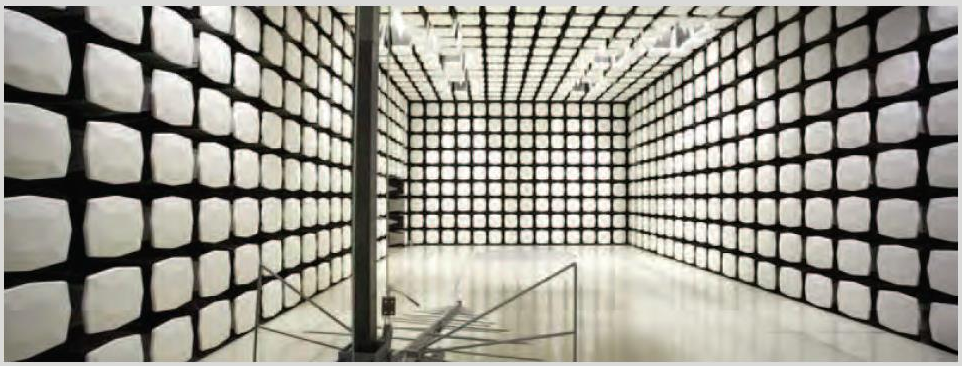
Logic PD, Inc.

Zoll R-Series Data Comm II C2PC

FCC 15.407:2021

802.11an

Report: LGPD0258.2, Issue Date: June 25, 2021



NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST

Last Date of Test: May 21, 2021
Logic PD, Inc.
EUT: Zoll R-Series Data Comm II C2PC

Radio Equipment Testing

Standards

Specification	Method
FCC 15.407:2021	ANSI C63.10:2013, KDB 789033, KDB 905462

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a C2PC related to part substitution of an oscillator
6.8	Frequency Stability	No	N/A	Not tested: There are no specific limits provided in either FCC 15.407, the product specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. As there is no specific limit, this testing was not performed.
12.2	Duty Cycle	Yes	Pass	
12.3.2.4	Maximum Conducted Output Power	Yes	Pass	
12.3.2.4	Equivalent Isotropic Radiated Power (EIRP)	Yes	Pass	
12.4.1	Emission Bandwidth	Yes	Pass	
12.4.2	Occupied Bandwidth	Yes	Pass	
12.4.2	Band Edge	No	N/A	Not required for a C2PC related to part substitution of an oscillator
12.5	Maximum Power Spectral Density	No	N/A	Not required for a C2PC related to part substitution of an oscillator
12.7, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
KDB 789033 - H	Measurement of Emission at Elevation Angle Higher Than 30 Degrees From Horizon	No	N/A	Not required unless the EUT is a Master device used outdoors.

Deviations From Test Standards

None

Approved By:

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.

CERTIFICATE OF TEST

element
2018-09-14

Eric Brandon, Department 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. 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		

ACCREDITATIONS AND AUTHORIZATIONS

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 Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

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

Korea

MSIT / 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.

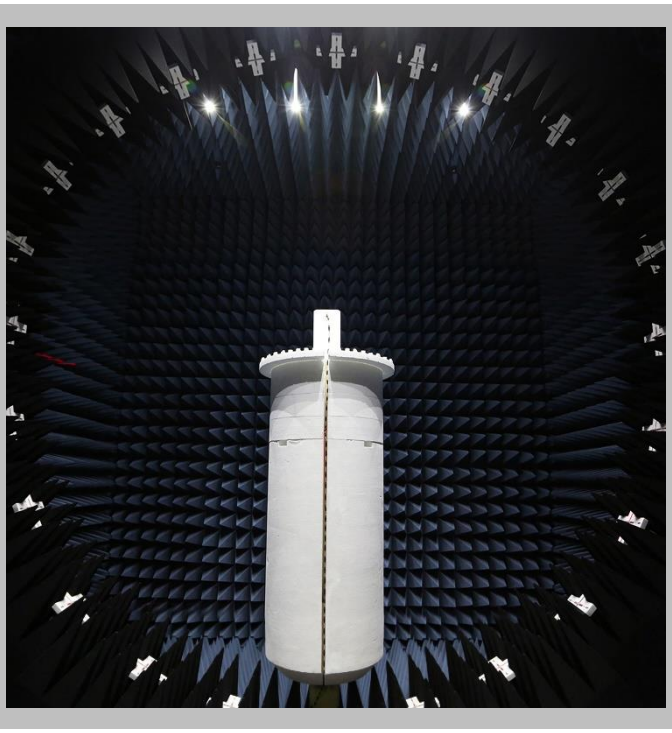
SCOPE

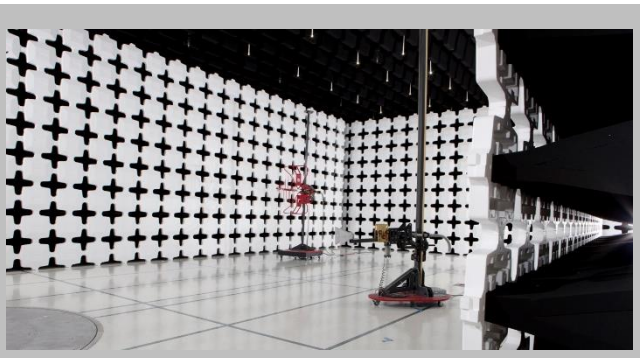
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

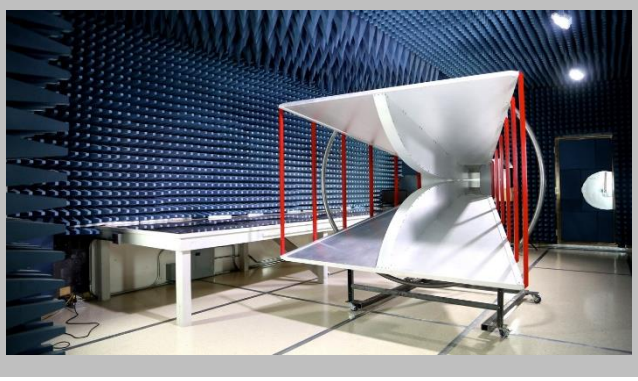
FACILITIES

element
2020.12.15

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 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 98011 (425)984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
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/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

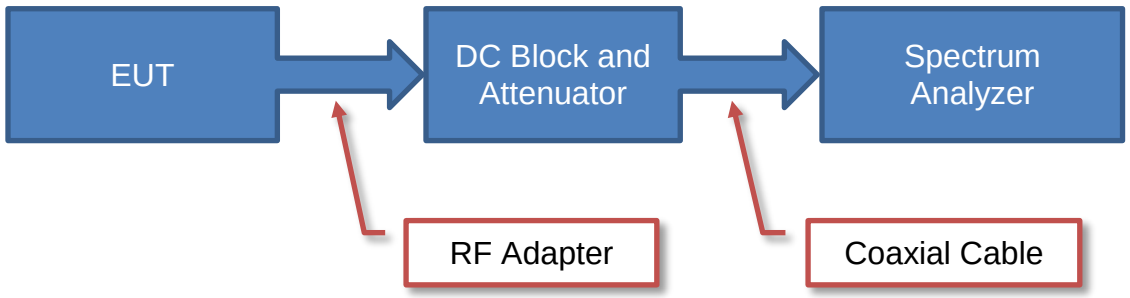
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

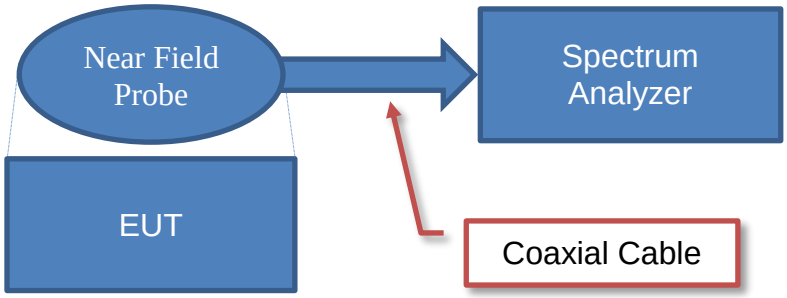
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

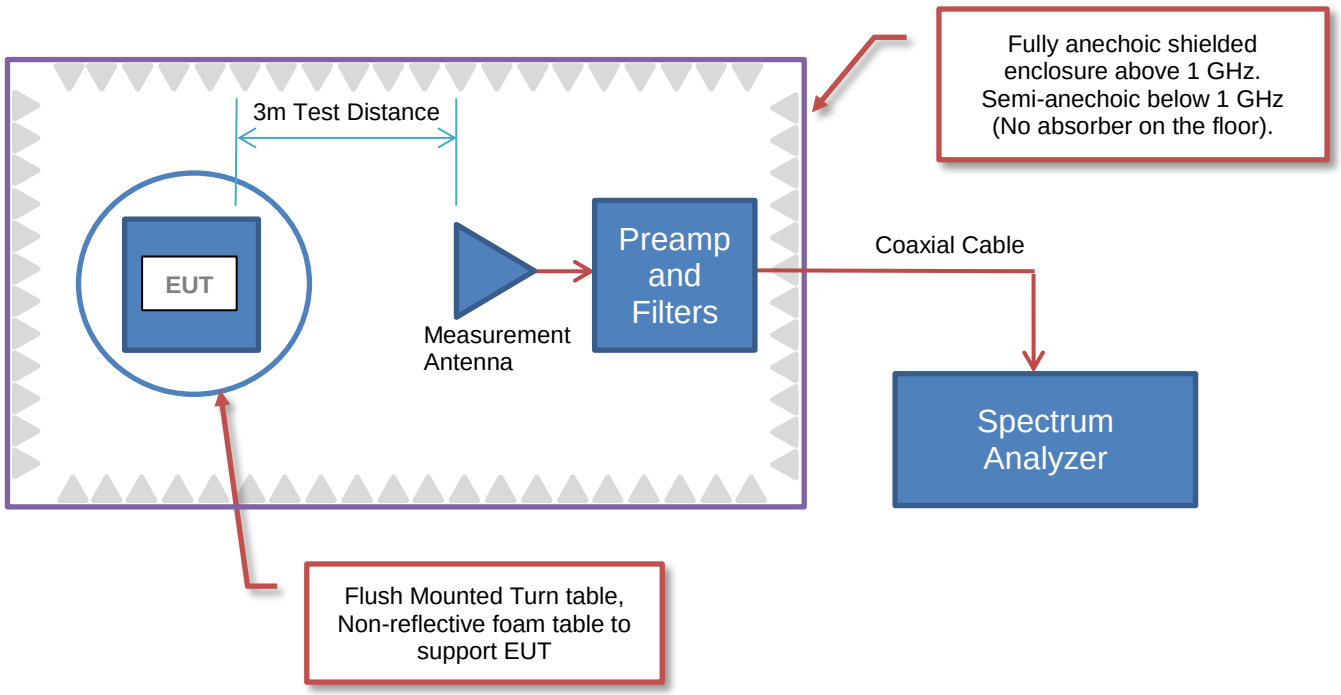
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



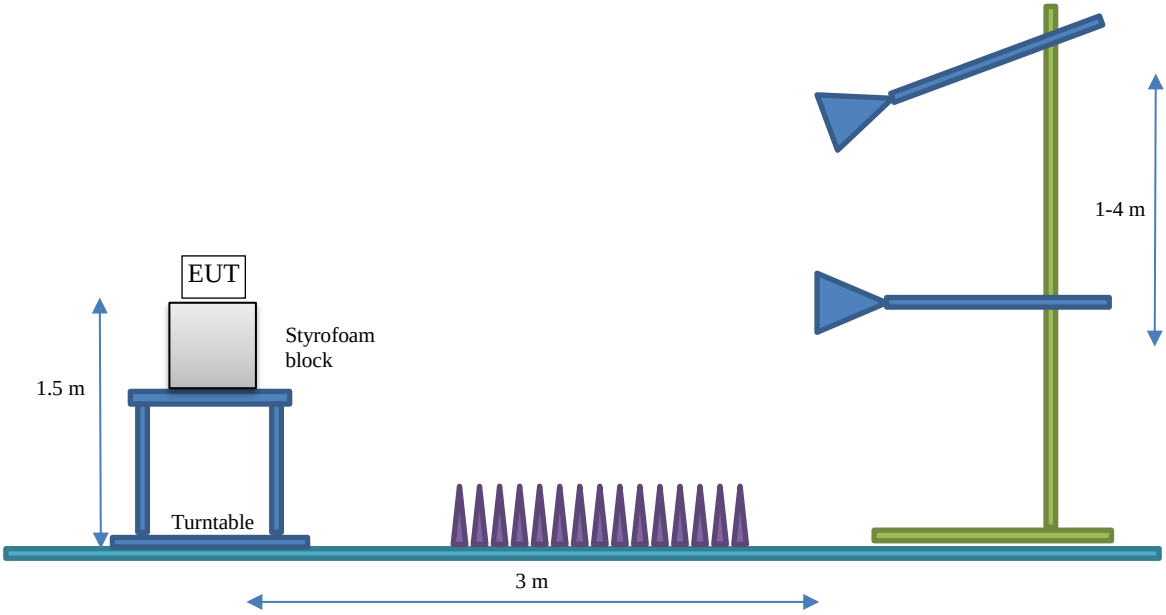
Spurious Radiated Emissions



Test Setup Block Diagrams

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Logic PD, Inc.
Address:	6201 Bury Drive
City, State, Zip:	Eden Prairie, MN 55346
Test Requested By:	Eric Fritz
EUT:	Zoll R-Series Data Comm II C2PC
First Date of Test:	May 4, 2021
Last Date of Test:	May 21, 2021
Receipt Date of Samples:	May 3, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Zoll R-Series Data Comm II - C2PC due to EOL oscillator change

Testing Objective:
To demonstrate compliance of the 802.11 radio under FCC 15.407 for operation in the 5.2 GHz, 5.3 GHz, 5.6 GHz and 5.8 GHz bands.

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Trace Antenna	Customer	5180-5825	2.6

POWER SETTINGS

Radio	Modulation	Channel	Power Setting (hex)
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	36 (5180 MHz)	0x19
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	48 (5240 MHz)	0x1A
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	52 (5260 MHz)	0x16
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	64 (5320 MHz)	0x1D
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	100 (5500 MHz)	0x13
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	116 (5580 MHz)	0x50
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	140 (5700 MHz)	0x1D
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	149 (5745 MHz)	0x21
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	157 (5785 MHz)	0x50
802.11(an)	6 Mbps, 36 Mbps, 54 Mbps, MCS0, MCS7	165 (5825 MHz)	0x50

CONFIGURATIONS

Configuration LGPD0258- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Zoll International Holding B.V	Zoll R-Series Data Comm II C2PC	LB211400035

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CF Breakout Board	Sycard	CFextend 160B	None
Serial Breakout Board	Logic PD Inc	None	None
DC Power Supply	MPJA	None	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Dell	Lattitude E6420/VVF52 A00	5NZR5Q1
Laptop Power Supply	Dell	DA90PS1-00	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.7m	No	AC Mains	DC Power Supply
DC Power	No	1.6m	No	DC Power Supply	CF Breakout Board
Ribbon Cable	No	0.05m	No	Wireless Module	Serial Breakout Board
AC Power	No	1.8m	No	AC Mains	Laptop Power Supply
DC Power	Unknown	1.7m	Yes	Laptop Power Supply	Laptop Computer
Serial Cable	Yes	1.7m	No	Serial Breakout Board	Serial to USB Adapter Cable
Serial to USB Adapter Cable	Yes	1.7m	No	Serial Cable	Laptop Computer

CONFIGURATIONS

Configuration LGPD0258- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Zoll International Holding B.V	Zoll R-Series Data Comm II C2PC	LB211400035

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CF Breakout Board	Sycard	CFextend 160B	None
Serial Breakout Board	Logic PD Inc	None	None
DC Power Supply	MPJA	None	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Dell	Lattitude E6420/VVF52 A00	5NZR5Q1
Laptop Power Supply	Dell	DA90PS1-00	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.7m	No	AC Mains	DC Power Supply
DC Power	No	1.6m	No	DC Power Supply	CF Breakout Board
Ribbon Cable	No	0.05m	No	Wireless Module	Serial Breakout Board
AC Power	No	1.8m	No	AC Mains	Laptop Power Supply
DC Power	Unknown	1.7m	Yes	Laptop Power Supply	Laptop Computer
Serial to USB Adapter Cable	Yes	1.7m	No	Serial Cable	Laptop Computer
Serial Cable (long)	No	>3m	No	Serial Breakout Board	Serial to USB Adapter Cable

CONFIGURATIONS

Configuration LGPD0258- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Zoll International Holding B.V	Zoll R-Series Data Comm II C2PC	LB211400035

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CF Breakout Board	Sycard	CFextend 160B	None
Serial Breakout Board	Logic PD Inc	None	None
DC Power Supply	MPJA	None	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Dell	Lattitude E6420/VVF52 A00	5NZR5Q1
Laptop Power Supply	Dell	DA90PS1-00	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.7m	No	AC Mains	DC Power Supply
Ribbon Cable	No	0.05m	No	Wireless Module	Serial Breakout Board
AC Power	No	1.8m	No	AC Mains	Laptop Power Supply
DC Power	Unknown	1.7m	Yes	Laptop Power Supply	Laptop Computer
Serial Cable	Yes	1.7m	No	Serial Breakout Board	Serial to USB Adapter Cable
Serial to USB Adapter Cable	Yes	1.7m	No	Serial Cable	Laptop Computer
DC Power	No	0.7m	No	DC Power Supply	CF Breakout Board

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-05-04	Emission Bandwidth	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2021-05-04	Occupied Bandwidth	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2021-05-07	Spurious Radiated Emissions	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2021-05-17	Duty Cycle	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2021-05-17	Maximum Conducted Output Power	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2021-05-17	Equivalent Isotropic Radiated Power (EIRP)	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2021-05-21	Spurious Radiated Emissions, Spot Checks	Tested as delivered to the Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.