Test Report # 3517 B

Equipment Under Test:	InTouch DX G2 w/ HID SmartCard
Requirement(s):	FCC Part 1.1307, RSS-102
Test Date(s):	September 29, 2021
Prepared for:	Kronos Incorporated (UKG) Attn: Jigney Shah 300 Chelmsford St Lowell, MA 01851

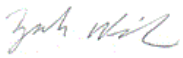
Report Issued by: Alec Krabbe, EMC Engineer

Signature:  Date: 1/20/2022

Report Reviewed by: Adam Alger, Laboratory Manager

Signature:  Date: 1/20/2022

Report Constructed by: Zach Wilson, EMC Engineer

Signature:  Date: 11/9/2021

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Laird Connectivity Test Services in Review

The Laird Connectivity, LLC. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

Certificate #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted

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Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers

Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

1 TEST REPORT SUMMARY

During **September 29th, 2021,** the Equipment Under Test (EUT), **InTouch DX G2 w/ HID SmartCard**, as provided by **Kronos Incorporated (UKG)** was tested to the following requirements:

Requirement	Description	Specification	Method	Result
FCC Part 1.1307, 2.1091, 2.1093	RF Exposure and equipment authorization requirements	Reported	FCC KDB 447498	Compliant
ISED Canada RSS-102	Radio Frequency Radiation Exposure Evaluation	Reported	RSS-102 Section 2.5.1	Compliant

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

2 CLIENT INFORMATION

Company Name	Kronos Incorporated (UKG)
Contact Person	Jigney Shah
Address	300 Chelmsford St Lowell, MA 01851

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	InTouch DX G2 w/ HID SmartCard
Model Number	8610000-017
Serial Number	00J2054861
IEEE Address	00405816BFB0
IC ID	1416A-8610U007
FCC ID	P5W-8610U007

2.2 Product Description

The InTouch DX G2 timeclock is a data collection device that communicates with the UKG host applications. The timeclock collects information that employees enter using a badge reader, biometric device, or keypad. The host application software collects data from the timeclocks to track and process labor-related data, generate management reports, and transfer information to the payroll service. The EUT contains a 13.56 RFID radio.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

No test modes provided; device tested in its operational setup.

2.5 Additional Information

Device is powered by 120 VAC and has an ethernet cable protruding the back of the enclosure for LAN operation. All programing is done through end user, android interface. No additional programming control/test modes available at time of testing.

3 REFERENCES

Publication	Edition	Date
CFR 47 Part 15	-	2021
ANSI C63.10	-	2013
RSS-247	2	2017
RSS GEN	5	2014
RSS-102	5	2015
CFR 47 Part 1 and 2	-	2021
FCC KDB 447498	D01 v06	10-23-2015

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

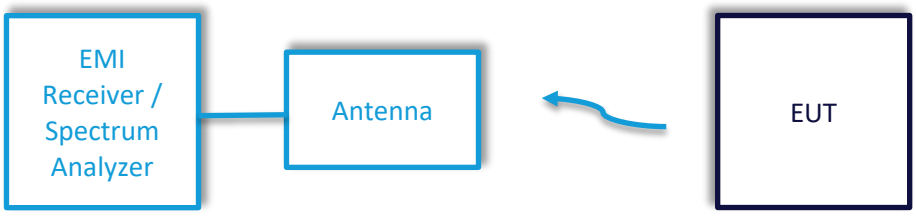
Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBµV/m) Margin (dB) = Limit (dBµV/m) - Corrected Reading (dBµV/m) Example at 4000 MHz: Reading = 40 dBµV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBµV/m Average Limit = 20 log (500) = 54 dBµV/m Margin = 54 dBµV/m - 50.8 dBµV/m = 3.2 dB

Block Diagram



5.1.1 Radiated Emissions: 13.56 NFC

Operator	Jon Dilley	**QA**	Alec Krabbe
Temperature	22.3°C	**R.H. %**	48.10%
Test Date	9/29/2021	**Location**	Chamber 3
Requirement	FCC 15.209, FCC 15.225 RSS-210	**Method**	ANSI C63.10

FCC 15.209 Limits:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m) (d_{limit})	Field Strength (dBµV/m) @ measurement distance
0.009-0.490	2400/F(kHz) [1]	300 [3]	Use F (kHz) [2]
0.490-1.705	24000/F(kHz) [1]	30 [3]	Use F (kHz) [2]
1.705-30	30	30 [3]	29.5

Note 1: F = measured frequency.

Note 2: Eq. 1 used to convert Field Strength (FS) to limit in dBµV/m.

Note 3: Conversion of measurement distance made using a combination of Eq. 2, Eq. 3, and Eq. 4.

Test Parameters

Frequency	9 kHz – 30 MHz	**Distance**	3 m ($d_{measure}$)
Detector(s)	Quasi-Peak, Average	**Table height**	80 cm
RBW	200 Hz, 9 kHz	**VBW**	2 kHz, 90 kHz
Example Calculations	Eq. 1 | dBµV/m field strength conversion: $20 * \log\left(FS\left(\frac{\mu V}{m}\right)\right)$ Eq. 2 | $d_{near\ field} = \frac{\lambda}{2\pi} distance = {}^{47.77}/_{f_{MHz}}$ If $d_{measure} < \frac{\lambda}{2\pi}$ and $d_{limit} > \frac{\lambda}{2\pi}$, the measurement shall be extrapolated using Eq. 3 Eq. 3 | $FS_{limit} = FS - 40 * \log\left(\frac{d_{near\ field}}{d_{emasure}}\right) - 20 * \log\left(\frac{d_{limit}}{d_{near\ field}}\right)$ If $d_{measure} \leq \frac{\lambda}{2\pi}$ and $d_{limit} \leq \frac{\lambda}{2\pi}$, the measurement shall be extrapolated using Eq. 4 Eq. 4 | $FS_{limit} = FS - 40 * \log\left(\frac{d_{limit}}{d_{emasure}}\right)$		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960006	Antenna - Active Loop	EMCO	6502	9205-2753	8/26/2021	8/26/2023	Active Calibration
AA 960206	Antenna - Loop	A.H. Systems, Inc.	SAS-565-H	2758	9/3/2021	9/3/2023	Active Calibration
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/20/2021	4/20/2022	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/15/2021	4/15/2022	Active Verification

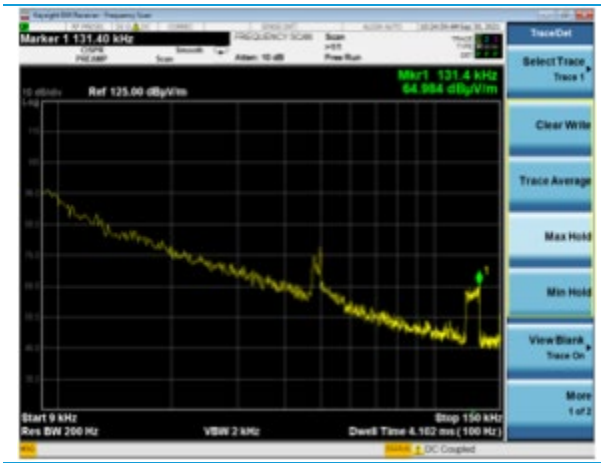
EUT Parameters

Input Power	120 VAC / 60 Hz	**Mode**	Operational Mode
EUT	InTouch DX G2 w/ HID SmartCard	**EUT**	RFID Tx

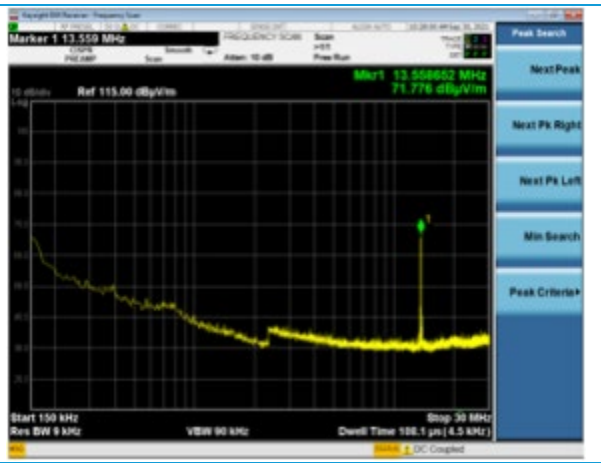
Data Table

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi-Peak Reading @ 3m	Distance Correction to Quasi-Peak Reading	Corrected Quasi-Peak @ Limit Distance	Quasi-Peak Limit @ Limit Distance	Quasi-Peak Margin (dB)
				(dBµV/m)				
13.560	Parallel	100	175	69.3	-21.4	47.9	84	44.3
13.559	Perpendicular	100	260	69.9	-21.4	48.5	84	35.5
13.558	Skew	100	167	61.1	-21.4	39.7	84	36.1

Plots

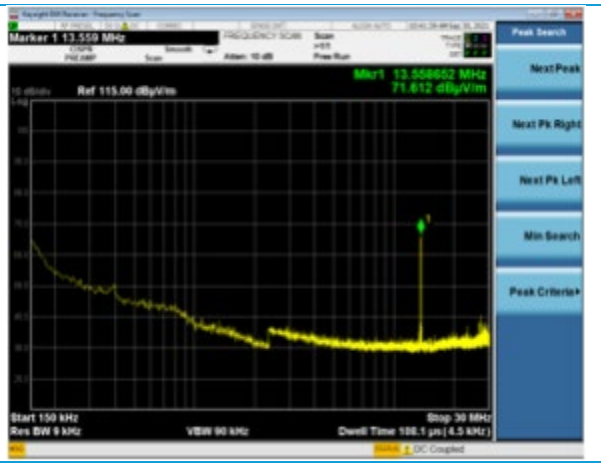


Parallel: 9 – 150 kHz



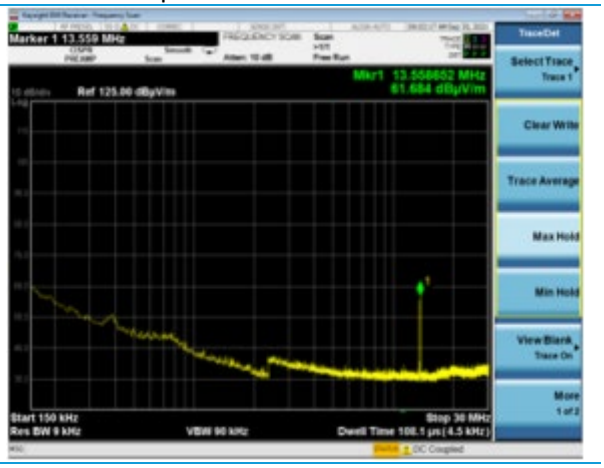
Parallel: 0.15 – 30 MHz

Perpendicular: 9 – 150 kHz



Perpendicular: 0.15 – 30 MHz

Skew: 9 – 150 kHz



Skew: 0.15 – 30 MHz

6 RF EXPOSURE EVALUATION

FCC

Frequency (MHz)	Average Reading @ 3m (dBµV/m)	Field Strength converted to dBm[1]	EUT Output power (mw)	SAR Test Exclusion (mw)[2]	MPE Distance (mm)
13.559	69.9	-25.3	0.00295	442.0	≤ 50

1: Output power converted from 3m field strength measurement (FS dBµV/m – 95.2)

2: KDB 447498 4.3.1 (c)(2)

Result: EUT power of 0.00295 mW is less than the exclusion threshold of 442.0 mW at the minimum distance of 50 mm

ISED

Frequency (MHz)	Average Reading @ 3m (dBµV/m)	Field Strength converted to dBm[1]	EUT Output power (mw)	SAR Test Exclusion (mw)[2]	MPE Distance (mm)
13.559	69.9	-25.3	0.00295	71.0	≤ 5

1: Output power converted from 3m field strength measurement (FS dBµV/m – 95.2)

2: RSS-102 2.5.1

Result: EUT power of 0.00295 mW is less than the exclusion threshold of 71 mW at the minimum distance of 5 mm.

FCC Simultaneous Transmission

FCC KDB 447498 Section 4.3.2 b) 1)

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:[36]

1) [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[$\sqrt{f_{(GHz)}}/x$] W/kg, for *test separation distances* ≤ 50 mm;
where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

Max Power = 0.00295 mW
Min Test Separation Distance = 50 mm
Frequency (GHz) = 0.013559
x = 7.5
W/kg = 0.0000025

TFB-1003

FCC:

Frequency = 2412MHz
Output Power = 13.8 dBm
Tune Up Tolerance = 1.56 dB
EIRP = 15.36 dBm = 34.36mW

Minimum separation distance for SAR test exclusion (1g tissue) = (Pout * [√f(GHz)])/3
= (34.36*1.55)/3
= **17.75 mm**

Max Power = 34.36 mW
Min Test Separation Distance = 50 mm
Frequency (GHz) = 2.412
x = 7.5
W/kg = 0.389

0.389 + 0.0000025 = 0.389 < 1.6 W/kg SAR limit therefore the device in simultaneous transmissions configuration is exempt from further evaluation.

ISED Simultaneous Transmission

Example Equation: (Max output power / RSS-102 Section 2.5.1 Limit) * 0.4 W/kg

Estimated SAR Calculation 13.559 MHz radio: (0.00295 mW / 71 mW) * 0.4 W/kg **= 0.000016 W/kg** (Limit from Section 2.5.1 at 5mm)

Estimated SAR Calculation 2412 MHz radio: (54.45 mW / 84.1 mW) * 0.4 W/kg **= 0.258 W/kg** (Limit Interpolated from Section 2.5.1 at 30mm)

RSS 102:

Frequency = 2412MHz
Output Power = 13.8 dBm
Tune Up Tolerance = 1.56 dB
Antenna gain = 2.0 dBi
EIRP = 17.36 dBm = 54.45 mW

Minimum separation distance for SAR test Exclusion (1g tissue) = **28.13 mm** (based on table 1 of RSS 102)

0.000016 + 0.258 = 0.258 < 1.6 W/kg SAR limit therefore the device in simultaneous transmissions configuration is exempt from further evaluation.

7 REVISION HISTORY

Version	Date	Notes	Person
V0	11/9/2021	Initial Draft	Zach Wilson
V1	11/10/2021	Final	Alec Krabbe
V2	1/11/2022	Updated FCC/IC IDs	Alec Krabbe
V3	1/20/2022	Update for Simultaneous Transmit Evaluation	Adam Alger

END OF REPORT