

EMC TEST REPORT

Test Report No.	<u>NC72133650.1</u>	Date of issue:	<u>06 February 2018</u>
Product Names	<u>13.56 MHz RFID module</u>		
Model(s) Tested	<u>8614105 module with 8001204 antenna, 8614105 module with 8004201 antenna, 8614105 module modified for testing with an SMA connector, and 8616103 module with 8001204 antenna</u>		
Serial No(s) Tested	<u>188110, 190794, 191179, 187378</u>		
Product Description	<u>13.56 MHz ISO 15693 reader PCA with 2 antenna variants (models 8001204 and 8004201) and 2 types of interface (RS232 and USB)</u>		
Manufacturer	<u>Colder Products Company</u> <u>1001 Westgate Drive</u> <u>Saint Paul, MN 55114 USA</u>		
Issuing Laboratory	<u>TÜV SÜD America Inc USA</u> <u>1775 Old Highway 8 NW, Suite 104</u> <u>New Brighton MN 55112 - 1891</u> <u>Phone: 651-631-2487 / Fax: 651-638-0285</u>		

Test Result Positive Negative

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REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	47	06 February 2018	Initial Release



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Test information

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LAB ACCREDITATION:

TÜV SÜD America's New Brighton and Taylors Falls Labs maintain A2LA accreditation to ISO/IEC 17025 for the specific tests listed in A2LA Certificate #2955.11 as Electrical Testing Laboratories located at the following addresses:

Physical Location: 1775 Old Highway 8 NW, Suite 104
New Brighton MN 55112-1891 USA

Satellite Location: 19333 Wild Mountain Road
Taylors Falls MN 55084 USA



EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C ⁽¹⁾ §15.225
FCC Part 15 Subpart C ⁽¹⁾ §15.207
RSS-210 ⁽¹⁾ Issue 9: August 2016 (Amendment November 2017)
RSS-Gen ⁽¹⁾ Issue 4: November 2014

⁽¹⁾ Test Method listed on A2LA Certificate #2955.11 Scope of Accreditation

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 12-20°C
Atmospheric pressure	: 97-100kPa
Relative Humidity	: 12-32%

POWER SUPPLY UTILIZED

Power supply system : 8-24 Vdc (RS232 interface) and 5 Vdc (USB interface)

TEST EQUIPMENT TRACEABILITY

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

MEASUREMENT UNCERTAINTY

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ± 1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ± 4.8 dB. All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

SIGN EXPLANATIONS

- not applicable
- applicable

Radiated emissions 13.553 – 13.567 MHz FCC §15.225(a), RSS-210 B.6(a)

Test summary

The requirements are: - MET - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.10 2013, clauses 6.4 “Radiated emissions from unlicensed wireless devices below 30 MHz”.

Measured the 13.56 MHz fundamental field strength of the model 8614105 RFID module with both antenna options and model 8616103 with antenna 8001204. The configuration with the 8004201 antenna is the highest with its field strength extrapolated to 12.5 $\mu\text{V}/\text{m}$ at 30 meters.

Test location

Taylor's Falls Lab. Large Test Site (Open Area Test Site)

Test distances

1.0, 3.0, 10.0 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
WRLE02418	6502	EMCO	Loop Antenna	2215	25 Sep 17	25 Sep 18
WRLE11198	ESI	Rohde & Schwarz	EMI Receiver (20 Hz-26.5 GHz)	835336/010	03 Mar 17	03 Mar 18
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.77	N/A	Code Y	Code Y

Code Y = Calibration not required when used with other calibrated equipment

Limit

15,848 $\mu\text{V}/\text{m}$ (84 $\text{dB}\mu\text{V}/\text{m}$) at 30 meters.

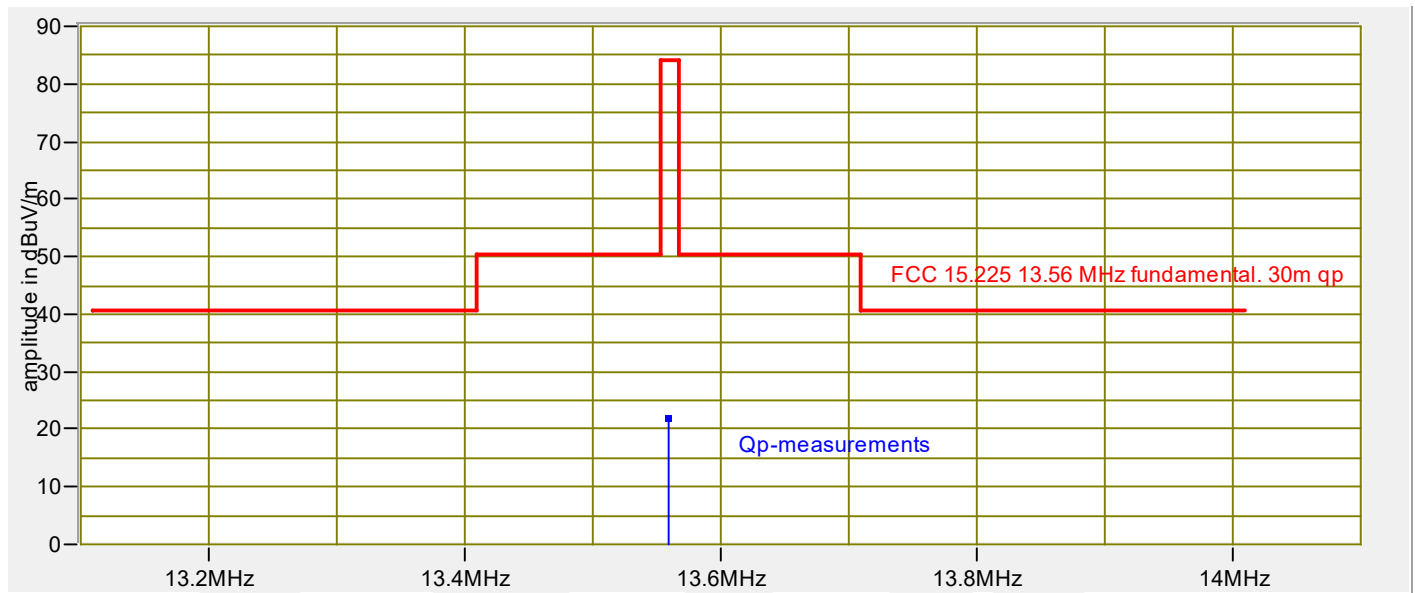
Test data

List of measurements for run #: 6

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.225 13.56 MHz fundamental. 30m qp	DELTA2
DUT 0.8m above ground plane						
Normal modulation						
Fundamental maximized through 3 orthogonal axis						
1m						
13.56 MHz	64.5 Qp	0.52 / 11.42 / 0.0 / 0.0	76.44	V / 1.00 / 150	-7.56	n/a
3m						
13.56 MHz	46.2 Qp	0.52 / 11.42 / 0.0 / 0.0	58.14	V / 1.00 / 150	-25.86	n/a
10m						
13.56 MHz	28.1 Qp	0.52 / 11.42 / 0.0 / 0.0	40.04	V / 1.00 / 150	-43.96	n/a
30m extrapolated level calculated using 36.2dB / decade roll off based on 3m & 10m delta						
Extrapolated 30m level = 3m level - 36.2dB = 21.94dBuV/m						
13.56 MHz	10.0 Qp	0.52 / 11.42 / 0.0 / 0.0	21.94	V / 1.00 / 150	-62.06	n/a
<30m levels not included in final measurement summary or graph						

Measurement summary: FCC 15.225 13.56 MHz fundamental. 30m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.225 13.56 MHz fundamental. 30m qp
13.56 MHz	10.0 Qp	0.52 / 11.42 / 0.0 / 0.0	21.94	12.5	15848	V / 1.00 / 150	-62.06



Radiated emissions < 30 MHz, outside the band 13.553 – 13.567 MHz

FCC §15.225(b), RSS-210 B.6(b). Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz
 FCC §15.225(c), RSS-210 B.6(c). Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz
 FCC §15.225(d), RSS-210 B.6(d). Outside of the 13.110-14.010 MHz band

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.10 2013, clauses 6.4 “Radiated emissions from unlicensed wireless devices below 30 MHz”. Scanned for the spurious emissions of the model 8614105 RFID module with both antenna options and 8616103 RFID module with 8001204 antenna.

No significant emissions were detected from 0.009 – 30 MHz.

Test location

Taylor's Falls Lab. Large Test Site (Open Area Test Site)

Test distance

1.0 meter

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
WRLE02418	6502	EMCO	Loop Antenna	2215	25 Sep 17	25 Sep 18
WRLE11198	ESI	Rohde & Schwarz	EMI Receiver (20 Hz-26.5 GHz)	835336/010	03 Mar 17	03 Mar 18
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.77	N/A	Code Y	Code Y

Code Y = Calibration not required when used with other calibrated equipment

Limits

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Distance (meters)
0.009 - 0.490	2400 / F(kHz)	48.52 – 13.8	300
0.490 - 1.705	24000 / F(kHz)	33.8 – 22.97	30
1.705 – 13.110	30	29.54	30
13.110 – 13.410	106	40.50	30
13.410 – 13.553	334	50.47	30
13.567 – 13.710	334	50.47	30
13.710 – 14.010	106	40.50	30
14.010 - 30.0	30	29.54	30

Test data

List of measurements for run #: 1

Scanned all sides of DUT. 0.009 - 30 MHz at 1.0m distance

No significant emissions detected

Radiated emissions 30 - 1000 MHz

FCC §15.225(d), RSS-210 B.6(d)

Test summary

The requirements are: - MET - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.10 2013, clause 6.5 "Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz".

Per FCC §15.225(d), The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Per FCC §15.209(f), in accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device.

Scanned for the spurious emissions of the devices which incorporate the model 8614105 RFID module with each antenna variant and model 8616103 RFID with antenna 8001204. Above the 10th harmonic, the devices and their associated digital electronics are compared to class B limits in §15.109.

The worst-case emission relative to the limits is 45.47 dBµV/m at 284.757 MHz at 3 meters with the 8614105 module with the 8004201 antenna. Margin of compliance is 0.53 dB.

Test location

Taylors Falls Lab. Large Test Site (Open Area Test Site)

Test distance

3.0 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
OWLE03202	EM-6917B	Electro-Metrics	Biconicallog Periodic	101	29 Nov 17	29 Nov 18
WRLE10896	ZHL-1042J	Mini-Circuits	Amplifier QA1148002	NA	Code B 11 Sep 17	Code B 11 Sep 18
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	30 May 17	30 May 18
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	30 May 17	30 May 18
OWLE02682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	30 May 17	30 May 18
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.77	N/A	Code Y	Code Y

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

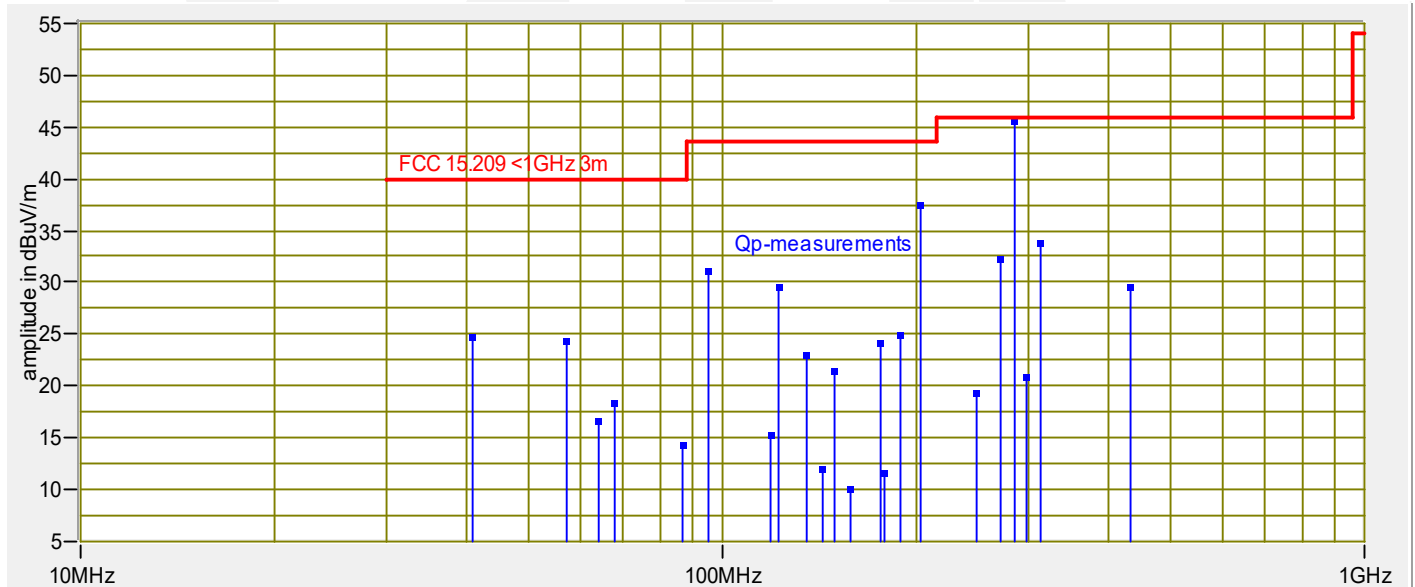
Limit at 3 meters

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
> 960	500	54.0

Test data

Measurement summary for limit1: FCC 15.209 <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 3m
284.757 MHz	55.55 Qp	1.75 / 18.64 / 30.47 / 0.0	45.47	H / 1.15 / 299	-0.53
203.399 MHz	49.9 Qp	1.47 / 16.5 / 30.47 / 0.0	37.41	H / 1.29 / 304	-6.09
311.895 MHz	42.7 Qp	1.84 / 19.56 / 30.41 / 0.0	33.7	H / 1.00 / 270	-12.3
94.924 MHz	46.25 Qp	0.87 / 14.27 / 30.31 / 0.0	31.07	H / 1.80 / 90	-12.43
271.201 MHz	42.35 Qp	1.7 / 18.59 / 30.5 / 0.0	32.15	H / 1.00 / 90	-13.85
122.038 MHz	43.95 Qp	1.03 / 14.9 / 30.43 / 0.0	29.45	H / 1.80 / 270	-14.05
40.69 MHz	31.65 Qp	0.54 / 22.71 / 30.14 / 0.0	24.76	V / 1.00 / 0	-15.24
56.985 MHz	35.9 Qp	0.64 / 17.9 / 30.14 / 0.0	24.3	V / 1.00 / 0	-15.7
430.515 MHz	35.4 Qp	2.25 / 22.29 / 30.41 / 0.0	29.53	V / 1.80 / 0	-16.47
189.856 MHz	37.35 Qp	1.42 / 16.51 / 30.43 / 0.0	24.85	H / 1.80 / 270	-18.65
176.284 MHz	37.95 Qp	1.36 / 15.11 / 30.4 / 0.0	24.01	H / 1.80 / 270	-19.49
135.603 MHz	38.4 Qp	1.11 / 13.92 / 30.49 / 0.0	22.94	H / 1.80 / 270	-20.56
67.81 MHz	32.3 Qp	0.71 / 15.53 / 30.19 / 0.0	18.35	V / 1.80 / 270	-21.65
149.17 MHz	35.25 Qp	1.2 / 15.51 / 30.47 / 0.0	21.48	V / 1.00 / 90	-22.02
64.156 MHz	29.95 Qp	0.68 / 16.19 / 30.17 / 0.0	16.65	V / 1.00 / 0	-23.35
297.237 MHz	30.45 Qp	1.79 / 19.09 / 30.44 / 0.0	20.89	H / 1.00 / 90	-25.11
86.896 MHz	30.35 Qp	0.82 / 13.27 / 30.27 / 0.0	14.17	V / 1.00 / 90	-25.83
247.839 MHz	30.5 Qp	1.62 / 17.56 / 30.44 / 0.0	19.24	V / 1.00 / 270	-26.76
119.02 MHz	29.45 Qp	1.01 / 15.2 / 30.42 / 0.0	15.24	V / 1.00 / 90	-28.26
143.272 MHz	26.4 Qp	1.16 / 14.84 / 30.48 / 0.0	11.92	V / 1.00 / 90	-31.58
178.384 MHz	25.35 Qp	1.37 / 15.3 / 30.4 / 0.0	11.62	H / 1.80 / 270	-31.88
158.14 MHz	24.2 Qp	1.25 / 15.09 / 30.45 / 0.0	10.09	V / 1.00 / 90	-33.41



Frequency tolerance

FCC §15.225(e), RSS-210 B.6

Test summary

The requirements are: - MET - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.10 2013, clause 6.8 "Frequency stability tests". Tested the RFID module, model 8614105 and 8616103. All frequency measurements over the specified voltage and temperature ranges were within tolerance.

Test location

New Brighton. Temperature chamber

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
NBLE10440	E4446A	Agilent	Spectrum Analyzer 44GHz	US44300488	02 Mar 17	02 Mar 18
NBLE11522	SU-241	ESPEC	Environmental Chamber	92010168	20 Oct 17	20 Oct 18
NBLE11294	XHR33-33	Ametek	Power Supply Programmable	1451A00393	Code Y	Code Y
NBLE11375	115	Fluke	Multimeter	32530450WS	15 May 17	15 May 18
NBLE02991	18N10W-20dB	Inmet	20dB Attenuator	2	19 Sep 17	19 Sep 18
na	7405-901	EMCO	Near field probe	na	Code Y	Code Y

Code Y = Calibration not required when used with other calibrated equipment

Limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to 50°C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage (5 – 24 Vdc) at a temperature of 20°C .

Test data

Model 8614105

Temperature ($^{\circ}\text{C}$)	Voltage (Vdc)	Frequency (MHz)	Tolerance (MHz)	Result
-20	12	13.560167	13.558644 – 13.561356	Pass
50	12	13.560000	13.558644 – 13.561356	Pass
20	6.8	13.560167	13.558644 – 13.561356	Pass
20	27.6	13.560167	13.558644 – 13.561356	Pass

Model 8616103

Temperature ($^{\circ}\text{C}$)	Voltage (Vdc)	Frequency (MHz)	Tolerance (MHz)	Result
-20	5	13.560000	13.558644 – 13.561356	Pass
50	5	13.560000	13.558644 – 13.561356	Pass
20	4.25	13.560000	13.558644 – 13.561356	Pass
20	5.75	13.560000	13.558644 – 13.561356	Pass

Occupied bandwidth

RSS-Gen 6.6

Test summary

The requirements are: ■ - MET □ - NOT MET

The measurement settings were determined by the occupied bandwidth (OBW) measurement function of the spectrum analyzer. Tested the RFID module, model 8614105. OBW = 21.5103 kHz.

Test location

New Brighton

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
NBLE11000	E4440A-M75	Agilent	Spectrum Analyzer	MY44303856	24 Jan 17	24 Jan 18
NBLE02991	18N10W-20dB	Inmet	20dB Attenuator	2	19 Sep 17	19 Sep 18

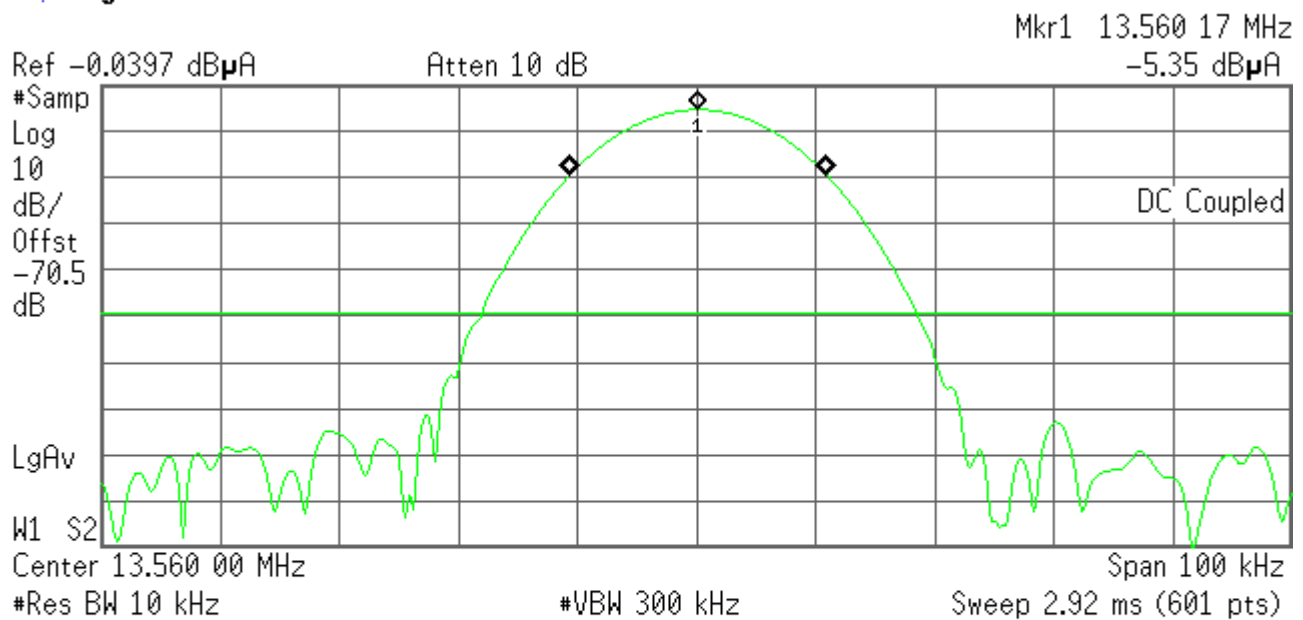
Test limit

The occupied bandwidth limit is not stated in RSS-210. When the limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

Test data

Agilent

R T



Occupied Bandwidth
 21.5103 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 141.125 Hz
x dB Bandwidth 28.723 kHz*

AC power line conducted emissions

FCC §15.207, RSS-Gen 8.8

Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.10 2013, clauses 6.2 "Standard test method for ac power-line conducted emissions from unlicensed wireless devices". Tested a representative power supply for the RFID module.

The worst-case emission relative to the quasi-peak limit was 13.5555 MHz at 53.89 dB μ V. Margin of compliance is 6.11 dB. The worst-case emission relative to the average limit was 4.569 MHz at 32.57 dB μ V. Margin of compliance is 13.43 dB.

Test location

Taylor's Falls Lab. Shield room 2

Test equipment

(see test data)

Test limit

Frequency (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 - 30	60	50

*Decreases with the logarithm of the frequency

Test data

(see following pages)



CONDUCTED VOLTAGE EMISSIONS

Test Report #: NC72133650 **Test Area:** SR2
EUT Model #: 8614105 **Date:** 22 Dec 2017
EUT Serial #: 191179 **EUT Power:** 9Vdc from 110V/60Hz AC-DC PS
Test Method: FCC 15.207 **Temperature:** 23 °C
Customer: Colder Products Co. **Air Pressure:** 99 kPa
EUT Description: 13.56MHz RFID. Modified RS232 reader assembly with SMA connector **Relative Humidity:** 31 %
Notes: Representative power supply. Phihong model PSM03A-090

Tested by: Greg Jakubowski **Reviewed by:** Joel T Schneider
Signature: *Greg Jakubowski* **Signature:** *Joel T. Schneider*

Equipment List Used During Testing

Equipment Description	Equipment Manufacturer	Equipment Model #	Equipment SN#	Asset #	Frequency Range	Calibrated On	Calibration Due	Calibration Required (Y or N)
Attenuator - 20dB Attenuator	Meca	603-20-1F18		WRLE11396	9kHz - 1.8GHz	5/9/2017	5/9/2018	Yes
Cable - BNC - WRL - LTS				WRLE03963	9kHz - 1GHz	11/6/2017	11/6/2018	Yes
LISN - FCC-LISN-50-25-2-10	FCC	FCC-LISN-50-25-2-10	120311	WRLE10947	150kHz - 30MHz	9/21/2017	9/21/2018	Yes
Receiver - R&S ESI	Rhode & Schwarz	ESI-26	835336/010	WRLE11198	9 kHz - 26.5 GHz	3/3/2017	3/3/2018	Yes

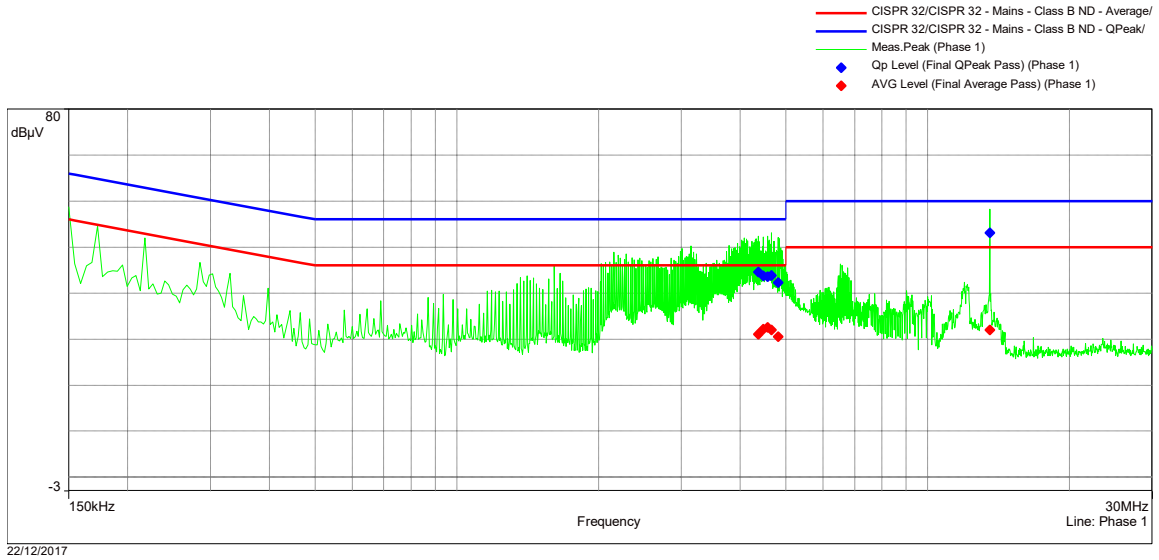
Note: If Calibration not required, internal verifications are performed

CONDUCTED VOLTAGE EMISSIONS



L1 [110VAC, 60Hz] antenna removed

Frequency Range	Line Tested	RBW	Step Size	Sweep Time
150kHz- 30MHz	L1	9kHz	4.5kHz	5000 ms/MHz



Limit:
 CISPR 32 - Mains - Class B

Line Tested:
 L1

Test Results:
 Pass

Test Notes:



CONDUCTED VOLTAGE EMISSIONS

L1 [110VAC, 60Hz] antenna removed Data Table

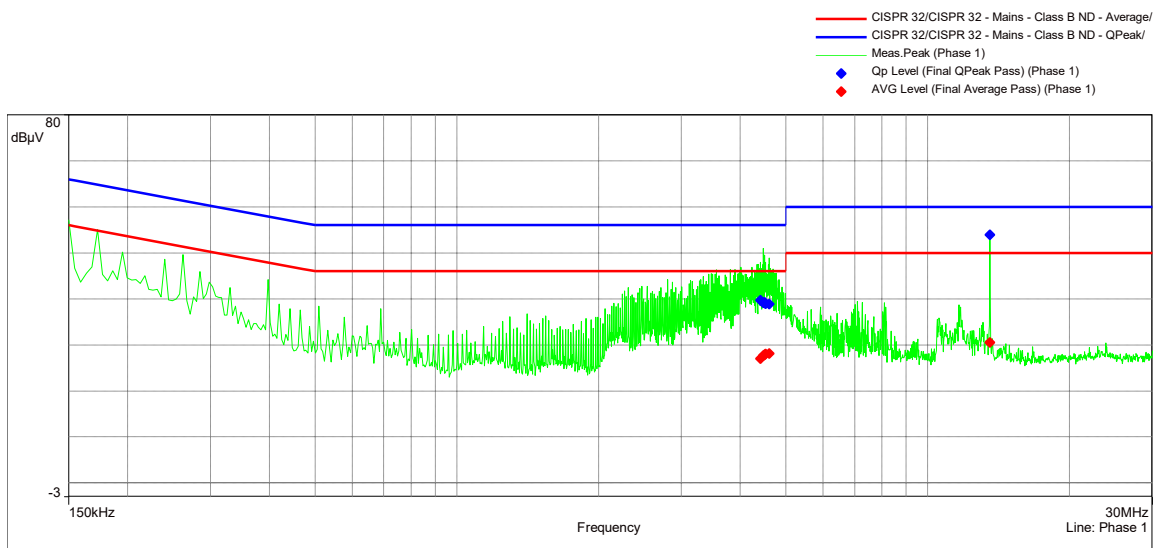
Frequency	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)	QPeak (dBuV)	QPeak Limit (dBuV)	QPeak Margin (dB)	Result
4.3665 MHz	31.04	46.00	-14.96	44.54	56.00	-11.46	PASS
4.479 MHz	32.21	46.00	-13.79	43.74	56.00	-12.26	PASS
4.569 MHz	32.57	46.00	-13.43	43.58	56.00	-12.42	PASS
4.659 MHz	32.01	46.00	-13.99	43.87	56.00	-12.13	PASS
4.812 MHz	30.50	46.00	-15.50	42.27	56.00	-13.73	PASS
13.5555 MHz	31.96	50.00	-18.04	53.08	60.00	-6.92	PASS

CONDUCTED VOLTAGE EMISSIONS



L2 [110VAC, 60Hz] antenna removed

Frequency Range	Line Tested	RBW	Step Size	Sweep Time
150kHz- 30MHz	L2	9kHz	4.5kHz	5000 ms/MHz



Limit:
 CISPR 32 - Mains - Class B

Line Tested:
 L2

Test Results:
 Pass

Test Notes:



CONDUCTED VOLTAGE EMISSIONS

L2 [110VAC, 60Hz] antenna removed Data Table

Frequency	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)	QPeak (dBuV)	QPeak Limit (dBuV)	QPeak Margin (dB)	Result
4.4115 MHz	26.99	46.00	-19.01	39.70	56.00	-16.30	PASS
4.479 MHz	27.69	46.00	-18.31	39.12	56.00	-16.88	PASS
4.5015 MHz	27.82	46.00	-18.18	39.23	56.00	-16.77	PASS
4.524 MHz	28.03	46.00	-17.97	38.95	56.00	-17.05	PASS
4.6095 MHz	28.11	46.00	-17.89	38.84	56.00	-17.16	PASS
13.5555 MHz	30.53	50.00	-19.47	53.89	60.00	-6.11	PASS

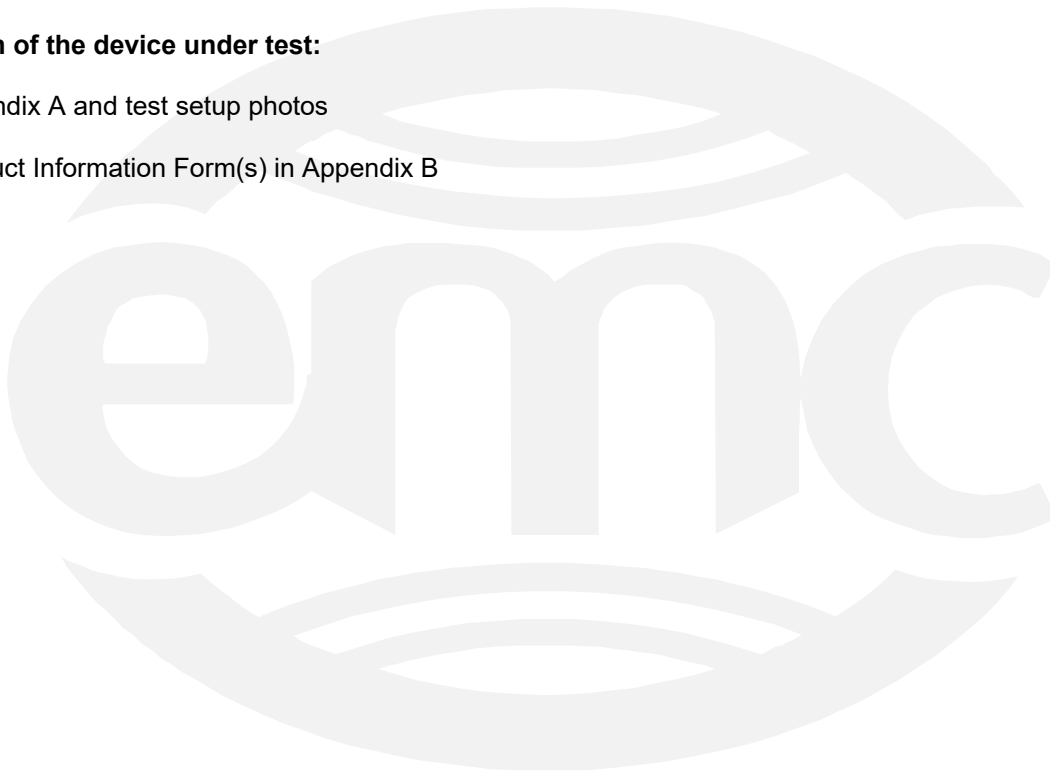
Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions:

- Standby
- Test program (customer specific)
- Practice operation
- Fundamental carrier set to CW or with normal modulation

Configuration of the device under test:

- See Appendix A and test setup photos
- See Product Information Form(s) in Appendix B



DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

None

Modifications required to pass:

- None
- As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

- None
- As indicated in the Test Plan

SUMMARY:

The requirements according to the technical regulations are

- met and the device under test does fulfill the general approval requirements.
- **not** met and the device under test does **not** fulfill the general approval requirements.

EUT Received Date: 13 December 2017
Condition of EUT: Normal
Testing Start Date: 13 December 2017
Testing End Date: 24 January 2018

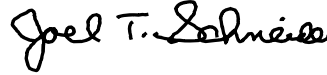
TÜV SÜD AMERICA INC

Tested by:



Greg Jakubowski
Senior EMC Technician

Approved by:



Joel Schneider
Senior EMC Engineer

Appendix A

EMC Test Plan and Product Information Form





EMC Test Plan and Product Information Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED VERSION OF THIS DOCUMENT INDICATING THOSE MODIFICATIONS.

NOTE: This information will be input into your test report as shown below.

Company:	CPC		
Address: (incl City, State, ZIP)	1001 Westgate Drive		
	St. Paul, MN 55114		
Contact:	Jessie Yan	Position:	Electronics Design and Development Engineer
Phone - Office:	651-999-1833	Cell:	
E-mail Address:	Jessie.yan@colder.com	Form completion date:	Jan 15, 2018

General Equipment Description -- NOTE: This info will be input into your test report as shown below.

EUT Description	Custom RS-232 Dual Line reader		
EUT Name	Dual Line reader		
Model No.:	3052300	Serial No.:	190794
Product Options:			
Configurations to be tested:	standard		

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised version of this document after testing is complete.)

Modifications since last test:	
Modifications made during test:	

EUT Specifications and Requirements

Length: 186" Width: 3.5" Height: 3" Weight: 1lb

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 8-24Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): 250mA Current (Amps/phase(nominal)): 60mA

Other _____



EMC Test Plan and Product Information Form

Oscillator Frequencies (Please list any and all internally generated frequencies of the Product - clocks, CPUs, etc. *The highest frequency will determine the upper frequency range to be tested.*)

<i>Frequency (kHz, MHz, GHz)</i>	<i>Description of Use</i>
13.56MHz	RF carrier frequency
32MHz, 16MHz, 8MHz (+/-6%)	PIC clock
115,200Hz or 19,200Hz	Serial communication
200kHz	RS232 interface chip charge pump
1.5MHz	Switching regulator



EMC Test Plan and Product Information Form

Typical Installation and/or Operating Environment (ie. Hospital, Small Business, Industrial/Factory, etc.)

Industrial, factory, office

Test Objective(s):

Please indicate (x) the tests to be performed, entering the applicable standard(s) where noted.

<input checked="" type="checkbox"/>	EMC Directive	Std(s):	FCC part 15 A or B, ICES-003
<input checked="" type="checkbox"/>	RED Directive	Std(s):	EN55032:2012, EN55024, EN301-489-1 1.9.2, EN 300 330
<input type="checkbox"/>	Medical Device Directive	Std(s):	
<input type="checkbox"/>	Vehicle	Std(s):	
<input type="checkbox"/>	Ag Directive	Std(s):	

Countries Needed (common standards shown below - "x" those applicable):

<input checked="" type="checkbox"/>	FCC (USA):	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	VCCI (Japan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	BSMI (Taiwan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	(Separate Report required)
<input checked="" type="checkbox"/>	Canada:	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Australia	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Korea:	Std(s):					
<input checked="" type="checkbox"/>	Other: (Europe)	Std(s):		CE			

Other Special Requirements (i.e. Water access, compressed air, etc)

Emissions Testing Operating Modes.

Describe what the product is doing during testing. Describe how the product will be exercised during emissions testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Operating Mode 1.	Standby mode, no RF activity
Operating Mode 2.	Worse case: continuous communication with RFID tag and reader interface

Immunity Testing Operating Modes.

If different than operating mode during emissions testing, describe what the product is doing during test. Describe how the product will be exercised during immunity testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Cycle Time of Product:	~500mS
Operating Mode 1.	
Operating Mode 2.	



EMC Test Plan and Product Information Form

Immunity Testing Performance Criteria and Pass/Fail Criteria.

For immunity testing, it is very important that performance criteria be defined. Please describe what parameters can be monitored, as well as their tolerances, to ensure that the product is operating properly during the immunity testing. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters.

Monitor communication via CPC_Term while reader is in continuous test mode (default). Error is allowed while disturbance is presence. Once disturbance is removed, normal operation should resume. Worse case, a reset (PU command) may be needed.

EUT Interface Ports and Cables

In order to verify all configurations in the report properly, it is generally necessary to populate all ports on the equipment under test. If any ports are to remain unpopulated, the justification for leaving them unpopulated should be noted. (e.g., "diagnostic use only"). Please note that any unpopulated port will be documented in the report, which may exclude it from the scope of compliance as detailed in that report. Please provide as many cables as possible for testing adding rows as needed. **The cable length should represent the maximum length of cable that you specify that can be attached to the product in your instruction manual. TUV SUD AMERICA requires a minimum of 15 feet that will connect to any support equipment that you do not want included in the test field.**

Type	Length tested (in meters)	Qty	Shielding		
			Yes	No	Type
<i>EXAMPLE: Ethernet</i>	6	2		X	
Serial	5	2	x		foil

Equipment Under Test (EUT) System Components

List and describe all major components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required.

Description	Model #	Serial #	FCC ID #

Customer Supplied Support Equipment

List and describe all support equipment which is not part of the EUT but that you are providing to exercise and monitor your product. Support equipment is defined as only needed for testing and is not part of the final product to be delivered to the customer (i.e. peripherals, simulators, etc). This information is required for FCC & Taiwan testing.

RS232 power adaptor – supplies power through the serial cable
AC to 9VDC power adaptor

Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part # or Value	Qty	Component # / Location
Ferrite 1500 ohm @ 100 MHz	Steward	HZ0805D152R-10	1	FB1



EMC Test Plan and Product Information Form

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NOTE: This information will be input into your test report as shown below.

Company:	CPC		
Address: (incl City, State, ZIP)	1001 Westgate Drive		
	St. Paul, MN 55114		
Contact:	Jessie Yan	Position:	Electronics Design and Development Engineer
Phone - Office:	651-999-1833	Cell:	
E-mail Address:	Jessie.yan@colder.com	Form completion date:	Jan 15, 2018

General Equipment Description -- NOTE: This info will be input into your test report as shown below.

EUT Description	RS-232 ISO 15693 reader PCA		
EUT Name	IdentiQuick Single channel reader		
Model No.:	8614105	Serial No.:	191179
Product Options:	iUDC, iNS4, iPLC, Dual Line		
Configurations to be tested:	With 8001204 antenna and 50Ohm SMA connector for testing		

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised version of this document after testing is complete.)

Modifications since last test:	
Modifications made during test:	

EUT Specifications and Requirements

Length: 43" Width: 1.5" Height: 1/4" Weight: 1lb

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 8-24Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): 250mA Current (Amps/phase(nominal)): 60mA

Other _____



EMC Test Plan and Product Information Form

Oscillator Frequencies (Please list any and all internally generated frequencies of the Product - clocks, CPUs, etc. *The highest frequency will determine the upper frequency range to be tested.*)

<i>Frequency (kHz, MHz, GHz)</i>	<i>Description of Use</i>
13.56MHz	RF carrier frequency
32MHz, 16MHz, 8MHz (+/-6%)	PIC clock
115,200Hz or 19,200Hz	Serial communication
200kHz	RS232 interface chip charge pump
1.5MHz	Switching regulator



EMC Test Plan and Product Information Form

Typical Installation and/or Operating Environment (ie. Hospital, Small Business, Industrial/Factory, etc.)

Industrial, factory, office

Test Objective(s):

Please indicate (x) the tests to be performed, entering the applicable standard(s) where noted.

<input type="checkbox"/>	EMC Directive	Std(s):	_____
<input checked="" type="checkbox"/>	RED Directive	Std(s):	EN 300 330, FCC §15.225, IC RSS-210
<input type="checkbox"/>	Medical Device Directive	Std(s):	_____
<input type="checkbox"/>	Vehicle	Std(s):	_____
<input type="checkbox"/>	Ag Directive	Std(s):	_____

Countries Needed (common standards shown below - "x" those applicable):

<input checked="" type="checkbox"/>	FCC (USA):	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	VCCI (Japan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	BSMI (Taiwan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	(Separate Report required)
<input checked="" type="checkbox"/>	Canada:	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Australia	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Korea:	Std(s):	_____				
<input checked="" type="checkbox"/>	Other: (Europe)	Std(s):	CE				

Other Special Requirements (i.e. Water access, compressed air, etc)

Emissions Testing Operating Modes.

Describe what the product is doing during testing. Describe how the product will be exercised during emissions testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Operating Mode 1.	Standby mode, no RF activity
Operating Mode 2.	Worse case: continuous communication with RFID tag and reader interface

Immunity Testing Operating Modes.

If different than operating mode during emissions testing, describe what the product is doing during test. Describe how the product will be exercised during immunity testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Cycle Time of Product:	~500mS
Operating Mode 1.	
Operating Mode 2.	



EMC Test Plan and Product Information Form

Immunity Testing Performance Criteria and Pass/Fail Criteria.

For immunity testing, it is very important that performance criteria be defined. Please describe what parameters can be monitored, as well as their tolerances, to ensure that the product is operating properly during the immunity testing. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters.

Monitor communication via CPC_Term while reader is in continuous test mode (default). Error is allowed while disturbance is presence. Once disturbance is removed, normal operation should resume. Worse case, a reset (PU command) may be needed.

EUT Interface Ports and Cables

In order to verify all configurations in the report properly, it is generally necessary to populate all ports on the equipment under test. If any ports are to remain unpopulated, the justification for leaving them unpopulated should be noted. (e.g., "diagnostic use only"). Please note that any unpopulated port will be documented in the report, which may exclude it from the scope of compliance as detailed in that report. Please provide as many cables as possible for testing adding rows as needed. **The cable length should represent the maximum length of cable that you specify that can be attached to the product in your instruction manual. TUV SUD AMERICA requires a minimum of 15 feet that will connect to any support equipment that you do not want included in the test field.**

Type	Length tested (in meters)	Qty	Shielding		
			Yes	No	Type
<i>EXAMPLE: Ethernet</i>	6	2		X	
Serial	5	2	x		foil

Equipment Under Test (EUT) System Components

List and describe all major components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required.

Description	Model #	Serial #	FCC ID #

Customer Supplied Support Equipment

List and describe all support equipment which is not part of the EUT but that you are providing to exercise and monitor your product. Support equipment is defined as only needed for testing and is not part of the final product to be delivered to the customer (i.e. peripherals, simulators, etc). This information is required for FCC & Taiwan testing.

RS232 power adaptor – supplies power through the serial cable
AC to 9VDC power adaptor

Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part # or Value	Qty	Component # / Location
Ferrite 1500 ohm @ 100 MHz	Steward	HZ0805D152R-10	1	FB1



EMC Test Plan and Product Information Form

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NOTE: This information will be input into your test report as shown below.

Company:	CPC		
Address: (incl City, State, ZIP)	1001 Westgate Drive		
	St. Paul, MN 55114		
Contact:	Jessie Yan	Position:	Electronics Design and Development Engineer
Phone - Office:	651-999-1833	Cell:	
E-mail Address:	Jessie.yan@colder.com	Form completion date:	Jan 15, 2018

General Equipment Description -- NOTE: This info will be input into your test report as shown below.

EUT Description	RS-232 SMART coupling reader		
EUT Name	IdentiQuick RS232 reader		
Model No.:	iUDCDR1700400	Serial No.:	188110
Product Options:	iUDCDRXXXXXX0, iPLCDRXXXXXX0, iNS4DRXXXXXX0		
Configurations to be tested:	iUDCDR1700400: iUDC in-line reader with 1/4" HB		

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised version of this document after testing is complete.)

Modifications since last test:	
Modifications made during test:	

EUT Specifications and Requirements

Length: 43" Width: 2.5" Height: 2" Weight: 1lb

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 8-28Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): 250mA Current (Amps/phase(nominal)): 60mA

Other _____



EMC Test Plan and Product Information Form

Oscillator Frequencies (Please list any and all internally generated frequencies of the Product - clocks, CPUs, etc. *The highest frequency will determine the upper frequency range to be tested.*)

<i>Frequency (kHz, MHz, GHz)</i>	<i>Description of Use</i>
13.56MHz	RF carrier frequency
32MHz, 16MHz, 8MHz (+/-6%)	PIC clock
115,200Hz or 19,200Hz	Serial communication
200kHz	RS232 interface chip charge pump
1.5MHz	Switching regulator



EMC Test Plan and Product Information Form

Typical Installation and/or Operating Environment (ie. Hospital, Small Business, Industrial/Factory, etc.)
Industrial, factory, office

Test Objective(s):
 Please indicate (x) the tests to be performed, entering the applicable standard(s) where noted.

<input checked="" type="checkbox"/> EMC Directive	Std(s):	FCC part 15 A or B, ICES-003
<input checked="" type="checkbox"/> RED Directive	Std(s):	EN55032:2012, EN55024, EN301-489-1 1.9.2, EN 300 330
<input type="checkbox"/> Medical Device Directive	Std(s):	
<input type="checkbox"/> Vehicle	Std(s):	
<input type="checkbox"/> Ag Directive	Std(s):	

Countries Needed (common standards shown below - "x" those applicable):

<input checked="" type="checkbox"/> FCC (USA):	Class	<input checked="" type="checkbox"/> A (Industrial)	<input checked="" type="checkbox"/> B (Residential)	
<input type="checkbox"/> VCCI (Japan):	Class	<input type="checkbox"/> A (Industrial)	<input type="checkbox"/> B (Residential)	
<input type="checkbox"/> BSMI (Taiwan):	Class	<input type="checkbox"/> A (Industrial)	<input type="checkbox"/> B (Residential)	(Separate Report required)
<input checked="" type="checkbox"/> Canada:	Class	<input checked="" type="checkbox"/> A (Industrial)	<input checked="" type="checkbox"/> B (Residential)	
<input type="checkbox"/> Australia	Class	<input type="checkbox"/> A (Industrial)	<input type="checkbox"/> B (Residential)	
<input type="checkbox"/> Korea:	Std(s):			
<input checked="" type="checkbox"/> Other: (Europe)	Std(s):	CE		

Other Special Requirements (i.e. Water access, compressed air, etc)

Emissions Testing Operating Modes.
 Describe what the product is doing during testing. Describe how the product will be exercised during emissions testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Operating Mode 1.	Standby mode, no RF activity
Operating Mode 2.	Worse case: continuous communication with RFID tag and reader interface

Immunity Testing Operating Modes.
 If different than operating mode during emissions testing, describe what the product is doing during test. Describe how the product will be exercised during immunity testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Cycle Time of Product:	~500mS
Operating Mode 1.	
Operating Mode 2.	



EMC Test Plan and Product Information Form

Immunity Testing Performance Criteria and Pass/Fail Criteria.

For immunity testing, it is very important that performance criteria be defined. Please describe what parameters can be monitored, as well as their tolerances, to ensure that the product is operating properly during the immunity testing. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters.

Monitor communication via CPC_Term while reader is in continuous test mode (default). Error is allowed while disturbance is presence. Once disturbance is removed, normal operation should resume. Worse case, a reset (PU command) may be needed.

EUT Interface Ports and Cables

In order to verify all configurations in the report properly, it is generally necessary to populate all ports on the equipment under test. If any ports are to remain unpopulated, the justification for leaving them unpopulated should be noted. (e.g., "diagnostic use only"). Please note that any unpopulated port will be documented in the report, which may exclude it from the scope of compliance as detailed in that report. Please provide as many cables as possible for testing adding rows as needed. **The cable length should represent the maximum length of cable that you specify that can be attached to the product in your instruction manual. TUV SUD AMERICA requires a minimum of 15 feet that will connect to any support equipment that you do not want included in the test field.**

Type	Length tested (in meters)	Qty	Shielding		
			Yes	No	Type
<i>EXAMPLE: Ethernet</i>	6	2		X	
Serial	5	2	x		foil

Equipment Under Test (EUT) System Components

List and describe all major components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required.

Description	Model #	Serial #	FCC ID #

Customer Supplied Support Equipment

List and describe all support equipment which is not part of the EUT but that you are providing to exercise and monitor your product. Support equipment is defined as only needed for testing and is not part of the final product to be delivered to the customer (i.e. peripherals, simulators, etc). This information is required for FCC & Taiwan testing.

RS232 power adaptor – supplies power through the serial cable
AC to 9VDC power adaptor

Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part # or Value	Qty	Component # / Location
Ferrite 1500 ohm @ 100 MHz	Steward	HZ0805D152R-10	1	FB1



EMC Test Plan and Product Information Form

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NOTE: This information will be input into your test report as shown below.

Company:	CPC		
Address: (incl City, State, ZIP)	1001 Westgate Drive		
	St. Paul, MN 55114		
Contact:	Jessie Yan	Position:	Electronics Design and Development Engineer
Phone - Office:	651-999-1833	Cell:	
E-mail Address:	Jessie.yan@colder.com	Form completion date:	Jan 15, 2018

General Equipment Description -- NOTE: This info will be input into your test report as shown below.

EUT Description	USB SMART coupling reader		
EUT Name	IdentiQuick USB reader		
Model No.:	iNS4DR1700401	Serial No.:	187378
Product Options:	iNS4DRXXXXXX1, iUDCDRXXXXXX1, iNS4DRXXXXXX1		
Configurations to be tested:	iNS4DR1700401: NS4 in-line with 1/4" HB		

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised version of this document after testing is complete.)

Modifications since last test:	
Modifications made during test:	Removed earth ground lead from J3_5 Added ferrite bead 8430019 to tie shield to power ground at R19

EUT Specifications and Requirements

Length: 43" Width: 2.5" Height: 2" Weight: 1lb

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 5Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): 250mA Current (Amps/phase(nominal)): 60mA

Other _____



EMC Test Plan and Product Information Form

Oscillator Frequencies (Please list any and all internally generated frequencies of the Product - clocks, CPUs, etc. *The highest frequency will determine the upper frequency range to be tested.*)

<i>Frequency (kHz, MHz, GHz)</i>	<i>Description of Use</i>
13.56MHz	RF carrier frequency
32MHz, 16MHz, 8MHz (+/-6%)	PIC clock
400 MHz	USB interface



EMC Test Plan and Product Information Form

Typical Installation and/or Operating Environment (ie. Hospital, Small Business, Industrial/Factory, etc.)

Industrial, factory, office

Test Objective(s):

Please indicate (x) the tests to be performed, entering the applicable standard(s) where noted.

<input checked="" type="checkbox"/>	EMC Directive	Std(s):	FCC part 15 A or B, ICES-003
<input checked="" type="checkbox"/>	RED Directive	Std(s):	EN55032:2012, EN55024, EN301-489-1 1.9.2, EN 300 330
<input type="checkbox"/>	Medical Device Directive	Std(s):	
<input type="checkbox"/>	Vehicle	Std(s):	
<input type="checkbox"/>	Ag Directive	Std(s):	

Countries Needed (common standards shown below - "x" those applicable):

<input checked="" type="checkbox"/>	FCC (USA):	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	VCCI (Japan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	BSMI (Taiwan):	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	(Separate Report required)
<input checked="" type="checkbox"/>	Canada:	Class	<input checked="" type="checkbox"/>	A (Industrial)	<input checked="" type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Australia	Class	<input type="checkbox"/>	A (Industrial)	<input type="checkbox"/>	B (Residential)	
<input type="checkbox"/>	Korea:	Std(s):					
<input checked="" type="checkbox"/>	Other: (Europe)	Std(s):		CE			

Other Special Requirements (i.e. Water access, compressed air, etc)

Emissions Testing Operating Modes.

Describe what the product is doing during testing. Describe how the product will be exercised during emissions testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Operating Mode 1.	Standby mode, no RF activity
Operating Mode 2.	Worse case: continuous communication with RFID tag and reader interface

Immunity Testing Operating Modes.

If different than operating mode during emissions testing, describe what the product is doing during test. Describe how the product will be exercised during immunity testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Cycle Time of Product:	~500mS
Operating Mode 1.	
Operating Mode 2.	



EMC Test Plan and Product Information Form

Immunity Testing Performance Criteria and Pass/Fail Criteria.

For immunity testing, it is very important that performance criteria be defined. Please describe what parameters can be monitored, as well as their tolerances, to ensure that the product is operating properly during the immunity testing. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters.

Monitor communication via CPC_Term while reader is in continuous test mode (default). Error is allowed while disturbance is presence. Once disturbance is removed, normal operation should resume. Worse case, a reset (PU command) may be needed.

EUT Interface Ports and Cables

In order to verify all configurations in the report properly, it is generally necessary to populate all ports on the equipment under test. If any ports are to remain unpopulated, the justification for leaving them unpopulated should be noted. (e.g., "diagnostic use only"). Please note that any unpopulated port will be documented in the report, which may exclude it from the scope of compliance as detailed in that report. Please provide as many cables as possible for testing adding rows as needed. **The cable length should represent the maximum length of cable that you specify that can be attached to the product in your instruction manual. TUV SUD AMERICA requires a minimum of 15 feet that will connect to any support equipment that you do not want included in the test field.**

Type	Length tested (in meters)	Qty	Shielding		
			Yes	No	Type
<i>EXAMPLE: Ethernet</i>	6	2		X	
USB extension	10	1	x		foil

Equipment Under Test (EUT) System Components

List and describe all major components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required.

Description	Model #	Serial #	FCC ID #

Customer Supplied Support Equipment

List and describe all support equipment which is not part of the EUT but that you are providing to exercise and monitor your product. Support equipment is defined as only needed for testing and is not part of the final product to be delivered to the customer (i.e. peripherals, simulators, etc). This information is required for FCC & Taiwan testing.

USB power adaptor – supplies 5Vdc power through the USB cable