole-body averaged exposure and the assumption of RF field levels relate most accurately to estimating whole-body averaged SAR. This means some local values of exposures exceeding the stated field strength and power density limits may not necessarily imply non-compliance if the spatial average of spatially averaged RF fields over the exposed portions of a person's body does not exceed the limits.

COMPLIANCE WITH 2.1091

"Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, parts 24, 25, 26 and 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more. Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under §§15.253, 15.255, and 15.257, and subparts D and E of part 15 of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in §2.1093(b) requiring evaluation under the provisions of that section. All other mobile and unlicensed 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 mobile and unlicensed transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application."

The EUT will only be used with a separation distance of 23 centimeters or greater between the antennas and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b). Per 47 CFR 1.1310, the EUT meets the General Population / Uncontrolled exposure limits listed in Table 1.

COMPLIANCE WITH FCC KDB 447498 D01 General RF Exposure Guidance v05r02

"KDB 447498 D01 General RF Exposure Guidance v05r02" provides the procedures, requirements, and authorization policies for mobile and portable devices. Section 7.2 best fits the exposure condition described in this report. Since these mobile devices are categorically excluded from routine evaluation; simple calculations may be used to estimate the power density to demonstrate compliance with 47 CFR 1.1310 requirements. The attached estimate shows MPE limits are met at a 23 cm boundary.

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

FCC LIMITS FOR MPE

Limits for General Population /Uncontrolled Exposure: 47 CFR 1.1310

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3 - 1.34	614	1.63	*(100)	30
1.34 - 30	824/f	2.19/f	*($180/f^2$)	30
30 - 300	27.5	0.073	0.2	30
300 - 1500			f/1500	30
1500 - 100000			1	30

f = frequency in MHz
*** = Plane-wave equivalent power density**

METHOD OF EVALUATION

The exposure level at a 23 cm distance from the EUT's transmitting antenna is calculated using the general equation:

$$S = \frac{P * G}{4 * \pi * R^2}$$

Where: S = power density (mW/cm2)
P = power input to the antenna (mW)
G = numeric power gain relative to an isotropic radiator
R = distance to the center of the radiation of the antenna (23 cm = limit for MPE estimates)
P*G = EIRP

Solving for S, the maximum power density 23 cm from the transmitting antenna is determined. This level is then compared to the applicable limit for that transmit frequency. This is called the "MPE Ratio". The MPE ratios for each co-located radio are summed. If the sum is less than or equal to one, then the device is excluded from testing and is deemed compliant.

The standalone MPE and summed MPE ratios are summarized in the following table:

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

EUT:	IP30C			Work Order:	INMC0898
Serial Number:	NA			Date:	3/30/15
Customer:	Intermec Technologies Corporation			Temperature (°C):	NA
Attendees:	NA			Rel. Humidity (%):	NA
Customer Project:	NA			Bar. Pres. (mb):	NA
Evaluated By:	Rod Peloquin	Power:	NA	Job Site:	NA

TEST SPECIFICATIONS

Specification:	Method:
FCC 2.1091:2012	KDB 447498 D01 General RF Exposure Guidance v05r02

COMMENTS

The IP30C is an RFID scan handle that clips to the backside of the handheld 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 IP30 hand scanner and is co-located with CK70 hand held computers when they are mounted in the IP30. The duty cycle of the RFID 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 the remote tags, and pull the trigger to engage the transmitter while maintaining at least a 23cm separation from the RFID antenna and the head or torso.

DEVIATIONS FROM TEST STANDARD

None

Signature

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

Intermec IP30C containing FCC ID: EHA-IM11 and FCC ID: QOQWT12 co-located with Intermec handheld computer FCC ID: EHA-1000CP01X2

MPE Estimates for Individual Devices (Conducted Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UHF RFID in IP30C	Yagi	Intermec	902.75	938.21	0.5	469.105	5.2	0	0.234	0.602	0.38827
Bluetooth in IP30C	Chip	Advanced Ceramic X	2402	3.258	1	3.258	0.5	0	0.001	1.000	0.00055
Wi-Fi in Handheld	PIFA	Laird	2462	53.2	1	53.2	3.2	0	0.017	1.000	0.01672
			5220	25.1	1	25.1	3.7	0	0.009	1.000	0.00885
			5300	24.5	1	24.5	3.7	0	0.009	1.000	0.00864
			5600	19.5	1	19.5	4.8	0	0.009	1.000	0.00886
			5875	17	1	17	5.0	0	0.008	1.000	0.00809
Bluetooth in Handheld	PIFA	Laird	2480	7	1	7	0.5	0	0.001	1.000	0.00117

Worst Case Co-located Exposure Conditions

Per KDB 447498 D01v05 Section 7.2, the Sum of Worst Case Power Ratios cannot exceed 1.0

IP30C		Handheld PC					
UHF RFID Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**Wi-Fi** Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit		**Sum of Worst Case Ratios (Power Density to the Exposure Limit)**	**FCC Limit for Sum of Worst Case Ratios**	
0.38827	0.00055	0.01672	0.00117		0.40671	1.0	**PASS**

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

Intermec IP30C containing FCC ID: EHA-IM11 and FCC ID: QOQWT12 co-located with Intermec handheld computer FCC ID: EHA-1000CP01SX1

MPE Estimates for Individual Devices (Conducted Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UHF RFID in IP30C	Yagi	Intermec	902.75	938.21	0.5	469.105	5.2	0	0.234	0.602	0.38827
Bluetooth in IP30C	Chip	Advanced Ceramic X	2402	3.258	1	3.258	0.5	0	0.001	1.000	0.00055
Wi-Fi in Handheld	PIFA	Laird	2462	53.2	1	53.2	3.2	0	0.017	1.000	0.01672
			5220	25.1	1	25.1	3.7	0	0.009	1.000	0.00885
			5300	24.5	1	24.5	3.7	0	0.009	1.000	0.00864
			5600	19.5	1	19.5	4.8	0	0.009	1.000	0.00886
			5875	17	1	17	5.0	0	0.008	1.000	0.00809
Bluetooth in Handheld	PIFA	Laird	2480	7	1	7	0.5	0	0.001	1.000	0.00117

MPE Estimates for Individual Devices (Radiated Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak EIRP (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UMTS in Handheld[1]	PIFA	Laird	836.6	1122	0.5	561	N/A	N/A	0.084	0.558	0.15131
	PIFA	Laird	1753	442	1	442	N/A	N/A	0.066	1.000	0.06649
	PIFA	Laird	1880	1548.8	0.5	774.4	N/A	N/A	0.116	1.000	0.11649
CDMA in Handheld[1]	PIFA	Laird	824.6	527	1	527	N/A	N/A	0.079	0.550	0.14421
	PIFA	Laird	1851.6	1420	1	1420	N/A	N/A	0.214	1.000	0.21361

Note 1: Either the UMTS or CDMA radio is operational - never both at the same time

Worst Case Co-located Exposure Conditions

Per KDB 447498 D01v05 Section 7.2, the Sum of Worst Case Power Ratios cannot exceed 1.0

IP30C		Handheld PC						
UHF RFID Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**Wi-Fi** Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**UMTS/CDMA** Worst Case Ratio of Power Density to the Exposure Limit		**Sum of Worst Case Ratios (Power Density to the Exposure Limit)**	**FCC Limit for Sum of Worst Case Ratios**	
0.38827	0.00055	0.01672	0.00117	0.15131		0.55802	1.0	**Pass**

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

Intermec IP30C containing FCC ID: EHA-IM11 and FCC ID: QOQWT12 co-located with Intermec handheld computer FCC ID: EHA-1000CP01UX1

MPE Estimates for Individual Devices (Conducted Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UHF RFID in IP30C	Yagi	Intermec	902.75	938.21	0.5	469.105	5.2	0	0.234	0.602	0.38827
Bluetooth in IP30C	Chip	Advanced Ceramic X	2402	3.258	1	3.258	0.5	0	0.001	1.000	0.00055
Wi-Fi in Handheld	PIFA	Laird	2462	53.2	1	53.2	3.2	0	0.017	1.000	0.01672
			5220	25.1	1	25.1	3.7	0	0.009	1.000	0.00885
			5300	24.5	1	24.5	3.7	0	0.009	1.000	0.00864
			5600	19.5	1	19.5	4.8	0	0.009	1.000	0.00886
			5875	17	1	17	5.0	0	0.008	1.000	0.00809
Bluetooth in Handheld	PIFA	Laird	2480	7	1	7	0.5	0	0.001	1.000	0.00117

MPE Estimates for Individual Devices (Radiated Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak EIRP (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UMTS in Handheld	PIFA	Laird	848.8	1370	0.5	685	N/A	N/A	0.103	0.566	0.18210
	PIFA	Laird	1880	1130	0.5	565	N/A	N/A	0.085	1.000	0.08499

Worst Case Co-located Exposure Conditions

Per KDB 447498 D01v05 Section 7.2, the Sum of Worst Case Power Ratios cannot exceed 1.0

IP30C		Handheld PC					
UHF RFID Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**Wi-Fi** Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**UMTS** Worst Case Ratio of Power Density to the Exposure Limit		**Sum of Worst Case Ratios (Power Density to the Exposure Limit)**	**FCC Limit for Sum of Worst Case Ratios**
0.38827	0.00055	0.01672	0.00117	0.18210		0.58881	1.0

PASS

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

NORTHWEST EMC
WTD.2014.12.17

Intermec IP30C containing FCC ID: EHA-IM11 and FCC ID: QOQWT12 co-located with Intermec handheld computer FCC ID: EHA-1000CP01CX2

MPE Estimates for Individual Devices (Conducted Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
UHF RFID in IP30C	Yagi	Intermec	902.75	938.21	0.5	469.105	5.2	0	0.234	0.602	0.38827
Bluetooth in IP30C	Chip	Advanced Ceramic X	2402	3.258	1	3.258	0.5	0	0.001	1.000	0.00055
Wi-Fi in Handheld	PIFA	Laird	2462	53.2	1	53.2	3.2	0	0.017	1.000	0.01672
			5220	25.1	1	25.1	3.7	0	0.009	1.000	0.00885
			5300	24.5	1	24.5	3.7	0	0.009	1.000	0.00864
			5600	19.5	1	19.5	4.8	0	0.009	1.000	0.00886
			5875	17	1	17	5.0	0	0.008	1.000	0.00809
Bluetooth in Handheld	PIFA	Laird	2480	7	1	7	0.5	0	0.001	1.000	0.00117

MPE Estimates for Individual Devices (Radiated Measurements)

Radio	Antenna Type	Antenna Manufacturer	Transmit Frequency (MHz)	Max Peak EIRP (mW)	Duty Cycle	Duty Cycle Corrected Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 23 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
CDMA in Handheld	PIFA	Laird	836.1	667	1	667	N/A	N/A	0.100	0.557	0.18001
	PIFA	Laird	1851.6	1148	1	1148	N/A	N/A	0.173	1.000	0.17269

Worst Case Co-located Exposure Conditions

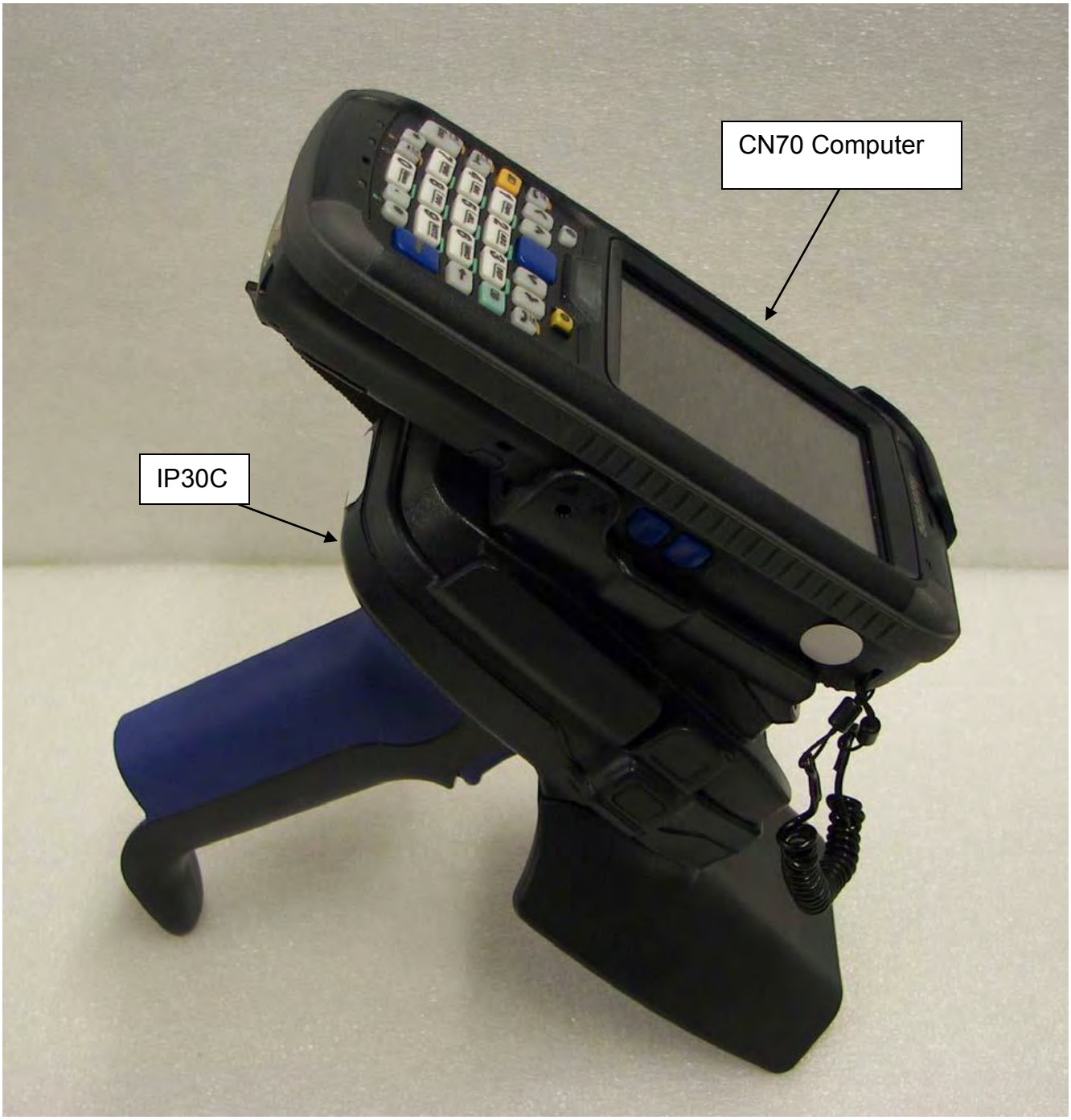
Per KDB 447498 D01v05 Section 7.2, the Sum of Worst Case Power Ratios cannot exceed 1.0

IP30C		Handheld PC						
UHF RFID Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**Wi-Fi** Worst Case Ratio of Power Density to the Exposure Limit	**Bluetooth** Worst Case Ratio of Power Density to the Exposure Limit	**CDMA** Worst Case Ratio of Power Density to the Exposure Limit		**Sum of Worst Case Ratios (Power Density to the Exposure Limit)**	**FCC Limit for Sum of Worst Case Ratios**	
0.38827	0.00055	0.01672	0.00117	0.18001		0.58671	1.0	**PASS**

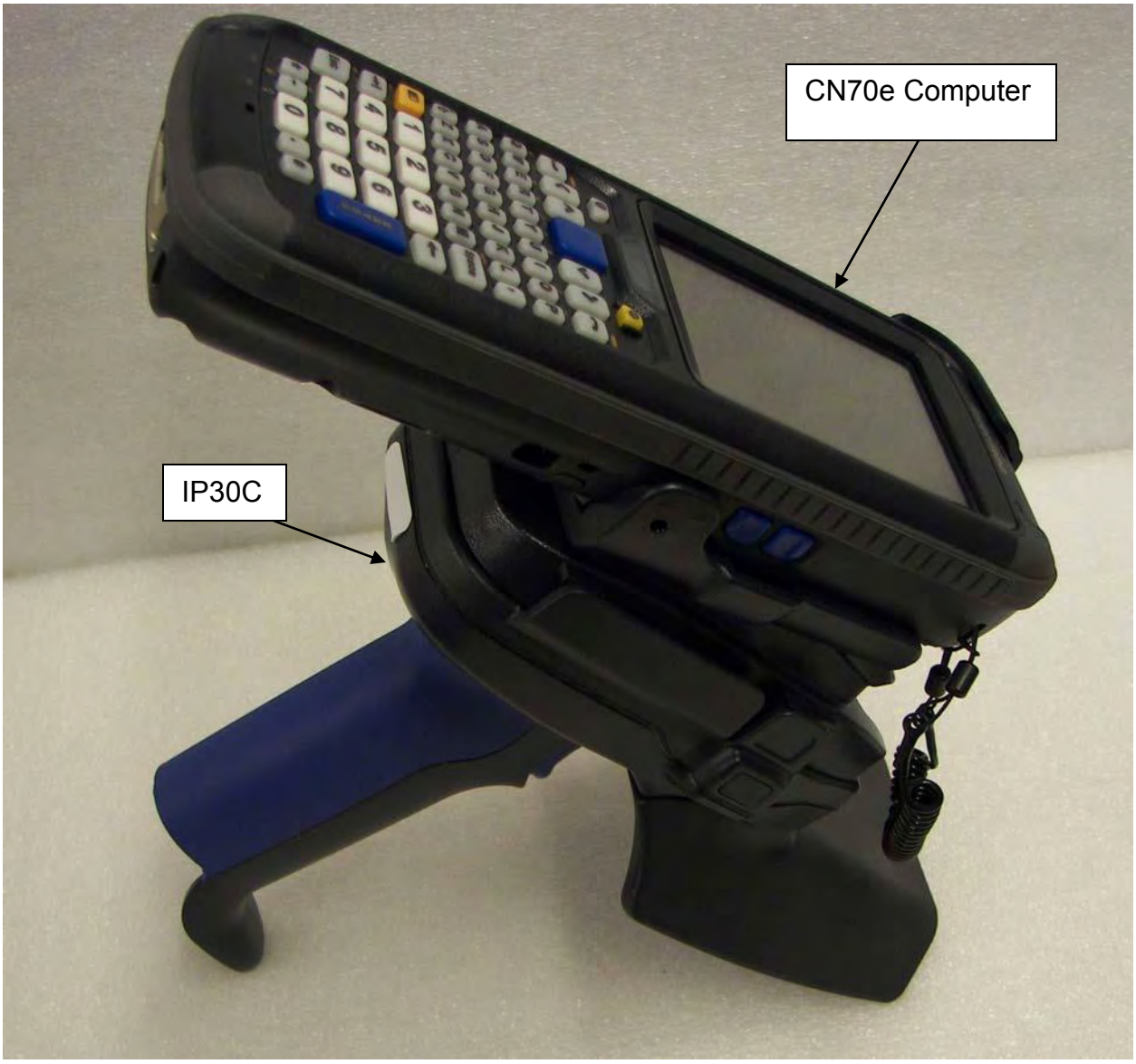
MAXIMUM PERMISSIBLE EXPOSURE (MPE)

IP30C without hand held computer installed

MAXIMUM PERMISSIBLE EXPOSURE (MPE)



MAXIMUM PERMISSIBLE EXPOSURE (MPE)



MAXIMUM PERMISSIBLE EXPOSURE (MPE)