



166 South Carter, Genoa City, WI 53128

Company:	Brady Corporation
Model Tested:	BDCi5100 RFID ASSEMBLY
Report Number:	23133
Project Number:	9157

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators

Section 15.225

Operation within the band 13.110 – 14.010 MHz

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

FCC ID: NUC-BDCI5100

Formal Name:	BDCi5100 RFID ASSEMBLY
Kind of Equipment:	13.56MHz RFID Read\Writer assembly
Frequency Range:	13.56 MHz
Test Configuration:	BDC5100 RFID ASSEMBLY tested @ board level w\ three antennas
Model Number(s):	BDCi5100 RFID ASSEMBLY
Model(s) Tested:	BDCi5100 RFID ASSEMBLY
Serial Number(s):	N\A (prototype)
Date of Tests:	September - October, 2017 November 20, 2017
Test Conducted For:	Brady Corporation 6555 W. Good Hope Road Milwaukee, WI 53223, USA

NOTICE: “This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government”. Please see the "Description of Test Sample" page listed inside of this report.

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SIGNATURE PAGE

Tested By:

A handwritten signature in black ink that reads "Paul Leo". The signature is written in a cursive, flowing style.

Paul Leo
Test Engineer

Reviewed By:

A handwritten signature in black ink that reads "William Stumpf". The signature is written in a cursive, flowing style.

William Stumpf
OATS Manager

Approved By:

A handwritten signature in black ink that reads "Brian J. Mattson". The signature is written in a cursive, flowing style.

Brian Mattson
General Manager



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United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2016-08-16 through 2017-09-30
Effective Dates



[Signature]
For the National Voluntary Laboratory Accreditation Program

**ELECTROMAGNETIC
COMPATIBILITY &
TELECOMMUNICATIONS**

NVLAP LAB CODE 100276-0

Emissions

Designation

Off-site test location

Description

D.L.S. Electronics performs radiated emissions testing at an additional location, 166 South Carter Street, Genoa City, WI 53128.



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management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2017-09-29 through 2018-09-30
Effective Dates



[Signature]
For the National Voluntary Laboratory Accreditation Program

**ELECTROMAGNETIC
COMPATIBILITY &
TELECOMMUNICATIONS**

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Designation

Off-site test location

Description

D.L.S. Electronics performs radiated emissions testing at an additional location, 166 South Carter Street, Genoa City, WI 53128.



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Company: Brady Corporation
Model Tested: BDCi5100 RFID ASSEMBLY
Report Number: 23133
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1.0 Summary of Test Report

It was determined that the BDCi5100 RFID ASSEMBLY, Model BDCi5100 RFID ASSEMBLY complies with the requirements of CFR 47 Part 15 Subpart C Section 15.225.

Subpart C Section 15.225 Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
FCC 15.215(c)	20 dB Emission Bandwidth	ANSI C63.10-2013 Section 6.9.2	1	Yes
FCC 15.225 & 15.209	Radiated Emissions	ANSI C63.4-2014 & ANSI C63.10-2013	1	Yes
FCC 15.225(e)	Frequency Stability	ANSI C63.10-2013 Section 6.8	1	Yes
FCC 15.207	AC Line Conducted Emissions	ANSI C63.4-2014, ANSI C63.10-2013 & KDB 174176 D01- Question 5	2	Yes
FCC 15.31(e)	Supply Voltage Statement	N/A		Yes
15.203	Antenna Requirement Statement	N/A		Yes

Note 1: Radiated emission measurement.

Note 2: AC Line Conducted emission measurement

2.0 Introduction

From September through November, 2017 the BDCi5100 RFID ASSEMBLY, Model BDCi5100 RFID ASSEMBLY, as provided from Brady Corporation was tested to the requirements of CFR 47 Part 15 Subpart C Section 15.225 for a single modular approval. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.



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3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Innovation Science and Economic Development Canada, and VCCI.

Wisconsin Test Facility:

D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:

D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

FCC Registration #90531

4.0 Description of Test Sample

Description:

BDCi5100 RFID ASSEMBLY comprises of BDCi5100 RFID module (requiring certification), coaxial antenna cables, and up to three transmit/receive antennae. The operating frequency of the system is 13.56MHz. Only one antenna is active at any one time. The tags are passive devices.

This sub-system will read/write RFID data from external RFID tags that provide brand security for Brady media/ribbons. Data / Control communications to the host controller are via USB. The host controller is considered the anchor printer, not part of this sub-system.

The antennae utilize headers or solder terminals for coaxial connection to BDCi5100 RFID module.

Power input to the BDCi5100 is 9 to 24 volts DC <200 mA.

Type of Equipment / Frequency Range:

RFID Read\Writer assembly / 13.56 MHz

Physical Dimensions of Equipment Under Test:

BDCi5100: 79.54mm L x 49.49mm W x 1.6mm H
Ribbon antenna: 50.8mm L x 69.85mm W x 1.6mm H
Media antenna: 69.85mm L x 120.65mm W x 1.6mm H

Power Source:

9 – 24 V DC



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4.0 Description of Test Sample (continued)

Internal Frequencies:

Fund: 13.56MHz, Ateml uP: 4 - 16MHz

Transmit / Receive Frequencies Used For Test Purpose:

13.56 MHz

Type of Modulation(s) / Antenna Type:

Amplitude / 50 OHM PCB loop antennas, 3 pieces

Description of Circuit Board(s) / Part Number:

IP BDC	Y538479
Assy - Media Antenna	Y557407
P PWA - Ribbon Antenna	Y476017

5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

D.L.S. Wisconsin – AC Line Conducted (Screen Room)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	4-5-17	4-5-18
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	8-9-17	8-9-18
Filter- High-Pass	SOLAR	7930-120	090702	120 kHz – 30 MHz	11-4-16	11-4-17
Limiter	Electro-Metrics	EM-7600	705	9 kHz – 30 MHz	11-4-16	11-4-17
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A



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5.0 Test Equipment (continued)

RADIATED EMISSIONS TEST 9 kHz – 30 MHz (Site 2)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	4-6-17	4-6-18
Antenna	Electro-Metrics	6502	1027	9 kHz – 30 MHz	8-22-17	8-22-19
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

RADIATED EMISSIONS TEST 30 – 1000 MHz (Site 2)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	4-6-17	4-6-18
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	12-2-16	12-2-17
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3-11-16	3-11-18
Antenna	Electro-Metrics	LPA-25	1205	200 MHz – 1 GHz	3-23-16	3-23-18
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

Temperature Chamber

Description	Manufacturer	Model Number	Serial Number	Temperature Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	4-5-17	4-5-18
Temperature Chamber	Test Equity	1007C	R035716	-73° C to +175° C	N/A	N/A
Multimeter	Fluke	115	18741295	N/A	7-12-17	7-12-18
Digital Thermometer	Tenma	72-2060	723662	-50 to + 1300 deg C	9-1-17	9-1-18



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6.0 Test Arrangements

Radiated Emissions Measurement Arrangement:

All radiated emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.10-2013, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up. See Appendix C for Measurement Uncertainty.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

7.0 Test Conditions

Normal Test Conditions:

Temperature and Humidity: 70°F at 57% RH or as noted on test data

Voltage: 9 - 24 Volt DC

Extreme Test Conditions

Temperature range tested: -20° C to + 50° C

Voltages: 9 VDC, 24 VDC

8.0 Modifications Made To EUT For Compliance

None



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9.0 Additional Descriptions

The EUT was in operational mode with an RFID tag to activate the transmitter. The three antennas were continuously transmitting (repeated polling of each antenna) during testing.

The EUT was tested stand-alone for Single Modular Approval.

10.0 FCC 15.31 (e) Supply Voltage Requirement statement

FCC 15.31 (e) - For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Compliance Statement: This device complies with the requirements of Part 15.31(e):

- ☐ This device is battery operated. All tests were performed using a new (or fully charged) battery.
- ☒ This device provides a constant regulated voltage to the RF circuitry regardless of supply voltage (see schematic diagrams).
- ☐ This device does not provide a constant regulated voltage to the RF circuitry regardless of supply voltage. Data has been supplied in this test report that supports compliance. Details:



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11.0 FCC 15.203 Antenna Requirement statement

SECTION 15.203 ANTENNA REQUIREMENT

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.... This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221.

Statement: This wireless device (Intentional Radiator) meets the requirements of FCC Part 15.203:

- ☐ The antenna is permanently attached
- ☒ The antenna has a unique coupling to the intentional radiator.
Description of coupling: The antennae utilize headers or solder terminals for coaxial connection to BDCi5100 RFID module.
- ☒ This intentional radiator is professionally installed
- ☐ This intentional radiator, in accordance with Section 15.31(d), must be measured at the installation site.

12.0 Results

Measurements were performed in accordance with ANSI C63.10-2013 and FCC KDB 174176 D01-Question 5. Graphical and tabular data can be found in Appendix B at the end of this report. Measurement Uncertainty can be found in Appendix C.

13.0 Conclusion

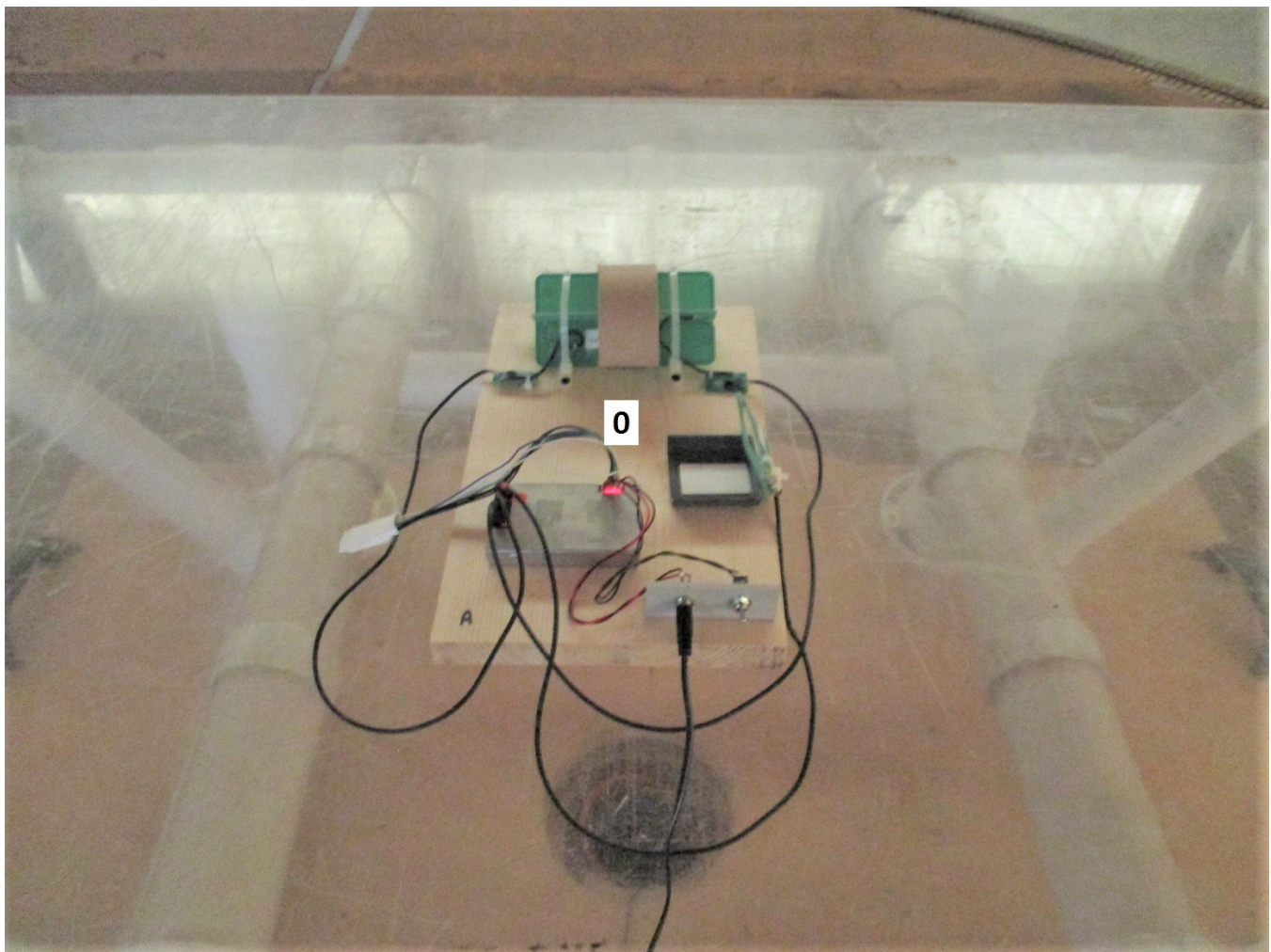
The BDCi5100 RFID ASSEMBLY, Model BDCi5100 RFID ASSEMBLY, as provided from Brady Corporation tested from September through November, 2017 **meets** the requirements of CFR 47 Part 15 Subpart C Section 15.225.

Appendix A – Test Photos

Photo Information and Test Setup:

Item 0: BDCi5100 RFID ASSEMBLY
 Circuit board in metal case
 Antenna 0745, Y476019 Rev C, with Tag
 Two 51 cm shielded cables
 Antenna 0745; Y476017 Rev B, with Tag
 One 50 cm shielded cable
 1.2 meter unshielded DC power cable (not EUT)

Radiated Emissions



Appendix A

Radiated Emissions



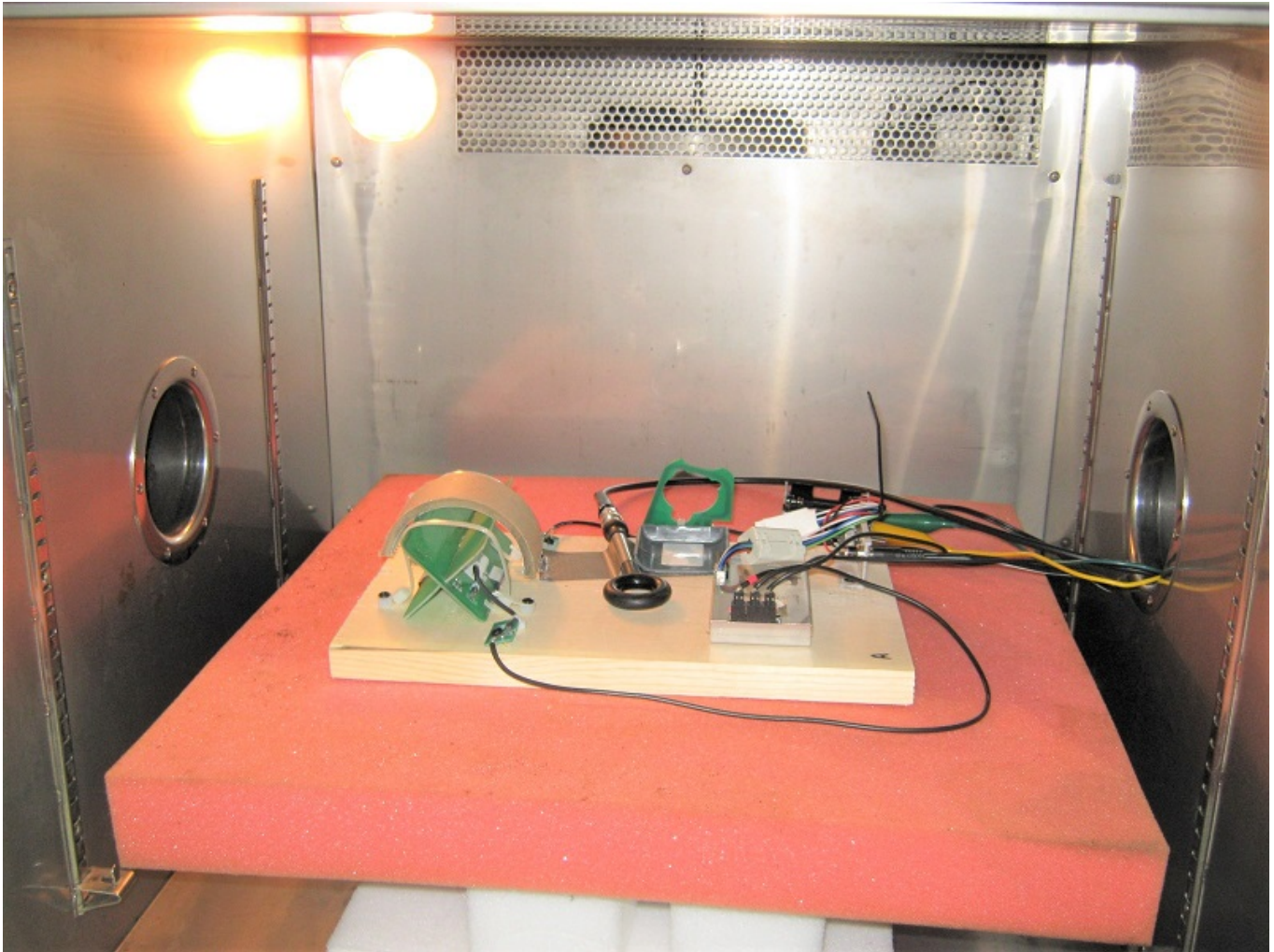
Appendix A

Radiated Emissions



Appendix A

Frequency Stability





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Appendix A

AC line conducted



Appendix A

AC line Conducted Emissions – Front with antennas connected



AC line Conducted Emissions – Back with antennas connected

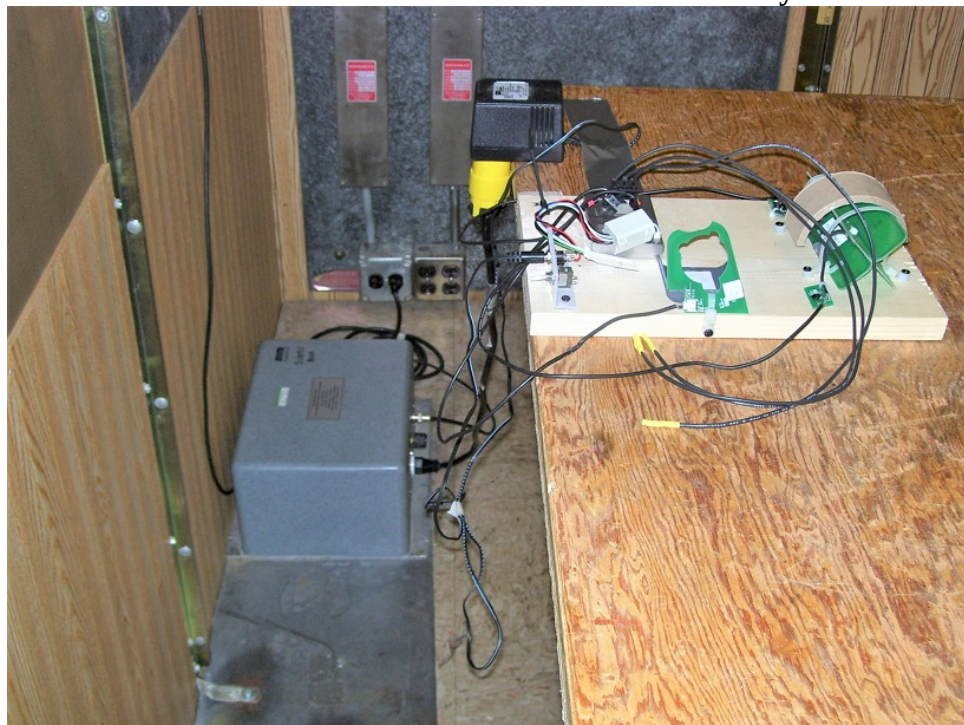


Appendix A

AC line Conducted Emissions – Front with dummy loads



AC line Conducted Emissions – Back with dummy loads





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Appendix B – Measurement Data

B1.0 Occupied Bandwidth – 20 dB

Rule Part: FCC 15.215(c)

Test Procedure: ANSI C63.10:2013 Section 6.9.2

Limits: 20 dB bandwidth must be contained within the 13.110 - 14.010 MHz band

Results: Compliant

Sample Equations: N/A

Notes: The EUT was set to transmit at its maximum power.

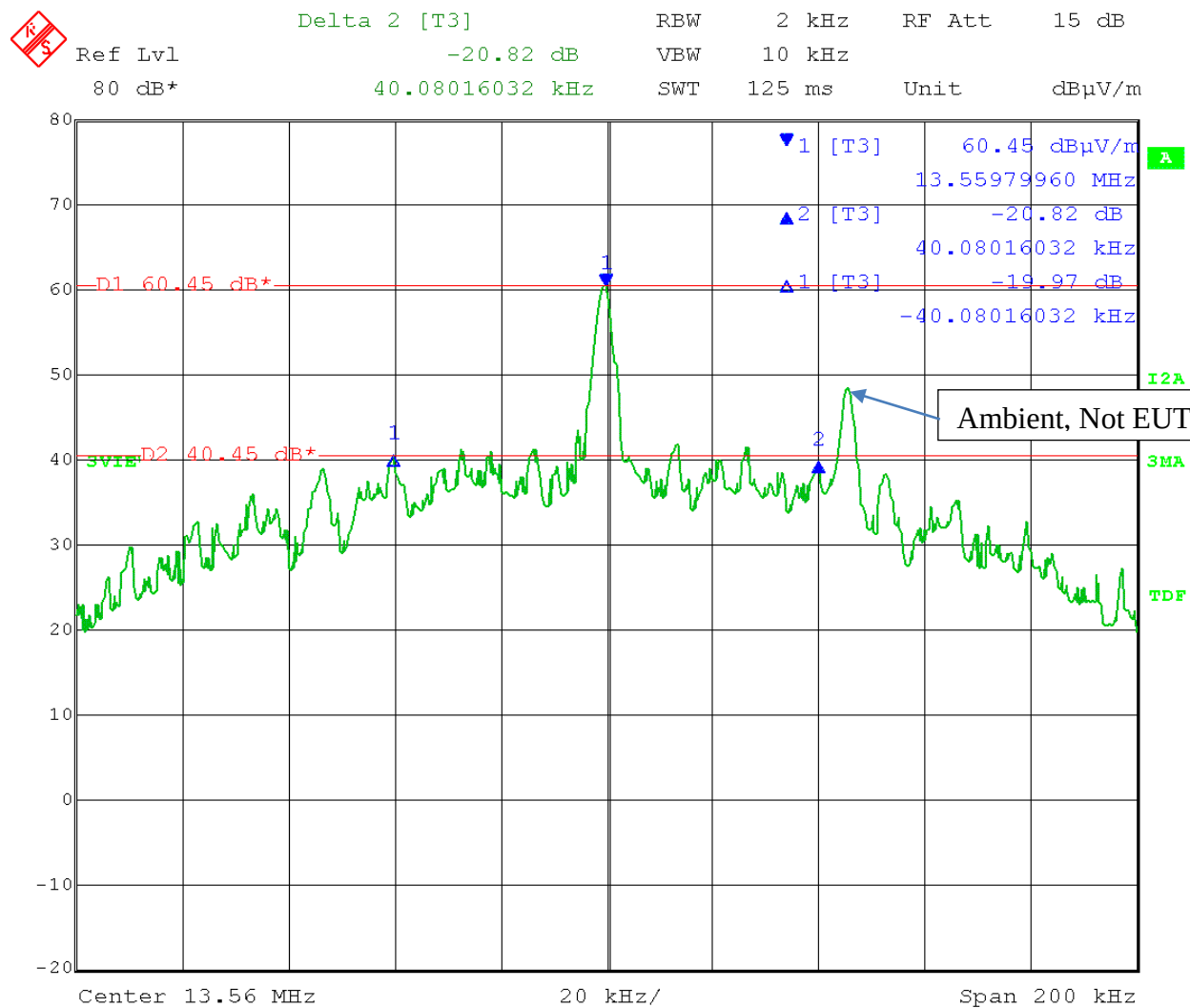


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Test Date: 09-15-2017
Company: Brady Corp.
EUT: i5100 BDC Radio Module A
Test: 20db Bandwidth; Peak
Operator: Paul L
Comment: Frequency: 13.56 MHz
Test distance: 10 meters



Date: 15.SEP.2017 10:26:12



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Appendix B

B2.0 Radiated Emissions

Rule Part: FCC Part 15.225 and FCC Part 15.209

Test Procedure: ANSI C63.10-2013

Limits: 15,848 $\mu\text{V/m}$ at 30 meters: 13.553-13.567 MHz
334 $\mu\text{V/m}$ at 30 meters: 13.410-13.553 & 13.567-13.710 MHz
106 $\mu\text{V/m}$ at 30 meters: 13.110-13.410 & 13.710-14.010 MHz
15.209 general emission limits: outside 13.110-14.010 MHz

Results: Compliant

Sample Equations: Limit at 10 meters:
Fundamental limit at 30 meters = 15,848 $\mu\text{V/m}$
 $20 \log (15,848) = 84 \text{ dB}\mu\text{V/m}$ at 30 meters
Using a 20 dB/decade distance extrapolation factor as per ANSI C63.10-2013, section 6.4.4.2. = 9.54 dB
 $84 \text{ dB}\mu\text{V/m} + 9.54 \text{ dB} = \mathbf{93.54 \text{ dB}\mu\text{V/m at 10 meter distance}}$

Notes: The EUT was set to transmit at its maximum power.

Field Strength measurements were taken at 10 meters from 9 kHz to 30 MHz, and 3 meters from 30 MHz to 1 GHz.



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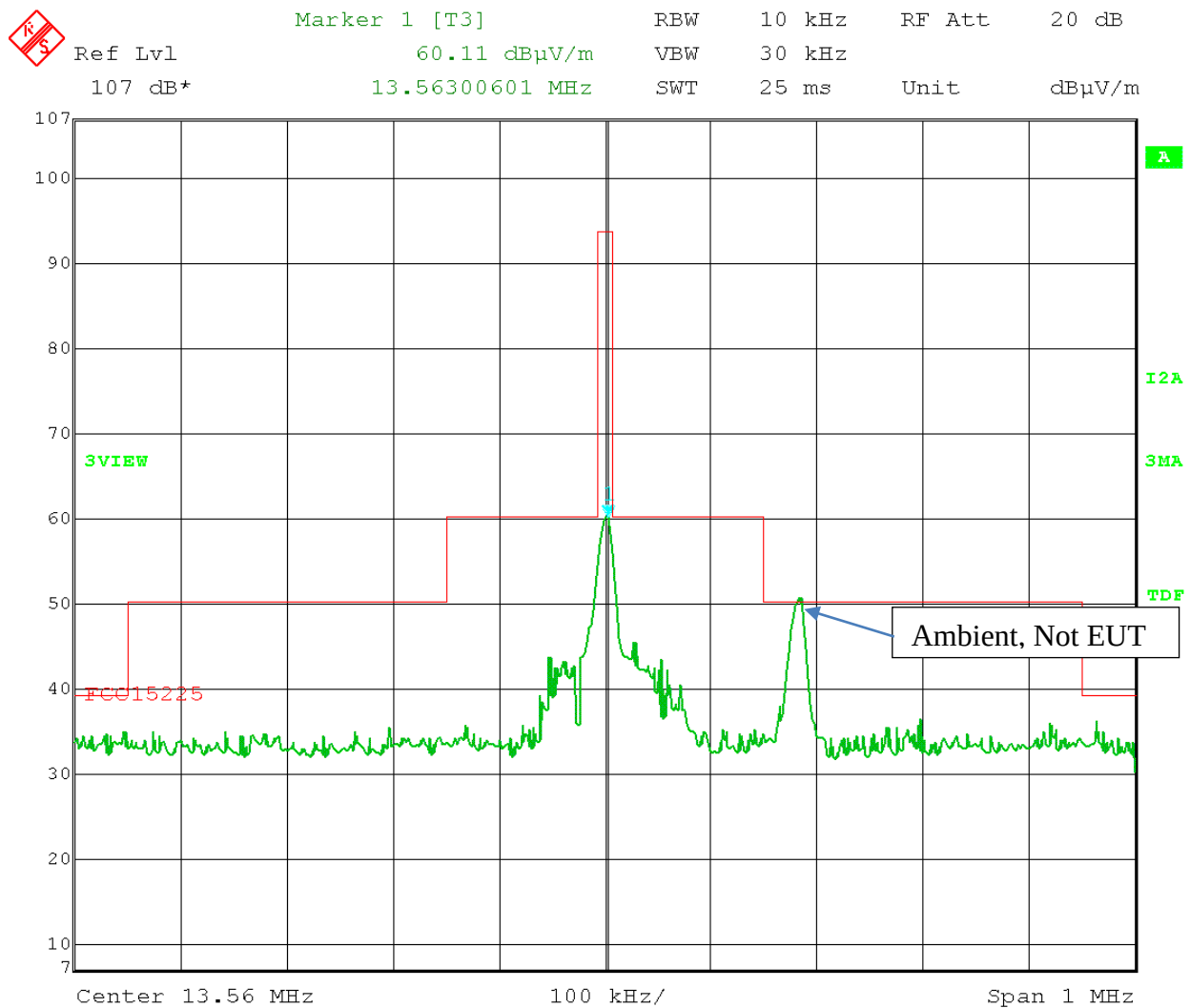
Company:
Model Tested:
Report Number:
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Appendix B

B2.1 Emissions Mask

Test Date: 09-15-2017
Company: Brady Corp.
EUT: i5100 BDC Radio Module A
Test: Emission Mask – Radiated; Peak
Operator: Paul L
Comment: Frequency: 13.56 MHz
Test distance: 10 meters



Date: 15.SEP.2017 09:29:08

Radiated Field Strength

EUT: i5100BDC Radio Module
Manufacturer: Brady Corp.
Operating Condition: 60deg F; 64% R.H.
Test Site: DLS O.F. Site 2
Operator: Paul L #9157
Test Specification: 120VAC 60Hz 9-24VDC
Comment: Continuous Transmit
DATE: 9/15/2017

TEXT: "E-Field 10 meters"

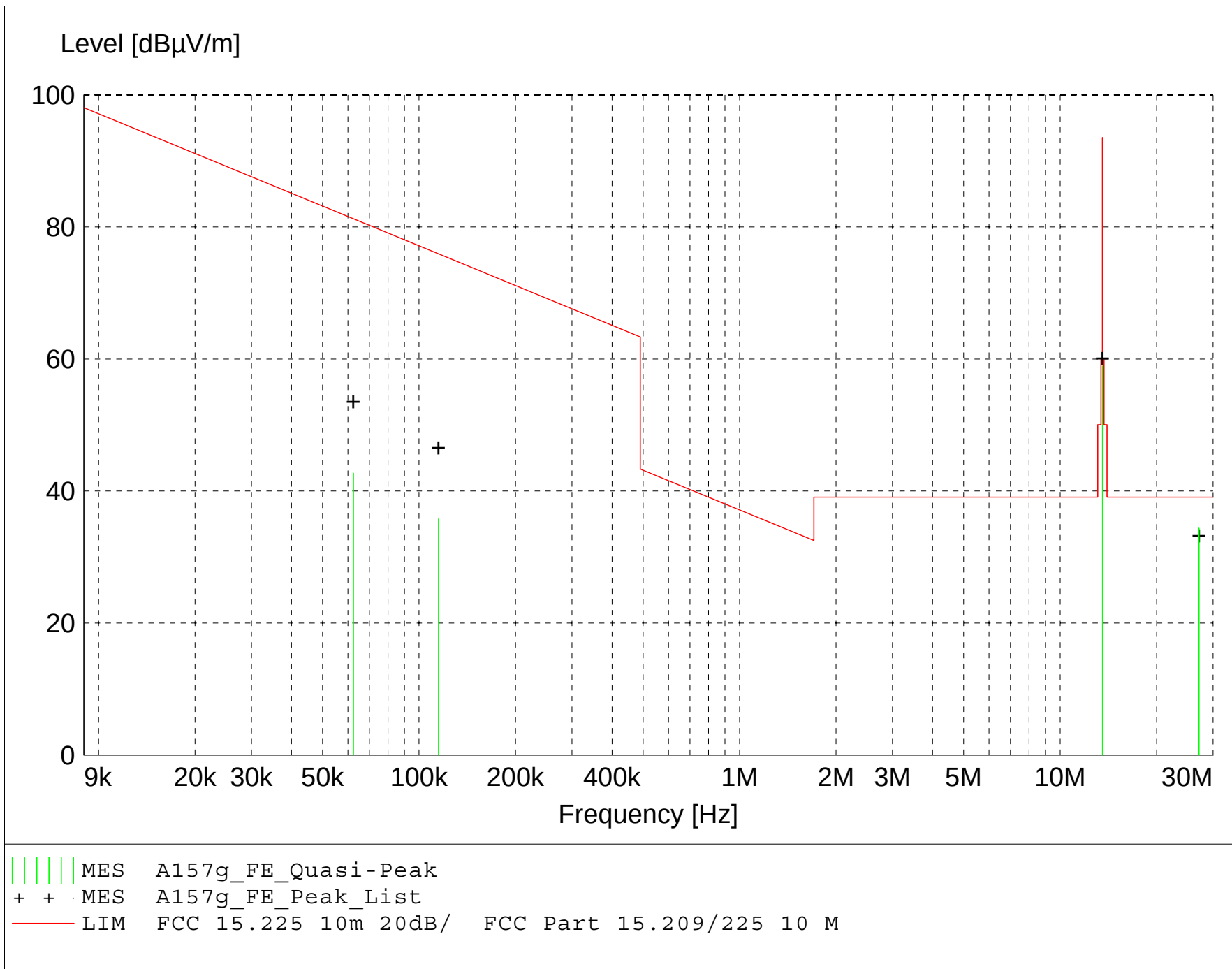
Short Description: E-Field

Test Set-up: EUT Measured at 10 Meters with Active Loop Antenna

Sample Equations:
$$\begin{array}{rclclcl} \text{Total Level (dB}\mu\text{V/m)} & = & \text{Level (dB}\mu\text{V)} & + & \text{System Loss (dB)} & + & \text{Antenna Factor (dB}\mu\text{V/m)} \\ 24.6 & & = 35.51 & + & (-22.1) & + & 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin (dB)} & = & \text{Limit (dB}\mu\text{V/m)} & - & \text{Total Level (dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)
 | Final maximized level using Quasi-Peak detector
 X Final maximized level using Average detector
 # Final maximized level using Peak detector



MEASUREMENT RESULT: "A157g_FE_Final"

9/15/2017 11:33AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dB μ V	Factor	Loss	Level	dB μ V/m	dB	Ant.	Angle	Detector	
		dB μ V/m	dB	dB μ V/m	dB μ V/m	dB	m	deg		
27.118000	24.91	8.46	1.0	34.4	39.1	4.7	1.00	90	QUASI-PEAK	2nd Harmonic
13.558000	47.73	10.50	0.7	58.9	93.5	34.6	1.00	90	QUASI-PEAK	Fundamental
0.062400	31.65	11.00	0.1	42.7	90.8	48.1	1.00	0	QUASI-PEAK	noise floor
0.115000	25.45	10.27	0.1	35.8	85.5	49.7	1.00	0	QUASI-PEAK	noise floor

Electric Field Strength

EUT: i5100 BDC Radio Module
Manufacturer: Brady Corp.
Operating Condition: 70 deg. F; 57% R.H.
Test Site: DLS Site 2
Operator: Paul L #9157
Test Specification: 120V 60Hz 9-24VDC
Comment: Continuous Transmit
Date: 09-26-2017

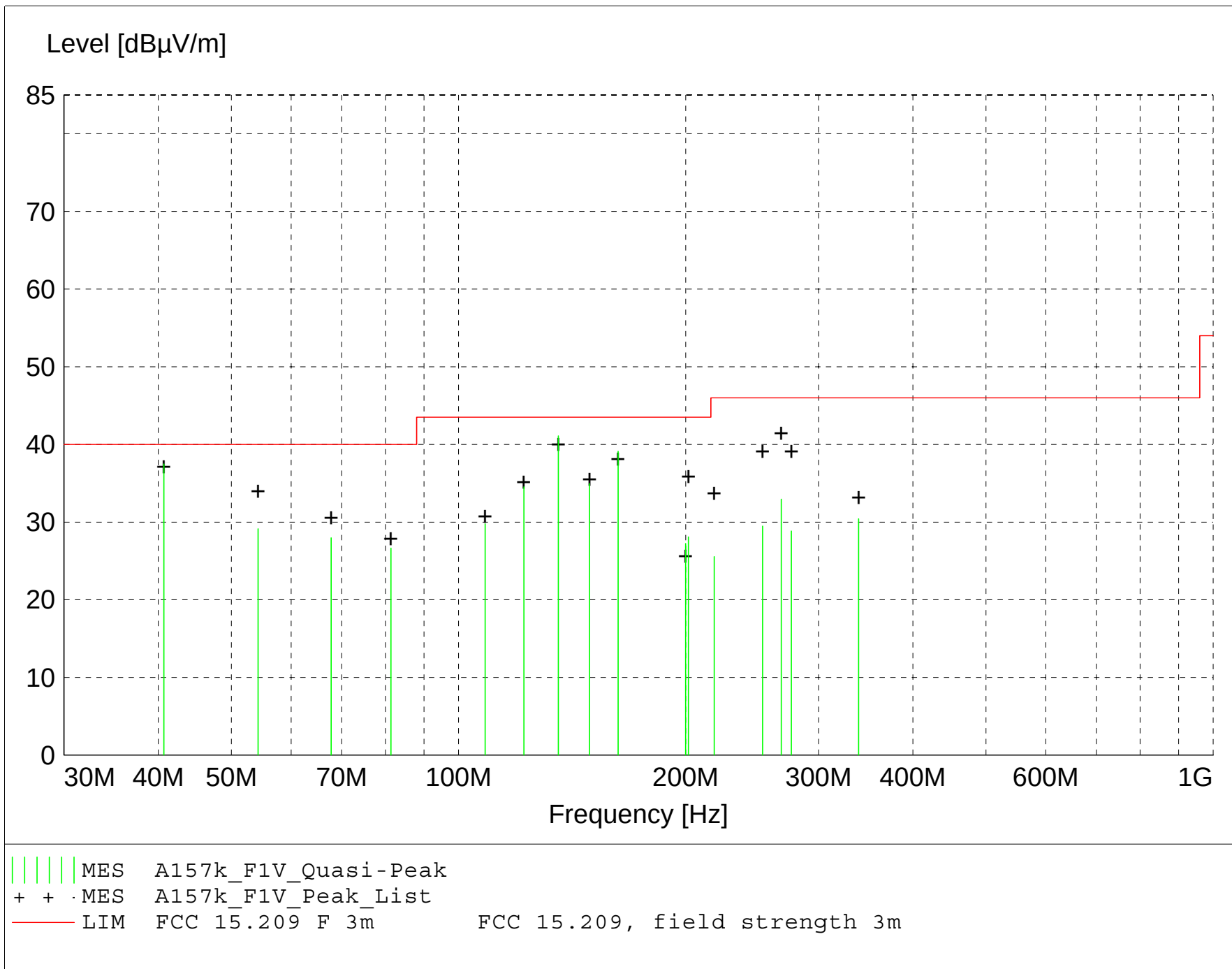
TEXT: "Vert 3 meters"

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with VERTICAL Antenna Polarization

Equations:
$$\text{Total Level (dB}\mu\text{V/m)} = \text{Level (dB}\mu\text{V)} + \text{System Loss (dB)} + \text{Antenna Factor (dB}\mu\text{V/m)}$$
$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)
| Final maximized level using Quasi-Peak detector
X Final maximized level using Average detector
Final maximized level using Peak detector



MEASUREMENT RESULT: "A157k_F1V_Final"

9/26/2017 1:17PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
135.600000	51.01	12.48	-22.4	41.1	43.5	2.4	1.00	270	QUASI-PEAK	10th Harm RB
40.700000	49.10	11.87	-23.5	37.5	40.0	2.5	1.00	135	QUASI-PEAK	3rd Harm
162.700000	47.93	13.34	-22.2	39.1	43.5	4.4	1.00	0	QUASI-PEAK	12th Harm RB
149.150000	45.08	12.10	-22.2	35.0	43.5	8.5	1.00	135	QUASI-PEAK	11th Harm
122.050000	44.29	12.71	-22.5	34.5	43.5	9.0	1.00	22	QUASI-PEAK	9th Harm
54.250000	41.36	11.08	-23.3	29.1	40.0	10.9	1.00	0	QUASI-PEAK	4th Harm
67.800000	43.22	7.84	-23.1	28.0	40.0	12.0	1.00	0	QUASI-PEAK	5th Harm
267.750000	41.39	13.11	-21.5	33.0	46.0	13.0	1.00	0	QUASI-PEAK	RB
81.350000	43.23	6.31	-22.9	26.7	40.0	13.3	1.00	0	QUASI-PEAK	6th Harm
108.450000	40.70	11.70	-22.6	29.8	43.5	13.7	1.00	0	QUASI-PEAK	8th Harm RB
201.700000	38.07	12.00	-22.0	28.1	43.5	15.4	1.00	0	QUASI-PEAK	None
339.000000	36.55	14.86	-21.0	30.4	46.0	15.6	1.00	22	QUASI-PEAK	25th Harmonic
199.950000	31.63	17.60	-22.0	27.2	43.5	16.3	1.00	0	QUASI-PEAK	None
252.850000	38.71	12.41	-21.6	29.5	46.0	16.5	1.00	135	QUASI-PEAK	RB
276.050000	36.95	13.42	-21.5	28.9	46.0	17.1	1.00	0	QUASI-PEAK	RB
218.200000	36.00	11.37	-21.8	25.6	46.0	20.4	1.00	225	QUASI-PEAK	None

Electric Field Strength

EUT: i5100 BDC Radio Module
Manufacturer: Brady Corp.
Operating Condition: 70 deg. F; 57% R.H.
Test Site: DLS Site 2
Operator: Paul L #9157
Test Specification: 120V 60Hz 9-24VDC
Comment: Continuous Transmit
Date: 09-26-2017

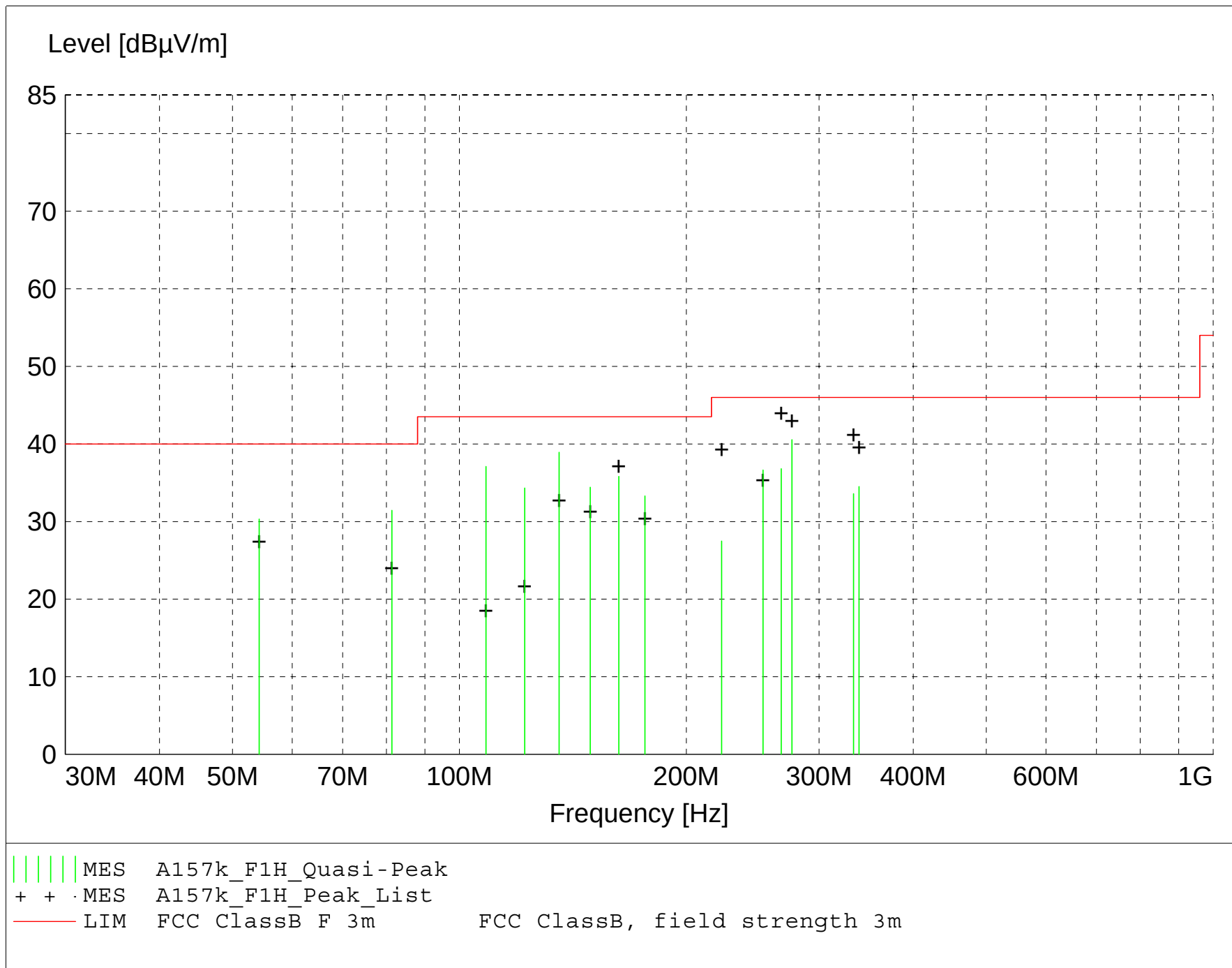
TEXT: "Horz 3 meters"

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization

Equations:
$$\text{Total Level (dB}\mu\text{V/m)} = \text{Level (dB}\mu\text{V)} + \text{System Loss (dB)} + \text{Antenna Factor (dB}\mu\text{V/m)}$$
$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)
| Final maximized level using Quasi-Peak detector
X Final maximized level using Average detector
Final maximized level using Peak detector



MEASUREMENT RESULT: "A157k_F1H_Final"

9/26/2017 1:55PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
135.600000	48.84	12.48	-22.4	38.9	43.5	4.6	2.50	135	QUASI-PEAK	10th Harm RB
276.150000	48.64	13.42	-21.5	40.6	46.0	5.4	1.00	135	QUASI-PEAK	RB
108.450000	48.03	11.70	-22.6	37.1	43.5	6.4	4.00	90	QUASI-PEAK	8th Harm RB
162.700000	44.64	13.34	-22.2	35.8	43.5	7.7	2.00	135	QUASI-PEAK	12th Harm RB
81.350000	48.02	6.31	-22.9	31.5	40.0	8.6	2.00	0	QUASI-PEAK	6th Harm
149.150000	44.55	12.10	-22.2	34.4	43.5	9.1	2.00	100	QUASI-PEAK	11th Harm
122.050000	44.09	12.71	-22.5	34.3	43.5	9.2	4.00	0	QUASI-PEAK	9th Harm
267.250000	45.28	13.09	-21.5	36.8	46.0	9.2	1.00	45	QUASI-PEAK	RB
252.800000	45.87	12.41	-21.6	36.6	46.0	9.4	1.00	45	QUASI-PEAK	RB
54.250000	42.54	11.08	-23.3	30.3	40.0	9.7	2.00	180	QUASI-PEAK	4th Harm
176.250000	39.98	15.43	-22.1	33.3	43.5	10.2	2.00	270	QUASI-PEAK	13th Harm
339.000000	40.65	14.86	-21.0	34.5	46.0	11.5	1.00	200	QUASI-PEAK	25th Harmonic
333.350000	39.98	14.67	-21.1	33.6	46.0	12.4	1.00	180	QUASI-PEAK	None
222.800000	38.02	11.24	-21.8	27.5	46.0	18.5	1.00	270	QUASI-PEAK	None



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Report Number:
Project Number:

Brady Corporation
BDCi5100 RFID ASSEMBLY
23133
9157

Appendix B

B3.0 Frequency Stability

Rule Part: FCC Part 15.225(e)

Test Procedure: ANSI C63.10:2013 Section 6.8

Limits: 0.01% of the center frequency
Limit = +/- 1.356 kHz (0.01% of 13.56 MHz)

Results: Compliant

Sample Equations: N/A

.

Notes: The EUT was coupled to a spectrum analyzer using a near-field probe.

The DC bench power supply voltage was varied from 9 Volts to 24 Volts. Carrier frequency measurements were performed and recorded at nominal temperature.

The temperature was varied from -20 °C to + 50 °C in increments of 10° and at 16.5 Volts to the input of the EUT. Carrier frequency measurements were performed and recorded at transmitter startup, and at 2 minutes, 5 minutes, and 10 minutes after startup. No significant drifting was observed.



166 South Carter, Genoa City, WI 53128

Company: Brady Corporation
 Model Tested: BDCi5100 RFID ASSEMBLY
 Report Number: 23133
 Project Number: 9157

DLS Electronic Systems, Inc.

Company: Brady Corporation
 Operator: Craig B
 Dates of test: 10-09-2017 & 10-10-2017
 Model: i5100 BDC Radio Module

Limit = +/- 0.01% (+/- 1,356 Hz)

Frequency Stability FCC Part 15.225

Time after turn ON	Nominal Frequency (MHz)	Measured Frequency (at 16.5 Volts DC)									
		+50 deg. C	Error (Hz)	+40 deg. C	Error (Hz)	+30 deg. C	Error (Hz)	+20 deg. C	Error (Hz)	+10 deg. C	Error (Hz)
immediate	13.560	13.559074	-925.600	13.559095	-905.060	13.559132	-867.740	13.559132	-867.740	13.559171	-829.180
2 min.	13.560	13.559068	-931.860	13.559084	-915.580	13.559100	-899.800	13.559120	-879.760	13.559161	-839.450
5 min.	13.560	13.559074	-926.350	13.559070	-930.110	13.559100	-899.800	13.559100	-899.800	13.559147	-852.730
10 min.	13.560	13.559077	-923.100	13.559068	-931.610	13.559086	-914.080	13.559088	-911.570	13.559141	-858.830

Frequency Stability FCC Part 15.225

Time after turn ON	Nominal Frequency (MHz)	Measured Frequency (at 16.5 Volts DC)									
		0 deg. C	Error (Hz)	-10 deg. C	Error (Hz)	-20 deg. C	Error (Hz)				
immediate	13.560	13.559188	-812.270	13.559171	-828.610	13.559127	-872.730				
2 min.	13.560	13.559180	-820.240	13.559184	-815.820	13.559180	-819.827				
5 min.	13.560	13.559172	-828.260	13.559183	-816.620	13.559182	-817.820				
10 min.	13.560	13.559169	-831.010	13.559183	-816.620	13.559182	-817.820				

Frequency Stability FCC Part 15.225

	Nominal Frequency (MHz)	Measured Frequency (at 20 deg. C)									
		9 Volts	Error (Hz)	16.5 Volts	Error (Hz)	24 Volts	Error (Hz)				
	13.560	13.559120	-879.760	13.559120	-879.760	13.559156	-843.690				



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Report Number:
Project Number:

Brady Corporation
BDCi5100 RFID ASSEMBLY
23133
9157

Appendix B

B4.0 AC Line Conducted Emissions

Rule Part: FCC Part 15.207

Test Procedure: ANSI C63.10-2013, section 6.2
FCC KDB 174176 D01 Line Conducted FAQ v01r01 – Question 5

Limit: 15.207(a)

Results: Compliant

Notes: This was an AC Conducted emissions measurement. The EUT was powered from an AC Adapter with an input of 120 V 60 Hz.

EUT was tested following the procedure set forth in FCC KDB 174176 D01 Line Conducted FAQ v01r01 – Question 5. For a device with a detachable antenna operating at or below 30 MHz, the FCC will accept measurements done with a suitable dummy load replacing the antenna under the following conditions: (1) perform the AC line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band.

Following the paragraph above, there are results for AC line conducted with the antennas connected which shows failing results at the RFID frequency. There are also results for AC line conducted with dummy loads connected showing passing results at all frequencies.

The length of the DC power wires from the AC power adapter were shortened to meet the AC line conducted limit at the frequency of the 2nd harmonic. The length of these wires (EUT power to host power circuit board) in a real installation would never exceed the length of the wire harness that is included in the testing of the module.



Report issuing date : 11-20-2017

Standard : FCC Part 15.207
Test Type : Voltage Mains Test
Test Site : DLS Screen Room
Temperature : 70 °F
Humidity : 26 %
Test Specs : Line 1
Operator : Craig B
DLS Project # : 9157
Result : Pass

EUT

Manufacturer : Brady Corporation
Model : i5100 BDC Radio Module
Product : 13.56 MHz Radio Module
Notes : 120 V 60 Hz
Comments : Continuous Transmit; Antennas Connected

Testing Company : DLS Electronic Systems
Tel./Fax : 262-279-0210
Web site : <http://www.dlsemc.com>

Receiver Details

Model : PMM 9010F
Brand : Narda
S/N : 020WW40102
Last Calibration : 04/06/2017

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



9157 Brady i5100 L1_000

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General
Nr. of Worst = Infinite (2)

Limits:
Class B V QP
Class B V AV

Factors:
LISN DLS#128
Cables 43 & 45
DLS#507 with CBL-035
DLS#592

Peak ———
QPeak ———
C-Avg ———

9157 Brady i5100 L1_000 20/11/2017 08:49:59
 Rel. SW 2.22 (August 2015)
 Rel. FW 1.57 21/12/16
 Margin: 22 dB

Frequency	QPeak	Limit	Delta	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor	
[MHz]	[dBμV]	Class B V..	[dB]	[dBμV]	Class B V..	[dB]	LISN DLS#..	Cables 43..	DLS#507 w..	DLS#592	
		[dBμV]			[dBμV]		[dB]	[dB]	[dB]	[dB]	
1	0.15	52.22	66.00	-13.78	23.27	56.00	---	0.23	0.12	9.74	2.23
2	0.152045	52.57	65.89	-13.32	23.62	55.89	---	0.23	0.11	9.73	2.19
3	0.15409	52.54	65.78	-13.24	23.59	55.78	---	0.23	0.10	9.72	2.15
4	0.156135	52.50	65.67	-13.17	23.53	55.67	---	0.23	0.10	9.72	2.11
5	0.319735	50.91	59.71	-8.80	23.93	49.71	---	0.20	0.08	9.72	1.17
6	0.32178	50.87	59.66	-8.79	25.32	49.66	---	0.20	0.08	9.72	1.16
7	0.323825	50.82	59.61	-8.79	25.44	49.61	---	0.20	0.08	9.72	1.15
8	0.32587	50.77	59.56	-8.79	25.31	49.56	---	0.20	0.08	9.71	1.15
9	0.327915	50.70	59.50	-8.80	24.03	49.50	---	0.20	0.08	9.71	1.14
10	0.50174	39.91	56.00	-16.09	14.95	46.00	---	0.19	0.13	9.69	0.75
11	0.503785	39.89	56.00	-16.11	14.95	46.00	---	0.19	0.13	9.69	0.75
12	0.50583	39.85	56.00	-16.15	14.96	46.00	---	0.19	0.13	9.69	0.75
13	0.507875	39.82	56.00	-16.18	14.94	46.00	---	0.19	0.14	9.69	0.74
14	0.50992	39.80	56.00	-16.20	14.92	46.00	---	0.19	0.14	9.69	0.74
15	13.29117	42.54	60.00	-17.46	21.48	50.00	---	0.32	0.73	9.83	0.20
16	13.293215	43.62	60.00	-16.38	22.12	50.00	---	0.32	0.73	9.83	0.20
17	13.29526	43.66	60.00	-16.34	22.20	50.00	---	0.32	0.73	9.83	0.20
18	13.297305	42.85	60.00	-17.15	21.77	50.00	---	0.32	0.73	9.83	0.20
19	13.29935	40.82	60.00	-19.18	20.06	50.00	---	0.32	0.73	9.83	0.20
20	13.554975	79.04	60.00	19.04	76.29	50.00	26.29	0.33	0.72	9.83	0.19
21	13.55702	82.88	60.00	22.88	80.11	50.00	30.11	0.33	0.72	9.83	0.19
22	13.559065	83.20	60.00	23.20	80.48	50.00	30.48	0.33	0.72	9.83	0.19
23	13.56111	83.00	60.00	23.00	80.24	50.00	30.24	0.33	0.72	9.83	0.19
24	13.563155	79.76	60.00	19.76	76.99	50.00	26.99	0.33	0.72	9.83	0.19
25	27.11537	44.17	60.00	-15.83	36.15	50.00	-13.85	0.63	0.96	9.89	0.35
26	27.117415	50.44	60.00	-9.56	42.40	50.00	-7.60	0.63	0.96	9.89	0.35
27	27.11946	51.75	60.00	-8.25	43.69	50.00	-6.31	0.63	0.96	9.89	0.35
28	27.121505	51.73	60.00	-8.27	43.67	50.00	-6.33	0.63	0.96	9.89	0.35
29	27.12355	50.21	60.00	-9.79	42.15	50.00	-7.85	0.63	0.96	9.89	0.35



Report issuing date : 11-20-2017

Standard : FCC Part 15.207
Test Type : Voltage Mains Test
Test Site : DLS Screen Room
Temperature : 70 °F
Humidity : 26 %
Test Specs : Line 2
Operator : Craig B
DLS Project # : 9157
Result : Pass

EUT

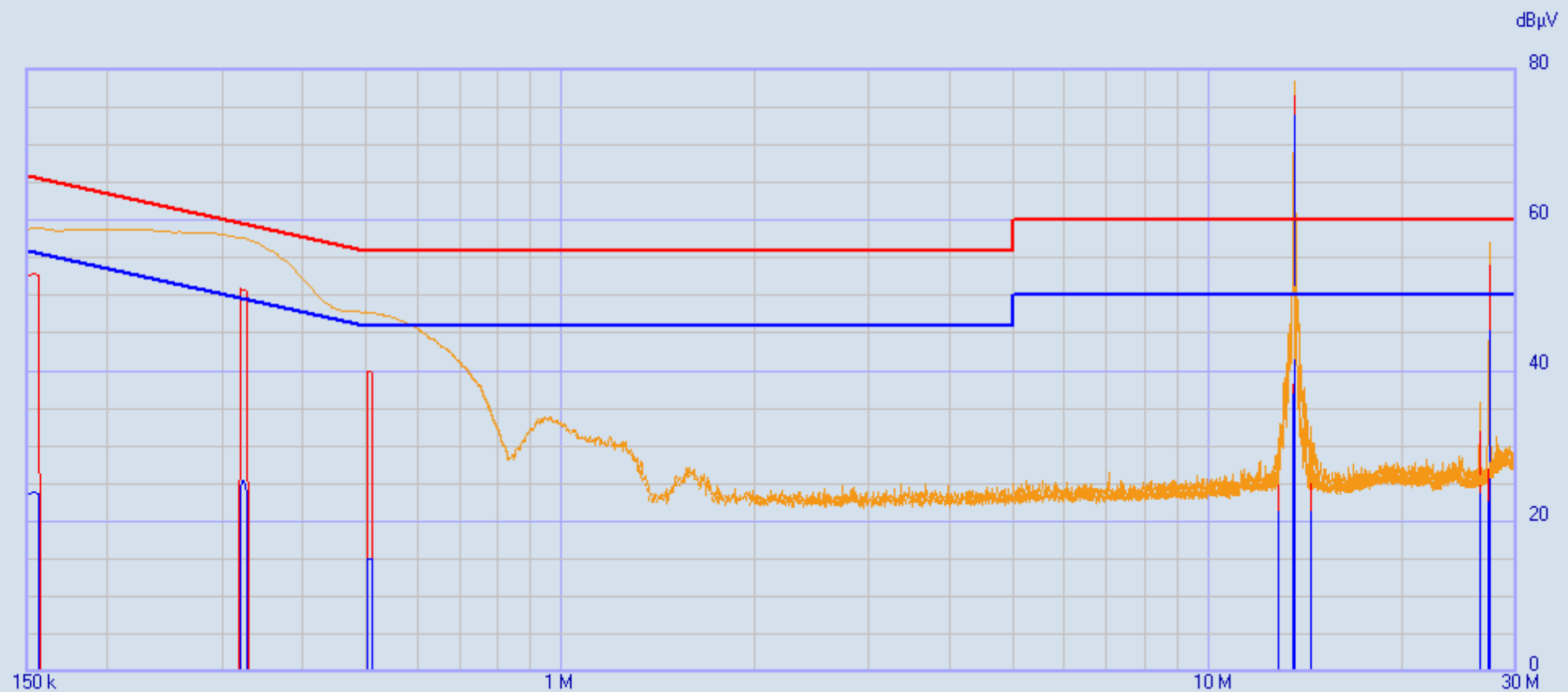
Manufacturer : Brady Corporation
Model : i5100 BDC Radio Module
Product : 13.56 MHz Radio Module
Notes : 120 V 60 Hz
Comments : Continuous Transmit; Antennas Connected

Testing Company : DLS Electronic Systems
Tel./Fax : 262-279-0210
Web site : <http://www.dlsemc.com>

Receiver Details

Model : PMM 9010F
Brand : Narda
S/N : 020WW40102
Last Calibration : 04/06/2017

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



9157 Brady i5100 L2_002

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General
Nr. of Worst = Infinite (2)

Limits:

Class B V QP

Class B V AV

Factors:

LISN DLS#128

Cables 43 & 45

DLS#507 with CBL-035

DLS#592

Peak ———
QPeak ———
C-Avg ———

9157 Brady i5100 L2_002 20/11/2017 09:24:00
 Rel. SW 2.22 (August 2015)
 Rel. FW 1.57 21/12/16
 Margin: 22 dB

Frequency	QPeak	Limit	Delta	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	[dBμV]	Class B V..	[dB]	LISN DLS#..	Cables 43..	DLS#507 w..	DLS#592
		[dBμV]			[dBμV]		[dB]	[dB]	[dB]	[dB]
1	0.15	52.50	66.00	-13.50	23.45	56.00	---	---	---	---
2	0.152045	52.86	65.89	-13.03	23.79	55.89	---	---	---	---
3	0.15409	52.83	65.78	-12.95	23.74	55.78	---	---	---	---
4	0.156135	52.79	65.67	-12.88	23.69	55.67	---	---	---	---
5	0.319735	50.90	59.71	-8.81	24.09	49.71	---	---	---	---
6	0.32178	50.85	59.66	-8.81	25.36	49.66	---	---	---	---
7	0.323825	50.78	59.61	-8.83	25.44	49.61	---	---	---	---
8	0.32587	50.71	59.56	-8.85	25.28	49.56	---	---	---	---
9	0.327915	50.61	59.50	-8.89	23.85	49.50	---	---	---	---
10	0.503785	39.91	56.00	-16.09	14.95	46.00	---	---	---	---
11	0.50583	39.87	56.00	-16.13	14.97	46.00	---	---	---	---
12	0.507875	39.84	56.00	-16.16	14.96	46.00	---	---	---	---
13	0.50992	39.82	56.00	-16.18	14.92	46.00	---	---	---	---
14	0.511965	39.79	56.00	-16.21	14.90	46.00	---	---	---	---
15	13.554975	72.52	60.00	12.52	69.85	50.00	19.85	---	---	---
16	13.55702	76.27	60.00	16.27	73.59	50.00	23.59	0.33	0.72	9.83
17	13.559065	76.60	60.00	16.60	73.93	50.00	23.93	0.33	0.72	9.83
18	13.56111	76.38	60.00	16.38	73.68	50.00	23.68	0.33	0.72	9.83
19	13.563155	73.01	60.00	13.01	70.34	50.00	20.34	0.33	0.72	9.83
20	27.11537	46.68	60.00	-13.32	38.18	50.00	-11.82	0.63	0.96	9.89
21	27.117415	52.81	60.00	-7.19	44.20	50.00	-5.80	0.63	0.96	9.89
22	27.11946	54.03	60.00	-5.97	45.40	50.00	-4.60	0.63	0.96	9.89
23	27.121505	54.00	60.00	-6.00	45.36	50.00	-4.64	0.63	0.96	9.89
24	27.12355	52.38	60.00	-7.62	43.76	50.00	-6.24	0.63	0.96	9.89

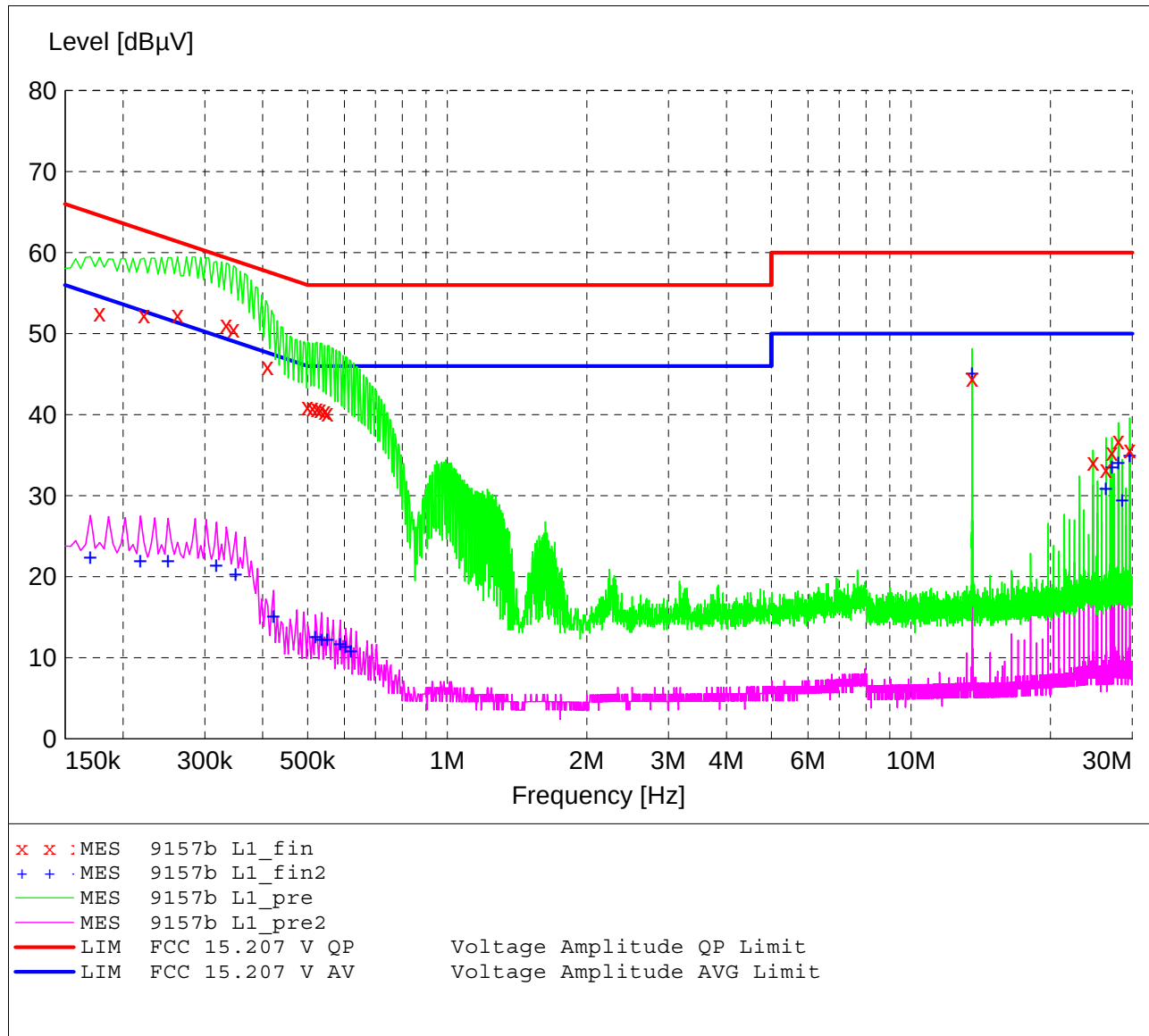
FCC Part 15.207

Voltage Mains Test

EUT: i5100 BDC Radio Module
Manufacturer: Brady Corporation
Operating Condition: 72 deg. F, 38% R.H.
Test Site: DLS O.F. ScrnRoom
Operator: Craig B #9157
Test Specification: 120 V 60 Hz; Line 1
Comment: Transmit with antennas replaced with dummy load
Date: 10-05-2017

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:			Line Conducted Emissions			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
9.0 kHz	150.0 kHz	40.0 Hz	QuasiPeak CISPR AV	2.0 s	200 Hz	LISN DLS#128
150.0 kHz	500.0 kHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128
500.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "9157b L1_fin"

10/5/2017 2:33PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.178000	52.60	12.2	65	12.0	QP
0.222000	52.30	11.9	63	10.4	QP
0.262000	52.30	11.9	61	9.1	QP
0.334000	51.10	11.6	59	8.3	QP
0.346000	50.60	11.5	59	8.5	QP
0.410000	46.00	11.4	58	11.6	QP
0.500000	41.00	11.4	56	15.0	QP
0.512000	40.90	11.3	56	15.1	QP
0.524000	40.80	11.3	56	15.2	QP
0.532000	40.70	11.3	56	15.3	QP
0.544000	40.40	11.3	56	15.6	QP
0.552000	40.20	11.3	56	15.8	QP
13.560000	44.50	11.6	60	15.5	QP
24.708000	34.20	12.2	60	25.8	QP
26.352000	33.30	12.3	60	26.7	QP
27.120000	35.40	12.3	60	24.6	QP
28.000000	36.80	12.3	60	23.2	QP
29.644000	35.70	12.2	60	24.3	QP

MEASUREMENT RESULT: "9157b L1_fin2"

10/5/2017 2:33PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.170000	22.40	12.3	55	32.6	CAV
0.218000	21.90	11.9	53	31.0	CAV
0.250000	21.90	11.9	52	29.9	CAV
0.318000	21.40	11.7	50	28.4	CAV
0.350000	20.30	11.5	49	28.7	CAV
0.422000	15.10	11.4	47	32.3	CAV
0.520000	12.60	11.3	46	33.4	CAV
0.536000	12.20	11.3	46	33.8	CAV
0.552000	12.20	11.3	46	33.8	CAV
0.588000	11.70	11.3	46	34.3	CAV
0.604000	11.30	11.2	46	34.7	CAV
0.620000	10.80	11.2	46	35.2	CAV
13.560000	45.10	11.6	50	4.9	CAV
26.352000	30.90	12.3	50	19.1	CAV
27.120000	33.50	12.3	50	16.5	CAV
28.000000	34.10	12.3	50	15.9	CAV
28.552000	29.40	12.3	50	20.6	CAV
29.648000	34.90	12.2	50	15.1	CAV

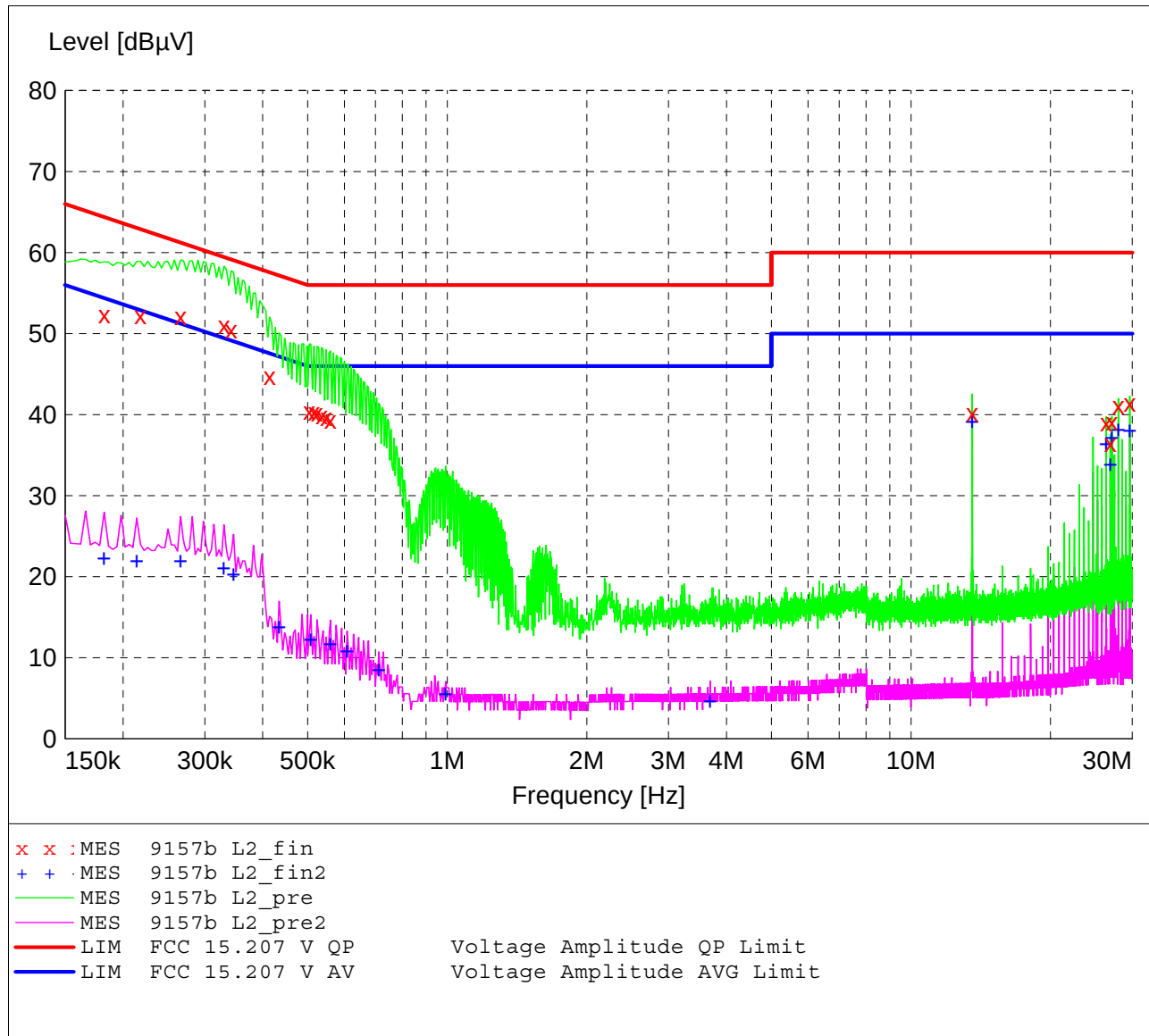
FCC Part 15.207

Voltage Mains Test

EUT: i5100 BDC Radio Module
 Manufacturer: Brady Corporation
 Operating Condition: 72 deg. F, 38% R.H.
 Test Site: DLS O.F. ScrnRoom
 Operator: Craig B #9157
 Test Specification: 120 V 60 Hz; Line 2
 Comment: Transmit with antennas replaced with dummy load
 Date: 10-05-2017

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:			Line Conducted Emissions			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	40.0 Hz	QuasiPeak CISPR AV	2.0 s	200 Hz	LISN DLS#128
150.0 kHz	500.0 kHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128
500.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "9157b L2_fin"

10/5/2017 2:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.182000	52.40	12.1	64	12.0	QP
0.218000	52.20	11.9	63	10.7	QP
0.266000	52.10	11.9	61	9.1	QP
0.330000	51.00	11.6	60	8.5	QP
0.342000	50.50	11.6	59	8.7	QP
0.414000	44.70	11.4	58	12.9	QP
0.504000	40.40	11.3	56	15.6	QP
0.516000	40.30	11.3	56	15.7	QP
0.524000	40.20	11.3	56	15.8	QP
0.536000	39.90	11.3	56	16.1	QP
0.548000	39.70	11.3	56	16.3	QP
0.560000	39.40	11.3	56	16.6	QP
13.560000	40.20	11.6	60	19.8	QP
26.356000	39.00	12.3	60	21.0	QP
26.904000	36.50	12.3	60	23.5	QP
27.120000	39.20	12.3	60	20.8	QP
28.000000	41.10	12.3	60	18.9	QP
29.648000	41.50	12.2	60	18.5	QP

MEASUREMENT RESULT: "9157b L2_fin2"

10/5/2017 2:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.182000	22.30	12.1	54	32.1	CAV
0.214000	21.90	11.9	53	31.1	CAV
0.266000	21.90	11.9	51	29.3	CAV
0.330000	21.00	11.6	50	28.5	CAV
0.346000	20.30	11.5	49	28.8	CAV
0.434000	13.80	11.4	47	33.4	CAV
0.508000	12.20	11.3	46	33.8	CAV
0.560000	11.70	11.3	46	34.3	CAV
0.608000	10.80	11.2	46	35.2	CAV
0.712000	8.50	11.2	46	37.5	CAV
0.992000	5.50	11.0	46	40.5	CAV
3.692000	4.60	11.1	46	41.4	CAV
13.560000	39.10	11.6	50	10.9	CAV
26.356000	36.40	12.3	50	13.6	CAV
26.904000	33.80	12.3	50	16.2	CAV
27.120000	37.20	12.3	50	12.8	CAV
28.004000	38.10	12.3	50	11.9	CAV
29.644000	38.00	12.2	50	12.0	CAV

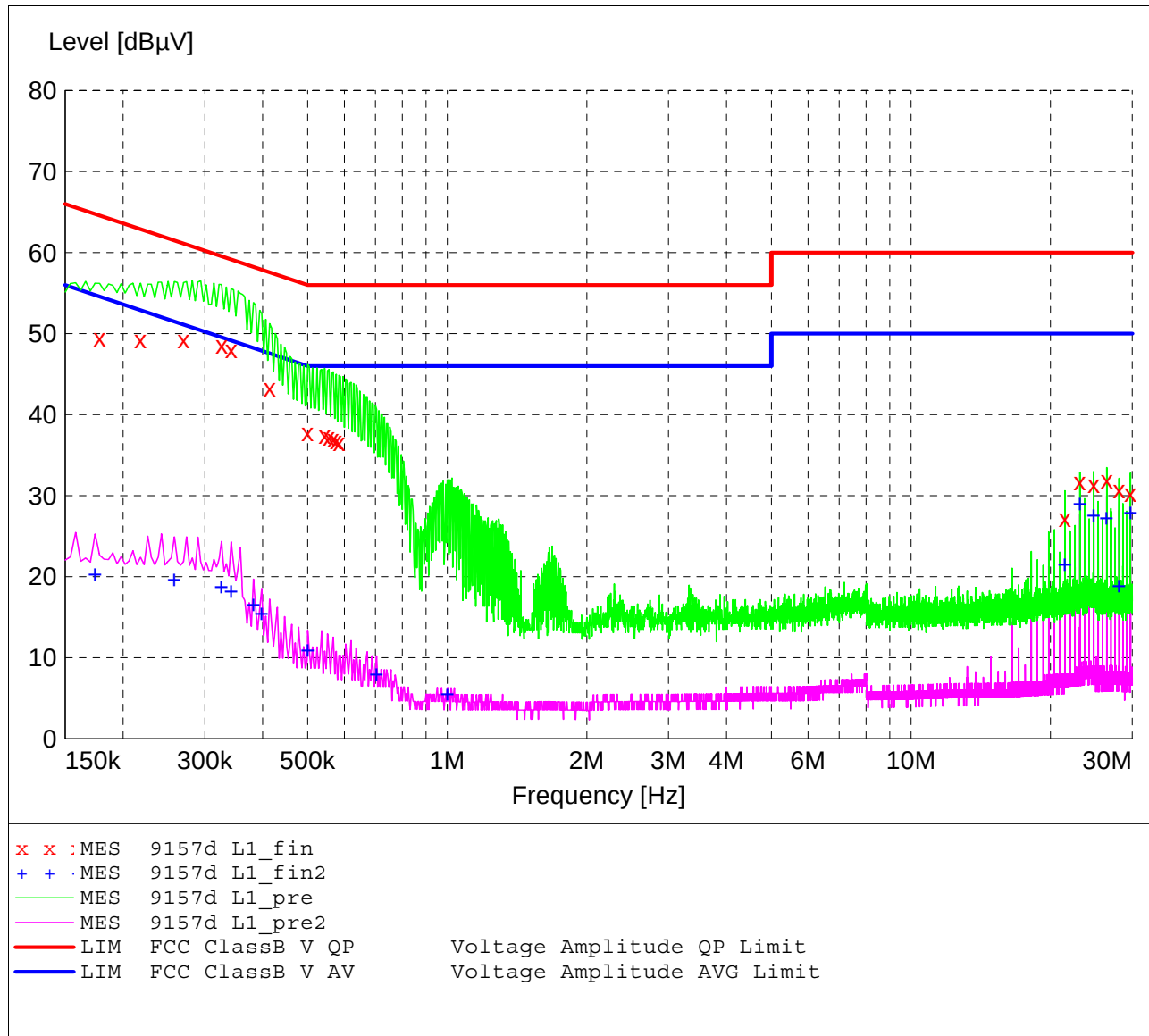
FCC Part 15.107

Voltage Mains Test

EUT: i5100 BDC Radio Module
Manufacturer: Brady Corporation
Operating Condition: 70 deg. F, 45% R.H.
Test Site: DLS O.F. ScrnRoom
Operator: Craig B #9157
Test Specification: 120 V 60 Hz; Line 1
Comment: Standby/Receive mode; no Transmit
Date: 10-09-2017

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:			Line Conducted Emissions			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	40.0 Hz	QuasiPeak CISPR AV	2.0 s	200 Hz	LISN DLS#128
150.0 kHz	500.0 kHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128
500.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "9157d L1_fin"

10/9/2017 8:26AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.178000	49.50	12.2	65	15.1	QP
0.218000	49.20	11.9	63	13.7	QP
0.270000	49.20	11.9	61	11.9	QP
0.326000	48.60	11.6	60	11.0	QP
0.342000	48.00	11.6	59	11.2	QP
0.414000	43.30	11.4	58	14.3	QP
0.500000	37.80	11.4	56	18.2	QP
0.544000	37.50	11.3	56	18.5	QP
0.556000	37.30	11.3	56	18.7	QP
0.568000	37.00	11.3	56	19.0	QP
0.576000	36.80	11.3	56	19.2	QP
0.584000	36.60	11.3	56	19.4	QP
21.484000	27.20	12.0	60	32.8	QP
23.132000	31.70	12.1	60	28.3	QP
24.784000	31.40	12.2	60	28.6	QP
26.436000	32.00	12.3	60	28.0	QP
28.088000	30.80	12.3	60	29.2	QP
29.736000	30.30	12.2	60	29.7	QP

MEASUREMENT RESULT: "9157d L1_fin2"

10/9/2017 8:26AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.174000	20.30	12.2	55	34.5	CAV
0.258000	19.60	11.9	52	31.9	CAV
0.326000	18.70	11.6	50	30.9	CAV
0.342000	18.20	11.6	49	31.0	CAV
0.382000	16.50	11.5	48	31.7	CAV
0.398000	15.40	11.5	48	32.5	CAV
0.500000	10.90	11.4	46	35.1	CAV
0.704000	7.90	11.2	46	38.1	CAV
1.000000	5.50	11.0	46	40.5	CAV
21.484000	21.50	12.0	50	28.5	CAV
23.132000	29.00	12.1	50	21.0	CAV
24.784000	27.50	12.2	50	22.5	CAV
26.436000	27.20	12.3	50	22.8	CAV
28.092000	18.80	12.3	50	31.2	CAV
29.740000	27.90	12.2	50	22.1	CAV

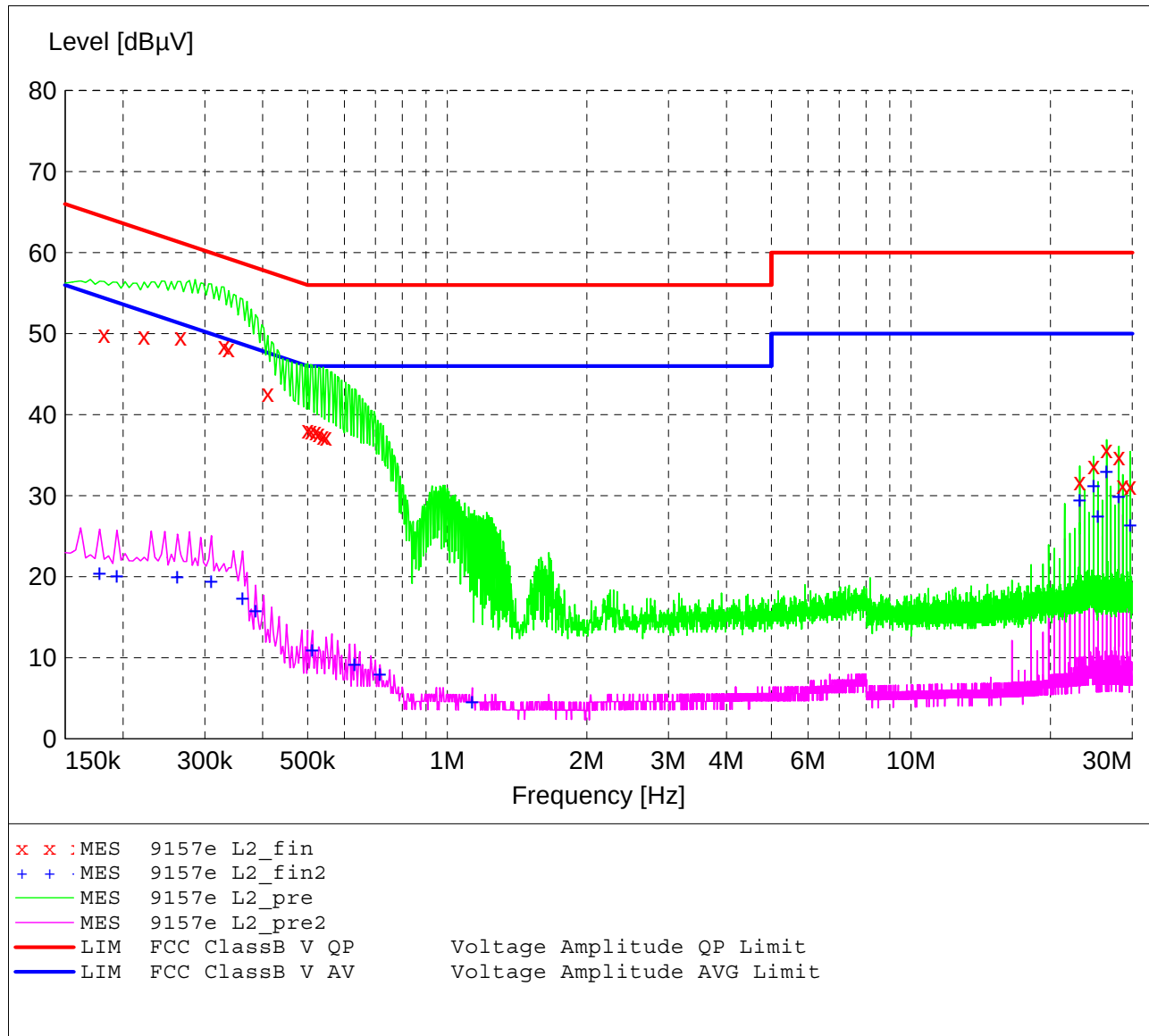
FCC Part 15.107

Voltage Mains Test

EUT: i5100 BDC Radio Module
 Manufacturer: Brady Corporation
 Operating Condition: 70 deg. F, 45% R.H.
 Test Site: DLS O.F. ScrnRoom
 Operator: Craig B #9157
 Test Specification: 120 V 60 Hz; Line 2
 Comment: Standby/Receive mode; no Transmit
 Date: 10-09-2017

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:			Line Conducted Emissions			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	40.0 Hz	QuasiPeak CISPR AV	2.0 s	200 Hz	LISN DLS#128
150.0 kHz	500.0 kHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128
500.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "9157e L2_fin"

10/9/2017 8:50AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.182000	49.90	12.1	64	14.5	QP
0.222000	49.70	11.9	63	13.0	QP
0.266000	49.60	11.9	61	11.6	QP
0.330000	48.50	11.6	60	11.0	QP
0.338000	48.20	11.6	59	11.1	QP
0.410000	42.70	11.4	58	14.9	QP
0.500000	38.10	11.4	56	17.9	QP
0.508000	38.00	11.3	56	18.0	QP
0.520000	37.90	11.3	56	18.1	QP
0.528000	37.70	11.3	56	18.3	QP
0.540000	37.40	11.3	56	18.6	QP
0.548000	37.30	11.3	56	18.7	QP
23.116000	31.70	12.1	60	28.3	QP
24.768000	33.70	12.2	60	26.3	QP
26.416000	35.70	12.3	60	24.3	QP
28.068000	34.80	12.3	60	25.2	QP
28.620000	31.30	12.2	60	28.7	QP
29.728000	31.20	12.2	60	28.8	QP

MEASUREMENT RESULT: "9157e L2_fin2"

10/9/2017 8:50AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.178000	20.40	12.2	55	34.2	CAV
0.194000	20.10	12.0	54	33.8	CAV
0.262000	19.90	11.9	51	31.5	CAV
0.310000	19.40	11.7	50	30.6	CAV
0.362000	17.30	11.5	49	31.4	CAV
0.386000	15.70	11.5	48	32.4	CAV
0.512000	10.90	11.3	46	35.1	CAV
0.632000	9.20	11.2	46	36.8	CAV
0.716000	7.90	11.2	46	38.1	CAV
1.132000	4.50	11.0	46	41.5	CAV
23.116000	29.40	12.1	50	20.6	CAV
24.768000	31.20	12.2	50	18.8	CAV
25.316000	27.40	12.3	50	22.6	CAV
26.416000	33.00	12.3	50	17.0	CAV
28.072000	29.90	12.3	50	20.1	CAV
29.724000	26.30	12.2	50	23.7	CAV



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Report Number:
Project Number:

Brady Corporation
BDCi5100 RFID ASSEMBLY
23133
9157

Appendix C – Measurement Uncertainty

Compliance with the limits in this standard are based on the results of the compliance measurement. Our calculated measurement uncertainty including the measurement instrumentation, associated connections between the various instruments in the measurement chain, and other contributions, are provided in this section of the test report.

Radiated Emission Uncertainty below 30MHz		Uncertainty (± dB)
Contribution	Probability Distribution	below 30 MHz
Combined Standard Uncertainty	Normal	1.60
Expanded Uncertainty	Normal (k=2)	3.19

Radiated Emission Uncertainty above 30MHz										
		(± dB)	(± dB)	(± dB)	(± dB)	(± dB)	(± dB)	(± dB)	(± dB)	(± dB)
Contribution	Probability Distribution	3M	3M	3M	3M	3M	3M	10M	10M	10M
		30-100 MHz	100-700 MHz	700-1000 MHz	1- 4.5 GHz	4.5 – 7 GHz	7 – 18 GHz	30-100 MHz	100-700 MHz	700-1000 MHz
Combined Standard Uncertainty	Normal	1.70	1.62	1.66	2.13	2.48	2.85	1.64	1.58	1.66
Expanded Uncertainty	Normal (k=2)	3.40	3.23	3.33	4.26	4.95	5.69	3.29	3.16	3.31

Power Line Conducted		Uncertainty (± dB)
Contribution	Probability Distribution	150 kHz - 30 MHz
Combined Standard Uncertainty	Normal	1.05
Expanded Uncertainty	Normal (k=2)	2.10



166 South Carter, Genoa City, WI 53128

Company:
Model Tested:
Report Number:
Project Number:

Brady Corporation
BDCi5100 RFID ASSEMBLY
23133
9157

END OF REPORT

Revision #	Date	Comments	By
1.0	10-30-2017	Preliminary Release	CB
1.1	11-09-2017	Capitalized all letters in FCC ID	CB
1.2	11-20-2017	Replaced "with antennas" line conducted data with new data	CB
1.2	11-20-2017	Added additional descriptions	CB
1.2	11-20-2017	Corrected test dates	CB
1.3	11-21-2017	Corrected 62 kHz and 115 kHz radiated limits	CB