DLS ELECTRONIC SYSTEMS, INC.

166 South Carter, Genoa City, WI 53128

Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators
Section 15.247
Operation within the bands 902 - 928 MHz,
2400 - 2483.5 MHz, 5725 - 5875 MHz,
and 24.0 - 24.25 GHz.

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

FCC ID: 2AKC7-LINK900G1

Formal Name:	Kenall TekLink 915 MHz Radio Transceiver Module
Kind of Equipment:	IEEE 802.15.4 Radio Transceiver module
Frequency Range:	906-924 MHz
Test Configuration:	DC powered transceiver module
Model Number(s):	L-3805
Model(s) Tested:	L-3805
Serial Number(s):	0001 and 0008
Date of Tests:	November 15th through 22nd, 2016
Test Conducted For:	Kenall Manufacturing 10200 55th Street Kenosha, WI 53144-4601, 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.

DLS ELECTRONIC SYSTEMS, INC.

166 South Carter, Genoa City, WI 53128

Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
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SIGNATURE PAGE

Tested By:

Craig Brandt
Senior Test Engineer

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

ELECTRONIC SYSTEMS, INC.

166 South Carter, Genoa City, WI 53128

Company: Kenall Manufacturing
Model Tested: L-3805
Report Number: 22351
DLS Project: 8491

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

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

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY & TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

Emissions

Designation	***Description***
Off-site test location	D.L.S. Electronics performs radiated emissions testing at an additional location, 166 South Carter Street, Genoa City, WI 53128.

1.0 Summary of Test Report

It was determined that the Kenall Manufacturing Kenall TekLink 915 MHz Radio Transceiver Module model L-3805, complies with the requirements of CFR 47 Part 15 Subpart C Section 15.247.

Subpart C Section 15.247 Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
15.247(a)(2)	DTS Bandwidth	ANSI C63.10-2013 Sections 11.8 & 11.8.1	1	Yes
15.247(b)(3)	Fundamental Emission Output Power	ANSI C63.10-2013 Sections 11.9.2 & 11.9.2.2.2	1	Yes
15.247(e)	Maximum Power Spectral Density	ANSI C63.10-2013 Sections 11.10 & 11.10.3	1	Yes
15.247(d)	Emissions in Non-Restricted Frequency Bands – RF Conducted	ANSI C63.10-2013 Sections 11.11, 11.11.2 & 11.11.3	1	Yes
15.247(d) 15.205(a) 15.209(a)	Emissions in Restricted Frequency Bands – Radiated	ANSI C63.10-2013 Sections 11.12 & 11.12.1	2	Yes
15.247(d)	Operating Band-Edge Measurements – RF Conducted	ANSI C63.10-2013 Sections 11.11, 11.11.2 & 11.11.3	1	Yes
15.207	AC Line Conducted Emissions	ANSI C63.10-2013 Section 6.2	3	Yes
Informative	Duty Cycle	ANSI C63.10-2013 Sections 11.6 & 11.6(b)	1	NA
Informative	Occupied Bandwidth (99% power bandwidth)	ANSI C63.10-2013 Section 6.9.3	1	NA

Note 1: RF conducted measurement.
Note 2: Radiated emission measurement.
Note 3: AC power line conducted measurement.

166 South Carter, Genoa City, WI 53128

2.0 Introduction

From November 15th through 22nd, 2016, the Kenall TekLink 915 MHz Radio Transceiver Module model L-3805, as provided from Kenall Manufacturing was tested to the requirements of CFR 47 Part 15 Subpart C Section 15.247 for single modular approval. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.

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, Industry 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:

A radio transceiver module supporting a variant of the IEEE 802.15.4 protocol in the 915 MHz North American band. Maximum target transmit power is 250 mW (+24dBm). Module runs on 3.3 volts DC and supports an asynchronous, bi-directional digital serial computer interface to control the radio transceiver. Primary application is for the Kenall TekLink TL2000 LED lighting product. Radio transceiver modules interlink the LED luminaires into a mesh network with repeaters and a master controller device.

Type of Equipment / Frequency Range:

Mobile / 906-924 MHz

Physical Dimensions of Equipment Under Test:

Length: 2.5 in., Width: 1.5 in., Height: 1.0 in.

4.0 Description of Test Sample - continued

Power Source:

3.3 VDC provided from the host device
3.3 VDC from a linear bench power supply used for radiated and RF conducted testing
120V / 60Hz host power supply used for AC line conducted testing

Internal Frequencies:

48.0, 16.0, 8.192, 4.0, 0.1152, 0.032 MHz

Transmit / Receive Frequencies Used For Test Purpose:

Low channel: 906 MHz, Middle channel: 914 MHz, High channel: 924 MHz

Type of Modulation(s) / Antenna Type:

BPSK / O-QPSK (IEEE 802.15.4) /

Linx quarter wave: ANT-916-CW-QW with a counterpoise plate (1.8 dBi gain) (reverse SMA connection to u.FL connection)

Kenall P10112 Rev1 Custom PCB quarter wave antenna (1.8 dBi gain) (u.FL connection)

Description of Circuit Board(s) / Part Number:

Kenall 900 MHz Radio Module	L-3805-V3

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.

Radiated 30 – 1000 MHz (Site 3)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	6-23-16	6-23-17
Low Pass Filter	Mini-Circuits	VLFX-1125	MUU9260	30 MHz – 1 GHz	7-1-15	7-1-16
Preamplifier	Rohde & Schwarz	TS-PR10	032001/005	9 kHz – 1 GHz	12-3-15	12-3-16
Antenna	EMCO	3104C	9701-4785	20 MHz – 200 MHz	2-16-16	2-16-17
Antenna	EMCO	3146	9702-4895	200 MHz – 1 GHz	2-4-16	2-4-17
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

AC Line Conducted (Screen Room)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Narda PMM	9010F	020WW40102	10Hz-50MHz	6-23-16	6-23-17
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	5-4-16	5-4-17
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	Narda PMM	PMM Emission Suite	Rel.2.17	N/A	N/A	N/A

5.0 Test Equipment - continued

Radiated 1-10 GHz (Site G1)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	6-23-16	6-23-17
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	1-20-16	1-20-17
Horn Antenna	EMCO	3115	9502-4451	1-18GHz	6-1-15	6-1-17
Filter- High Pass	Planar	HP2G-1780-CD-SS	PF1227/0728	1-19GHz	6-5-16	6-5-17
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

RF Conducted / Other

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	6-23-16	6-23-17
20 dB attenuator	Aeroflex/weinschel	75A-20-12	1071	DC – 40 GHz	6-5-16	6-5-17

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

6.0 Test Arrangements - continued

RF Conducted Emissions Measurement Arrangement:

All RF conducted 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.

7.0 Test Conditions

Temperature and Humidity:

71°F at 34% RH unless otherwise noted on test data

Supply Voltage:

3.3 VDC from a linear bench power supply used for radiated testing and RF conducted testing

120V / 60Hz host power supply used for AC line conducted testing

8.0 Modifications Made To EUT For Compliance

No modifications were made to the EUT.

9.0 Additional Descriptions

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

The EUT was connected to a remote power supply and computer through an interface board consisting of connectors and wires (no metal planes).

The EUT was programmed for continuous transmission on Low, Mid, and High channels, with a 100% duty cycle.

For radiated emissions, the EUT with was rotated through 3 orthoganal axis to find worst-case. The antennas were placed in the orientation that will be used in every installation.

10.0 Results

Measurements were performed in accordance with CFR 47 Part 15 Subpart C Section 15.247 and ANSI C63.10-2013. Graphical and tabular data can be found in Appendix B at the end of this report.

11.0 Conclusion

The Kenall TekLink 915 MHz Radio Transceiver Module model L-3805, as provided from Kenall Manufacturing, tested from November 15th through 22nd, 2016 **meets** the requirements of CFR 47 Part 15 Subpart C Section 15.247.

166 South Carter, Genoa City, WI 53128

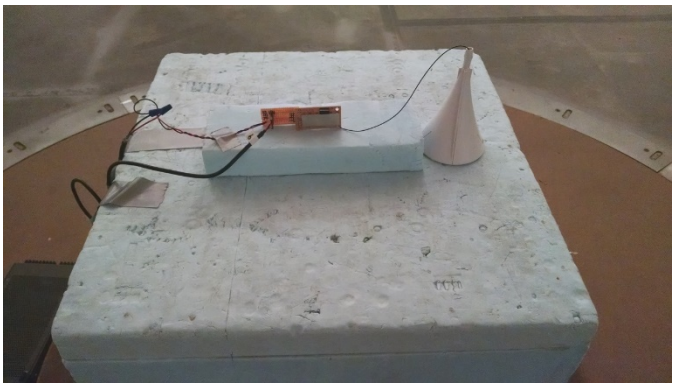
Appendix A – Test Setup Photos

Radiated Emissions Below 1 GHz – with custom PCB quarter wave antenna

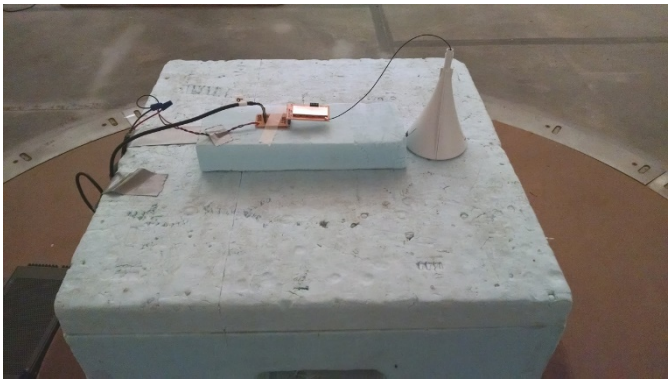
Front

Back

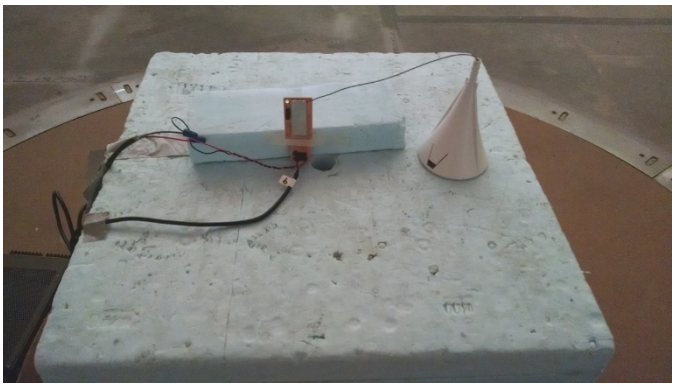
Position 1



Position 2



Position 3



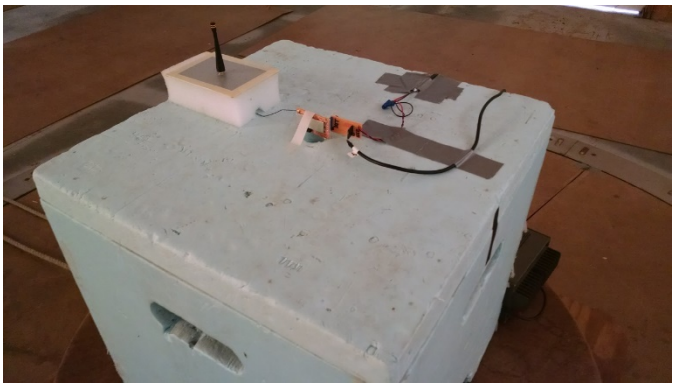
Appendix A – Test Photos - continued

Radiated Emissions Below 1 GHz – with Linx ANT-916-CW-QW antenna

Front

Back

Position 1



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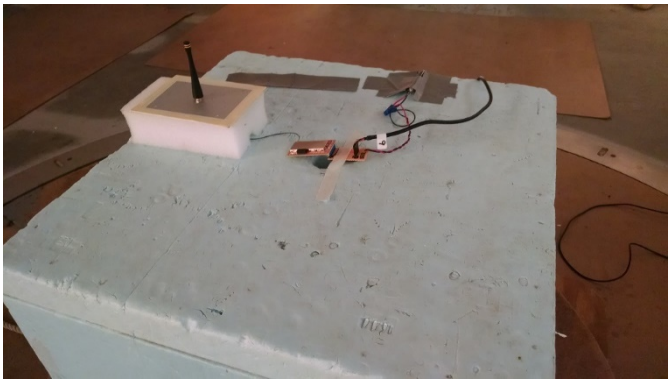
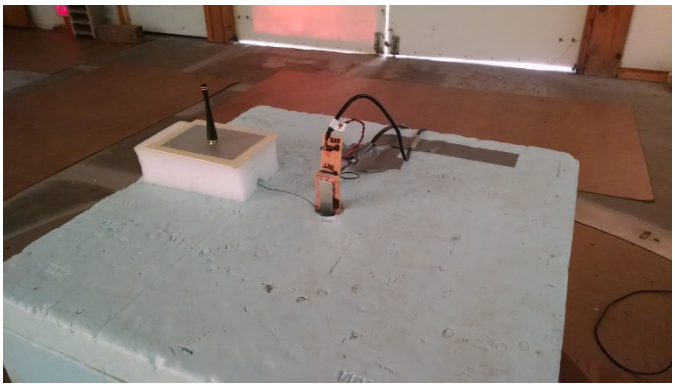


Position 3

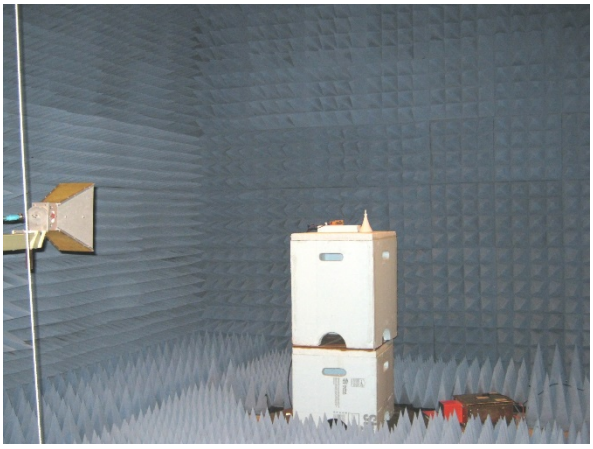


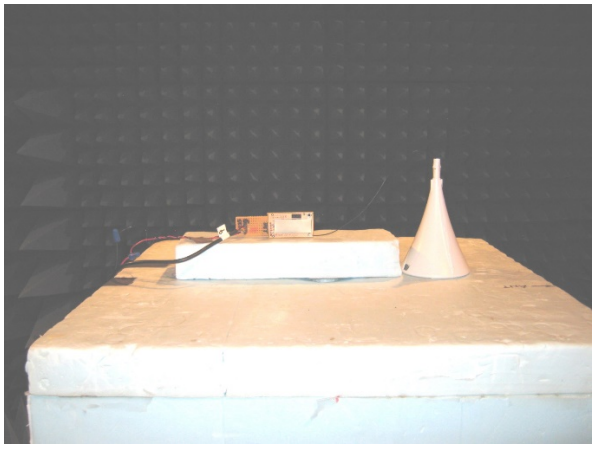
166 South Carter, Genoa City, WI 53128

Appendix A – Test Photos - continued

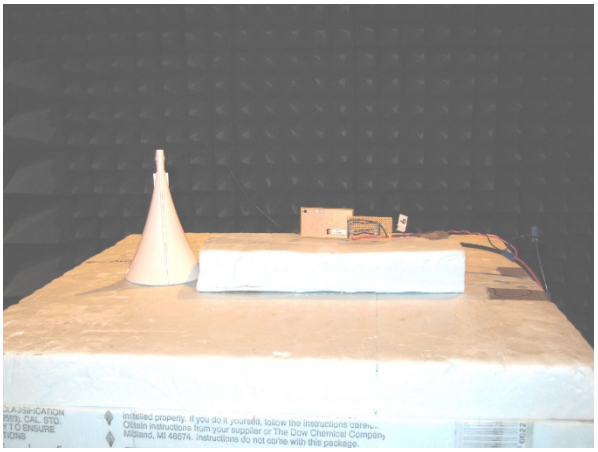
Radiated Emissions Above 1 GHz – with custom PCB quarter wave antenna

Position 1 - front

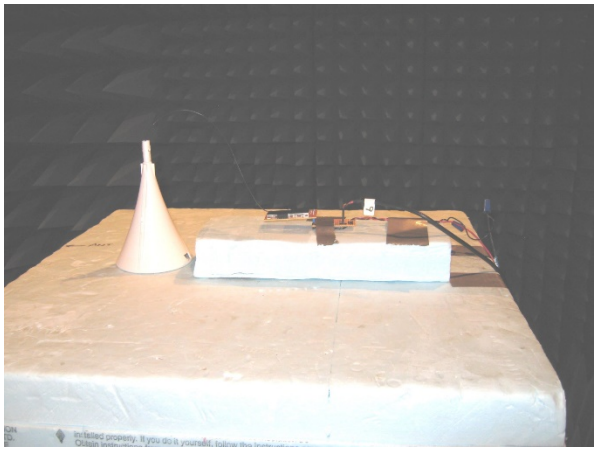




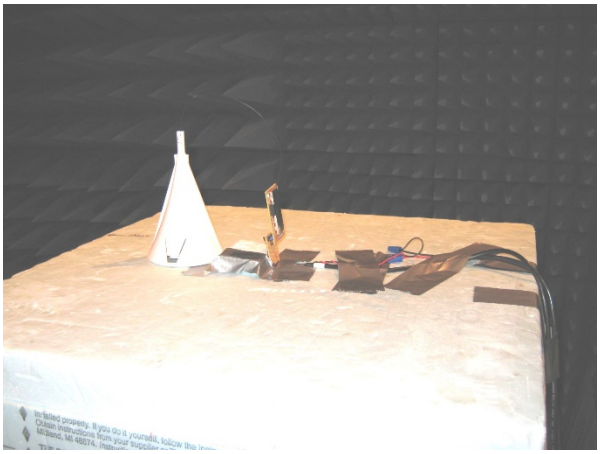
Position 1 - back



Position 2



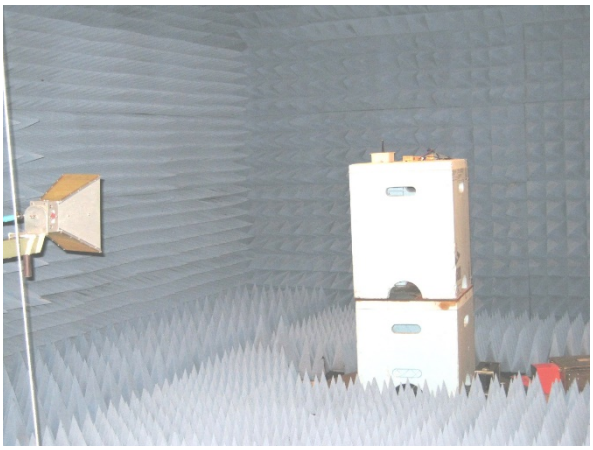
Position 3

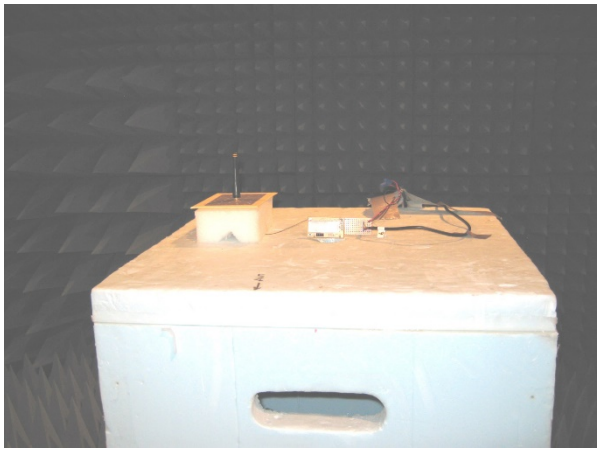


Appendix A – Test Photos - continued

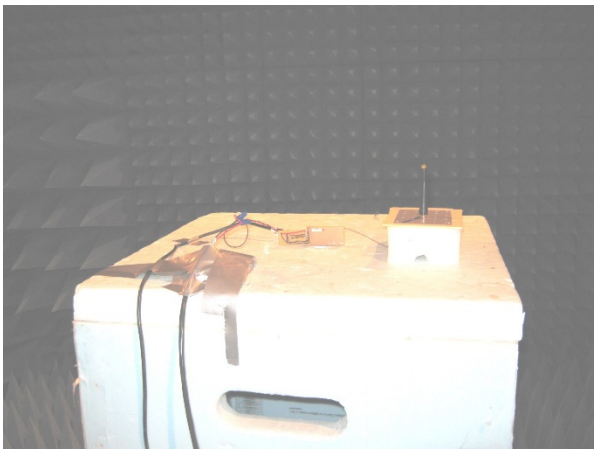
Radiated Emissions Above 1 GHz – with Linx ANT-916-CW-QW antenna

Position 1 - front

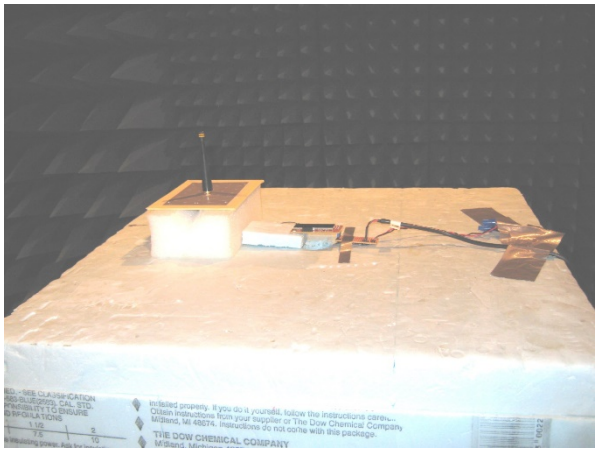




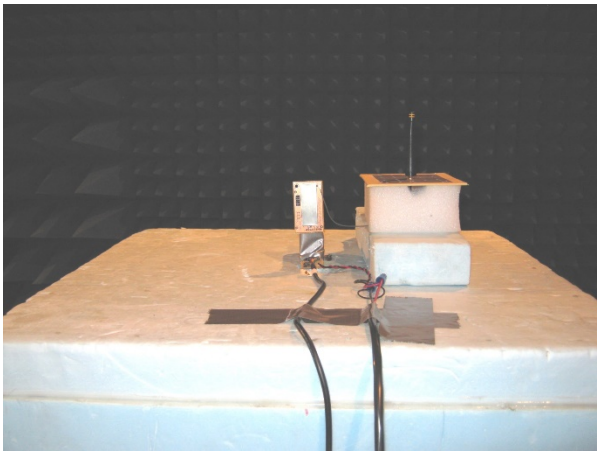
Position 1 - back



Position 2



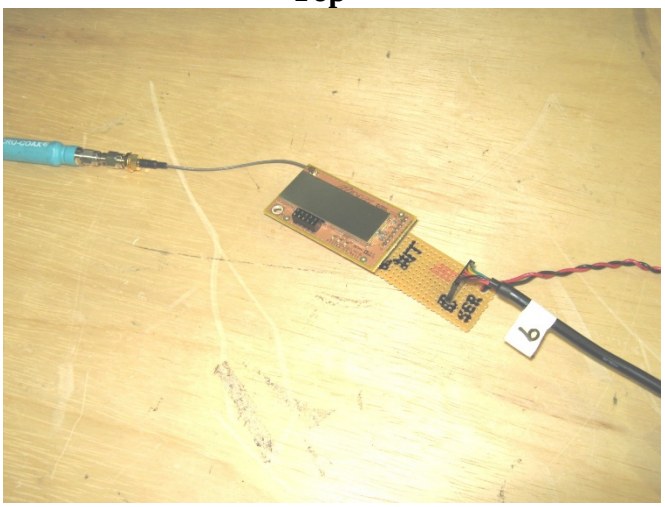
Position 3



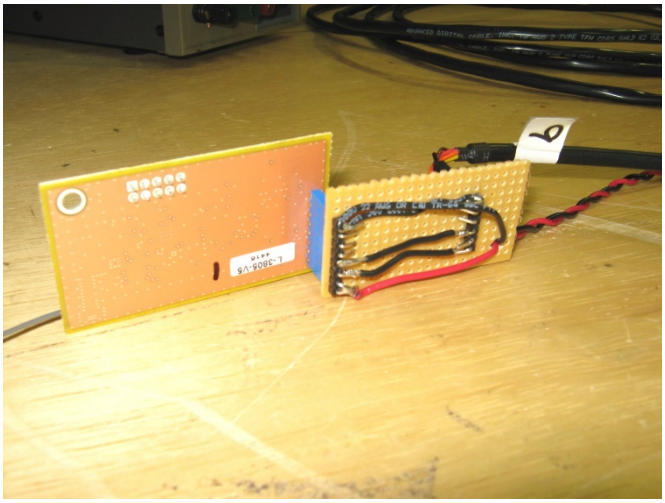
Appendix A – Test Photos - continued

RF Conducted

Top



Bottom



AC Line Conducted Emissions

with custom PCB quarter wave antenna

with Linx ANT-916-CW-QW antenna

Appendix B – Measurement Data

B1.0 DTS Bandwidth

Rule Part:

Section 15.247(a)(2)

Test Procedure:

ANSI C63.10-2013
11.8 DTS Bandwidth
11.8.1 Option 1

Limit:

6 dB bandwidth shall be at least 500 kHz

Results:

Compliant
Minimum 6 dB bandwidth: **794 kHz**

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the low, middle, and high channels of operation.

DLS ELECTRONIC SYSTEMS, INC.

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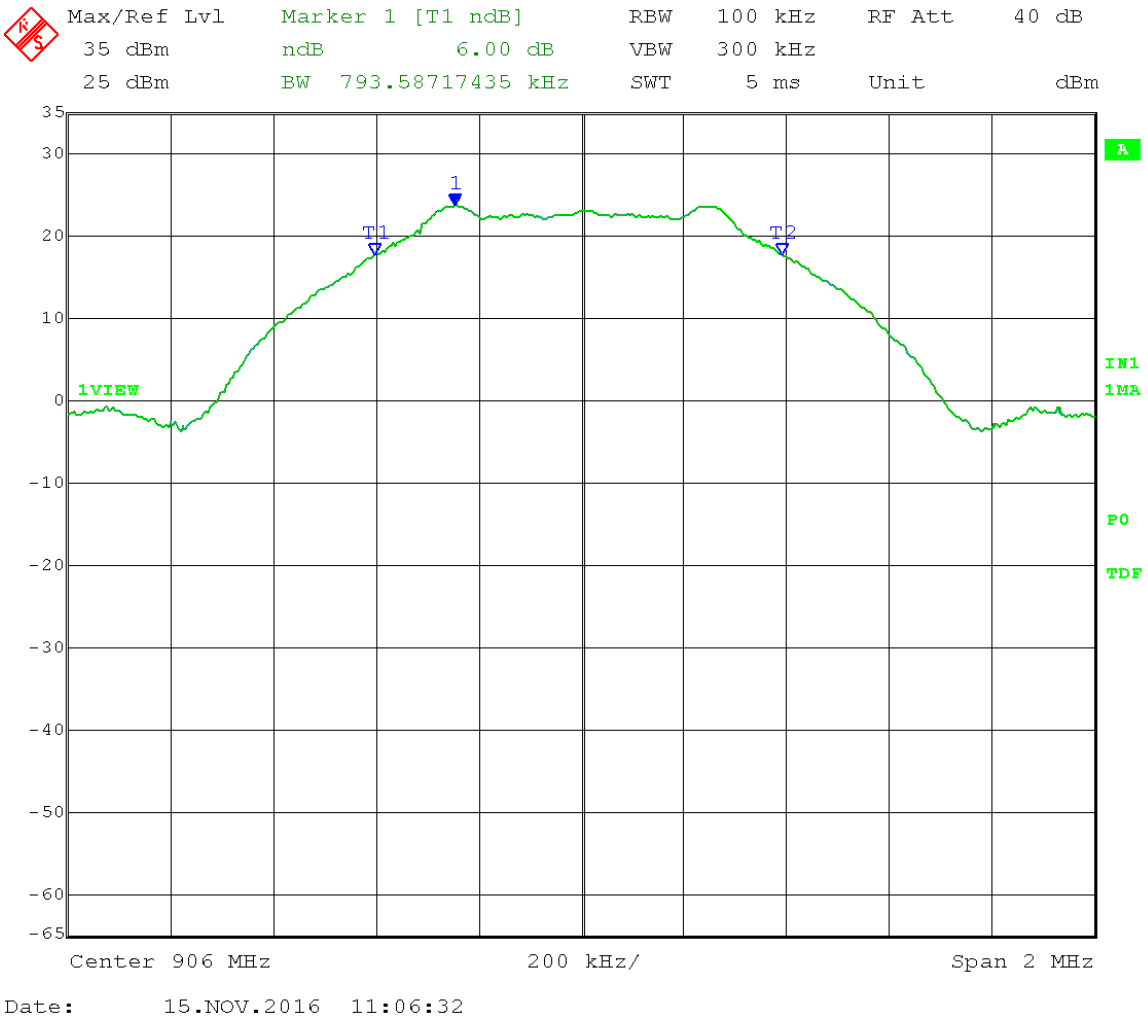
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	DTS Bandwidth (6 dB) - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW = 300 kHz
Detector = Peak
Sweep = auto couple

Comment: Low Channel: Frequency – 906 MHz
Output power setting 21

6 dB Emission Bandwidth = 794 kHz



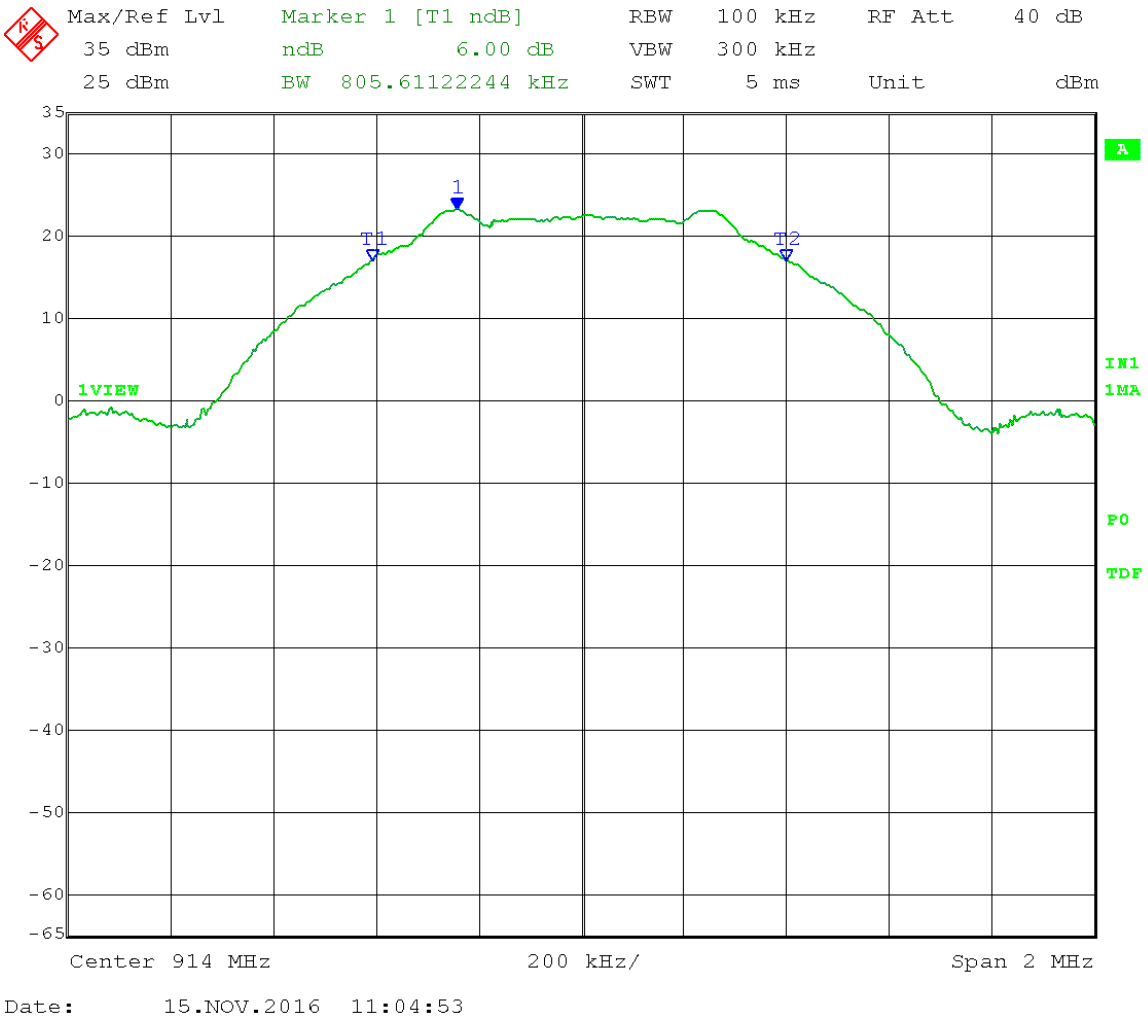
166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: DTS Bandwidth (6 dB) - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW = 300 kHz
Detector = Peak
Sweep = auto couple

Comment: Mid Channel: Frequency – 914 MHz
Output power setting 21

6 dB Emission Bandwidth = 806 kHz



ELECTRONIC SYSTEMS, INC.

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Model Tested:	L-3805
Report Number:	22351
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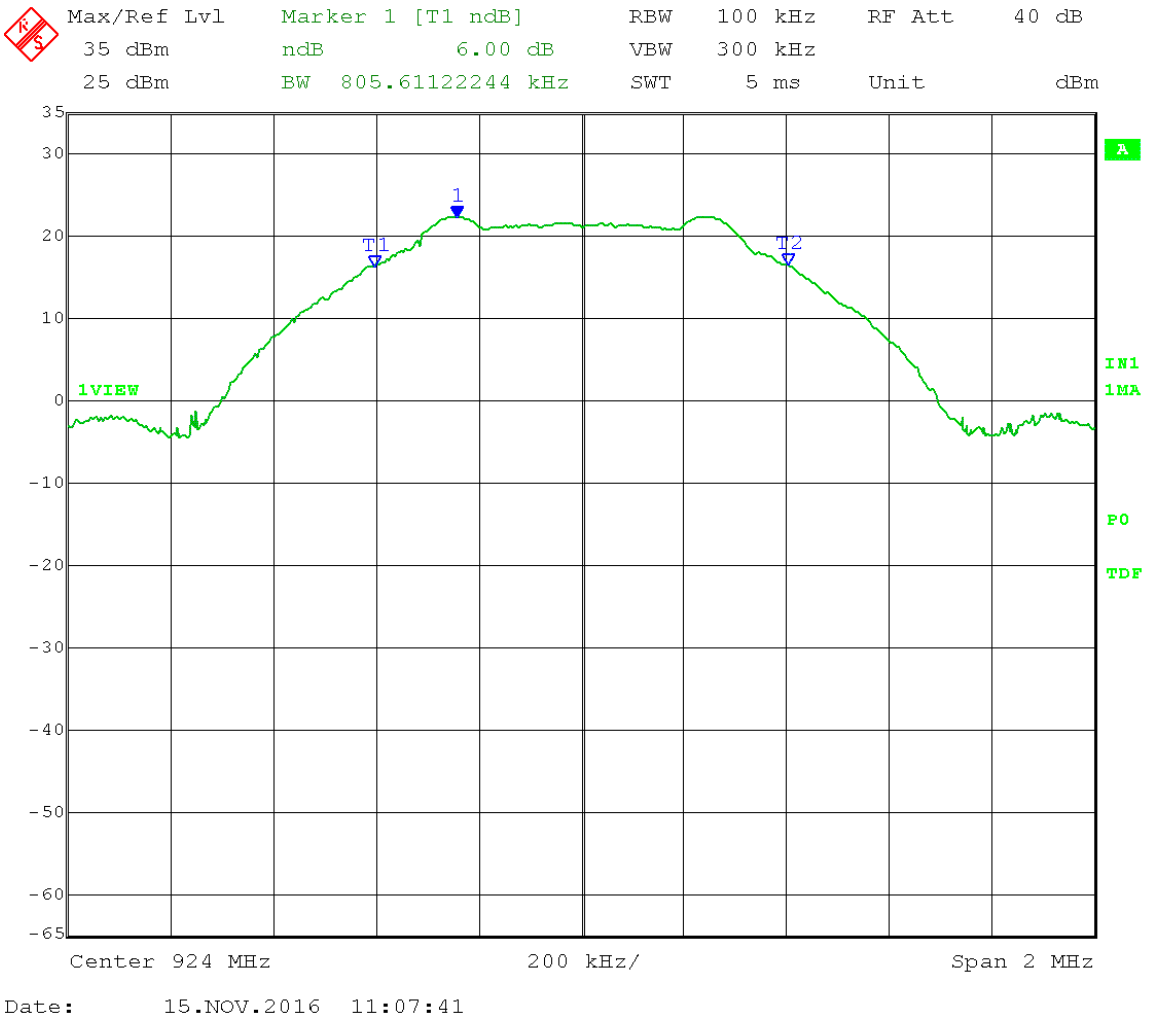
Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	DTS Bandwidth (6 dB) - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW = 300 kHz
Detector = Peak
Sweep = auto couple

Comment: High Channel: Frequency – 924 MHz
Output power setting 21

6 dB Emission Bandwidth = 806 kHz



166 South Carter, Genoa City, WI 53128

Appendix B

B2.0 Fundamental Emission Output Power

Rule Part:

15.247(b)(3)

Test Procedure:

ANSI C63.10-2013
11.9.2 Maximum Conducted (Average) Output Power
11.9.2.2.2 Method AVGSA-1: Trace averaging with the EUT transmitting at full power throughout each sweep.

Limit:

The maximum peak conducted output power limit is 1 watt (30 dBm).

Results:

Compliant
Maximum conducted output power: **256 mW (24.09 dBm)**

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the low, middle, and high channels of operation. The measurements were corrected to account for the cable loss and external attenuator.

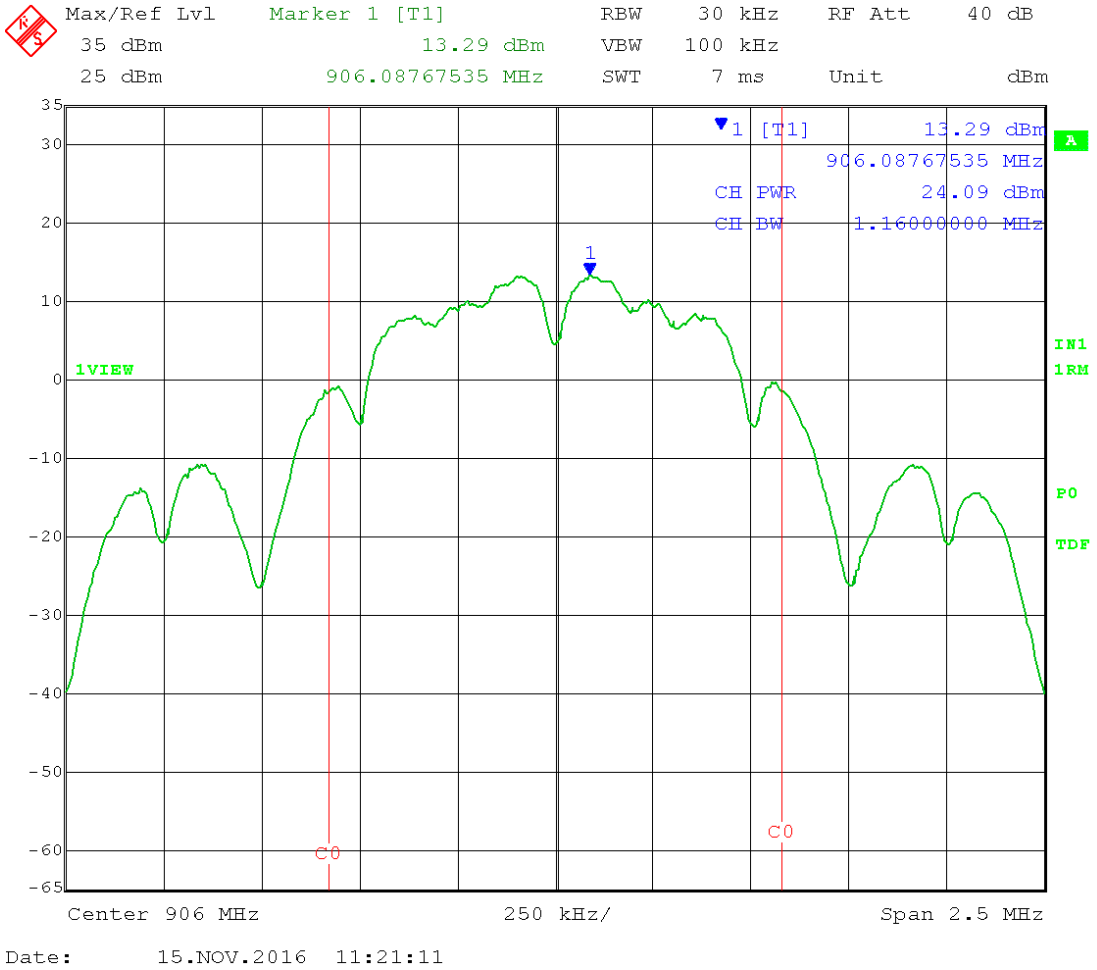
166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Fundamental Emission Output Power - Conducted
Operator: Craig B

Comment: Method AVGSA-1 – maximum conducted (average) output power
SPAN 1.5 x OBW
RBW = 1% to 5% OBW
VBW ≥ 3 x RBW
Sweep = auto couple
Detector = RMS
Trace = average 200 traces
Integrate power over OBW

Comment: Low channel: Frequency – 906 MHz
Output power setting 21

Fundamental Emission Output Power = 24.09 dBm = **256 mW**



Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

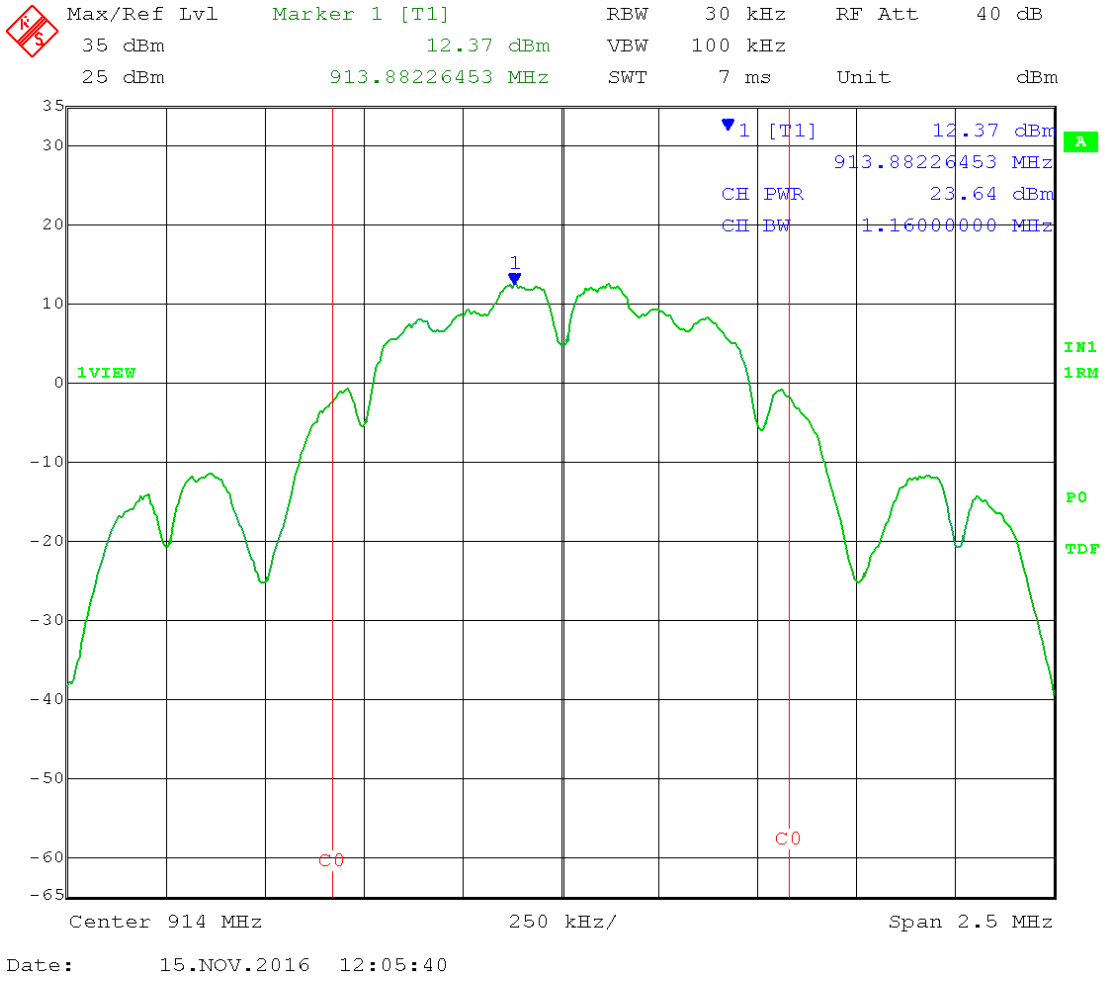
166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Fundamental Emission Output Power - Conducted
Operator:	Craig B

Comment: Method AVGSA-1 – maximum conducted (average) output power
SPAN 1.5 x OBW
RBW = 1% to 5% OBW
VBW ≥ 3 x RBW
Sweep = auto couple
Detector = RMS
Trace = average 200 traces
Integrate power over OBW

Comment: Mid channel: Frequency – 914 MHz
Output power setting 21

Fundamental Emission Output Power = 23.64 dBm = **231 mW**



Company:	Kenall Manufacturing
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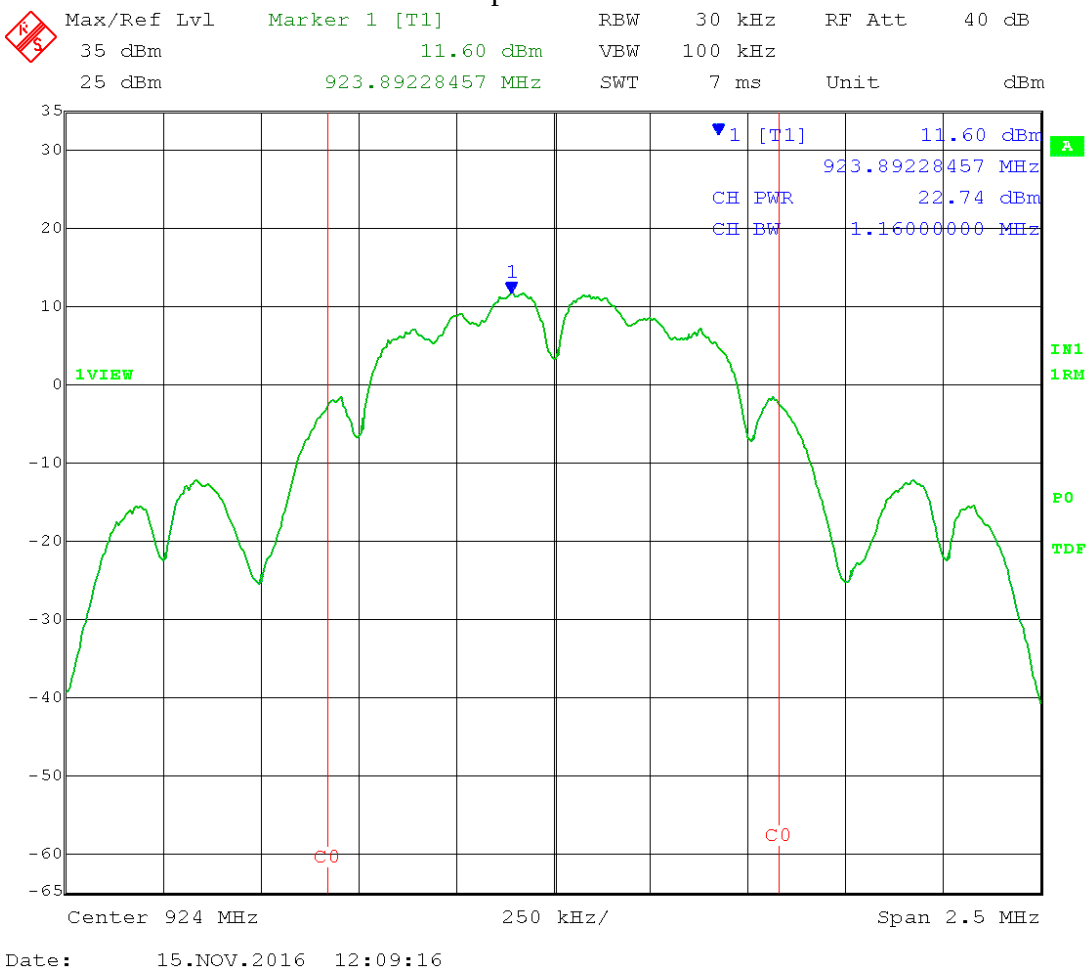
166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Fundamental Emission Output Power - Conducted
Operator:	Craig B

Comment: Method AVGSA-1 – maximum conducted (average) output power
SPAN 1.5 x OBW
RBW = 1% to 5% OBW
VBW ≥ 3 x RBW
Sweep = auto couple
Detector = RMS
Trace = average 200 traces
Integrate power over OBW

Comment: High channel: Frequency – 924 MHz
Output power setting 21

Fundamental Emission Output Power = 22.74 dBm = **188 mW**



166 South Carter, Genoa City, WI 53128

Appendix B

B3.0 Maximum Power Spectral Density (PSD)

Rule Part:

15.247(e)

Test Procedure:

ANSI C63.10-2013
11.10 Maximum Power Spectral Density Level in the Fundamental Emission
11.10.3 Method AVGPSD-1 (average PSD): Trace averaging with EUT transmitting at full power throughout each sweep.

Limit:

+8 dBm in any 3 kHz band segment within the fundamental during any time interval of continuous transmission.

Results:

Compliant
Maximum conducted power spectral density (PSD): **4.92 dBm/3kHz**

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the low, middle, and high channels of operation. The spectrum analyzer measurements were corrected to account for the cable loss and external attenuator.

DLS ELECTRONIC SYSTEMS, INC.

166 South Carter, Genoa City, WI 53128

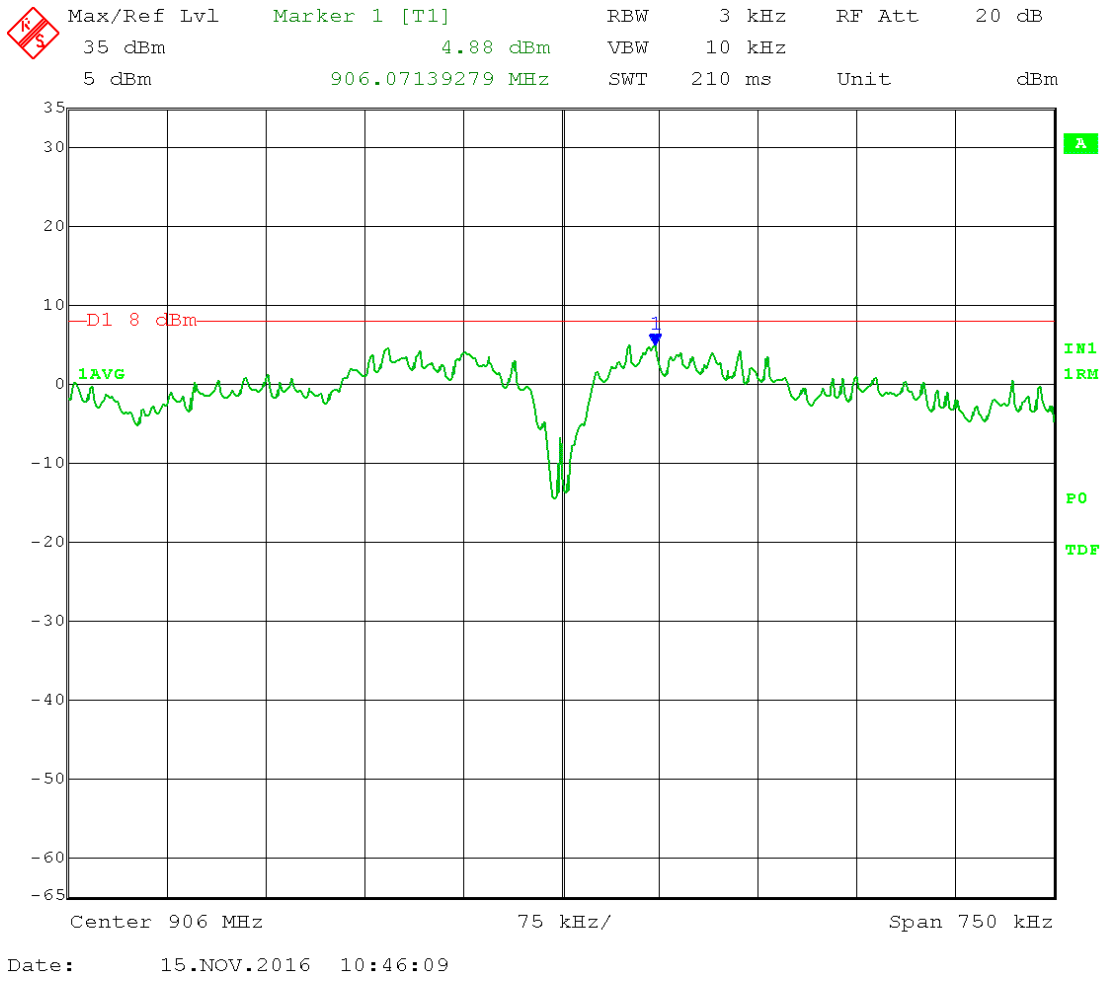
Company: Kenall Manufacturing
Model Tested: L-3805
Report Number: 22351
DLS Project: 8491

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Maximum Power Spectral Density (PSD)
Operator: Craig B

Comment: SPAN 1.5 x OBW (lowered to meet the minimum measurement point requirement)
RBW = 3 kHz
VBW = 10 kHz
Detector = RMS
Sweep = auto couple
Trace average 200 traces

Comment: Low Channel: Frequency – 906 MHz
Output power setting 21

Maximum PSD = 4.88 dBm/3kHz



ELECTRONIC SYSTEMS, INC.

166 South Carter, Genoa City, WI 53128

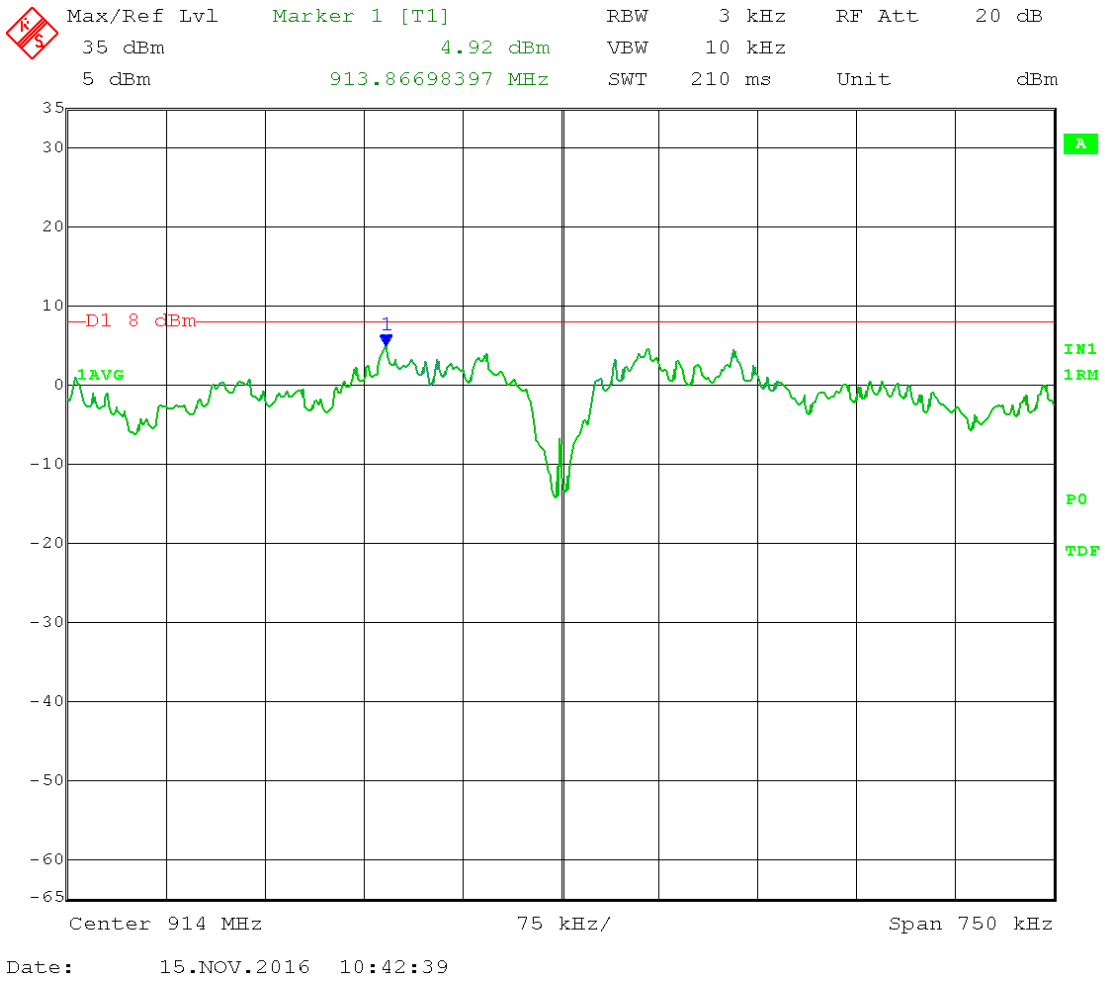
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Maximum Power Spectral Density (PSD)
Operator: Craig B

Comment: SPAN 1.5 x OBW (lowered to meet the minimum measurement point requirement)
RBW = 3 kHz
VBW = 10 kHz
Detector = RMS
Sweep = auto couple
Trace average 200 traces

Comment: Middle Channel: Frequency – 914 MHz
Output power setting 21

Maximum PSD = 4.92 dBm/3kHz



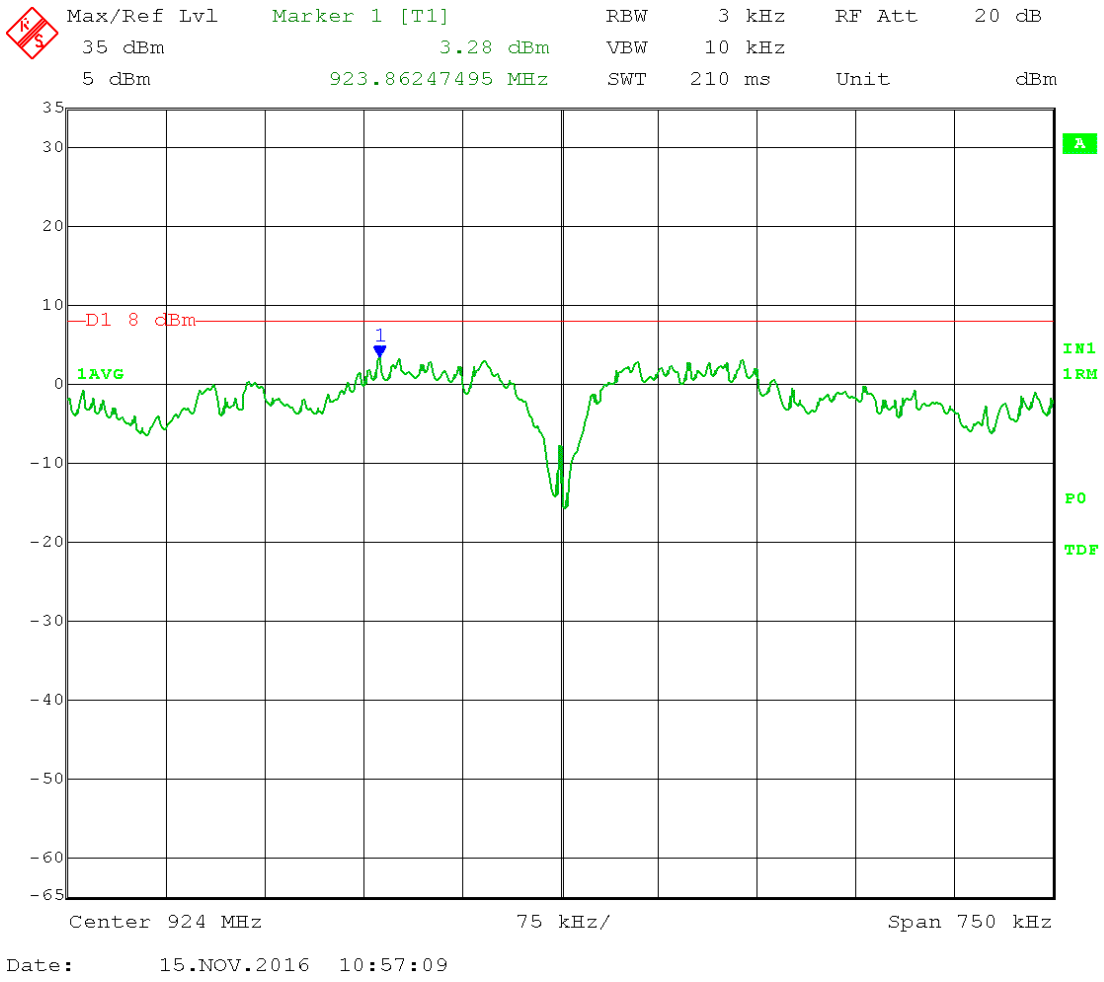
166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Maximum Power Spectral Density (PSD)
Operator: Craig B

Comment: SPAN 1.5 x OBW (lowered to meet the minimum measurement point requirement)
RBW = 3 kHz
VBW = 10 kHz
Detector = RMS
Sweep = auto couple
Trace average 200 traces

Comment: High Channel: Frequency – 924 MHz
Output power setting 21

Maximum PSD = 3.28 dBm/3kHz



166 South Carter, Genoa City, WI 53128

Appendix B

B4.0 Emissions in Non-Restricted Frequency Bands - RF Conducted

Rule Part:

15.247(d)

Test Procedure:

ANSI C63.10-2013
11.11 Emissions in non-restricted frequency bands
11.11.2 Reference Level Measurement
11.11.3 Unwanted Emissions Level Measurement

Limit:

RMS averaging was used to measure the output power. Therefore, the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least **30 dB** relative to the maximum measured in-band peak PSD level.

Results:

Compliant

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the low, middle, and high channels of operation. The spectrum analyzer measurements were corrected to account for the cable loss and external attenuator.

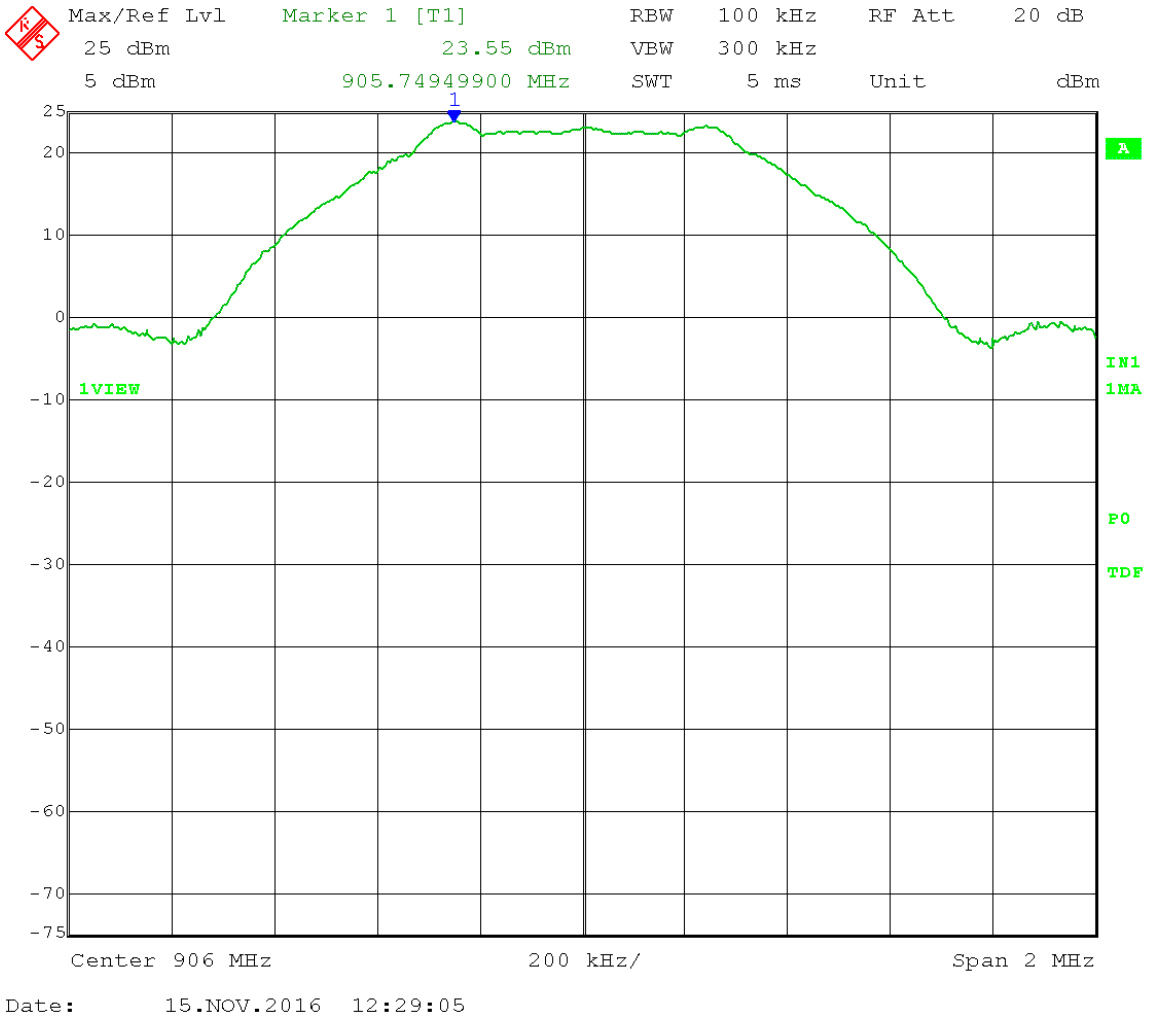
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span 1.5 x DTS Bandwidth
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 906 MHz
Output power setting 21
Reference Level measurement
Limit = 23.55 dBm – 30 dB = -6.45 dBm



DLS ELECTRONIC SYSTEMS, INC.

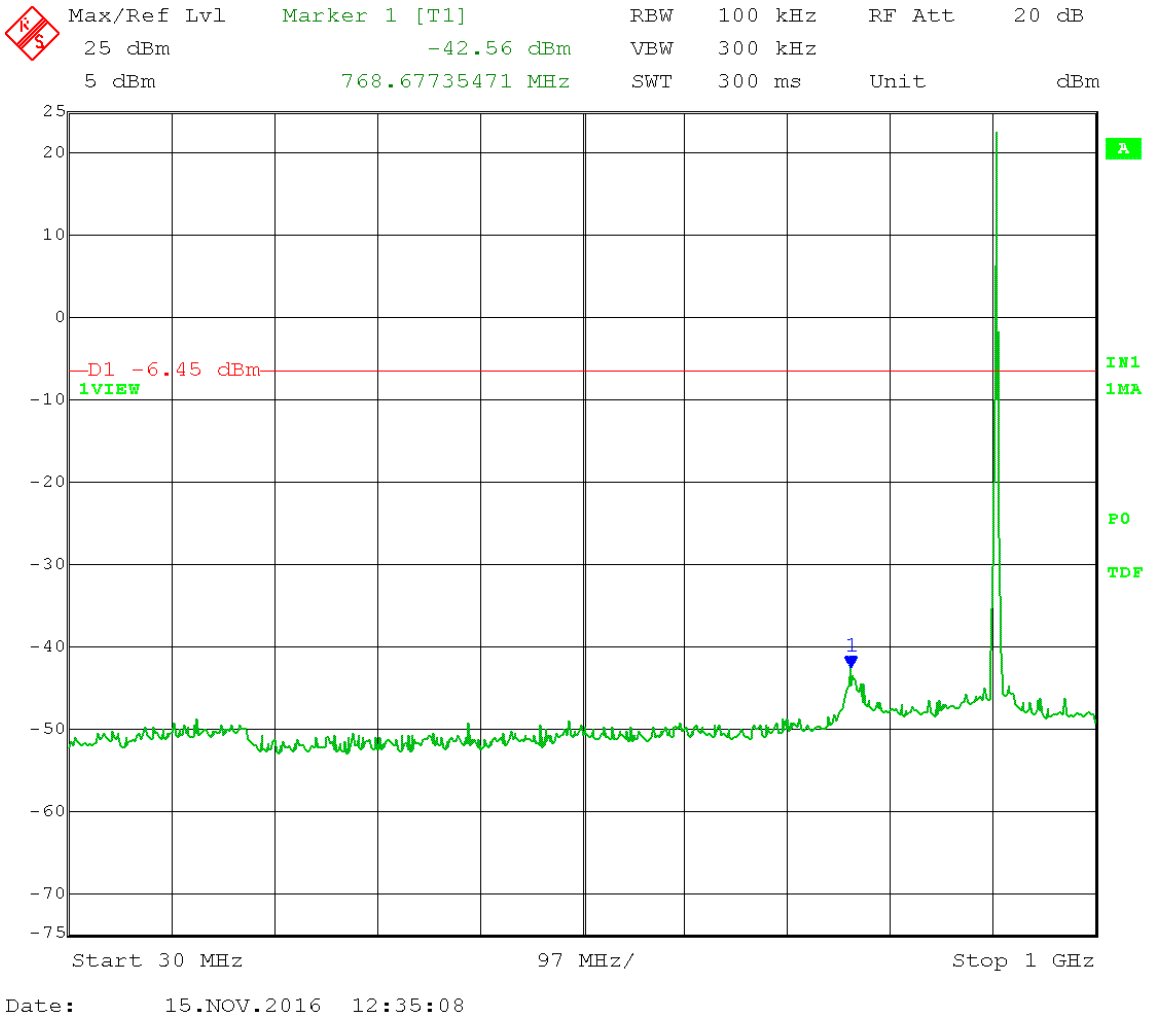
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 906 MHz
Output power setting 21
Frequency Range: 30 – 1000 MHz
Limit = 23.55 dBm – 30 dB = -6.45 dBm



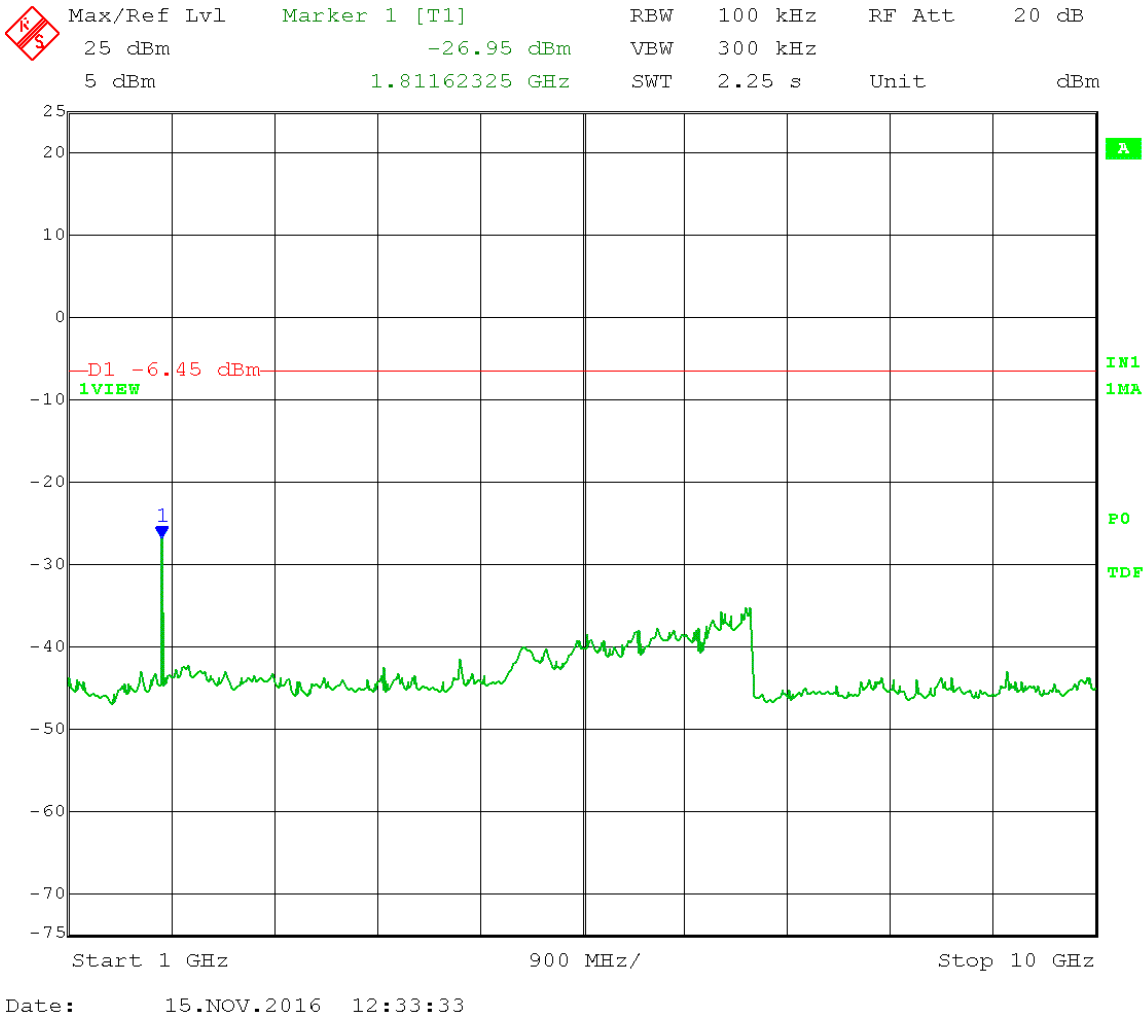
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 906 MHz
Output power setting 21
Frequency Range: 1 – 10 GHz
Limit = 23.55 dBm – 30 dB = -6.45 dBm



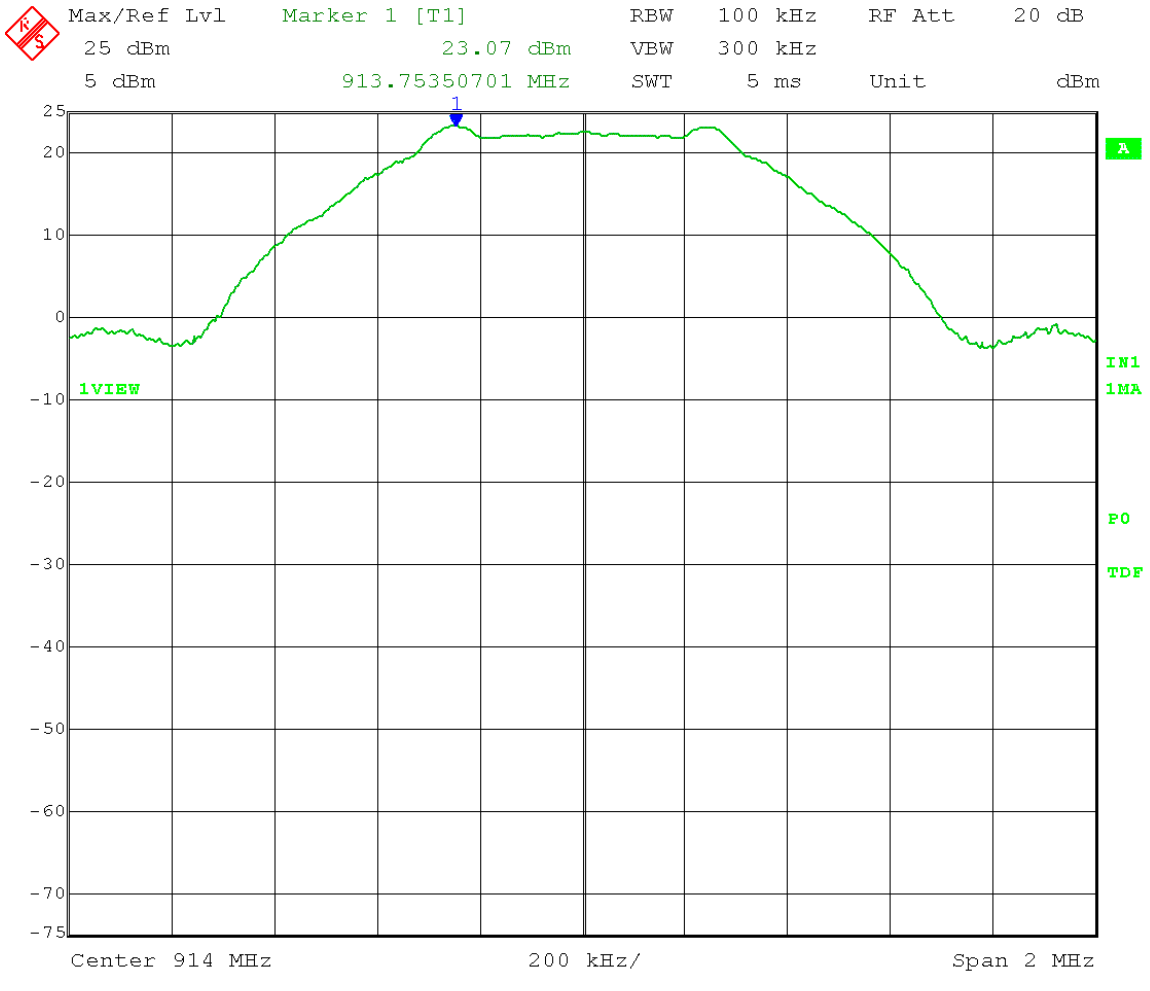
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span 1.5 x DTS Bandwidth
Detector = Peak
Sweep = auto couple
Trace = max hold

Mid Channel Transmit = 914 MHz
Output power setting 21
Reference Level measurement
Limit = 23.07 dBm – 30 dB = -6.93 dBm



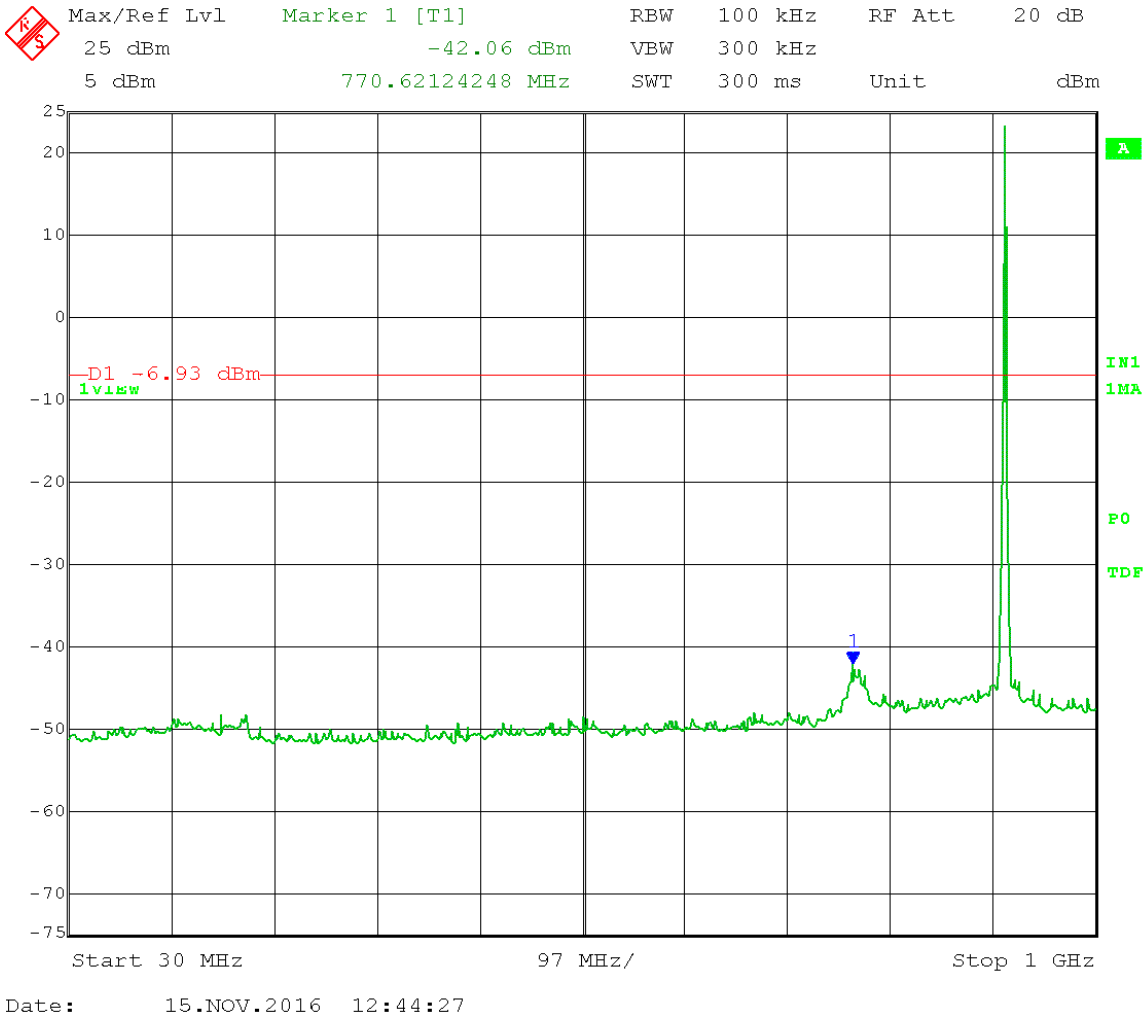
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Mid Channel Transmit = 914 MHz
Output power setting 21
Frequency Range: 30 – 1000 MHz
Limit = 23.07 dBm – 30 dB = -6.93 dBm



ELECTRONIC SYSTEMS, INC.

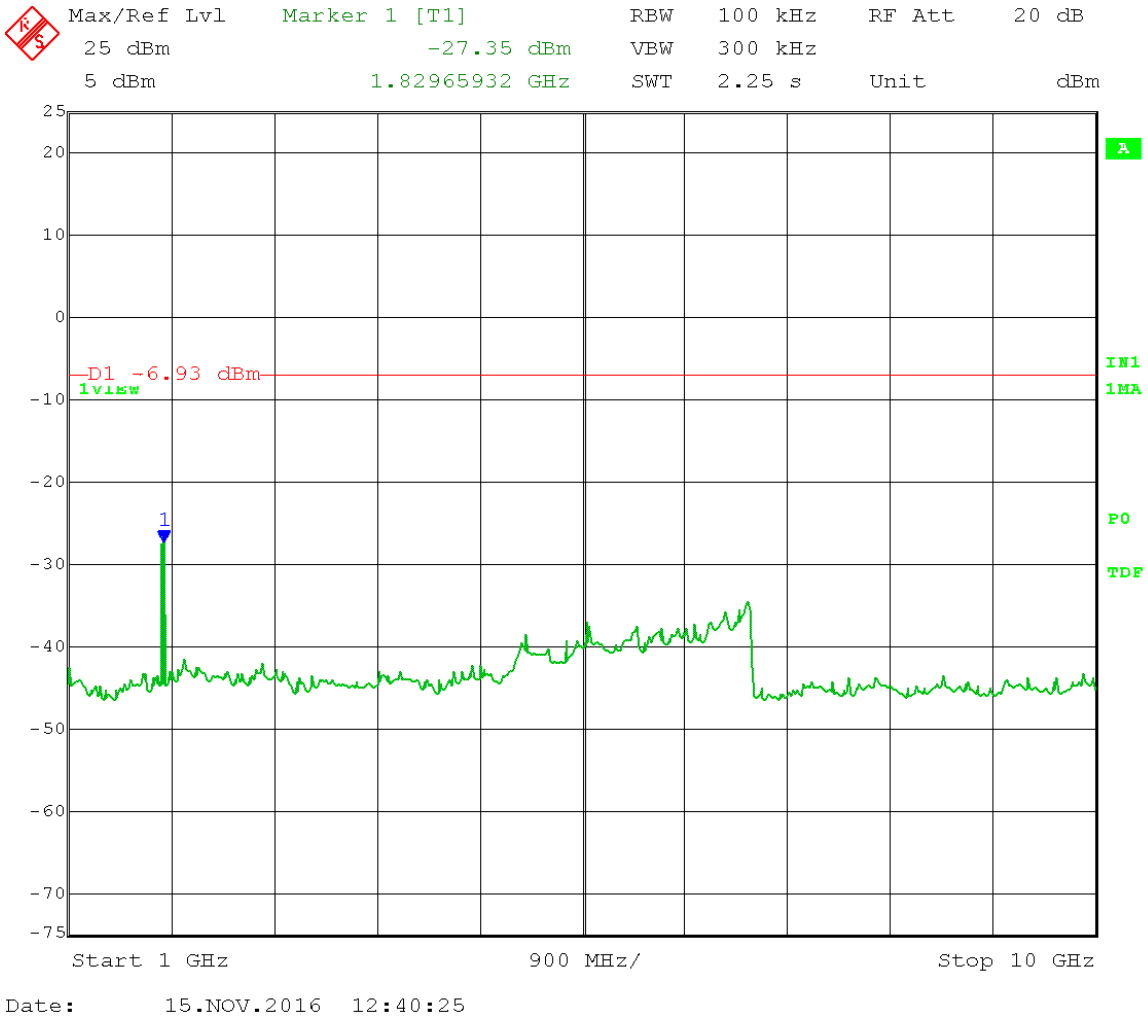
166 South Carter, Genoa City, WI 53128

Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Mid Channel Transmit = 914 MHz
Output power setting 21
Frequency Range: 1 – 10 GHz
Limit = 23.07 dBm – 30 dB = -6.93 dBm



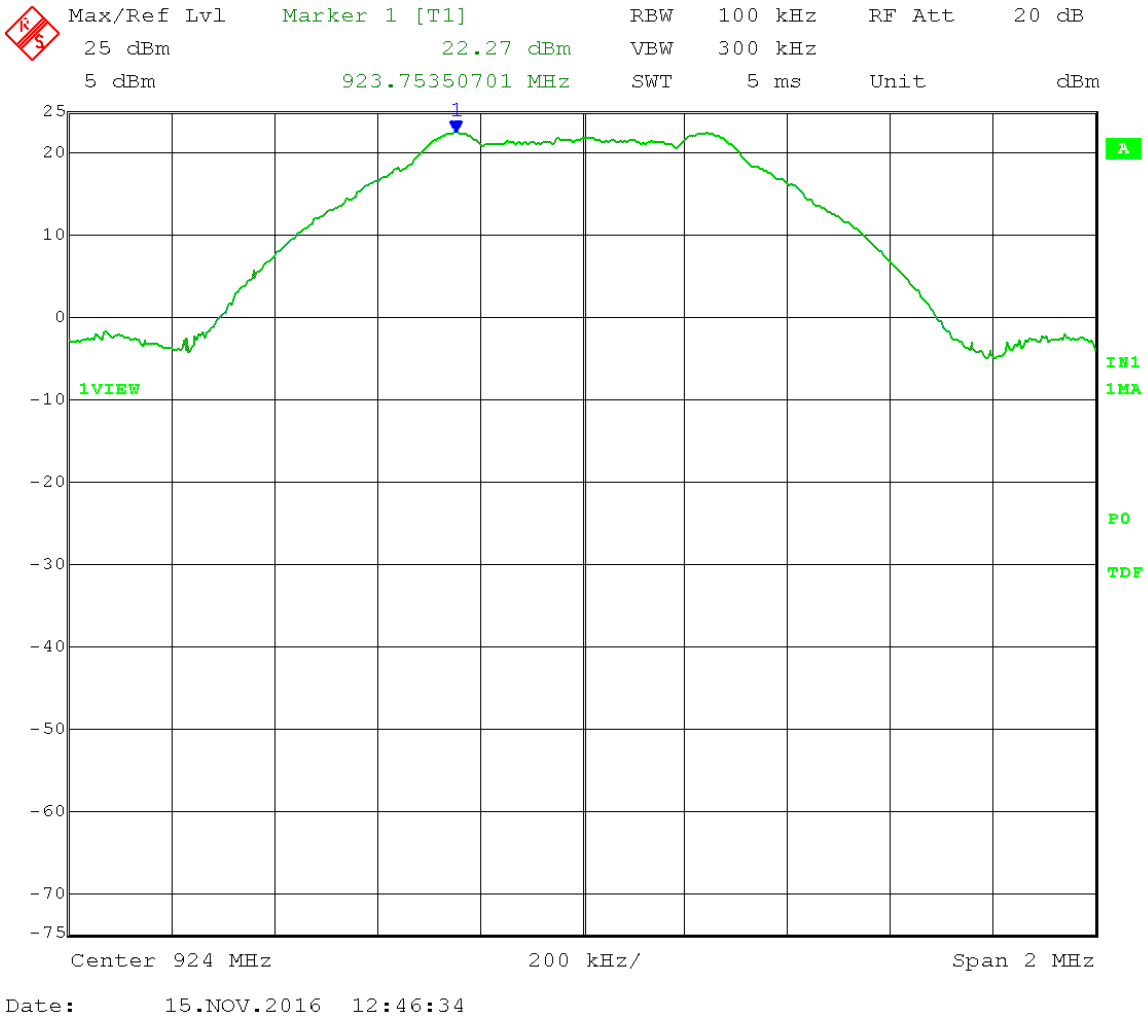
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span 1.5 x DTS Bandwidth
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 924 MHz
Output power setting 21
Reference Level measurement
Limit = 22.27 dBm – 30 dB = -7.73 dBm

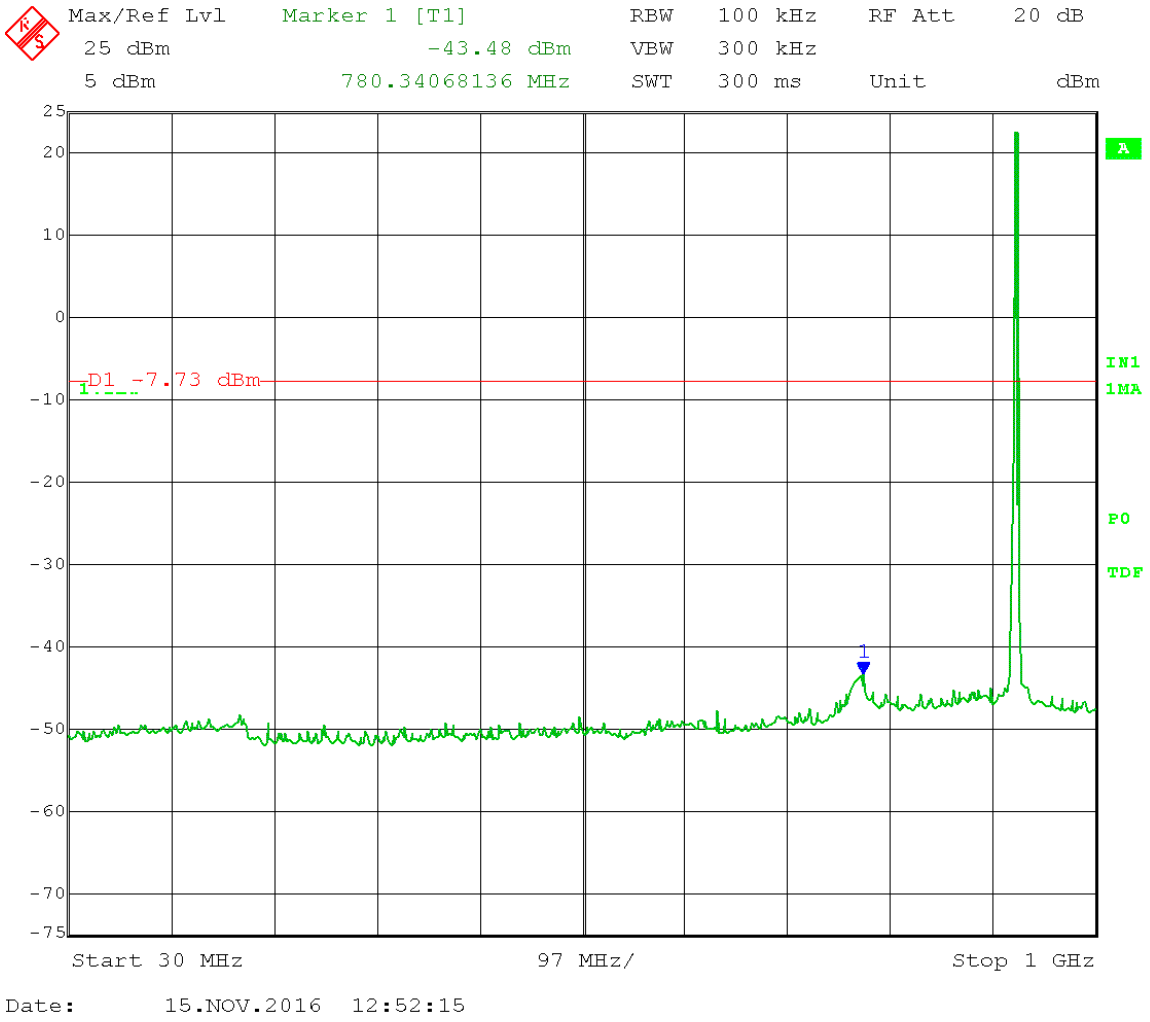


166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 924 MHz
Output power setting 21
Frequency Range: 30 – 1000 MHz
Limit = 22.27 dBm – 30 dB = -7.73 dBm



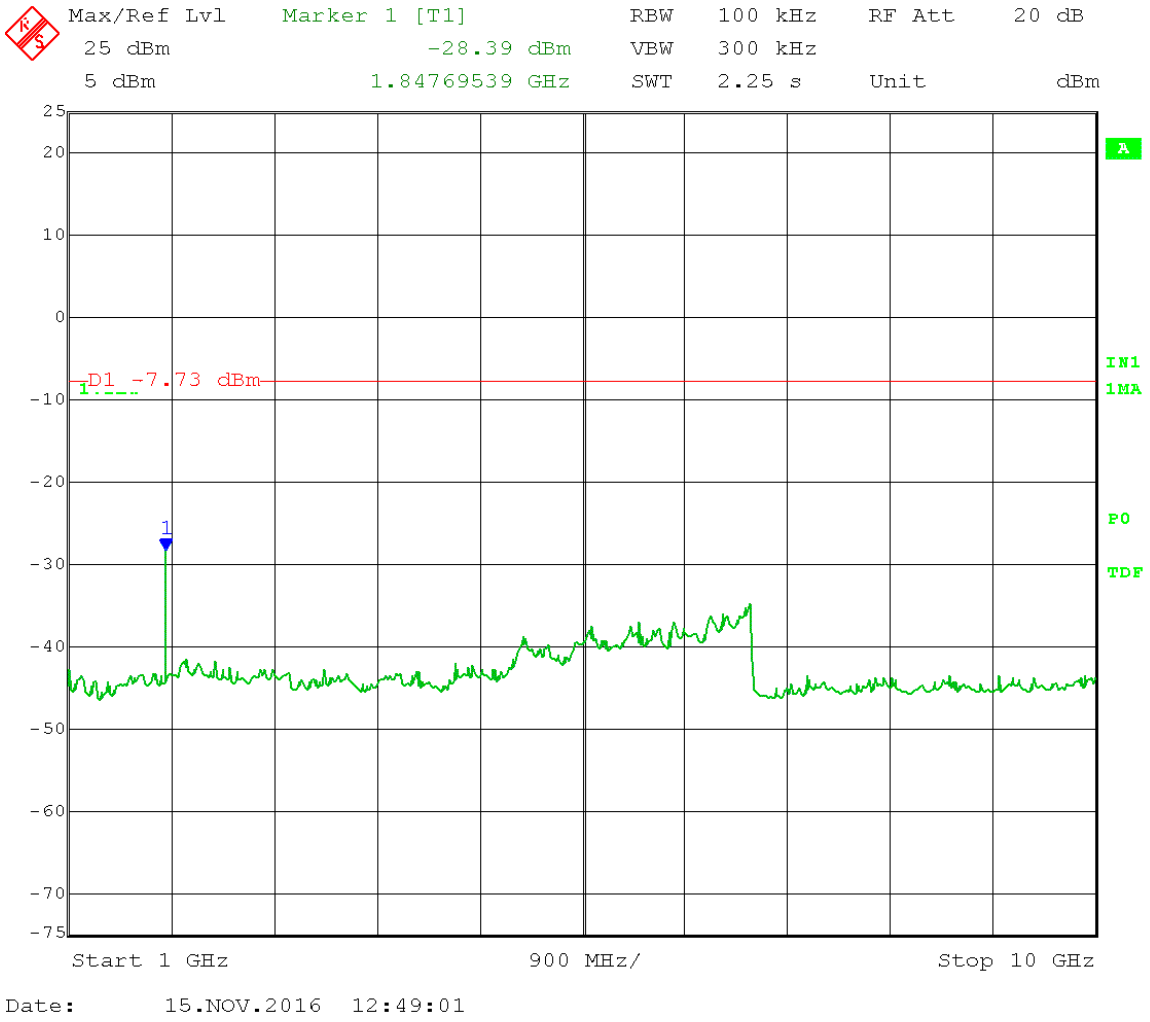
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date:	11-15-2016
Company:	Kenall
EUT:	Link900G1
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 924 MHz
Output power setting 21
Frequency Range: 1 – 10 GHz
Limit = 22.27 dBm – 30 dB = -7.73 dBm



Appendix B

B5.0 Emissions in Restricted Frequency Bands – Radiated

Rule Part:

15.247(d), 15.205(a), 15.209(a)

Test Procedure:

ANSI C63.10-2013
11.12 Emissions in Restricted Frequency Bands
11.12.1 Radiated Emissions Measurements

Limit:

15.209(a)

Results:

Compliant

Notes:

Testing was performed with the antenna connected.
Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the low, middle, and high channels of operation.

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Kenall TekLink 915 MHz Radio Transceiver Module, Model# L-3805
Manufacturer: Kenall Manufacturing
Operating Condition: 62 deg. F; 39% R.H.
Test Site: DLS O.F. Site 3
Operator: John S #8491
Test Specification: 3.3VDC TX mode; PCB quarter wave antenna
Comment: Low/mid/high channels, x/y/z axis's checked for worst case.
Date: 11-16-2016

TEXT: "Vert 3 meters"

Short Description: Test Set-up

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

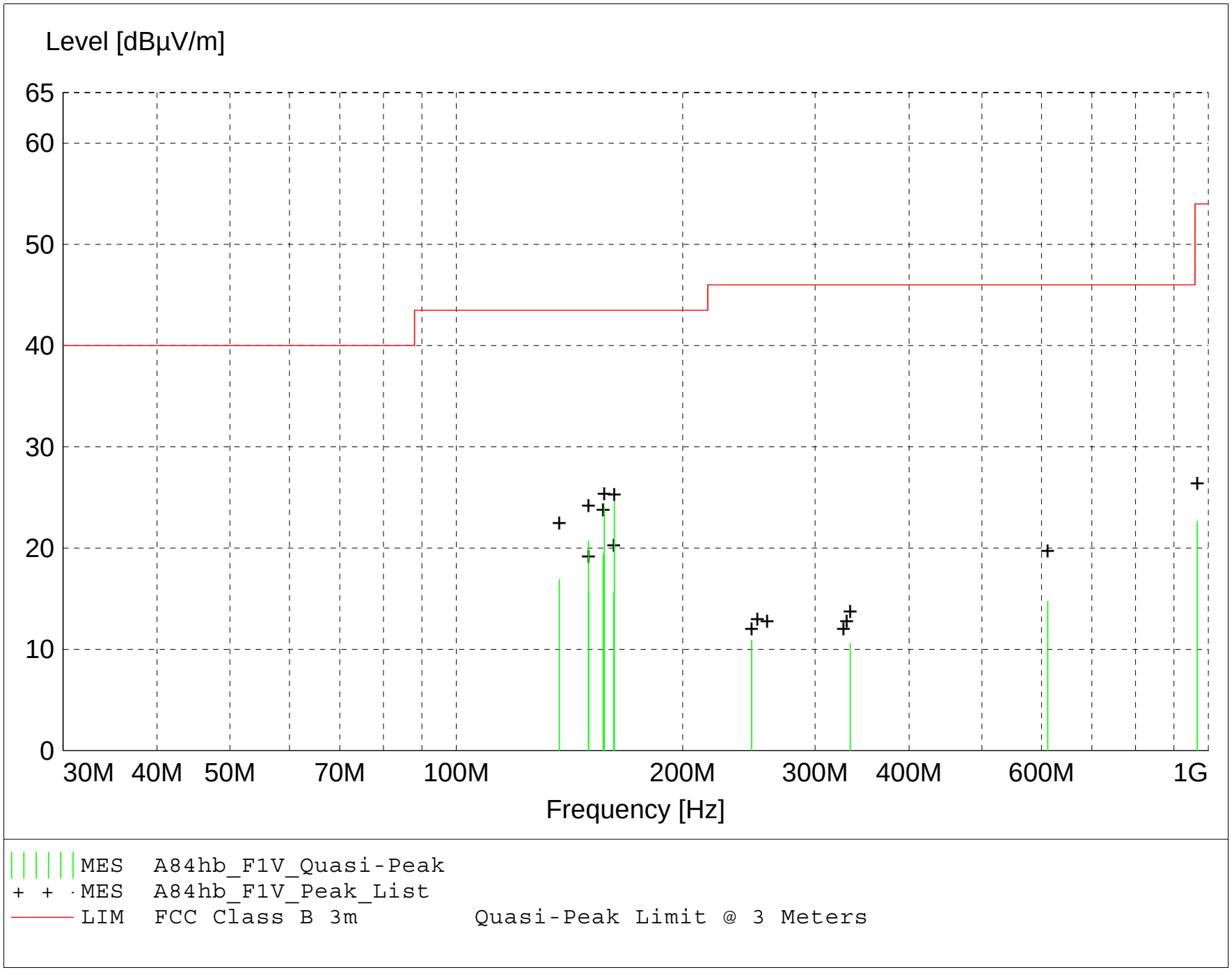
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A84hb_F1V_Quasi-Peak
MES A84hb_F1V_Peak_List
LIM FCC Class B 3m Quasi-Peak Limit @ 3 Meters

MEASUREMENT RESULT: "A84hb_F1V_Final"

11/18/2016 12:31PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
162.250000	34.39	13.25	-23.0	24.6	43.5	18.9	1.00	45	QUASI-PEAK	hi ch
156.700000	34.51	12.64	-23.2	24.0	43.5	19.5	1.00	0	QUASI-PEAK	hi ch
149.900000	31.92	12.00	-23.2	20.7	43.5	22.8	1.00	90	QUASI-PEAK	mid ch
156.800000	30.01	12.56	-23.2	19.4	43.5	24.1	1.00	45	QUASI-PEAK	mid ch
137.100000	28.02	12.19	-23.3	16.9	43.5	26.6	1.00	0	QUASI-PEAK	lo ch
149.950000	26.72	12.00	-23.2	15.5	43.5	28.0	1.00	90	QUASI-PEAK	lo ch
611.600000	16.01	19.60	-20.9	14.8	46.0	31.2	1.00	0	QUASI-PEAK	noise floor
966.400000	16.73	23.86	-17.9	22.6	54.0	31.4	1.00	0	QUASI-PEAK	noise floor
247.000000	21.36	11.98	-22.4	10.9	46.0	35.1	1.00	0	QUASI-PEAK	noise floor
334.100000	18.08	14.46	-22.0	10.6	46.0	35.4	1.00	0	QUASI-PEAK	noise floor

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Kenall TekLink 915 MHz Radio Transceiver Module, Model# L-3805
Manufacturer: Kenall Manufacturing
Operating Condition: 62 deg. F; 39% R.H.
Test Site: DLS O.F. Site 3
Operator: John S #8491
Test Specification: 3.3VDC TX mode; PCB quarter wave antenna
Comment: Low/mid/high channels, x/y/z axis's checked for worst case.
Date: 11-16-2016

TEXT: "Horz 3 meters"

Short Description: Test Set-up

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

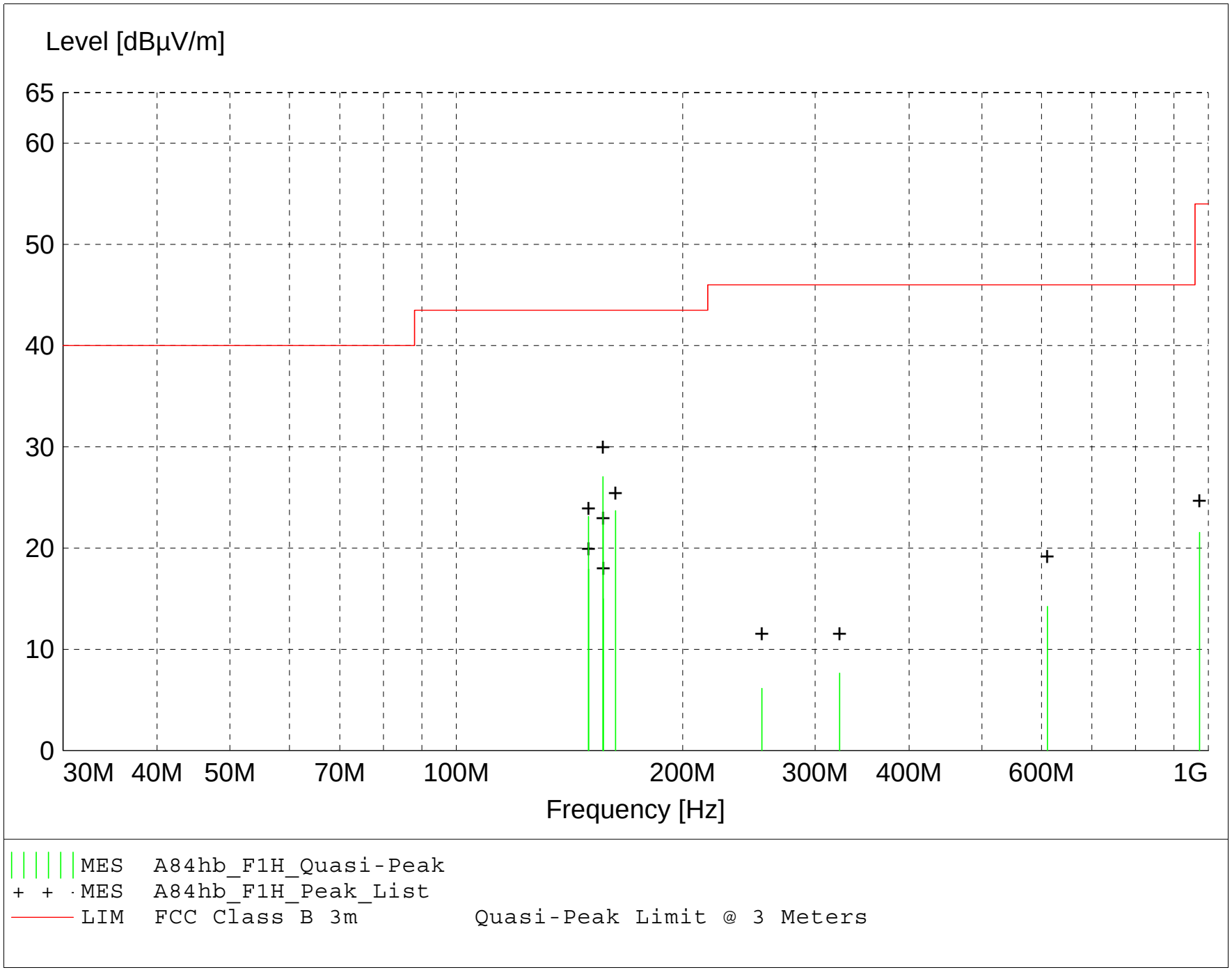
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A84hb_F1H_Quasi-Peak
MES A84hb_F1H_Peak_List
LIM FCC Class B 3m
Quasi-Peak Limit @ 3 Meters

MEASUREMENT RESULT: "A84hb_F1H_Final"

11/18/2016 12:36PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
156.700000	37.68	12.54	-23.2	27.1	43.5	16.4	2.00	270	QUASI-PEAK	hi ch
162.850000	33.35	13.37	-23.0	23.7	43.5	19.8	2.00	270	QUASI-PEAK	hi ch
149.900000	34.35	12.00	-23.2	23.1	43.5	20.4	2.00	270	QUASI-PEAK	mid ch
156.800000	33.02	12.56	-23.2	22.4	43.5	21.1	2.00	100	QUASI-PEAK	mid ch
149.950000	29.14	12.00	-23.2	17.9	43.5	25.6	2.00	270	QUASI-PEAK	low ch
156.850000	25.59	12.57	-23.2	15.0	43.5	28.5	2.00	270	QUASI-PEAK	low ch
610.950000	15.54	19.56	-20.9	14.2	46.0	31.8	2.00	0	QUASI-PEAK	noise floor
973.500000	15.19	24.14	-17.8	21.6	54.0	32.4	2.00	0	QUASI-PEAK	noise floor
323.350000	15.17	14.50	-22.0	7.7	46.0	38.3	1.00	0	QUASI-PEAK	noise floor
254.850000	16.10	12.29	-22.3	6.1	46.0	39.9	1.00	0	QUASI-PEAK	noise floor

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Link900G1
Manufacturer: Kenall
Operating Condition: 71 deg F 28% R.H.
Test Site: DLS O.F. G1
Operator: Craig B
Test Specification: Power setting 21; PCB quarter wave antenna
Comment: Ch's 906, 914, 924 MHz
Date: 11-17-2016 / 11-21-2016

TEXT: "Vert 3 meters"

Short Description: Test Set-up

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

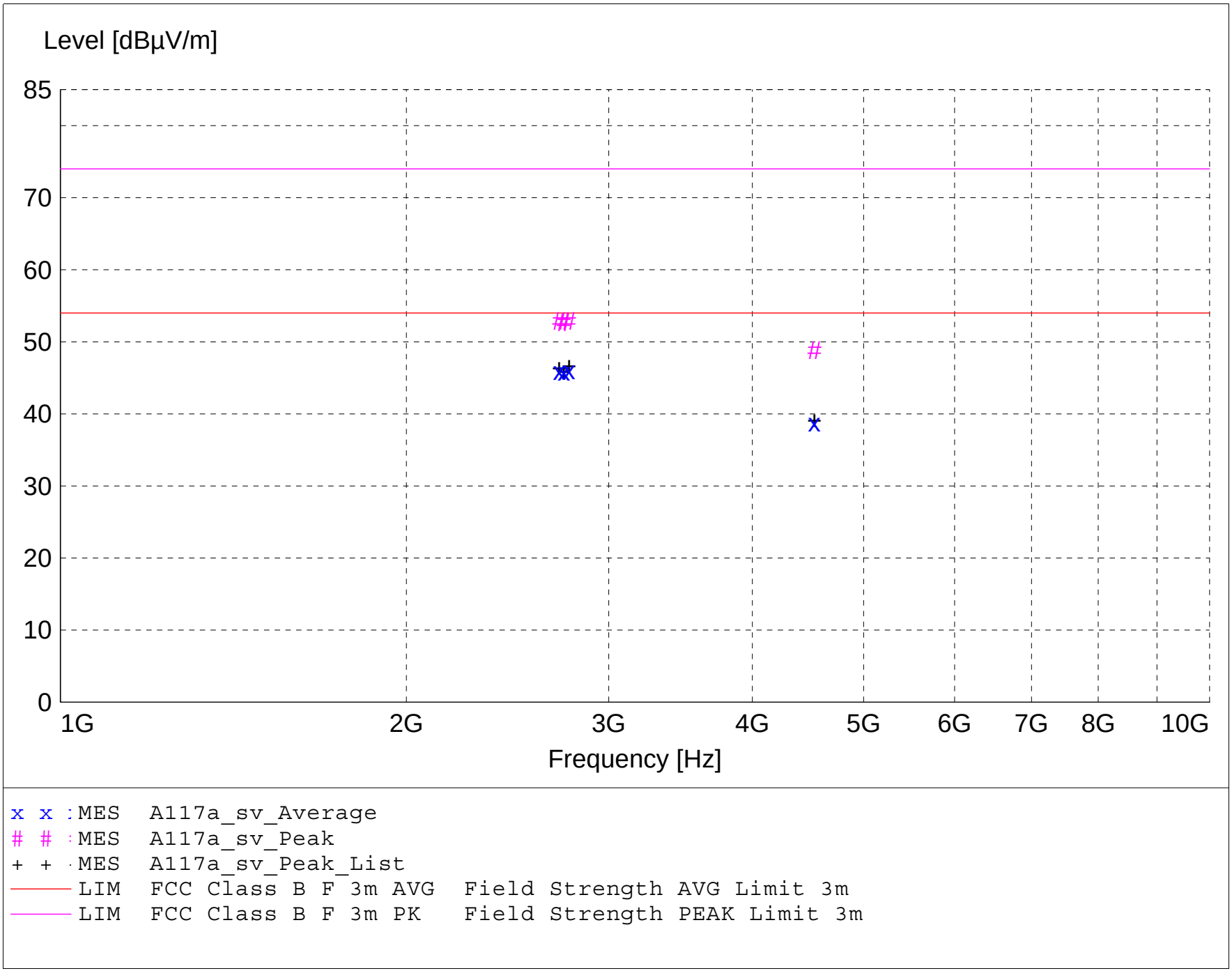
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector
-	Background Scan Peak Detector (Optional)
-	Background Scan Average Detector (Optional)



x x : MES A117a_sv_Average
: MES A117a_sv_Peak
+ + : MES A117a_sv_Peak_List
——— LIM FCC Class B F 3m AVG Field Strength AVG Limit 3m
——— LIM FCC Class B F 3m PK Field Strength PEAK Limit 3m

MEASUREMENT RESULT: "A117a_sv_Final"

11/21/2016 10:33AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
2771.320000	57.03	28.72	-39.7	46.1	54.0	7.9	1.60	197	AVERAGE	High ch
2717.300000	56.98	28.70	-39.7	46.0	54.0	8.0	1.16	231	AVERAGE	Low ch
2742.620000	56.78	28.71	-39.7	45.8	54.0	8.2	1.43	243	AVERAGE	Mid ch
4531.160000	44.06	32.35	-37.7	38.7	54.0	15.3	1.00	11	AVERAGE	Low ch
2717.300000	63.93	28.70	-39.7	52.9	74.0	21.1	1.16	231	MAX PEAK	Low ch
2771.320000	63.88	28.72	-39.7	52.9	74.0	21.1	1.60	197	MAX PEAK	High ch
2742.620000	63.74	28.71	-39.7	52.8	74.0	21.2	1.43	243	MAX PEAK	Mid ch
4531.160000	54.16	32.35	-37.7	48.8	74.0	25.2	1.00	11	MAX PEAK	Low ch

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Link900G1
Manufacturer: Kenall
Operating Condition: 71 deg F 28% R.H.
Test Site: DLS O.F. G1
Operator: Craig B
Test Specification: Power setting 21; PCB quarter wave antenna
Comment: Ch's 906, 914, 924 MHz
Date: 11-17-2016 / 11-21-2016

TEXT: "Horz 3 meters"

Short Description: Test Set-up

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

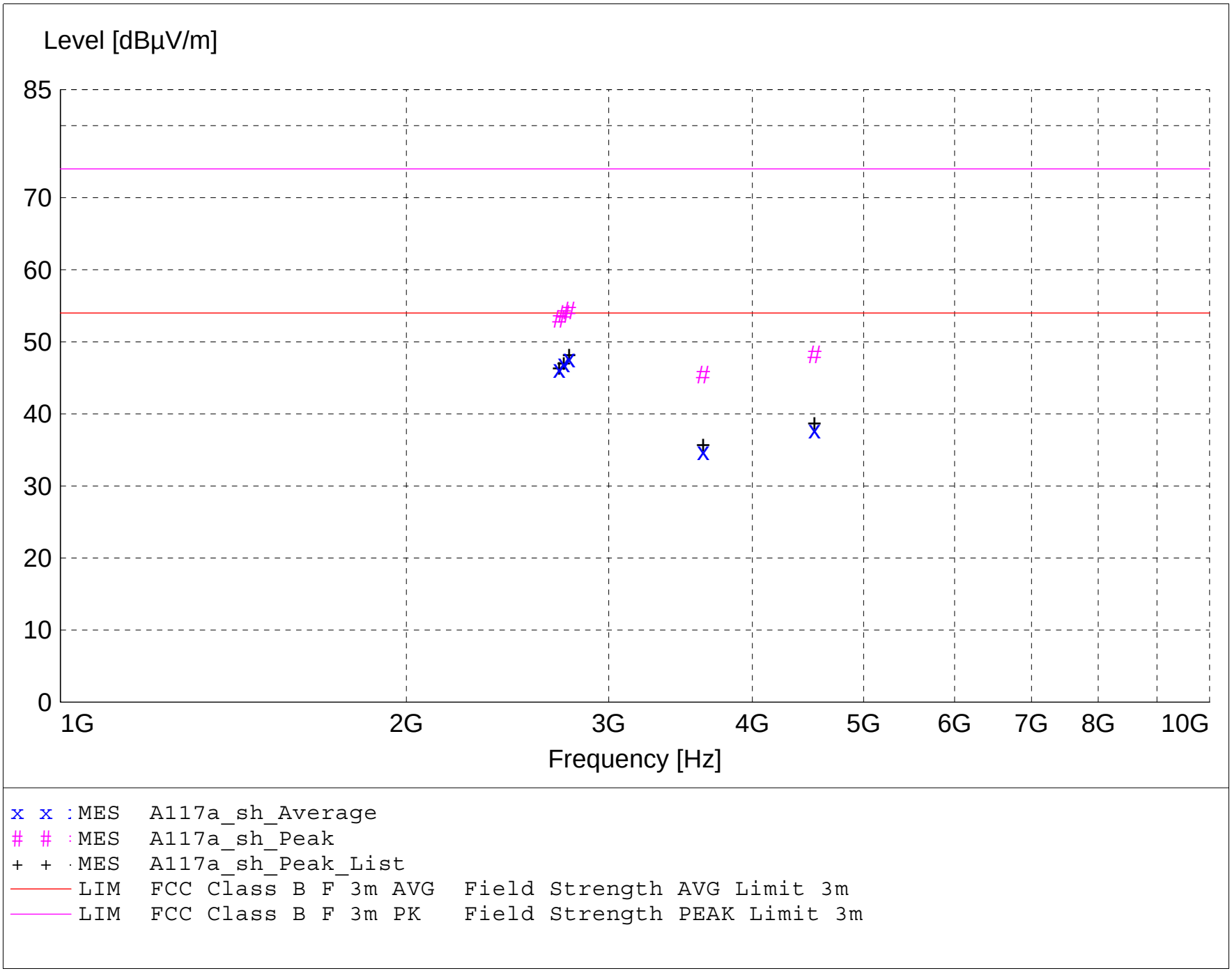
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector
-	Background Scan Peak Detector (Optional)
-	Background Scan Average Detector (Optional)



x x : MES A117a_sh_Average
: MES A117a_sh_Peak
+ + : MES A117a_sh_Peak_List
——— LIM FCC Class B F 3m AVG Field Strength AVG Limit 3m
——— LIM FCC Class B F 3m PK Field Strength PEAK Limit 3m

MEASUREMENT RESULT: "A117a_sh_Final"

11/21/2016 9:45AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
2771.320000	58.67	28.72	-39.7	47.7	54.0	6.3	1.15	113	AVERAGE	High ch
2742.620000	57.97	28.71	-39.7	47.0	54.0	7.0	1.35	167	AVERAGE	Mid ch
2717.320000	57.26	28.70	-39.7	46.3	54.0	7.7	1.25	222	AVERAGE	Low ch
4531.180000	43.16	32.35	-37.7	37.8	54.0	16.2	1.21	133	AVERAGE	Low ch
3624.960000	42.29	31.58	-39.0	34.8	54.0	19.2	1.10	179	AVERAGE	Low ch
2771.320000	65.34	28.72	-39.7	54.4	74.0	19.6	1.15	113	MAX PEAK	High ch
2742.620000	64.81	28.71	-39.7	53.8	74.0	20.2	1.35	167	MAX PEAK	Mid ch
2717.320000	64.19	28.70	-39.7	53.2	74.0	20.8	1.25	222	MAX PEAK	Low ch
4531.180000	53.62	32.35	-37.7	48.3	74.0	25.7	1.21	133	MAX PEAK	Low ch
3624.960000	52.91	31.58	-39.0	45.4	74.0	28.6	1.10	179	MAX PEAK	Low ch

FCC Part 15 Part C

Electric Field Strength

EUT: Kenall TekLink 915 MHz Radio Transceiver Module, Model# L-3805
Manufacturer: Kenall Manufacturing
Operating Condition: 62 deg. F; 39% R.H.
Test Site: DLS O.F. Site 3
Operator: John S #8491
Test Specification: 3.3VDC TX mode; Linx antenna
Comment: Low/mid/high channels, x/y/z axis's checked for worst case.
Date: 11-16-2016

TEXT: "Vert 3 meters"

Short Description: Test Set-up

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

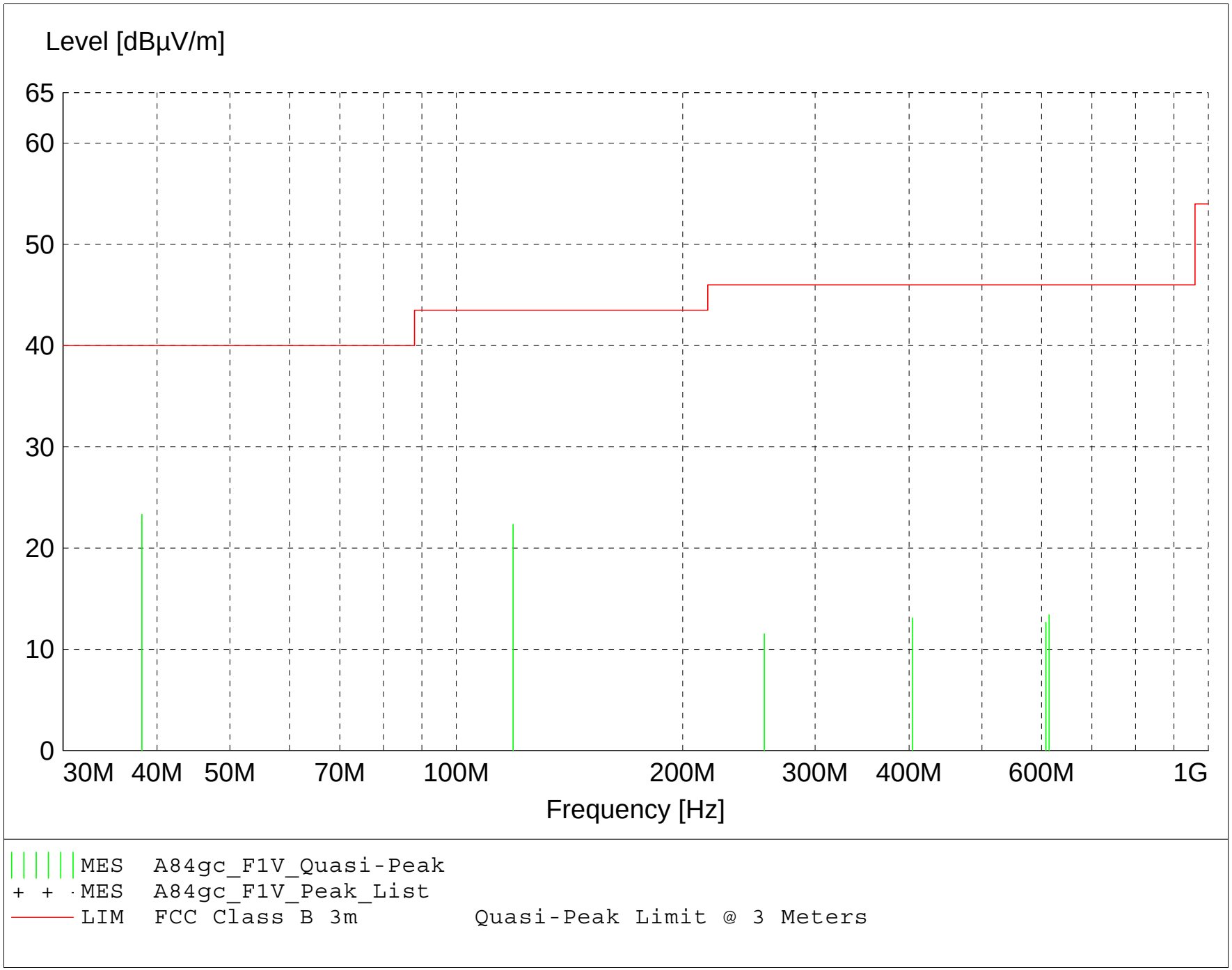
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A84gc_F1V_Quasi-Peak
MES A84gc_F1V_Peak_List
LIM FCC Class B 3m Quasi-Peak Limit @ 3 Meters

MEASUREMENT RESULT: "A84gc_F1V_Final"

11/16/2016 1:46PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
38.200000	36.27	11.64	-24.6	23.3	40.0	16.7	1.00	0	QUASI-PEAK	noise floor
119.000000	32.62	13.10	-23.4	22.3	43.5	21.2	1.00	0	QUASI-PEAK	noise floor
613.900000	14.51	19.73	-20.8	13.4	46.0	32.6	1.00	0	QUASI-PEAK	noise floor
404.100000	18.85	15.82	-21.6	13.1	46.0	32.9	1.00	0	QUASI-PEAK	noise floor
608.200000	14.15	19.39	-20.9	12.7	46.0	33.3	1.00	0	QUASI-PEAK	noise floor
256.850000	21.32	12.41	-22.2	11.5	46.0	34.5	1.00	0	QUASI-PEAK	noise floor

FCC Part 15 Part C

Electric Field Strength

EUT: Kenall TekLink 915 MHz Radio Transceiver Module, Model# L-3805
Manufacturer: Kenall Manufacturing
Operating Condition: 62 deg. F; 39% R.H.
Test Site: DLS O.F. Site 3
Operator: John S #8491
Test Specification: 3.3VDC TX mode; Linx antenna
Comment: Low/mid/high channels, x/y/z axis's checked for worst case.
Date: 11-16-2016

TEXT: "Horz 3 meters"

Short Description: Test Set-up

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

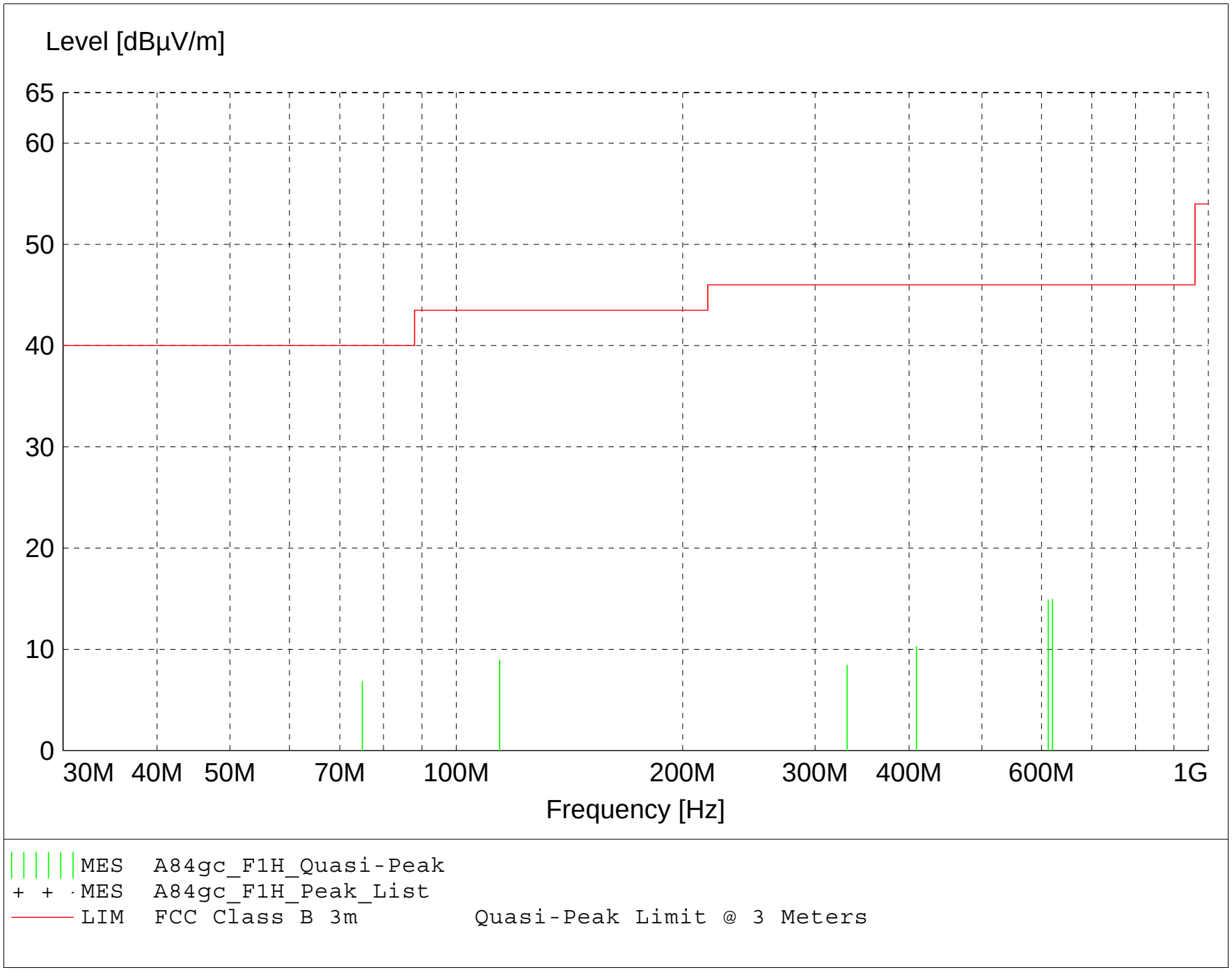
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A84gc_F1H_Quasi-Peak
MES A84gc_F1H_Peak_List
LIM FCC Class B 3m Quasi-Peak Limit @ 3 Meters

MEASUREMENT RESULT: "A84gc_F1H_Final"

11/16/2016 1:43PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
996.850000	41.86	24.24	-17.8	48.3	54.0	5.7	2.50	100	QUASI-PEAK	lo ch, x axis
994.550000	37.16	24.19	-17.8	43.6	54.0	10.4	2.50	100	QUASI-PEAK	lo ch, x axis
994.550000	37.16	24.19	-17.8	43.6	54.0	10.4	2.50	100	QUASI-PEAK	lo ch, x axis
988.150000	26.49	24.10	-17.7	32.9	54.0	21.1	1.00	90	QUASI-PEAK	hi ch, x axis
970.100000	26.15	24.00	-17.9	32.3	54.0	21.7	2.50	350	QUASI-PEAK	lo ch, x axis
977.950000	25.78	24.14	-17.7	32.3	54.0	21.7	1.00	45	QUASI-PEAK	mid ch, x axis
965.000000	25.34	23.80	-18.0	31.2	54.0	22.8	1.00	90	QUASI-PEAK	mid ch, x axis
985.150000	21.31	24.10	-17.6	27.8	54.0	26.2	1.00	90	QUASI-PEAK	hi ch, x axis
612.500000	16.08	19.65	-20.8	14.9	46.0	31.1	1.00	0	QUASI-PEAK	noise floor
610.850000	16.10	19.55	-20.9	14.8	46.0	31.2	1.00	0	QUASI-PEAK	noise floor
75.000000	24.58	6.30	-24.0	6.8	40.0	33.2	1.00	0	QUASI-PEAK	noise floor
114.200000	19.85	12.52	-23.4	8.9	43.5	34.6	1.00	0	QUASI-PEAK	noise floor
409.250000	16.21	15.72	-21.6	10.3	46.0	35.7	1.00	0	QUASI-PEAK	noise floor
330.900000	16.03	14.34	-21.9	8.4	46.0	37.6	1.00	0	QUASI-PEAK	noise floor

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Link900G1
Manufacturer: Kenall
Operating Condition: 71 deg F 34% R.H.
Test Site: DLS O.F. G1
Operator: Craig B
Test Specification: Power Setting 21; Linx antenna ANT-916-CW-QW
Comment: Ch's 906, 914, 924 MHz
Date: 11-15-2016

TEXT: "Vert 3 meters"

Short Description: Test Set-up

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

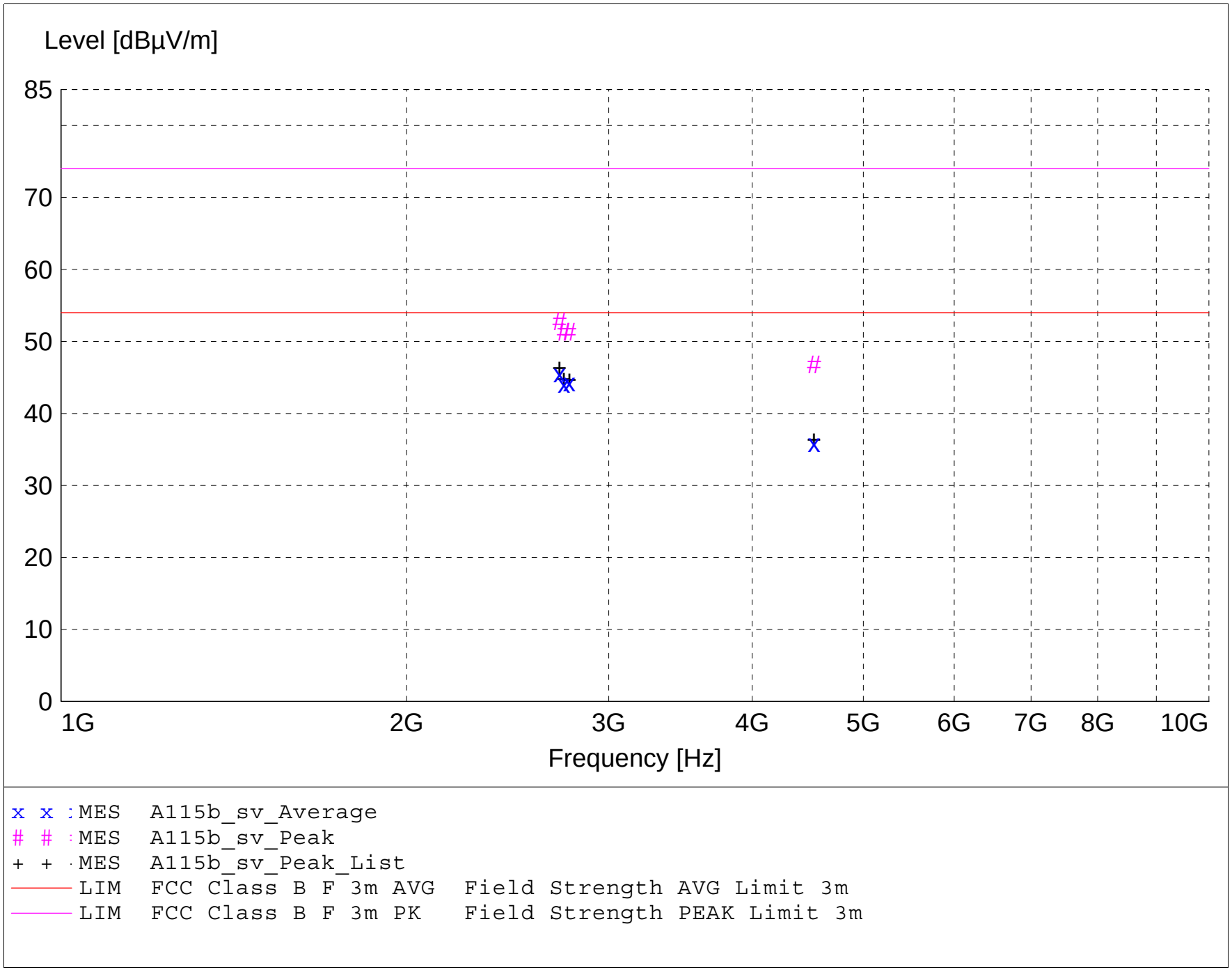
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector
-	Background Scan Peak Detector (Optional)
-	Background Scan Average Detector (Optional)


Level [dBµV/m]
85
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
8G
10G
Frequency [Hz]
x x : MES A115b_sv_Average
: MES A115b_sv_Peak
+ + : MES A115b_sv_Peak_List
LIM FCC Class B F 3m AVG Field Strength AVG Limit 3m
LIM FCC Class B F 3m PK Field Strength PEAK Limit 3m

MEASUREMENT RESULT: "A115b_sv_Final"

11/15/2016 3:16PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
2718.690000	56.58	28.70	-39.7	45.6	54.0	8.4	1.43	218	AVERAGE	Low ch
2772.660000	55.24	28.72	-39.7	44.3	54.0	9.7	1.58	219	AVERAGE	High ch
2742.630000	55.08	28.71	-39.7	44.1	54.0	9.9	1.14	221	AVERAGE	Mid ch
4528.794500	41.24	32.35	-37.7	35.9	54.0	18.1	1.65	14	AVERAGE	Low ch
2718.690000	63.76	28.70	-39.7	52.8	74.0	21.2	1.43	218	MAX PEAK	Low ch
2772.660000	62.35	28.72	-39.7	51.4	74.0	22.6	1.58	219	MAX PEAK	High ch
2742.630000	62.35	28.71	-39.7	51.4	74.0	22.6	1.14	221	MAX PEAK	Mid ch
4528.794500	52.17	32.35	-37.7	46.8	74.0	27.2	1.65	14	MAX PEAK	Low ch

FCC Pt. 15.205 / 15.209

Electric Field Strength

EUT: Link900G1
Manufacturer: Kenall
Operating Condition: 71 deg F 34% R.H.
Test Site: DLS O.F. G1
Operator: Craig B
Test Specification: Power Setting 21; Linx antenna ANT-916-CW-QW
Comment: Ch's 906, 914, 924 MHz
Date: 11-15-2016

TEXT: "Horz 3 meters"

Short Description: Test Set-up

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

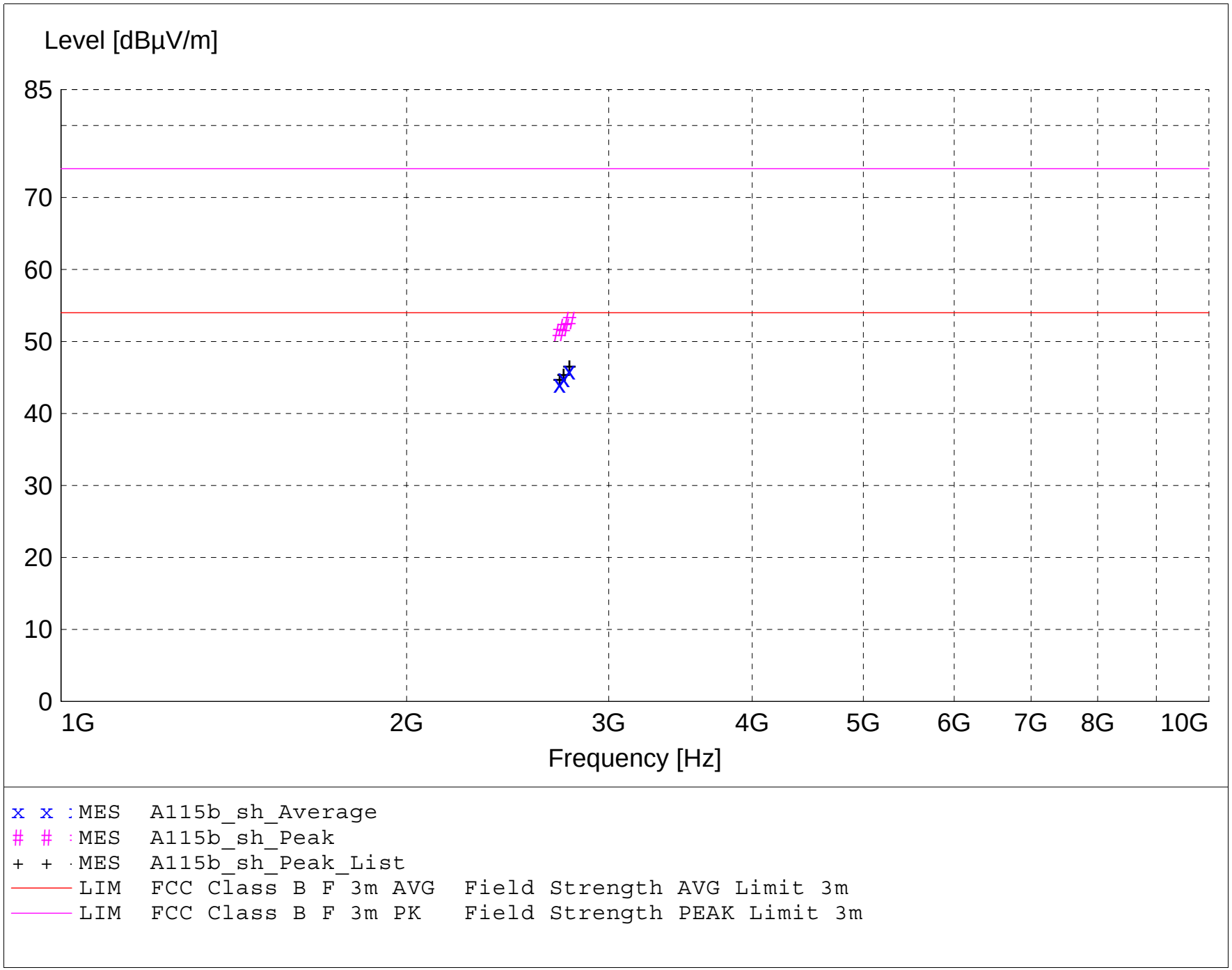
Sample Equations:

Total Level(dBµV/m)	= Level(dBµV)	+ System Loss(dB)	+ Antenna Factor(dBµV/m)
24.6	= 35.51	+ (-22.1)	+ 11.20

Margin(dB)	= Limit(dBµV/m)	- Total Level(dBµV/m)
15.4	= 40	- 24.6

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 dector
#	Final maximized level using Peak detector
-	Background Scan Peak Detector (Optional)
-	Background Scan Average Detector (Optional)


Level [dBµV/m]
85
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
8G
10G
Frequency [Hz]
x x : MES A115b_sh_Average
: MES A115b_sh_Peak
+ + : MES A115b_sh_Peak_List
LIM FCC Class B F 3m AVG Field Strength AVG Limit 3m
LIM FCC Class B F 3m PK Field Strength PEAK Limit 3m

MEASUREMENT RESULT: "A115b_sh_Final"

11/15/2016 3:44PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
2772.660000	56.94	28.72	-39.7	46.0	54.0	8.0	1.22	29	AVERAGE	High ch
2741.340000	55.82	28.71	-39.7	44.8	54.0	9.2	1.25	26	AVERAGE	Mid ch
2718.640000	55.09	28.70	-39.7	44.1	54.0	9.9	1.29	24	AVERAGE	Low ch
2772.660000	63.90	28.72	-39.7	52.9	74.0	21.1	1.22	29	MAX PEAK	High ch
2741.340000	62.91	28.71	-39.7	51.9	74.0	22.1	1.25	26	MAX PEAK	Mid ch
2718.640000	62.21	28.70	-39.7	51.2	74.0	22.8	1.29	24	MAX PEAK	Low ch

166 South Carter, Genoa City, WI 53128

Appendix B

B6.0 Operating Band-Edge Measurements – RF Conducted

Rule Part:

15.247(d)

Test Procedure:

ANSI C63.10-2013
11.11 Emissions in non-restricted frequency bands
11.11.2 Reference Level Measurement
11.11.3 Unwanted Emissions Level Measurement

Limit:

RMS averaging was used to measure the output power. Therefore, the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least **30 dB** relative to the maximum measured in-band peak PSD level.

Results:

Compliant

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The EUT was tested at the lowest and highest channels of operation. The spectrum analyzer measurements were corrected to account for the cable loss and external attenuator.

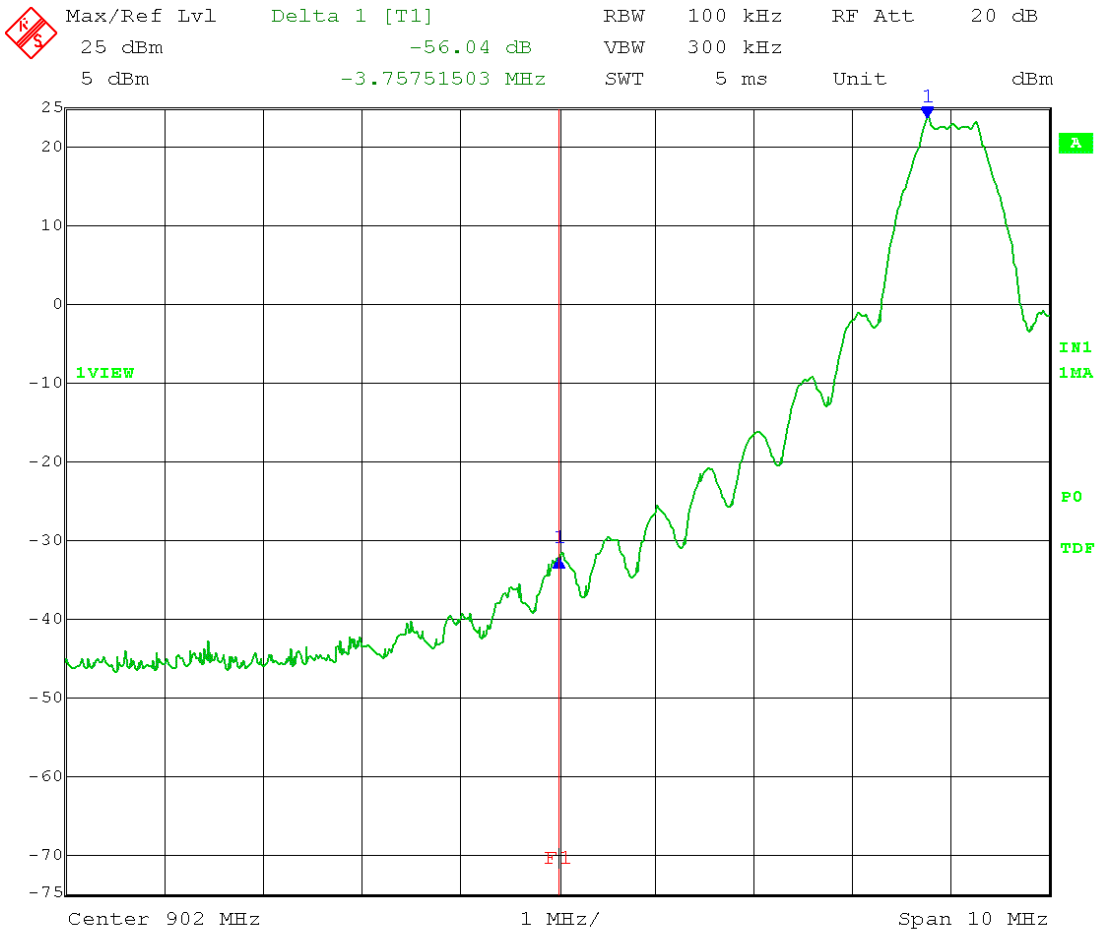
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Band-Edge Measurements - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold
Low Channel Transmit = 906 MHz
Output power setting 21
Limit: Band-Edge > 30 dB Below Peak In-Band Emission
(RMS averaging used to measure output power)

Band-Edge Frequency = 902 MHz



Date: 15.NOV.2016 12:25:35

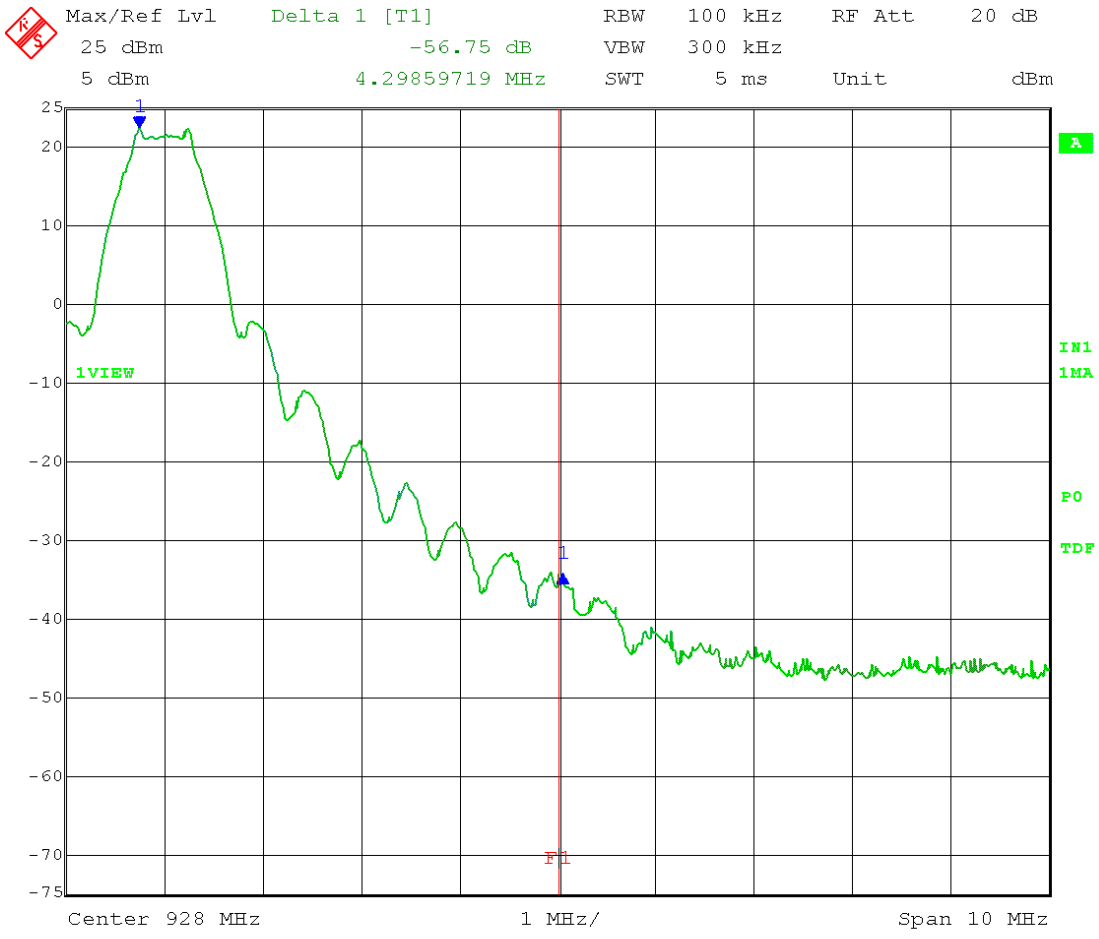
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Band-Edge Measurements - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold
High Channel Transmit = 924 MHz
Output power setting 21
Limit: Band-Edge > 30 dB Below Peak In-Band Emission
(RMS averaging used to measure output power)

Band-Edge Frequency = 928 MHz



166 South Carter, Genoa City, WI 53128

Appendix B

B7.0 AC Line Conducted Emissions

Rule Part:

FCC Part 15.207

Test Procedure:

ANSI C63.10-2013
6.2 Standard test method for AC power-line conducted emissions from unlicensed wireless devices

Limit:

FCC Part 15.207(a)

Results:

Compliant

Notes:

The EUT was powered with 3.3 V DC through a Kenall host power supply (P10112 Rev1) that was connected to a Line Impedance Stabilization Network using a 2.2 meter non-shielded power cord. Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21.

PMM NARDA REPORT: 8491 Kenall Link900G1 PCB ant L1

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 1; Quasi-Peak
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

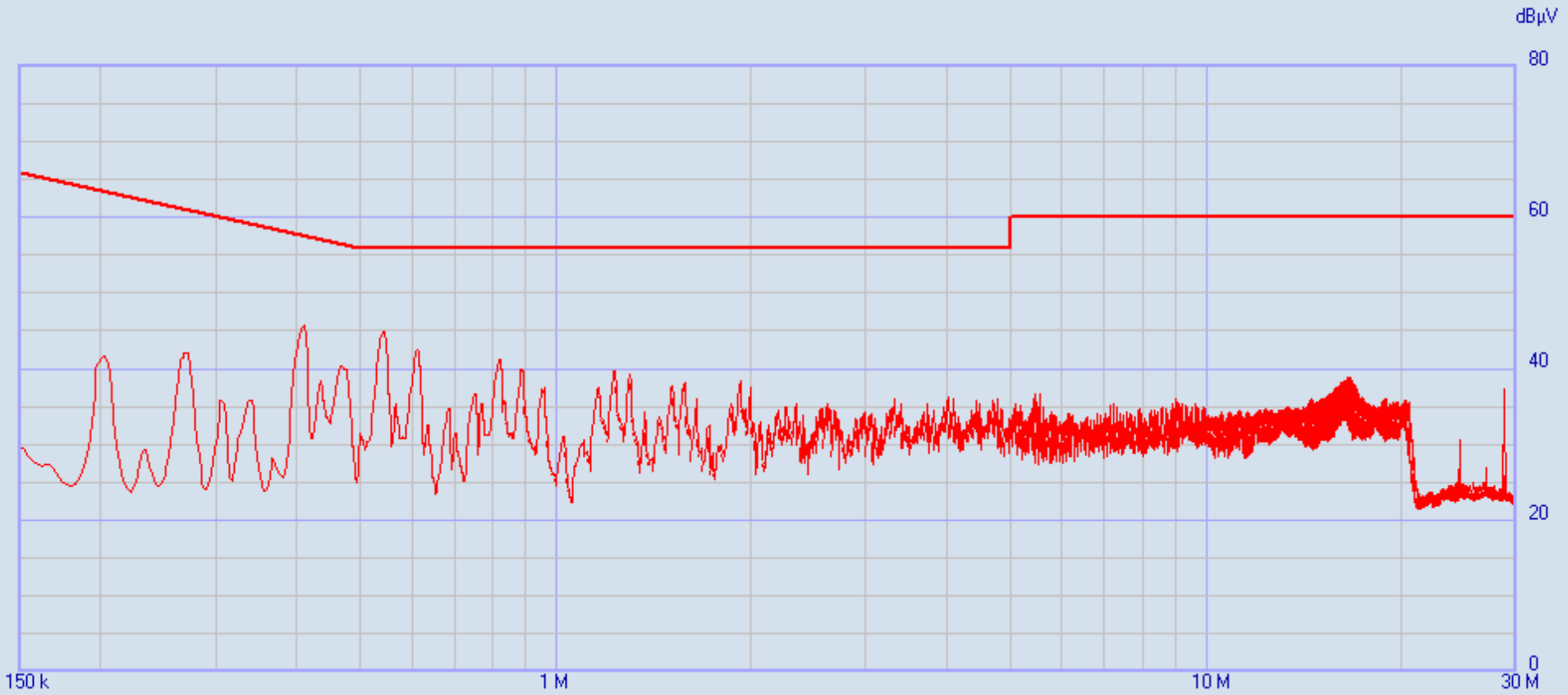
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Custom PCB quarter wave antenna

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 : 06/23/2016

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.



8491 Kenall Link900G1 PCB ant L1

	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

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

QPeak

8491 Kenall Link900G1 PCB ant L1 (Worst: 2) 22/11/2016 10:41:57
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 15 dB

	Frequency [MHz]	QPeak [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.401535	43.22	57.82	-14.60	0.53	0.10	1.00	10.14
2	0.40358	44.55	57.78	-13.23	0.53	0.10	1.00	10.14
3	0.405625	45.17	57.74	-12.57	0.53	0.10	0.99	10.14
4	0.40767	45.62	57.70	-12.08	0.52	0.10	0.99	10.14
5	0.409715	45.67	57.65	-11.98	0.52	0.11	0.98	10.15
6	0.41176	44.30	57.61	-13.31	0.52	0.11	0.98	10.15
7	0.532415	41.23	56.00	-14.77	0.44	0.14	0.78	10.19
8	0.53446	41.98	56.00	-14.02	0.44	0.14	0.77	10.19
9	0.536505	43.08	56.00	-12.92	0.44	0.14	0.77	10.19
10	0.53855	43.93	56.00	-12.07	0.43	0.14	0.77	10.19
11	0.540595	44.33	56.00	-11.67	0.43	0.14	0.76	10.19
12	0.54264	44.83	56.00	-11.17	0.43	0.14	0.76	10.19
13	0.544685	44.96	56.00	-11.04	0.43	0.14	0.76	10.19
14	0.54673	44.86	56.00	-11.14	0.43	0.14	0.75	10.19
15	0.548775	43.60	56.00	-12.40	0.43	0.14	0.75	10.19
16	0.60808	41.28	56.00	-14.72	0.40	0.15	0.70	10.18
17	0.610125	41.96	56.00	-14.04	0.40	0.15	0.70	10.18
18	0.61217	42.37	56.00	-13.63	0.40	0.15	0.70	10.18
19	0.614215	42.55	56.00	-13.45	0.40	0.15	0.70	10.18
20	0.61626	42.19	56.00	-13.81	0.40	0.15	0.70	10.18
21	0.818715	41.11	56.00	-14.89	0.35	0.17	0.52	10.20
22	0.82076	41.03	56.00	-14.97	0.35	0.17	0.52	10.20

PMM NARDA REPORT: 8491 Kenall Link900G1 PCB ant L1

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 1; AVERAGE
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

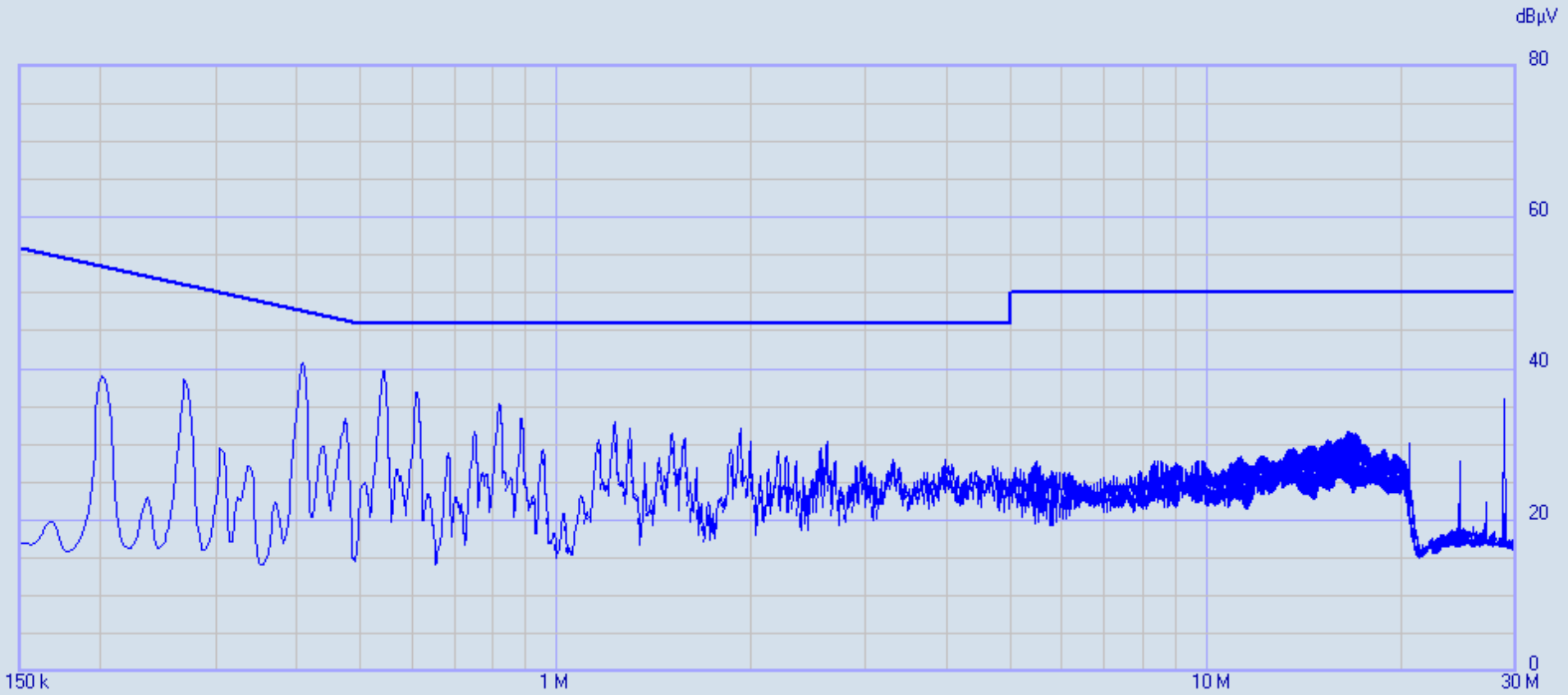
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Custom PCB quarter wave antenna

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 : 06/23/2016

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.



8491 Kenall Link900G1 PCB ant L1

	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 AV

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

C-Avg

8491 Kenall Link900G1 PCB ant L1 (Worst: 2) 22/11/2016 10:41:57
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 12 dB

	Frequency [MHz]	C-Avg [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.401535	35.84	47.82	-11.98	0.53	0.10	1.00	10.14
2	0.40358	38.41	47.78	-9.37	0.53	0.10	1.00	10.14
3	0.405625	40.26	47.74	-7.48	0.53	0.10	0.99	10.14
4	0.40767	40.75	47.70	-6.95	0.52	0.10	0.99	10.14
5	0.409715	40.05	47.65	-7.60	0.52	0.11	0.98	10.15
6	0.41176	37.83	47.61	-9.78	0.52	0.11	0.98	10.15
7	0.536505	34.20	46.00	-11.80	0.44	0.14	0.77	10.19
8	0.53855	35.43	46.00	-10.57	0.43	0.14	0.77	10.19
9	0.540595	37.75	46.00	-8.25	0.43	0.14	0.76	10.19
10	0.54264	39.59	46.00	-6.41	0.43	0.14	0.76	10.19
11	0.544685	39.65	46.00	-6.35	0.43	0.14	0.76	10.19
12	0.54673	38.81	46.00	-7.19	0.43	0.14	0.75	10.19
13	0.548775	36.99	46.00	-9.01	0.43	0.14	0.75	10.19
14	0.610125	36.06	46.00	-9.94	0.40	0.15	0.70	10.18
15	0.61217	36.78	46.00	-9.22	0.40	0.15	0.70	10.18
16	0.614215	36.61	46.00	-9.39	0.40	0.15	0.70	10.18
17	0.61626	35.49	46.00	-10.51	0.40	0.15	0.70	10.18
18	0.81667	35.29	46.00	-10.71	0.35	0.17	0.52	10.20
19	0.818715	35.23	46.00	-10.77	0.35	0.17	0.52	10.20
20	0.82076	34.47	46.00	-11.53	0.35	0.17	0.52	10.20

PMM NARDA REPORT: 8491 Kenall Link900G1 PCB ant L2

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 2; Quasi-Peak
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

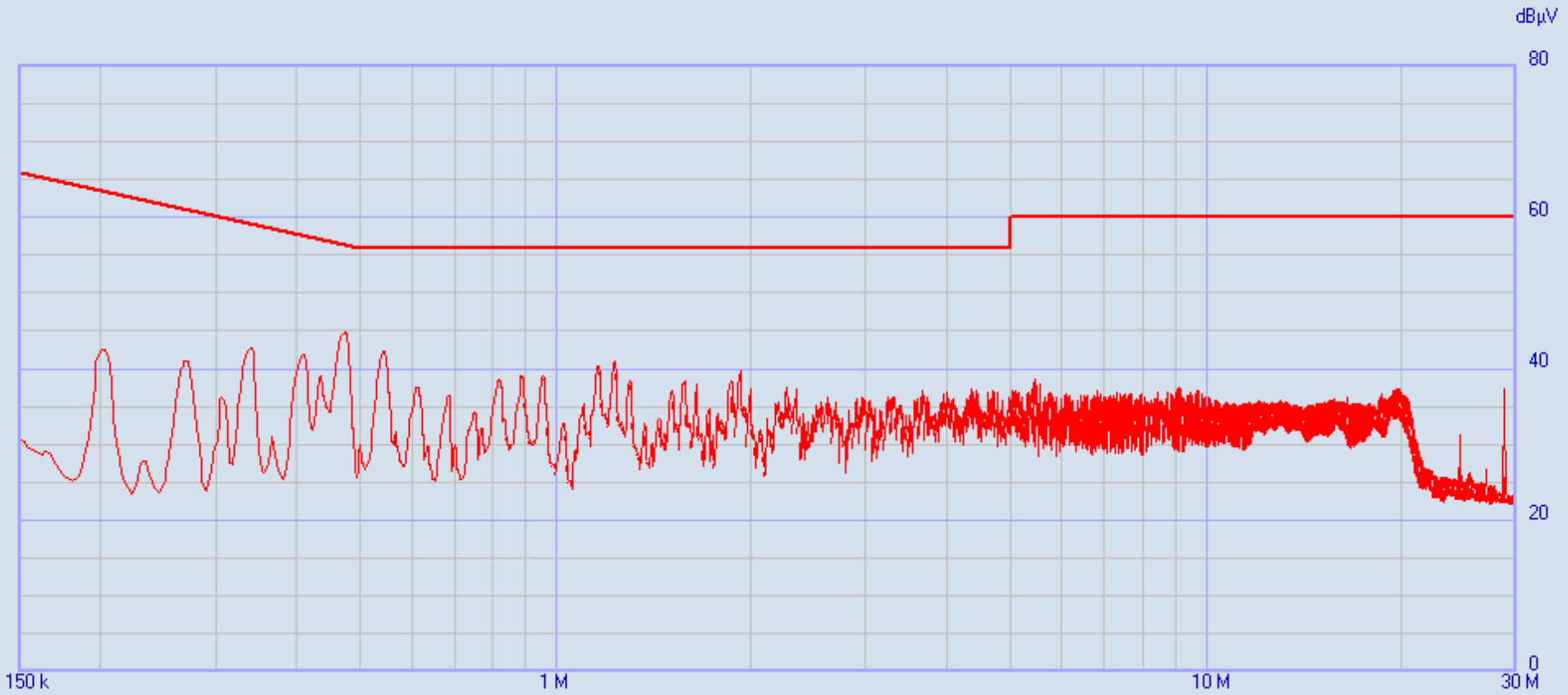
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Custom PCB quarter wave antenna

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 : 06/23/2016

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.



8491 Kenall Link900G1 PCB ant L2

	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

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

QPeak

8491 Kenall Link900G1 PCB ant L2 (Worst: 2) 22/11/2016 10:35:09
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 16 dB

	Frequency [MHz]	QPeak [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.40767	41.94	57.70	-15.76	0.52	0.10	0.99	10.14
2	0.409715	41.84	57.65	-15.81	0.52	0.11	0.98	10.15
3	0.46084	41.59	56.68	-15.09	0.48	0.12	0.89	10.17
4	0.462885	43.16	56.64	-13.48	0.47	0.12	0.89	10.17
5	0.46493	44.14	56.60	-12.46	0.47	0.12	0.89	10.17
6	0.466975	44.21	56.57	-12.36	0.47	0.12	0.89	10.17
7	0.46902	44.38	56.53	-12.15	0.47	0.13	0.88	10.18
8	0.471065	44.61	56.50	-11.89	0.47	0.13	0.88	10.18
9	0.47311	44.70	56.46	-11.76	0.47	0.13	0.88	10.18
10	0.475155	44.85	56.42	-11.57	0.47	0.13	0.87	10.18
11	0.4772	44.64	56.39	-11.75	0.46	0.13	0.87	10.18
12	0.479245	44.37	56.35	-11.98	0.46	0.13	0.87	10.18
13	0.48129	42.36	56.32	-13.96	0.46	0.13	0.87	10.18
14	0.536505	40.37	56.00	-15.63	0.44	0.14	0.77	10.19
15	0.53855	40.98	56.00	-15.02	0.43	0.14	0.77	10.19
16	0.540595	41.65	56.00	-14.35	0.43	0.14	0.76	10.19
17	0.54264	42.22	56.00	-13.78	0.43	0.14	0.76	10.19
18	0.544685	42.29	56.00	-13.71	0.43	0.14	0.76	10.19
19	0.54673	42.13	56.00	-13.87	0.43	0.14	0.75	10.19
20	0.548775	41.37	56.00	-14.63	0.43	0.14	0.75	10.19
21	1.158185	40.05	56.00	-15.95	0.31	0.28	0.40	10.19
22	1.16023	40.43	56.00	-15.57	0.31	0.28	0.40	10.19
23	1.162275	40.28	56.00	-15.72	0.31	0.29	0.40	10.19
24	1.16432	40.37	56.00	-15.63	0.31	0.29	0.40	10.19
25	1.22567	40.01	56.00	-15.99	0.31	0.30	0.38	10.19
26	1.227715	40.68	56.00	-15.32	0.31	0.30	0.38	10.19
27	1.22976	40.75	56.00	-15.25	0.31	0.30	0.38	10.19
28	1.231805	40.89	56.00	-15.11	0.31	0.30	0.38	10.19
29	1.23385	40.60	56.00	-15.40	0.31	0.30	0.38	10.19

PMM NARDA REPORT: 8491 Kenall Link900G1 PCB ant L2

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 2; AVERAGE
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

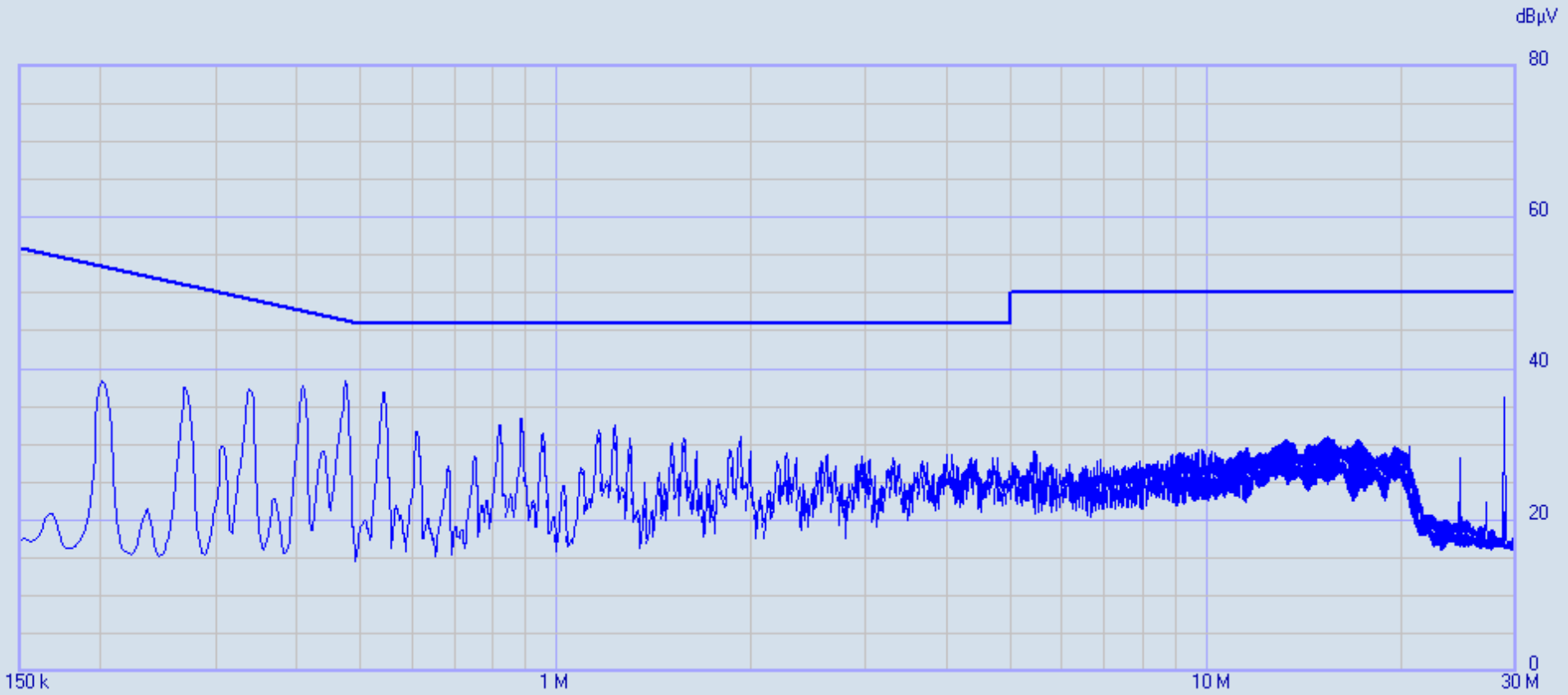
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Custom PCB quarter wave antenna

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 : 06/23/2016

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.



8491 Kenall Link900G1 PCB ant L2

	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 AV

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

C-Avg

8491 Kenall Link900G1 PCB ant L2 (Worst: 2) 22/11/2016 10:35:09
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 13 dB

	Frequency [MHz]	C-Avg [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.336095	36.37	49.30	-12.93	0.62	0.07	1.17	10.14
2	0.33814	37.21	49.25	-12.04	0.62	0.07	1.16	10.13
3	0.340185	36.97	49.20	-12.23	0.62	0.07	1.16	10.13
4	0.405625	36.90	47.74	-10.84	0.53	0.10	0.99	10.14
5	0.40767	37.70	47.70	-10.00	0.52	0.10	0.99	10.14
6	0.409715	37.12	47.65	-10.53	0.52	0.11	0.98	10.15
7	0.41176	35.30	47.61	-12.31	0.52	0.11	0.98	10.15
8	0.46902	33.82	46.53	-12.71	0.47	0.13	0.88	10.18
9	0.471065	34.87	46.50	-11.63	0.47	0.13	0.88	10.18
10	0.47311	36.97	46.46	-9.49	0.47	0.13	0.88	10.18
11	0.475155	38.29	46.42	-8.13	0.47	0.13	0.87	10.18
12	0.4772	37.88	46.39	-8.51	0.46	0.13	0.87	10.18
13	0.479245	36.63	46.35	-9.72	0.46	0.13	0.87	10.18
14	0.48129	33.85	46.32	-12.47	0.46	0.13	0.87	10.18
15	0.540595	34.29	46.00	-11.71	0.43	0.14	0.76	10.19
16	0.54264	36.50	46.00	-9.50	0.43	0.14	0.76	10.19
17	0.544685	36.78	46.00	-9.22	0.43	0.14	0.76	10.19
18	0.54673	36.21	46.00	-9.79	0.43	0.14	0.75	10.19
19	0.548775	34.28	46.00	-11.72	0.43	0.14	0.75	10.19
20	0.8862	33.48	46.00	-12.52	0.34	0.17	0.49	10.20
21	0.888245	33.28	46.00	-12.72	0.34	0.17	0.49	10.20

PMM NARDA REPORT: 8491 Kenall Link900G1 Linx ant L1

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 1; Quasi-Peak
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Linx ANT-916-CW-QW antenna with counnterpoise

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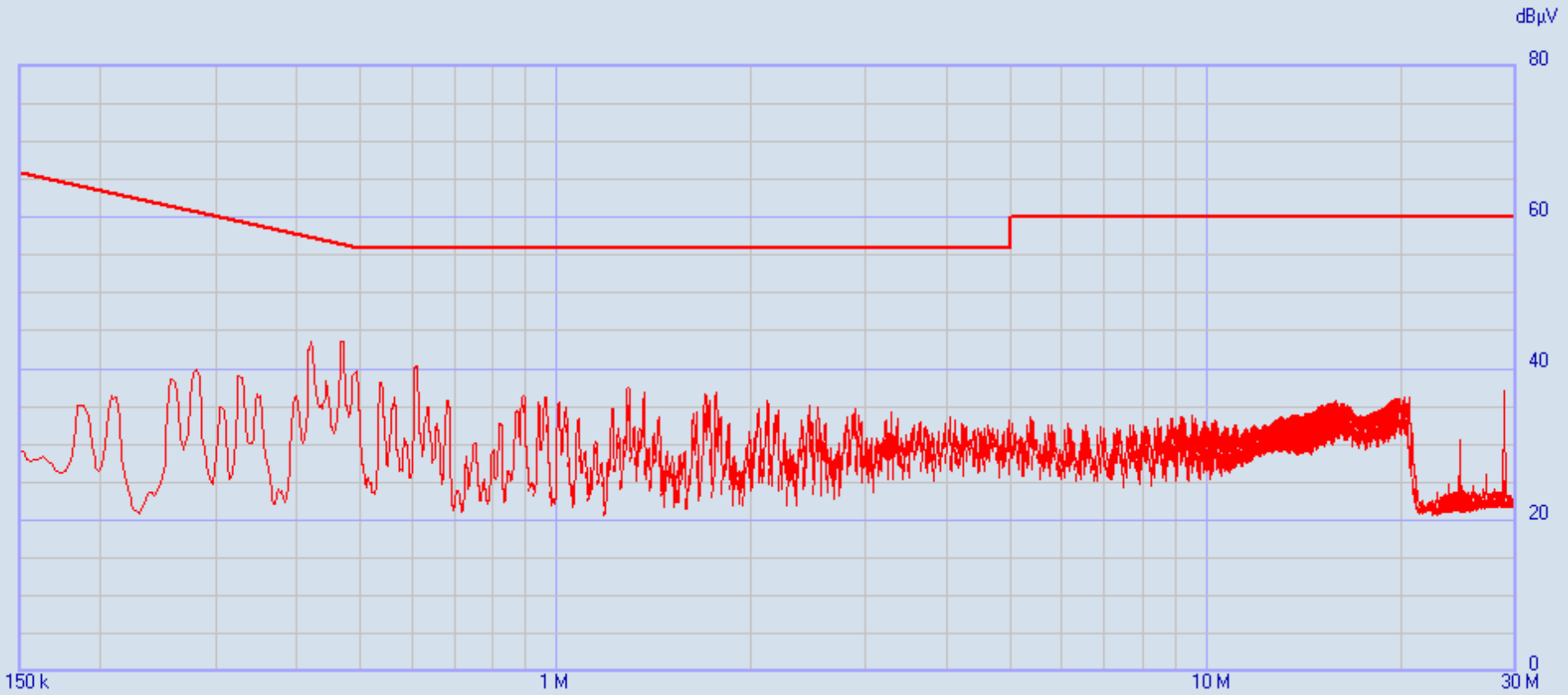
Testing Company : DLS Electronic Systems
Tel./Fax : 262-279-0210
Web site : http://www.dlsemc.com

Receiver Details

Model : PMM 9010F
Brand : Narda
S/N : 020WW40102
Last Calibration : 06/23/2016

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.



8491 Kenall Link900G1 Linx ant L1

	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

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

QPeak

8491 Kenall Link900G1 Linx ant L1 (Worst: 2) 22/11/2016 10:11:05
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 17 dB

	Frequency [MHz]	QPeak [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.417895	42.46	57.49	-15.03	0.52	0.11	0.97	10.15
2	0.41994	42.40	57.45	-15.05	0.51	0.11	0.96	10.15
3	0.421985	43.50	57.41	-13.91	0.51	0.11	0.96	10.15
4	0.42403	42.50	57.37	-14.87	0.51	0.11	0.96	10.15
5	0.46493	41.06	56.60	-15.54	0.47	0.12	0.89	10.17
6	0.466975	43.52	56.57	-13.05	0.47	0.12	0.89	10.17
7	0.46902	43.38	56.53	-13.15	0.47	0.13	0.88	10.18
8	0.471065	43.52	56.50	-12.98	0.47	0.13	0.88	10.18
9	0.47311	41.43	56.46	-15.03	0.47	0.13	0.88	10.18
10	0.48947	39.25	56.18	-16.93	0.46	0.13	0.85	10.19
11	0.491515	39.44	56.14	-16.70	0.46	0.13	0.85	10.19
12	0.49356	39.73	56.11	-16.38	0.46	0.13	0.85	10.19
13	0.60808	40.17	56.00	-15.83	0.40	0.15	0.70	10.18
14	0.610125	40.18	56.00	-15.82	0.40	0.15	0.70	10.18
15	0.61217	40.35	56.00	-15.65	0.40	0.15	0.70	10.18

PMM NARDA REPORT: 8491 Kenall Link900G1 Linx ant L1

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 1; AVERAGE
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

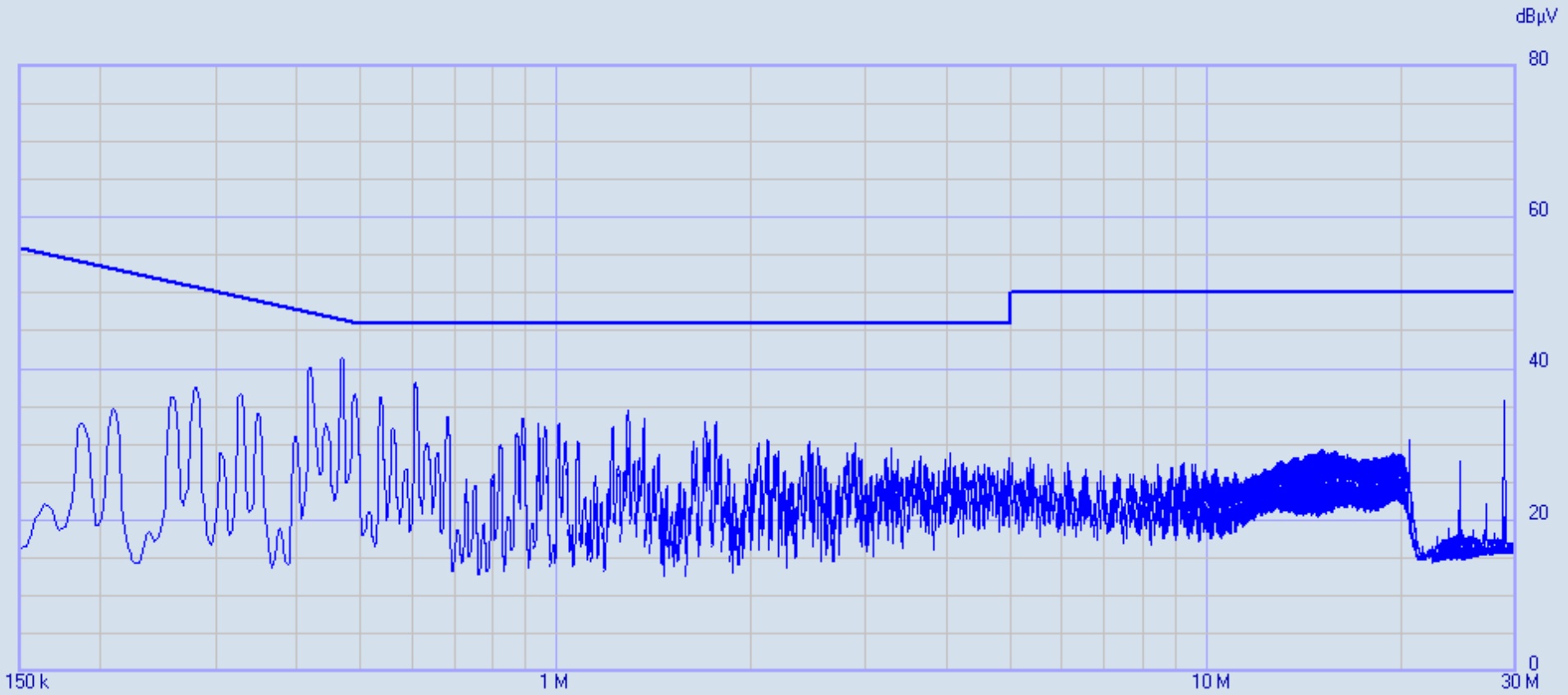
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Linx ANT-916-CW-QW antenna with counnterpoise

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 : 06/23/2016

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.



8491 Kenall Link900G1 Linx ant L1

	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 AV

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

C-Avg

8491 Kenall Link900G1 Linx ant L1 (Worst: 2) 22/11/2016 10:11:05
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 12 dB

	Frequency [MHz]	C-Avg [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.41585	35.66	47.53	-11.87	0.52	0.11	0.97	10.15
2	0.417895	39.57	47.49	-7.92	0.52	0.11	0.97	10.15
3	0.41994	40.20	47.45	-7.25	0.51	0.11	0.96	10.15
4	0.421985	40.11	47.41	-7.30	0.51	0.11	0.96	10.15
5	0.42403	37.81	47.37	-9.56	0.51	0.11	0.96	10.15
6	0.46493	37.86	46.60	-8.74	0.47	0.12	0.89	10.17
7	0.466975	41.15	46.57	-5.42	0.47	0.12	0.89	10.17
8	0.46902	41.48	46.53	-5.05	0.47	0.13	0.88	10.18
9	0.471065	41.12	46.50	-5.38	0.47	0.13	0.88	10.18
10	0.47311	37.71	46.46	-8.75	0.47	0.13	0.88	10.18
11	0.487425	34.98	46.21	-11.23	0.46	0.13	0.86	10.19
12	0.48947	36.51	46.18	-9.67	0.46	0.13	0.85	10.19
13	0.491515	36.55	46.14	-9.59	0.46	0.13	0.85	10.19
14	0.49356	35.50	46.11	-10.61	0.46	0.13	0.85	10.19
15	0.536505	35.11	46.00	-10.89	0.44	0.14	0.77	10.19
16	0.53855	36.18	46.00	-9.82	0.43	0.14	0.77	10.19
17	0.540595	36.15	46.00	-9.85	0.43	0.14	0.76	10.19
18	0.54264	34.51	46.00	-11.49	0.43	0.14	0.76	10.19
19	0.606035	35.47	46.00	-10.53	0.40	0.15	0.70	10.18
20	0.60808	37.88	46.00	-8.12	0.40	0.15	0.70	10.18
21	0.610125	38.13	46.00	-7.87	0.40	0.15	0.70	10.18
22	0.61217	37.55	46.00	-8.45	0.40	0.15	0.70	10.18
23	1.29111	34.43	46.00	-11.57	0.31	0.31	0.36	10.20
24	1.293155	34.40	46.00	-11.60	0.31	0.31	0.36	10.20

PMM NARDA REPORT: 8491 Kenall Link900G1 Linx ant L2

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 2; Quasi-Peak
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

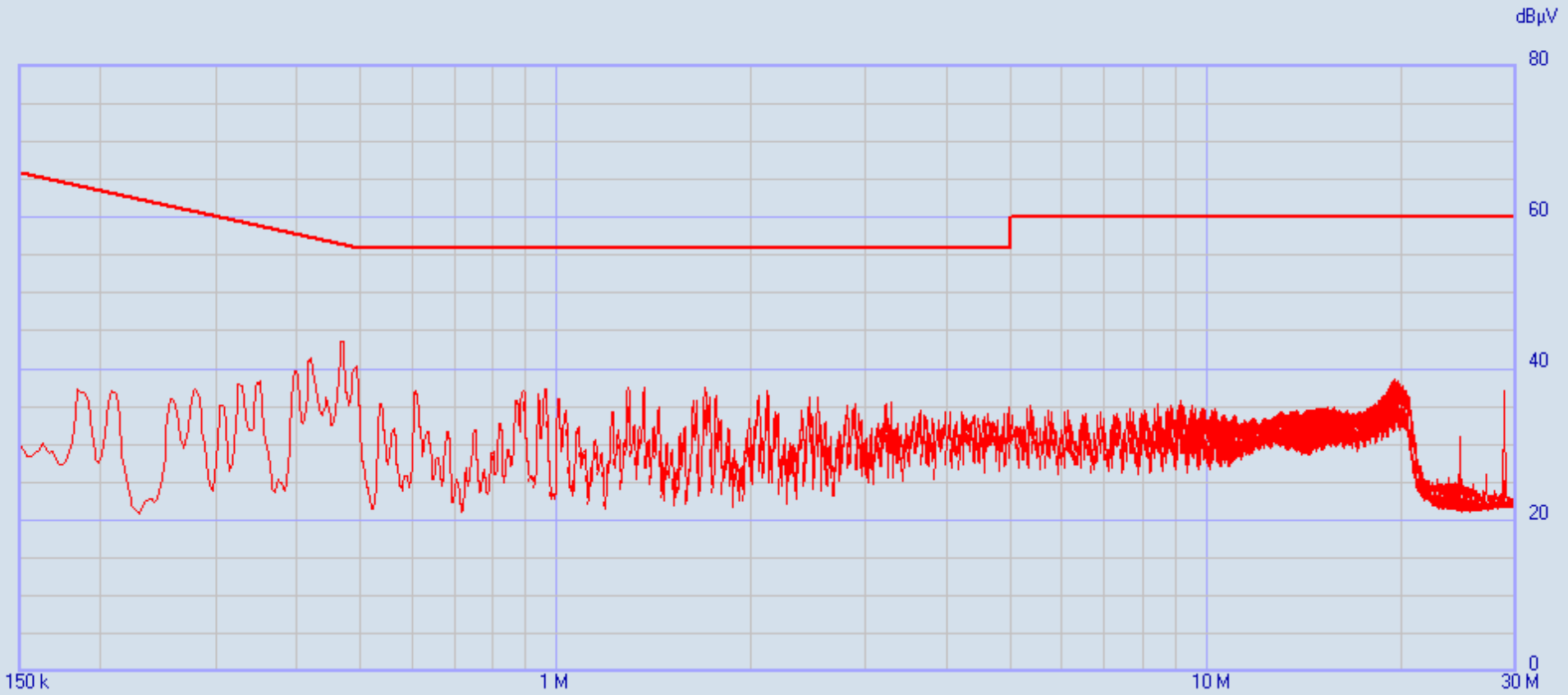
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Linx ANT-916-CW-QW antenna with counnterpoise

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 : 06/23/2016

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.



8491 Kenall Link900G1 Linx ant L2

	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

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

QPeak

8491 Kenall Link900G1 Linx ant L2 (Worst: 2) 22/11/2016 10:20:35
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 17 dB

	Frequency [MHz]	QPeak [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.417895	40.91	57.49	-16.58	0.52	0.11	0.97	10.15
2	0.41994	41.07	57.45	-16.38	0.51	0.11	0.96	10.15
3	0.421985	41.47	57.41	-15.94	0.51	0.11	0.96	10.15
4	0.46493	41.62	56.60	-14.98	0.47	0.12	0.89	10.17
5	0.466975	43.52	56.57	-13.05	0.47	0.12	0.89	10.17
6	0.46902	43.39	56.53	-13.14	0.47	0.13	0.88	10.18
7	0.471065	43.52	56.50	-12.98	0.47	0.13	0.88	10.18
8	0.47311	41.24	56.46	-15.22	0.47	0.13	0.88	10.18
9	0.487425	39.44	56.21	-16.77	0.46	0.13	0.86	10.19
10	0.48947	39.74	56.18	-16.44	0.46	0.13	0.85	10.19
11	0.491515	40.03	56.14	-16.11	0.46	0.13	0.85	10.19
12	0.49356	40.27	56.11	-15.84	0.46	0.13	0.85	10.19

PMM NARDA REPORT: 8491 Kenall Link900G1 Linx ant L2

Report issuing date : 11-22-2016

Standard : FCC Part 15.207 / 15.107 Class B
Test Type : VOltage Mains Test
Test Site : DLS O.F. Screen Room
Temperature : 70 °F
Humidity : 24%
Test Specs : Line 2; AVERAGE
Operator : Craig B
DLS Project # : 8491
Result : Pass

EUT

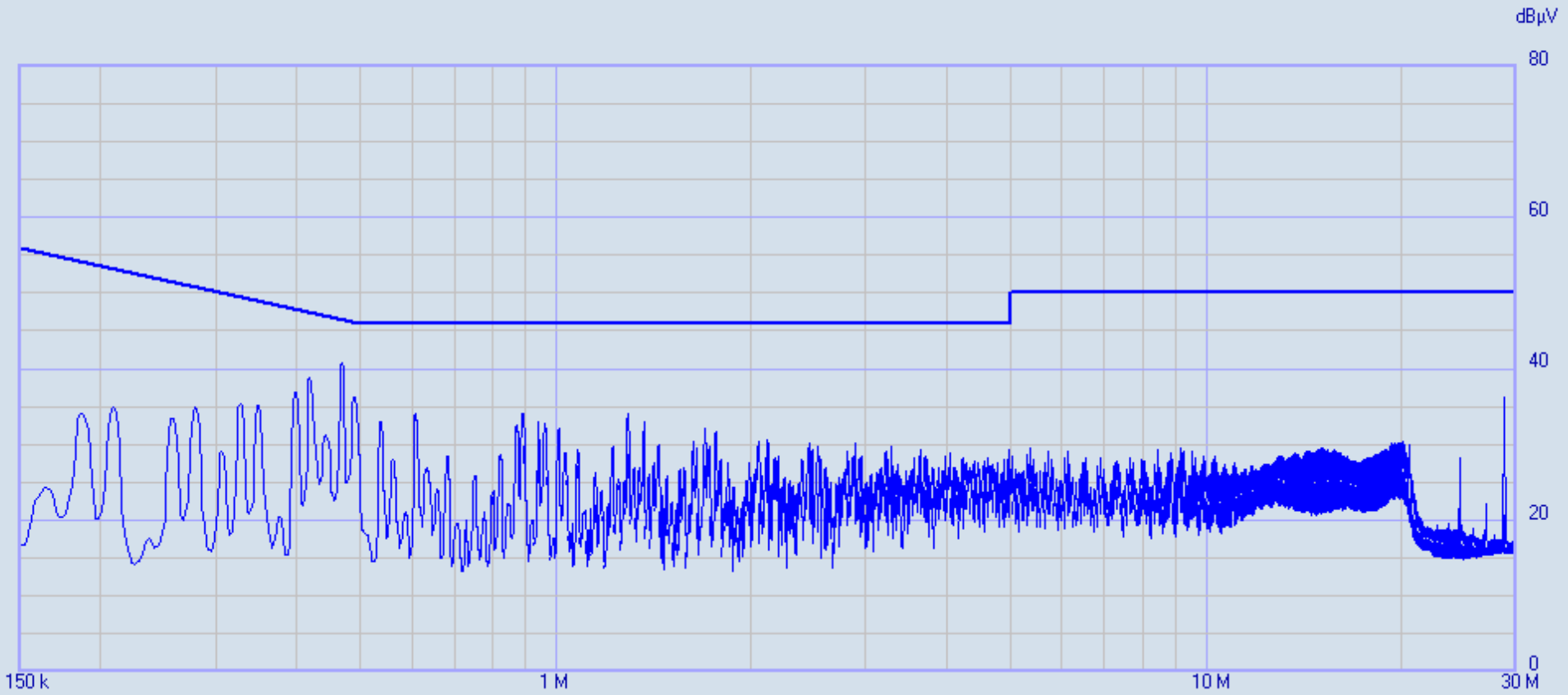
Manufacturer : Kenall
Model : Link900G1
Product : 900 MHz radio module
Notes : 120V 60Hz (Kenall host 3.3 VDC power supply, P10112 Rev1)
: Continuous Tx mode; Linx ANT-916-CW-QW antenna with counnterpoise

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 : 06/23/2016

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.



8491 Kenall Link900G1 Linx ant L2

	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 AV

Factors:
LISN DLS#128
Cables 43 & 45
DLS #592
EM-L705

C-Avg

8491 Kenall Link900G1 Linx ant L2 (Worst: 2) 22/11/2016 10:20:35
Rel. SW 2.22 (August 2015)
Rel. FW 1.54 20/04/16
Margin: 13 dB

	Frequency [MHz]	C-Avg [dBµV]	Limit Class B V.. [dBµV]	Delta [dB]	Factor LISN DLS#.. [dB]	Factor Cables 43.. [dB]	Factor DLS #592 [dB]	Factor EM-L705 [dB]
1	0.3954	35.37	47.95	-12.58	0.53	0.10	1.01	10.14
2	0.397445	36.93	47.91	-10.98	0.53	0.10	1.01	10.14
3	0.39949	36.92	47.86	-10.94	0.53	0.10	1.00	10.14
4	0.401535	35.59	47.82	-12.23	0.53	0.10	1.00	10.14
5	0.41585	34.84	47.53	-12.69	0.52	0.11	0.97	10.15
6	0.417895	38.28	47.49	-9.21	0.52	0.11	0.97	10.15
7	0.41994	38.72	47.45	-8.73	0.51	0.11	0.96	10.15
8	0.421985	38.38	47.41	-9.03	0.51	0.11	0.96	10.15
9	0.42403	35.44	47.37	-11.93	0.51	0.11	0.96	10.15
10	0.46493	37.31	46.60	-9.29	0.47	0.12	0.89	10.17
11	0.466975	40.46	46.57	-6.11	0.47	0.12	0.89	10.17
12	0.46902	40.72	46.53	-5.81	0.47	0.13	0.88	10.18
13	0.471065	40.27	46.50	-6.23	0.47	0.13	0.88	10.18
14	0.47311	36.50	46.46	-9.96	0.47	0.13	0.88	10.18
15	0.487425	34.88	46.21	-11.33	0.46	0.13	0.86	10.19
16	0.48947	36.23	46.18	-9.95	0.46	0.13	0.85	10.19
17	0.491515	36.24	46.14	-9.90	0.46	0.13	0.85	10.19
18	0.49356	34.93	46.11	-11.18	0.46	0.13	0.85	10.19
19	0.53855	33.00	46.00	-13.00	0.43	0.14	0.77	10.19
20	0.60808	33.88	46.00	-12.12	0.40	0.15	0.70	10.18
21	0.610125	34.01	46.00	-11.99	0.40	0.15	0.70	10.18
22	0.61217	33.14	46.00	-12.86	0.40	0.15	0.70	10.18
23	0.89029	34.08	46.00	-11.92	0.34	0.17	0.49	10.20
24	0.892335	33.98	46.00	-12.02	0.34	0.17	0.49	10.20
25	0.93937	33.03	46.00	-12.97	0.34	0.18	0.47	10.20
26	1.289065	33.06	46.00	-12.94	0.31	0.31	0.36	10.20
27	1.29111	34.00	46.00	-12.00	0.31	0.31	0.36	10.20
28	1.293155	33.78	46.00	-12.22	0.31	0.31	0.36	10.20

166 South Carter, Genoa City, WI 53128

Appendix B

B8.0 Duty Cycle of Test Unit

Rule Part:

Informative – used to show duty cycle is ≥ 98%

Test Procedure:

ANSI C63.10-2013
11.6 Duty cycle, transmission duration, and maximum power control level
11.6(b) Zero-span mode on spectrum analyzer

Limits:

Not Applicable

Results:

Duty cycle = 100%
Duty Cycle Correction: none

Notes:

Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21.

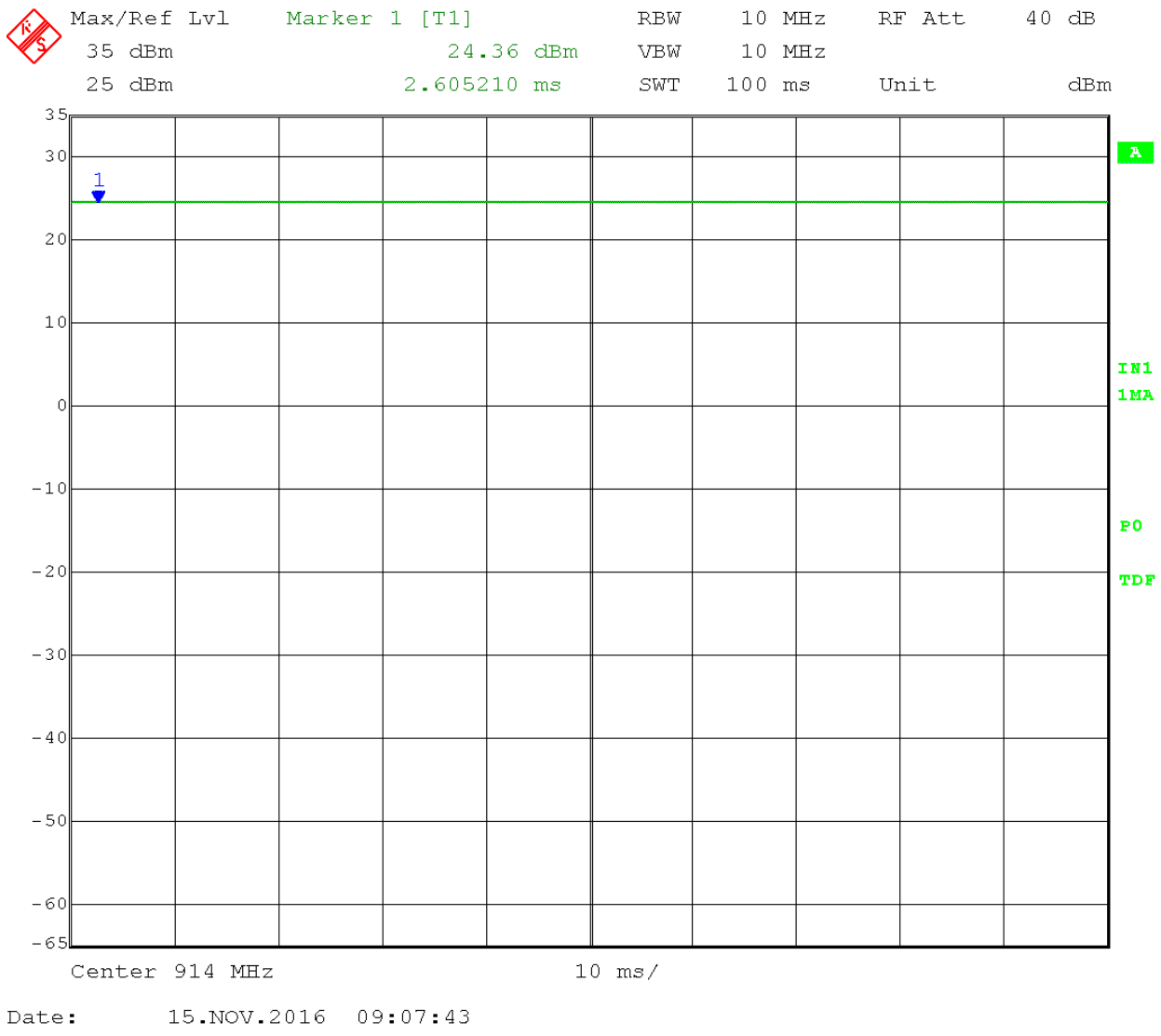
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Duty Cycle – special mode for testing purposes
Operator: Craig B

Comment: Middle channel: 914 MHz

Duty Cycle = 100 %



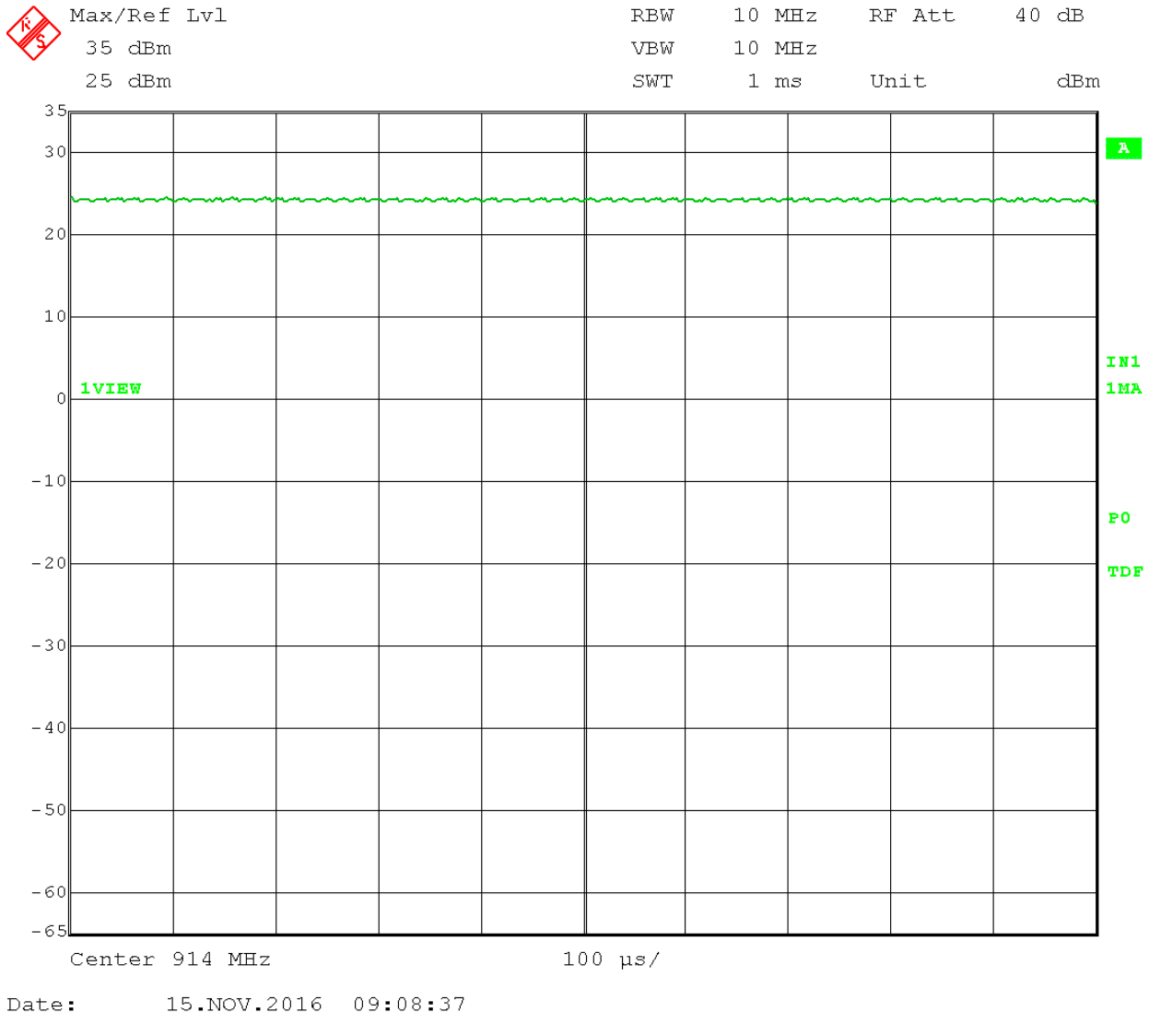
Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Duty Cycle – special mode for testing purposes
Operator: Craig B

Comment: Middle channel: 914 MHz

Duty Cycle = 100 %



Date: 15.NOV.2016 09:08:37

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Appendix B

B9.0 Occupied Bandwidth – 99 %

Rule Part:

Informative – used for output power measurements

Test Procedure:

ANSI C63.10-2013
6.9.3 Occupied bandwidth—power bandwidth (99%) measurement procedure

Limit:

Informative

Results:

99 % power bandwidth:	1.16 MHz
Emission Designator:	1M16G7D

Notes:

This was a conducted emissions measurement. Testing was performed using the manufacturer's test software to transmit a random data payload at a 100% duty cycle with an output power setting of 21. The span of the spectrum analyzer was set to a value between 1.5 and 5 times the occupied bandwidth. The resolution bandwidth of the spectrum analyzer was set to a value between 1% and 5% of the occupied bandwidth, and the video bandwidth was set greater than or equal to 3 times the resolution bandwidth. Peak detection and max-hold were used. The 99% power bandwidth function of the spectrum analyzer was used to take this measurement.

Company:	Kenall Manufacturing
Model Tested:	L-3805
Report Number:	22351
DLS Project:	8491

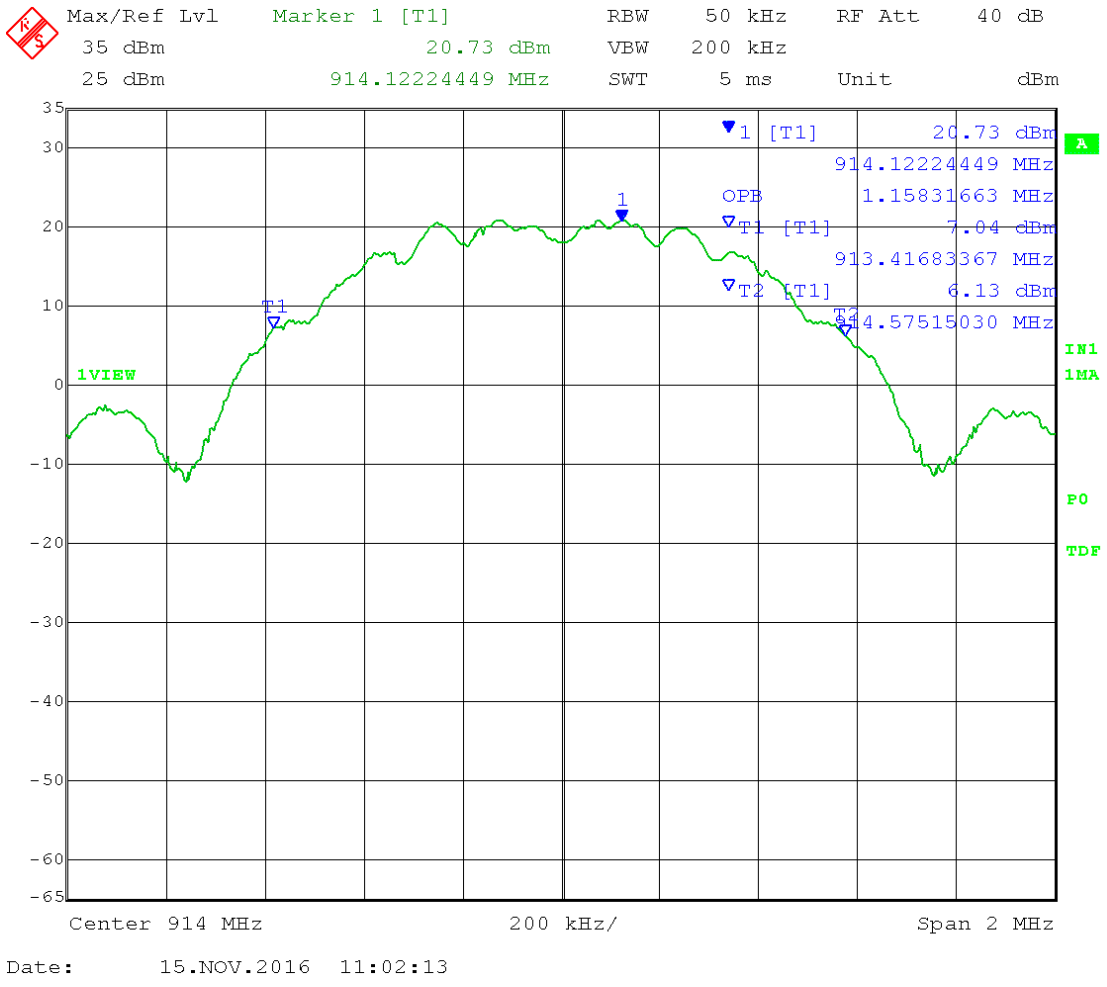
166 South Carter, Genoa City, WI 53128

Test Date: 11-15-2016
Company: Kenall
EUT: Link900G1
Test: Emission Bandwidth (99% Power) - Conducted
Operator: Craig B

Comment: SPAN set between 1.5 to 5 times the Occupied Bandwidth
RBW = 1-5% of Occupied Bandwidth
VBW ≥ 3 x RBW
Detector = Peak
Sweep = auto couple

Comment: Mid Channel: Frequency – 914 MHz
Output power setting 21

99% Power Bandwidth = 1.16 MHz



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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.

Parameter		Expanded Uncertainty (K=2)
Occupied Channel Bandwidth		+/-1.14%
RF Output Power, Conducted		+/-0.89dB
Power Spectral Density, Conducted		+/-1.26dB
Unwanted Emissions, Conducted		+/-2.62dB
All Emissions, Radiated		+/-4.95dB
DC and Low Frequency Voltages		+/-2.42%
Time		+/-0.01%
Duty Cycle		+/-0.05%

AC 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: Kenall Manufacturing
Model Tested: L-3805
Report Number: 22351
DLS Project: 8491

END OF REPORT

Revision #	Date	Comments	By
1.0	November 23, 2016	Initial Release	CB
1.1	December 6, 2016	Updated FCC ID to use all capital letters	CB
1.2	December 7, 2016	Corrected test dates on cover page	CB