



Total Quality. Assured.

Intertek
731 Enterprise Drive
Lexington, KY 40510

Tel 859 226 1000
Fax 859 226 1040

www.intertek.com

Avery Dennison Retail Information Services, LLC. TEST REPORT

SCOPE OF WORK

EMC TESTING – PATHFINDER 6059

REPORT NUMBER

103831188LEX-001

ISSUE DATE

6/18/2019

PAGES

45

DOCUMENT CONTROL NUMBER

Non-Specific EMC Report Shell Rev. December 2017
© 2017 INTERTEK



EMC TEST REPORT
(FULL COMPLIANCE)

Report Number: 103831188LEX-001

Project Number: G103831188

Report Issue Date: 6/18/2019

Model(s) Tested: Pathfinder 6059

Standards: FCC Part 15B
ICES-003 Issue 6
FCC Part 15C
(Limited to Radiated Spurious Emissions)
FCC Part 15E
(Limited to Radiated Spurious Emissions)
RSS-247 Issue 2
(Limited to Radiated Spurious Emissions)

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Dr.
Lexington, KY 40510
USA

Client:
Avery Dennison Retail Information Services, LLC.
170 Monarch Lane
Miamisburg, OH 45342-3638
USA

Report prepared by



Michael Carlson, Engineer

Report reviewed by



Bryan Taylor,
Team Leader

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.





Table of Contents

1	<i>Introduction and Conclusion</i>	4
2	<i>Test Summary</i>	4
3	<i>Client Information</i>	5
4	<i>Description of Equipment under Test and Variant Models</i>	6
5	<i>System Setup and Method</i>	7
6	<i>Radiated Emissions (Transmitters Idle)</i>	12
7	<i>Radiated Spurious Emissions (Transmitters Active)</i>	19
8	<i>Revision History</i>	45



1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Page	Test full name	Result
12	Radiated Emissions (Transmitters Idle) (ANSI C63.4:2014)	Pass
23	Radiated Spurious Emissions (2.4GHz WiFi Transmitting) (ANSI C63.10:2015)	Pass
27	Radiated Spurious Emissions (5GHz WiFi Transmitting) (ANSI C63.10:2015)	Pass
39	Radiated Spurious Emissions (Bluetooth Transmitting) (ANSI C63.10:2015)	Pass
42	Radiated Spurious Emissions (RFID Transmitting) (ANSI C63.10:2015)	Pass

Note: The conducted tests from the Laird module (FCCID: SQG-60SIPT) also apply to the Pathfinder 6059



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Avery Dennison Retail Information Services, LLC.
Address:	170 Monarch Lane Miamisburg, OH 45342-3638 USA
Contact:	Michael Ouziel
Telephone:	(937) 865-2020
Email:	Michael.ouziel@averydennison.com
Manufacturer Information	
Manufacturer Name:	Avery Dennison Retail Information Services, LLC.
Manufacturer Address:	170 Monarch Lane Miamisburg, OH 45342-3638 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Pathfinder 6059
Model Number	6059
Serial Number	FCC Test Sample
Receive Date	3/26/2019
Test Start Date	3/26/2019
Test End Date	5/19/2019
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	7.4VDC
Radios Onboard	RFID, Bluetooth, WiFi
Operating Frequency Ranges	RFID: 902 – 928MHz Bluetooth: 2.4 – 2.48GHz 2.4GHz WiFi: 2.4 – 2.473GHz 5GHz WiFi: 5.15 – 5.35GHz 5.47 – 5.725GHz
Rated Frequency	NA – DC Powered
Number of Phases	NA – DC Powered
Description of Equipment Under Test (provided by client)	
The product under test was the Pathfinder 6059 manufactured by Avery Dennison Retail Information Services, LLC. The 6059 is a handheld battery operated scanner / label printer equipped with Bluetooth, WiFi, and RFID capabilities.	

4.1 Variant Models:

There were no variant models covered by this evaluation.



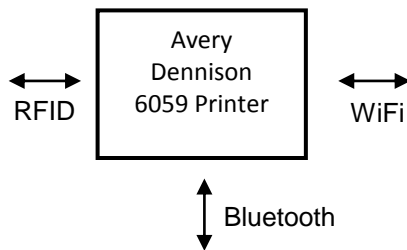
5 System Setup and Method

5.1 Method:

Configuration as required by ANSI C63.4:2014 and ANSI C63.10:2015

No.	Descriptions of EUT Exercising
1	Printing labels while displaying color bars
2	Transmitting 2.4GHz WiFi at maximum output power continuously via the use of special test code
3	Transmitting Bluetooth at maximum output power continuously via the use of special test code
4	Transmitting in the 5GHz WiFi bands at maximum output power continuously via the use of special test code
5	Transmitting an RFID signal via the use of special test code

5.2 EUT Block Diagram:





5.3 EUT Photo (Top):





5.4 EUT Photo (Bottom):





5.5 EUT Photo (Left):





5.6 EUT Photo (Right):





6 Radiated Emissions (Transmitters Idle)

6.1 Method

Tests are performed in accordance with ANSI C63.4:2014.

TEST SITE: 10m ALSE

Site Designation: 10m Chamber

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	U _{CISPR}
Radiated Emissions, 10m	30-1000 MHz	3.9dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.0dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.7dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required.



6.2 Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$



6.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	3900	Rohde & Schwarz	ESU40	9/18/2018	9/18/2019
Bilog Antenna	7088	SunAR	JB6	7/24/2018	7/24/2019
Horn Antenna	3780	ETS Lindgren	3117	6/11/2018	6/11/2019
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
3m Cable Antenna→Preamp	3074			11/26/2018	11/26/2019
3m Cable Preamplifier	3918	Rohde & Schwarz	TS-PR18	11/26/2018	11/26/2019
3m Cable Preamp→Chamber	2588			11/26/2018	11/26/2019
3m Cable Chamber→Control Room	2593			11/26/2018	11/26/2019
3m Cable Control Room→Receiver	2592			11/26/2018	11/26/2019

6.4 Software Utilized:

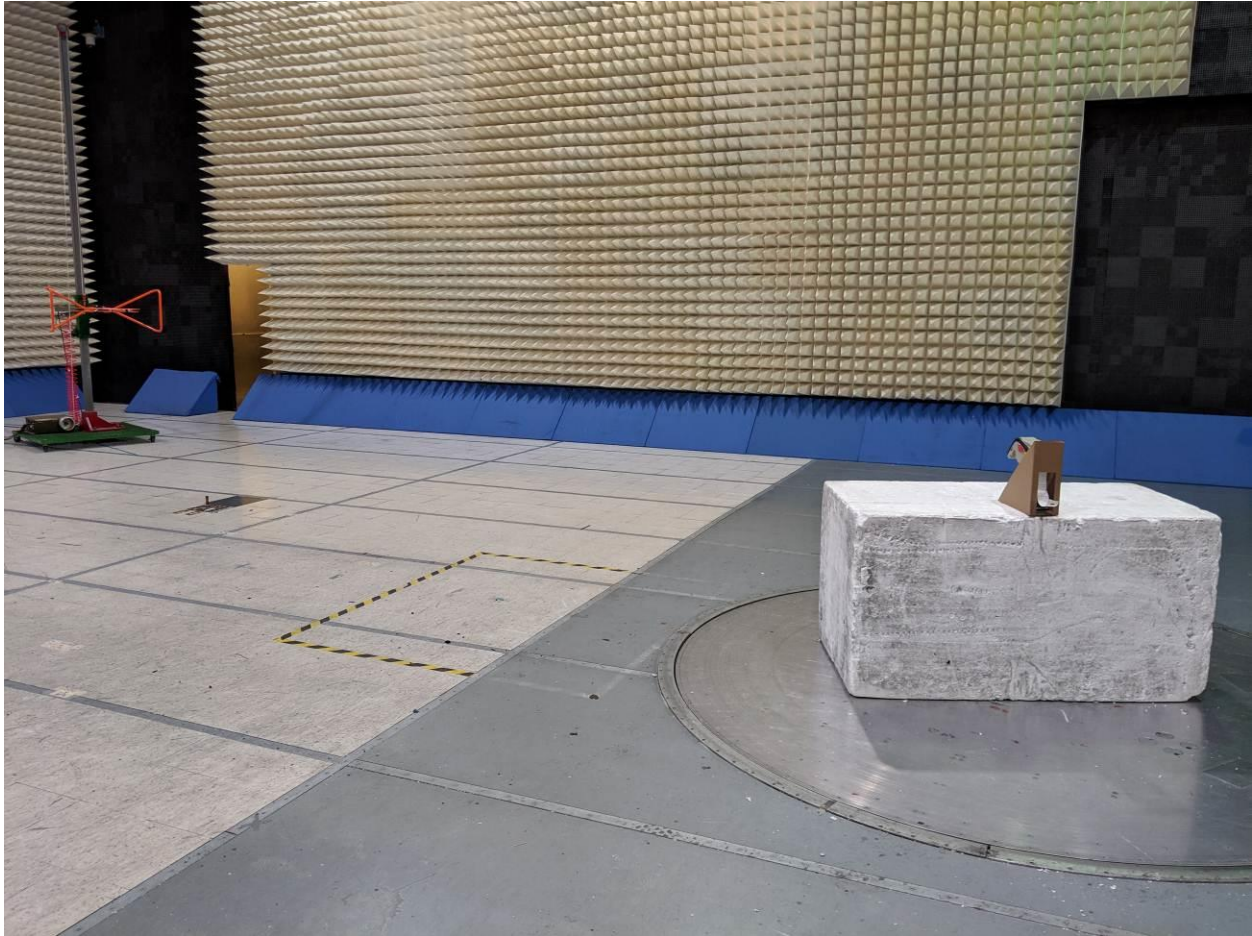
Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 9.15.02

6.5 Results:

The sample tested was found to Comply.

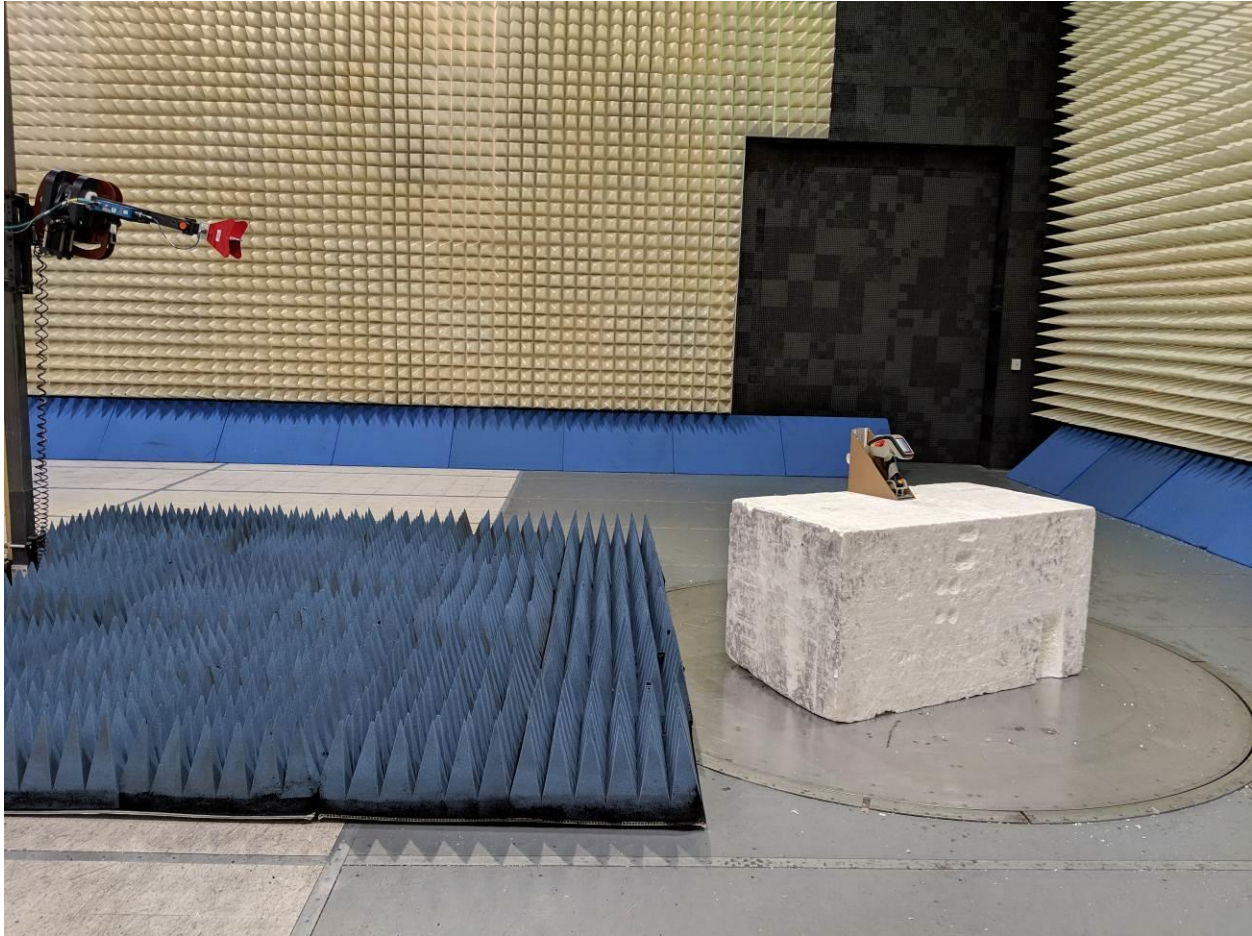


6.6 Setup Photographs: Radiated Emissions (FCC Part 15B Below 1GHz)



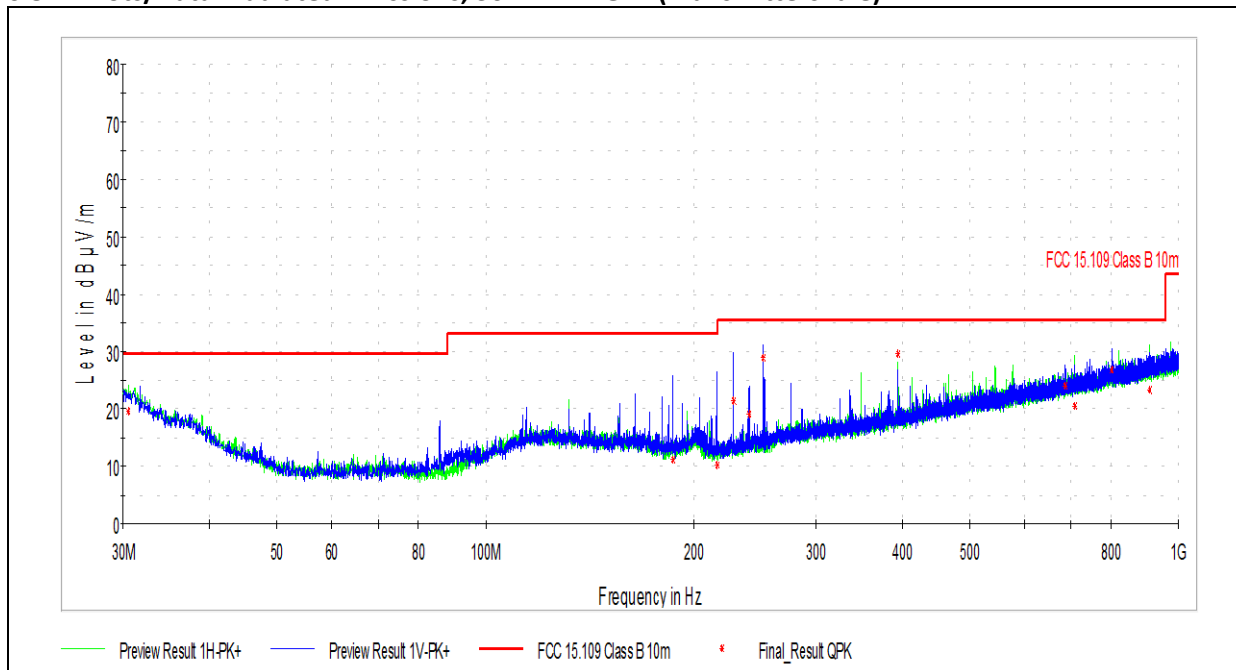


6.7 Setup Photographs: Radiated Emissions (FCC Part 15B Above 1GHz)





6.8 Plots/Data: Radiated Emissions, 30MHz – 1GHz (Transmitters Idle)



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.538889	19.64	29.55	9.91	120.000	368.0	H	156.0	-1.9
186.331667	11.08	33.10	22.02	120.000	105.0	V	60.0	-9.4
215.862778	10.23	33.10	22.87	120.000	100.1	V	201.0	-9.9
227.987778	21.35	35.55	14.20	120.000	99.8	V	0.0	-9.3
240.058889	19.14	35.55	16.41	120.000	105.3	V	218.0	-8.7
251.968333	29.03	35.55	6.52	120.000	117.9	V	167.0	-8.7
394.127222	29.61	35.55	5.94	120.000	153.9	H	46.0	-3.7
687.282778	24.05	35.55	11.50	120.000	213.8	V	183.0	2.2
708.946111	20.62	35.55	14.93	120.000	264.4	H	73.0	2.4
801.850556	26.75	35.55	8.80	120.000	189.8	V	304.0	4.4
908.658333	23.31	35.55	12.24	120.000	400.1	H	43.0	5.3

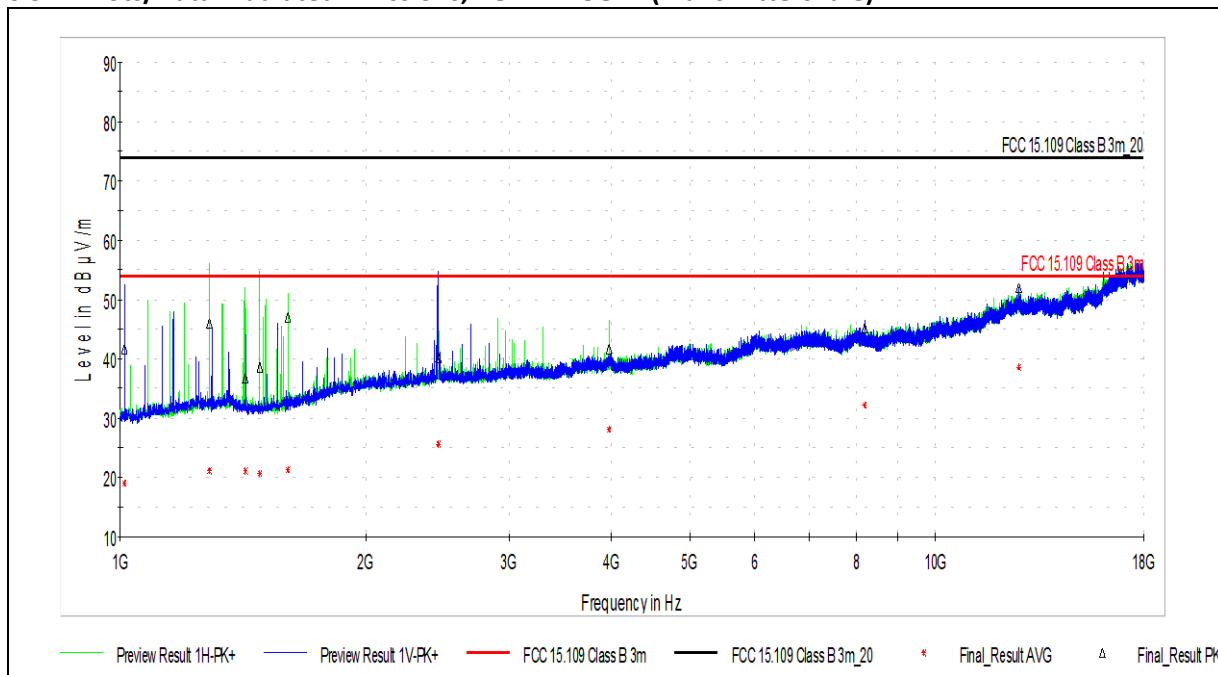
Test Personnel: Brian Daffinn
 Supervising/Reviewing Engineer: NA
 (Where Applicable) FCC Part 15B
 Product Standard: ICES-003 Issue 6
 Input Voltage: 7.4VDC
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/26/2019
 Limit Applied: Class B
 Ambient Temperature: 22.1°C
 Relative Humidity: 42.1%
 Atmospheric Pressure: 992mbar

Deviations, Additions, or Exclusions: None



6.9 Plots/Data: Radiated Emissions, 1GHz – 18GHz (Transmitters Idle)



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1012.000000	41.75	74.00	32.25	1000.000	325.0	V	132.0	-4.4
1287.500000	46.05	74.00	27.95	1000.000	205.0	H	134.0	-1.7
1425.000000	36.71	74.00	37.29	1000.000	265.0	H	84.0	-2.1
1482.500000	38.49	74.00	35.51	1000.000	410.0	H	170.0	-2.3
1606.000000	47.07	74.00	26.93	1000.000	100.0	H	339.0	-2.0
2456.500000	40.19	74.00	33.81	1000.000	100.0	V	0.0	3.1
3978.000000	41.58	74.00	32.42	1000.000	410.0	H	106.0	5.8
8185.500000	45.21	74.00	28.79	1000.000	360.0	V	137.0	11.7
12653.500000	51.89	74.00	22.11	1000.000	410.0	V	67.0	18.8

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1012.000000	19.00	54.00	35.00	1000.000	325.0	V	132.0	-4.4
1287.500000	21.14	54.00	32.86	1000.000	205.0	H	134.0	-1.7
1425.000000	21.01	54.00	32.99	1000.000	265.0	H	84.0	-2.1
1482.500000	20.68	54.00	33.32	1000.000	410.0	H	170.0	-2.3
1606.000000	21.23	54.00	32.77	1000.000	100.0	H	339.0	-2.0
2456.500000	25.57	54.00	28.43	1000.000	100.0	V	0.0	3.1
3978.000000	28.18	54.00	25.82	1000.000	410.0	H	106.0	5.8
8185.500000	32.16	54.00	21.84	1000.000	360.0	V	137.0	11.7
12653.500000	38.61	54.00	15.39	1000.000	410.0	V	67.0	18.8

Test Personnel: Brian Daffin
 Supervising/Reviewing Engineer: (Where Applicable)
 (Where Applicable) NA
 Product Standard: ICES-003 Issue 6
 Input Voltage: 7.4VDC
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/26/2019
 Limit Applied: Class B
 Ambient Temperature: 22.1°C
 Relative Humidity: 42.1%
 Atmospheric Pressure: 992mbar

Deviations, Additions, or Exclusions: None



7 Radiated Spurious Emissions (Transmitters Active)

7.1 Method

Tests are performed in accordance with ANSI C63.10:2015.

TEST SITE: 10m ALSE

Site Designation: 10m Chamber

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	3.9dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.0dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.7dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required.



7.2 Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$



7.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	3900	Rohde & Schwarz	ESU40	9/18/2018	9/18/2019
Bilog Antenna	7088	SunAR	JB6	7/24/2018	7/24/2019
Horn Antenna	3780	ETS Lindgren	3117	6/11/2018	6/11/2019
Horn Antenna (18 - 40GHz)	3779	ETS	3116c	6/7/2018	6/7/2019
Preamplifier	3921	Rohde&Schwarz	TS-PR40	11/26/2018	11/26/2019
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
3m Cable Antenna→Preamp	3074			11/26/2018	11/26/2019
3m Cable Preamplifier	3918	Rohde & Schwarz	TS-PR18	11/26/2018	11/26/2019
3m Cable Preamp→Chamber	2588			11/26/2018	11/26/2019
3m Cable Chamber→Control Room	2593			11/26/2018	11/26/2019
3m Cable Control Room→Receiver	2592			11/26/2018	11/26/2019

7.4 Software Utilized:

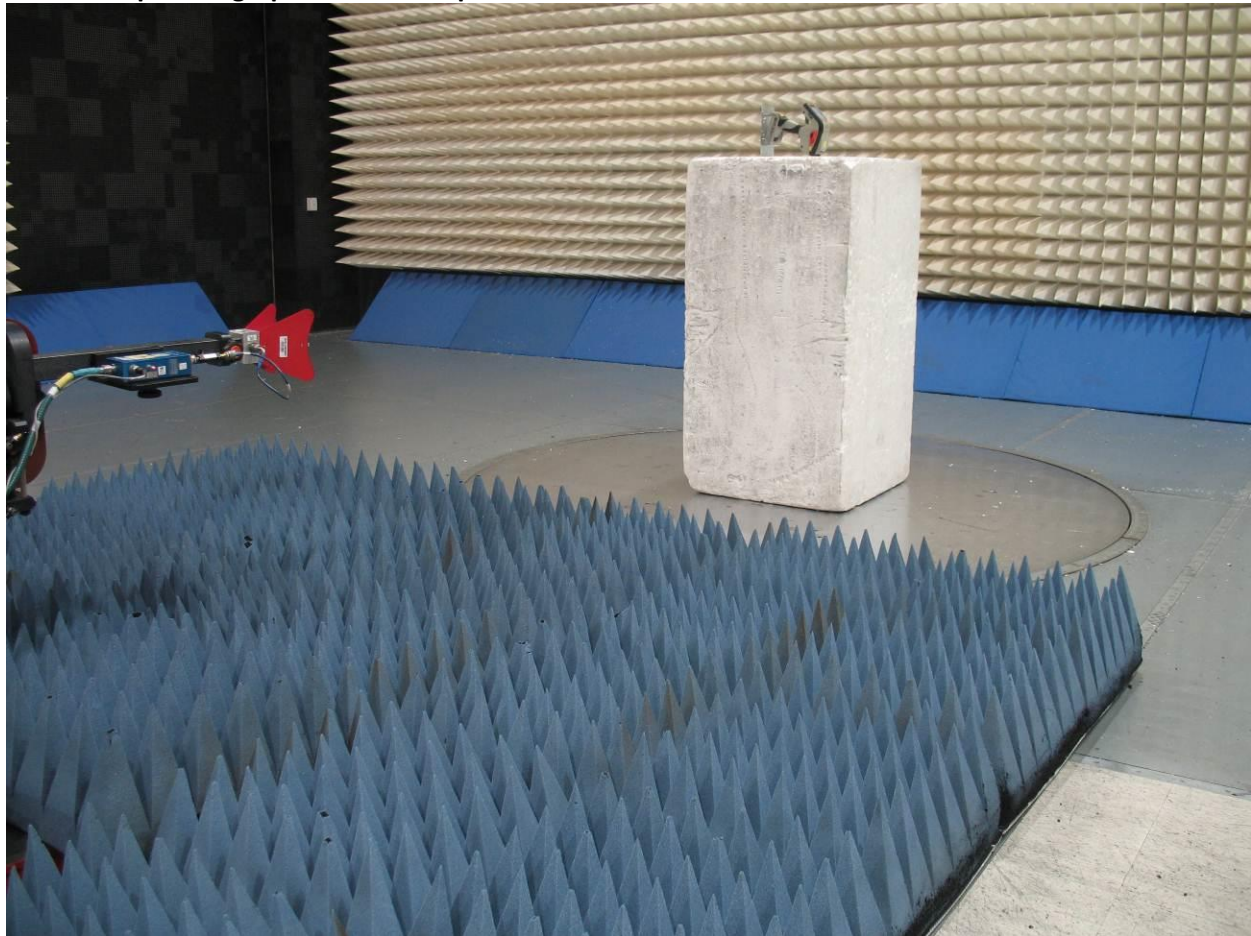
Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 9.15.02

7.5 Results:

The sample tested was found to Comply.



7.6 Setup Photographs: Radiated Spurious Emissions



**7.7 Radiated Spurious Emissions (802.11b, Channel 6)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	33.46	73.98	40.52	1000.000	253.0	V	78.0	-3.2
1440.000000	39.17	73.98	34.81	1000.000	135.0	H	26.0	-2.3
1594.000000	40.21	73.98	33.77	1000.000	178.0	V	216.0	-2.1
2221.000000	39.19	73.98	34.79	1000.000	358.0	V	11.0	2.2
4064.000000	42.76	73.98	31.22	1000.000	226.0	H	108.0	5.9
4874.000000	49.68	73.98	24.30	1000.000	226.0	V	68.0	7.0
16057.500000	55.50	73.98	18.48	1000.000	410.0	V	28.0	23.7
17730.000000	57.79	73.98	16.19	1000.000	410.0	H	295.0	25.2

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	20.78	53.98	33.20	1000.000	253.0	V	78.0	-3.2
1440.000000	30.86	53.98	23.12	1000.000	135.0	H	26.0	-2.3
1594.000000	22.37	53.98	31.61	1000.000	178.0	V	216.0	-2.1
2221.000000	25.38	53.98	28.60	1000.000	358.0	V	11.0	2.2
4064.000000	29.97	53.98	24.01	1000.000	226.0	H	108.0	5.9
4874.000000	40.14	53.98	13.84	1000.000	226.0	V	68.0	7.0
16057.500000	42.35	53.98	11.63	1000.000	410.0	V	28.0	23.7
17730.000000	44.53	53.98	9.45	1000.000	410.0	H	295.0	25.2

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.8 Radiated Spurious Emissions (802.11g, Channel 6)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	35.35	73.98	38.63	1000.000	109.0	V	328.0	-3.1
1186.500000	34.33	73.98	39.65	1000.000	206.0	V	293.0	-2.5
1593.500000	40.09	73.98	33.89	1000.000	134.0	V	318.0	-2.1
2249.000000	40.96	73.98	33.02	1000.000	359.0	H	81.0	2.5
4874.000000	50.13	73.98	23.85	1000.000	225.0	V	70.0	7.0
15998.500000	54.21	73.98	19.77	1000.000	100.0	V	182.0	22.3
17814.000000	57.86	73.98	16.12	1000.000	410.0	H	68.0	25.4

Final_Result_AVG

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	20.57	53.98	33.41	1000.000	109.0	V	328.0	-3.1
1186.500000	21.34	53.98	32.64	1000.000	206.0	V	293.0	-2.5
1593.500000	22.33	53.98	31.65	1000.000	134.0	V	318.0	-2.1
2249.000000	26.26	53.98	27.72	1000.000	359.0	H	81.0	2.5
4874.000000	34.46	53.98	19.52	1000.000	225.0	V	70.0	7.0
15998.500000	40.98	53.98	13.00	1000.000	100.0	V	182.0	22.3
17814.000000	44.25	53.98	9.73	1000.000	410.0	H	68.0	25.4

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.9 Radiated Spurious Emissions (802.11n, Channel 6)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	33.62	73.98	40.36	1000.000	100.0	V	292.0	-3.1
1598.000000	43.18	73.98	30.80	1000.000	224.0	V	219.0	-2.1
2228.000000	40.67	73.98	33.31	1000.000	367.0	V	0.0	2.2
4063.000000	43.34	73.98	30.64	1000.000	258.0	H	113.0	5.9
4871.000000	48.72	73.98	25.26	1000.000	280.0	H	0.0	7.2
7309.500000	49.09	73.98	24.89	1000.000	321.0	H	145.0	11.0
16010.500000	54.23	73.98	19.75	1000.000	410.0	V	219.0	22.4
17779.000000	57.32	73.98	16.66	1000.000	410.0	H	171.0	25.3

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	20.56	53.98	33.42	1000.000	100.0	V	292.0	-3.1
1598.000000	23.43	53.98	30.55	1000.000	224.0	V	219.0	-2.1
2228.000000	25.92	53.98	28.06	1000.000	367.0	V	0.0	2.2
4063.000000	28.85	53.98	25.13	1000.000	258.0	H	113.0	5.9
4871.000000	31.81	53.98	22.17	1000.000	280.0	H	0.0	7.2
7309.500000	33.84	53.98	20.14	1000.000	321.0	H	145.0	11.0
16010.500000	41.20	53.98	12.78	1000.000	410.0	V	219.0	22.4
17779.000000	44.35	53.98	9.63	1000.000	410.0	H	171.0	25.3

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.10 Radiated Spurious Emissions (802.11n 40MHz, Channel 6)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1135.500000	33.83	73.98	40.15	1000.000	109.0	V	316.0	-3.1
1186.500000	35.16	73.98	38.82	1000.000	127.0	V	47.0	-2.5
1593.500000	42.05	73.98	31.93	1000.000	334.0	V	213.0	-2.1
2219.000000	39.86	73.98	34.12	1000.000	376.0	V	0.0	2.2
3262.500000	45.63	73.98	28.35	1000.000	152.0	H	92.0	4.7
12538.000000	52.03	73.98	21.95	1000.000	100.0	H	90.0	19.0
16060.500000	55.72	73.98	18.26	1000.000	410.0	H	136.0	24.0
17817.000000	57.91	73.98	16.07	1000.000	100.0	H	96.0	25.4

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1135.500000	20.39	53.98	33.59	1000.000	109.0	V	316.0	-3.1
1186.500000	21.71	53.98	32.27	1000.000	127.0	V	47.0	-2.5
1593.500000	22.85	53.98	31.13	1000.000	334.0	V	213.0	-2.1
2219.000000	25.04	53.98	28.94	1000.000	376.0	V	0.0	2.2
3262.500000	30.39	53.98	23.59	1000.000	152.0	H	92.0	4.7
12538.000000	38.94	53.98	15.04	1000.000	100.0	H	90.0	19.0
16060.500000	42.52	53.98	11.46	1000.000	410.0	H	136.0	24.0
17817.000000	44.24	53.98	9.74	1000.000	100.0	H	96.0	25.4

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.11 Radiated Spurious Emissions (U-NII-1, 802.11a, Channel 44)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	33.92	73.98	40.06	1000.000	109.0	V	194.0	-3.2
1598.000000	41.59	73.98	32.39	1000.000	375.0	V	243.0	-2.1
2201.500000	40.29	73.98	33.69	1000.000	134.0	V	259.0	2.1
2237.500000	38.38	73.98	35.60	1000.000	205.0	H	238.0	2.3
2296.000000	38.08	73.98	35.90	1000.000	118.0	V	259.0	2.6
4502.000000	48.61	73.98	25.37	1000.000	118.0	H	81.0	6.7
4570.000000	51.91	73.98	22.07	1000.000	231.0	H	14.0	7.1
16083.500000	56.01	73.98	17.97	1000.000	126.0	H	265.0	24.8
17856.500000	57.61	73.98	16.37	1000.000	410.0	V	142.0	25.4

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	20.88	53.98	33.10	1000.000	109.0	V	194.0	-3.2
1598.000000	22.92	53.98	31.06	1000.000	375.0	V	243.0	-2.1
2201.500000	24.70	53.98	29.28	1000.000	134.0	V	259.0	2.1
2237.500000	24.81	53.98	29.17	1000.000	205.0	H	238.0	2.3
2296.000000	24.87	53.98	29.11	1000.000	118.0	V	259.0	2.6
4502.000000	28.76	53.98	25.22	1000.000	118.0	H	81.0	6.7
4570.000000	32.18	53.98	21.80	1000.000	231.0	H	14.0	7.1
16083.500000	42.76	53.98	11.22	1000.000	126.0	H	265.0	24.8
17856.500000	44.23	53.98	9.75	1000.000	410.0	V	142.0	25.4

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: NA
(Where Applicable)
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.12 Radiated Spurious Emissions (U-NII-1, 802.11n, Channel 44)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4094.000000	41.71	73.98	32.27	1000.000	243.0	H	0.0	6.0
4560.000000	53.37	73.98	20.61	1000.000	100.0	H	80.0	7.0
4571.500000	57.83	73.98	16.15	1000.000	272.0	H	69.0	7.1
12553.500000	51.87	73.98	22.11	1000.000	100.0	H	328.0	19.0
16023.000000	54.47	73.98	19.51	1000.000	100.0	H	204.0	22.7
17822.500000	57.65	73.98	16.33	1000.000	100.0	H	171.0	25.4

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4094.000000	28.19	53.98	25.79	1000.000	243.0	H	0.0	6.0
4560.000000	33.67	53.98	20.31	1000.000	100.0	H	80.0	7.0
4571.500000	35.15	53.98	18.83	1000.000	272.0	H	69.0	7.1
12553.500000	38.73	53.98	15.25	1000.000	100.0	H	328.0	19.0
16023.000000	41.23	53.98	12.75	1000.000	100.0	H	204.0	22.7
17822.500000	44.43	53.98	9.55	1000.000	100.0	H	171.0	25.4

Test Personnel:	<u>Michael Carlson</u>	Test Date:	<u>5/9/2019 – 5/19/2019</u>
Supervising/Reviewing Engineer:	<u>(Where Applicable) NA</u>	Limit Applied:	<u>FCC Part 15.205 / FCC Part 15.209</u>
Product Standard:	<u>FCC Part 15C / RSS-247</u>	Ambient Temperature:	<u>22.0°C</u>
Input Voltage:	<u>7.4VDC</u>	Relative Humidity:	<u>37.0%</u>
Pretest Verification w / Ambient Signals or BB Source:	<u>Yes</u>	Atmospheric Pressure:	<u>991.2mbar</u>

Deviations, Additions, or Exclusions: None

**7.13 Radiated Spurious Emissions (U-NII-1, 802.11n 40MHz, Channel 44)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	33.97	73.98	40.01	1000.000	144.0	H	100.0	-3.5
1599.000000	38.59	73.98	35.39	1000.000	153.0	H	253.0	-2.1
2251.500000	38.62	73.98	35.36	1000.000	208.0	H	314.0	2.6
2342.000000	38.23	73.98	35.75	1000.000	292.0	V	103.0	2.7
2483.500000	39.01	73.98	34.97	1000.000	100.0	H	125.0	3.4
4560.500000	53.41	73.98	20.57	1000.000	333.0	H	70.0	7.0
16054.000000	55.09	73.98	18.89	1000.000	109.0	H	0.0	23.7
17874.000000	57.55	73.98	16.43	1000.000	410.0	H	261.0	25.5

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1131.000000	20.65	53.98	33.33	1000.000	144.0	H	100.0	-3.5
1599.000000	23.39	53.98	30.59	1000.000	153.0	H	253.0	-2.1
2251.500000	24.96	53.98	29.02	1000.000	208.0	H	314.0	2.6
2342.000000	25.03	53.98	28.95	1000.000	292.0	V	103.0	2.7
2483.500000	25.81	53.98	28.17	1000.000	100.0	H	125.0	3.4
4560.500000	32.78	53.98	21.20	1000.000	333.0	H	70.0	7.0
16054.000000	41.97	53.98	12.01	1000.000	109.0	H	0.0	23.7
17874.000000	44.18	53.98	9.80	1000.000	410.0	H	261.0	25.5

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.14 Radiated Spurious Emissions (U-NII-2A, 802.11a, Channel 60)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1442.000000	39.08	73.98	34.90	1000.000	144.0	V	0.0	-2.7
1595.500000	40.58	73.98	33.40	1000.000	244.0	H	224.0	-2.1
3738.500000	45.41	73.98	28.57	1000.000	100.0	V	292.0	5.6
4564.000000	50.22	73.98	23.76	1000.000	270.0	H	137.0	7.0
12332.500000	51.55	73.98	22.43	1000.000	100.0	H	306.0	18.7
16069.000000	55.16	73.98	18.82	1000.000	100.0	V	98.0	24.2
17784.000000	57.70	73.98	16.28	1000.000	100.0	H	340.0	25.3

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1442.000000	29.58	53.98	24.40	1000.000	144.0	V	0.0	-2.7
1595.500000	22.31	53.98	31.67	1000.000	244.0	H	224.0	-2.1
3738.500000	28.11	53.98	25.87	1000.000	100.0	V	292.0	5.6
4564.000000	34.06	53.98	19.92	1000.000	270.0	H	137.0	7.0
12332.500000	38.51	53.98	15.47	1000.000	100.0	H	306.0	18.7
16069.000000	42.23	53.98	11.75	1000.000	100.0	V	98.0	24.2
17784.000000	44.42	53.98	9.56	1000.000	100.0	H	340.0	25.3

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.15 Radiated Spurious Emissions (U-NII-2A, 802.11n, Channel 60)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1313.500000	34.97	73.98	39.01	1000.000	336.0	V	96.0	-1.6
1597.000000	38.14	73.98	35.84	1000.000	274.0	H	216.0	-2.1
2209.500000	38.67	73.98	35.31	1000.000	163.0	H	153.0	2.2
4568.000000	54.53	73.98	19.45	1000.000	210.0	H	141.0	7.1
12329.000000	51.49	73.98	22.49	1000.000	100.0	V	96.0	18.6
13341.000000	51.77	73.98	22.21	1000.000	119.0	H	245.0	19.3
16056.000000	55.05	73.98	18.93	1000.000	100.0	H	70.0	23.8
17932.000000	57.72	73.98	16.26	1000.000	100.0	H	12.0	25.8

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1313.500000	21.75	53.98	32.23	1000.000	336.0	V	96.0	-1.6
1597.000000	21.71	53.98	32.27	1000.000	274.0	H	216.0	-2.1
2209.500000	24.91	53.98	29.07	1000.000	163.0	H	153.0	2.2
4568.000000	33.81	53.98	20.17	1000.000	210.0	H	141.0	7.1
12329.000000	38.48	53.98	15.50	1000.000	100.0	V	96.0	18.6
13341.000000	38.60	53.98	15.38	1000.000	119.0	H	245.0	19.3
16056.000000	41.96	53.98	12.02	1000.000	100.0	H	70.0	23.8
17932.000000	44.21	53.98	9.77	1000.000	100.0	H	12.0	25.8

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.16 Radiated Spurious Emissions (U-NII-2A, 802.11n 40MHz, Channel 60)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	33.68	73.98	40.30	1000.000	100.0	V	0.0	-3.1
1599.500000	39.72	73.98	34.26	1000.000	219.0	V	211.0	-2.1
2246.500000	38.52	73.98	35.46	1000.000	100.0	H	144.0	2.5
2338.500000	37.72	73.98	36.26	1000.000	144.0	H	320.0	2.5
2840.500000	38.90	73.98	35.08	1000.000	100.0	V	112.0	3.7
4644.500000	50.56	73.98	23.42	1000.000	385.0	H	73.0	7.0
15964.500000	54.42	73.98	19.56	1000.000	100.0	H	256.0	21.9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.500000	20.64	53.98	33.34	1000.000	100.0	V	0.0	-3.1
1599.500000	23.22	53.98	30.76	1000.000	219.0	V	211.0	-2.1
2246.500000	24.78	53.98	29.20	1000.000	100.0	H	144.0	2.5
2338.500000	24.81	53.98	29.17	1000.000	144.0	H	320.0	2.5
2840.500000	25.66	53.98	28.32	1000.000	100.0	V	112.0	3.7
4644.500000	34.18	53.98	19.80	1000.000	385.0	H	73.0	7.0
15964.500000	40.62	53.98	13.36	1000.000	100.0	H	256.0	21.9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.17 Radiated Spurious Emissions (U-NII-2C, 802.11a, Channel 116)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1437.500000	37.91	73.98	36.07	1000.000	225.0	H	26.0	-2.2
1599.500000	38.94	73.98	35.04	1000.000	170.0	H	246.0	-2.0
4633.500000	48.87	73.98	25.11	1000.000	296.0	H	147.0	7.1
12652.000000	51.38	73.98	22.60	1000.000	100.0	V	223.0	18.8
16053.000000	55.33	73.98	18.65	1000.000	100.0	H	108.0	23.6
17755.500000	57.10	73.98	16.88	1000.000	100.0	H	271.0	25.2

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1437.500000	27.58	53.98	26.40	1000.000	225.0	H	26.0	-2.2
1599.500000	23.48	53.98	30.50	1000.000	170.0	H	246.0	-2.0
4633.500000	33.30	53.98	20.68	1000.000	296.0	H	147.0	7.1
12652.000000	38.42	53.98	15.56	1000.000	100.0	V	223.0	18.8
16053.000000	41.88	53.98	12.10	1000.000	100.0	H	108.0	23.6
17755.500000	44.29	53.98	9.69	1000.000	100.0	H	271.0	25.2

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.18 Radiated Spurious Emissions (U-NII-2C, 802.11n, Channel 116)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1598.500000	41.38	73.98	32.60	1000.000	209.0	V	163.0	-2.1
2266.000000	38.25	73.98	35.73	1000.000	100.0	V	0.0	2.5
4634.000000	55.51	73.98	18.47	1000.000	410.0	H	81.0	7.1
12400.000000	51.80	73.98	22.18	1000.000	100.0	V	0.0	18.8
16079.000000	55.86	73.98	18.12	1000.000	100.0	H	326.0	24.8

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1598.500000	22.78	53.98	31.20	1000.000	209.0	V	163.0	-2.1
2266.000000	24.91	53.98	29.07	1000.000	100.0	V	0.0	2.5
4634.000000	34.39	53.98	19.59	1000.000	410.0	H	81.0	7.1
12400.000000	38.43	53.98	15.55	1000.000	100.0	V	0.0	18.8
16079.000000	42.62	53.98	11.36	1000.000	100.0	H	326.0	24.8

Test Personnel:	<u>Michael Carlson</u>	Test Date:	<u>5/9/2019 – 5/19/2019</u>
Supervising/Reviewing Engineer:		Limit Applied:	<u>FCC Part 15.205 / FCC Part 15.209</u>
(Where Applicable)	<u>NA</u>	Ambient Temperature:	<u>22.0°C</u>
Product Standard:	<u>FCC Part 15C / RSS-247</u>	Relative Humidity:	<u>37.0%</u>
Input Voltage:	<u>7.4VDC</u>	Atmospheric Pressure:	<u>991.2mbar</u>
Pretest Verification w / Ambient Signals or BB Source:	<u>Yes</u>		

Deviations, Additions, or Exclusions: None

**7.19 Radiated Spurious Emissions (U-NII-2C, 802.11n 40MHz, Channel 116)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1598.000000	40.35	73.98	33.63	1000.000	186.0	V	227.0	-2.1
4201.500000	46.79	73.98	27.19	1000.000	126.0	H	0.0	6.0
4629.000000	50.29	73.98	23.69	1000.000	388.0	H	80.0	7.2
12300.000000	52.00	73.98	21.98	1000.000	100.0	H	270.0	18.7
16055.000000	55.47	73.98	18.51	1000.000	100.0	H	350.0	23.7
17823.500000	57.58	73.98	16.40	1000.000	100.0	H	0.0	25.4

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1598.000000	22.28	53.98	31.70	1000.000	186.0	V	227.0	-2.1
4201.500000	28.17	53.98	25.81	1000.000	126.0	H	0.0	6.0
4629.000000	34.44	53.98	19.54	1000.000	388.0	H	80.0	7.2
12300.000000	38.50	53.98	15.48	1000.000	100.0	H	270.0	18.7
16055.000000	41.92	53.98	12.06	1000.000	100.0	H	350.0	23.7
17823.500000	44.42	53.98	9.56	1000.000	100.0	H	0.0	25.4

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.20 Radiated Spurious Emissions (U-NII-3, 802.11a, Channel 157)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1439.500000	43.03	73.98	30.95	1000.000	188.0	H	210.0	-2.2
2222.500000	38.41	73.98	35.57	1000.000	410.0	H	162.0	2.3
2291.000000	39.57	73.98	34.41	1000.000	410.0	V	318.0	2.6
4332.000000	49.60	73.98	24.38	1000.000	226.0	H	-1.0	6.3
4341.000000	50.33	73.98	23.65	1000.000	252.0	H	0.0	6.4
4667.000000	48.28	73.98	25.70	1000.000	329.0	H	312.0	7.0
16098.500000	55.58	73.98	18.40	1000.000	100.0	H	31.0	24.4
17830.000000	57.89	73.98	16.09	1000.000	308.0	V	214.0	25.4

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1439.500000	34.49	53.98	19.49	1000.000	188.0	H	210.0	-2.2
2222.500000	24.61	53.98	29.37	1000.000	410.0	H	162.0	2.3
2291.000000	24.63	53.98	29.35	1000.000	410.0	V	318.0	2.6
4332.000000	32.04	53.98	21.94	1000.000	226.0	H	-1.0	6.3
4341.000000	32.27	53.98	21.71	1000.000	252.0	H	0.0	6.4
4667.000000	29.40	53.98	24.58	1000.000	329.0	H	312.0	7.0
16098.500000	42.25	53.98	11.73	1000.000	100.0	H	31.0	24.4
17830.000000	44.33	53.98	9.65	1000.000	308.0	V	214.0	25.4

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: NA
(Where Applicable)
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.21 Radiated Spurious Emissions (U-NII-3, 802.11n, Channel 157)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1440.000000	43.81	73.98	30.17	1000.000	186.0	H	328.0	-2.3
1598.500000	41.02	73.98	32.96	1000.000	195.0	V	92.0	-2.1
2389.000000	39.86	73.98	34.12	1000.000	100.0	V	81.0	2.9
4337.000000	48.99	73.98	24.99	1000.000	248.0	V	223.0	6.2
4341.500000	50.72	73.98	23.26	1000.000	205.0	H	0.0	6.4
4666.500000	43.52	73.98	30.46	1000.000	100.0	V	206.0	6.9
16057.000000	56.74	73.98	17.24	1000.000	100.0	H	57.0	23.8
17772.500000	57.69	73.98	16.29	1000.000	100.0	V	302.0	25.3

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1440.000000	37.57	53.98	16.41	1000.000	186.0	H	328.0	-2.3
1598.500000	22.70	53.98	31.28	1000.000	195.0	V	92.0	-2.1
2389.000000	24.85	53.98	29.13	1000.000	100.0	V	81.0	2.9
4337.000000	31.79	53.98	22.19	1000.000	248.0	V	223.0	6.2
4341.500000	32.79	53.98	21.19	1000.000	205.0	H	0.0	6.4
4666.500000	29.30	53.98	24.68	1000.000	100.0	V	206.0	6.9
16057.000000	42.00	53.98	11.98	1000.000	100.0	H	57.0	23.8
17772.500000	44.31	53.98	9.67	1000.000	100.0	V	302.0	25.3

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.22 Radiated Spurious Emissions (U-NII-3, 802.11n 40MHz, Channel 157)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1023.500000	34.90	73.98	39.08	1000.000	386.0	H	68.0	-3.9
1439.500000	45.07	73.98	28.91	1000.000	204.0	V	18.0	-2.7
2246.500000	40.10	73.98	33.88	1000.000	162.0	H	201.0	2.5
2346.000000	39.79	73.98	34.19	1000.000	100.0	V	70.0	2.7
2360.500000	41.13	73.98	32.85	1000.000	190.0	V	70.0	2.7
4351.500000	48.43	73.98	25.55	1000.000	198.0	H	0.0	6.4
16080.000000	56.06	73.98	17.92	1000.000	100.0	H	182.0	24.8
17873.000000	57.10	73.98	16.88	1000.000	100.0	H	240.0	25.5

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1023.500000	18.92	53.98	35.06	1000.000	386.0	H	68.0	-3.9
1439.500000	36.85	53.98	17.13	1000.000	204.0	V	18.0	-2.7
2246.500000	24.47	53.98	29.51	1000.000	162.0	H	201.0	2.5
2346.000000	24.82	53.98	29.16	1000.000	100.0	V	70.0	2.7
2360.500000	24.70	53.98	29.28	1000.000	190.0	V	70.0	2.7
4351.500000	30.31	53.98	23.67	1000.000	198.0	H	0.0	6.4
16080.000000	42.72	53.98	11.26	1000.000	100.0	H	182.0	24.8
17873.000000	44.24	53.98	9.74	1000.000	100.0	H	240.0	25.5

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.23 Radiated Spurious Emissions (Bluetooth BDR)**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.000000	33.49	73.98	40.49	1000.000	198.0	V	234.0	-3.1
1440.000000	40.53	73.98	33.45	1000.000	249.0	H	81.0	-2.3
1593.000000	44.12	73.98	29.86	1000.000	197.0	V	230.0	-2.1
2215.500000	38.92	73.98	35.06	1000.000	100.0	V	270.0	2.2
16039.000000	55.22	73.98	18.76	1000.000	100.0	V	148.0	23.0
17728.500000	57.95	73.98	16.03	1000.000	100.0	H	0.0	25.2

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1132.000000	20.49	53.98	33.49	1000.000	198.0	V	234.0	-3.1
1440.000000	32.96	53.98	21.02	1000.000	249.0	H	81.0	-2.3
1593.000000	23.06	53.98	30.92	1000.000	197.0	V	230.0	-2.1
2215.500000	24.71	53.98	29.27	1000.000	100.0	V	270.0	2.2
16039.000000	41.81	53.98	12.17	1000.000	100.0	V	148.0	23.0
17728.500000	44.43	53.98	9.55	1000.000	100.0	H	0.0	25.2

Test Personnel:	<u>Michael Carlson</u>	Test Date:	<u>5/9/2019 – 5/19/2019</u>
Supervising/Reviewing Engineer:	<u>(Where Applicable) NA</u>	Limit Applied:	<u>FCC Part 15.205 / FCC Part 15.209</u>
Product Standard:	<u>FCC Part 15C / RSS-247</u>	Ambient Temperature:	<u>22.0°C</u>
Input Voltage:	<u>7.4VDC</u>	Relative Humidity:	<u>37.0%</u>
Pretest Verification w / Ambient Signals or BB Source:	<u>Yes</u>	Atmospheric Pressure:	<u>991.2mbar</u>

Deviations, Additions, or Exclusions: None

**7.24 Radiated Spurious Emissions (Bluetooth EDR)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1134.500000	33.85	73.98	40.13	1000.000	100.0	V	294.0	-3.1
1189.500000	34.86	73.98	39.12	1000.000	118.0	V	257.0	-2.6
1598.000000	41.24	73.98	32.74	1000.000	153.0	V	216.0	-2.1
2236.000000	38.48	73.98	35.50	1000.000	267.0	H	205.0	2.4
12220.500000	52.41	73.98	21.57	1000.000	100.0	V	191.0	18.1
13390.500000	51.85	73.98	22.13	1000.000	410.0	H	80.0	19.2
16097.000000	55.84	73.98	18.14	1000.000	357.0	V	0.0	24.3
17893.000000	57.63	73.98	16.35	1000.000	100.0	H	246.0	25.6

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1134.500000	20.54	53.98	33.44	1000.000	100.0	V	294.0	-3.1
1189.500000	21.14	53.98	32.84	1000.000	118.0	V	257.0	-2.6
1598.000000	22.66	53.98	31.32	1000.000	153.0	V	216.0	-2.1
2236.000000	24.80	53.98	29.18	1000.000	267.0	H	205.0	2.4
12220.500000	37.96	53.98	16.02	1000.000	100.0	V	191.0	18.1
13390.500000	38.82	53.98	15.16	1000.000	410.0	H	80.0	19.2
16097.000000	42.53	53.98	11.45	1000.000	357.0	V	0.0	24.3
17893.000000	44.27	53.98	9.71	1000.000	100.0	H	246.0	25.6

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.25 Radiated Spurious Emissions (Bluetooth BLE)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1442.000000	35.27	73.98	38.71	1000.000	186.0	H	198.0	-2.3
1598.500000	42.14	73.98	31.84	1000.000	135.0	V	220.0	-2.1
12563.000000	52.49	73.98	21.49	1000.000	100.0	H	24.0	18.9
13394.500000	52.38	73.98	21.60	1000.000	410.0	H	116.0	19.2
16081.500000	56.62	73.98	17.36	1000.000	100.0	H	336.0	24.8
17760.000000	57.76	73.98	16.22	1000.000	410.0	H	68.0	25.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1442.000000	22.61	53.98	31.37	1000.000	186.0	H	198.0	-2.3
1598.500000	24.32	53.98	29.66	1000.000	135.0	V	220.0	-2.1
12563.000000	38.80	53.98	15.18	1000.000	100.0	H	24.0	18.9
13394.500000	38.81	53.98	15.17	1000.000	410.0	H	116.0	19.2
16081.500000	43.15	53.98	10.83	1000.000	100.0	H	336.0	24.8
17760.000000	44.31	53.98	9.67	1000.000	410.0	H	68.0	25.2

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.26 Radiated Spurious Emissions (RFID Low Channel)**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
94.855000	24.29	43.50	19.21	120.000	368.3	V	245.0	17.8
239.960000	35.06	46.00	10.94	120.000	100.0	H	340.0	20.8
335.900000	34.34	46.00	11.66	120.000	100.0	H	184.0	24.0
593.330000	40.67	46.00	5.33	120.000	154.1	H	7.0	29.8
741.650000	42.84	46.00	3.16	120.000	178.0	H	229.0	31.8
1000.000000	44.57	54.00	9.43	120.000	143.4	H	52.0	35.3

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2708.000000	38.28	73.98	35.70	1000.000	100.0	V	272.0	3.3
3611.000000	40.82	73.98	33.16	1000.000	262.0	V	300.0	4.9
4513.750000	41.87	73.98	32.11	1000.000	100.0	V	242.0	6.7
17707.000000	58.30	73.98	15.68	1000.000	100.0	V	2.0	25.2

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2708.000000	25.42	53.98	28.56	1000.000	100.0	V	272.0	3.3
3611.000000	27.56	53.98	26.42	1000.000	262.0	V	300.0	4.9
4513.750000	28.47	53.98	25.51	1000.000	100.0	V	242.0	6.7
17707.000000	44.54	53.98	9.44	1000.000	100.0	V	2.0	25.2

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.27 Radiated Spurious Emissions (RFID Mid Channel)**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
113.160000	29.45	43.50	14.05	120.000	249.5	H	180.0	21.0
239.940000	35.22	46.00	10.78	120.000	99.7	H	0.0	20.8
368.620000	36.25	46.00	9.75	120.000	118.2	V	118.0	24.7
593.330000	40.44	46.00	5.56	120.000	248.7	H	44.0	29.8
741.680000	41.76	46.00	4.24	120.000	177.4	H	340.0	31.8
1000.000000	44.41	54.00	9.59	120.000	272.8	H	8.0	35.3

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2260.000000	38.50	73.98	35.48	1000.000	100.0	H	200.0	2.5
2745.750000	38.56	73.98	35.42	1000.000	290.0	V	295.0	3.4
3661.000000	40.48	73.98	33.50	1000.000	304.0	V	262.0	5.2
16078.000000	56.01	73.98	17.97	1000.000	143.0	V	265.0	24.6
17780.500000	57.37	73.98	16.61	1000.000	240.0	H	306.0	25.3

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2260.000000	24.97	53.98	29.01	1000.000	100.0	H	200.0	2.5
2745.750000	25.61	53.98	28.37	1000.000	290.0	V	295.0	3.4
3661.000000	27.56	53.98	26.42	1000.000	304.0	V	262.0	5.2
16078.000000	42.82	53.98	11.16	1000.000	143.0	V	265.0	24.6
17780.500000	44.31	53.98	9.67	1000.000	240.0	H	306.0	25.3

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None

**7.28 Radiated Spurious Emissions (RFID High Channel)**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.364000	35.33	40.00	4.67	120.000	399.9	H	18.0	28.5
239.940000	35.12	46.00	10.90	120.000	104.9	H	0.0	20.8
341.820000	31.29	46.00	14.73	120.000	117.7	H	273.0	24.1
390.180000	32.53	46.00	13.49	120.000	272.8	H	136.0	25.5
593.330000	40.59	46.00	5.43	120.000	105.1	H	109.0	29.8
741.680000	41.70	46.00	4.32	120.000	115.4	H	208.0	31.8
791.090000	40.92	46.00	5.10	120.000	400.1	V	0.0	32.6
846.260000	41.80	46.00	4.22	120.000	237.1	H	120.0	33.5
897.140000	42.65	46.00	3.37	120.000	237.0	H	0.0	34.2
946.040000	43.51	46.00	2.51	120.000	248.9	H	136.0	34.7

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1679.500000	34.97	73.98	39.01	1000.000	392.0	H	167.0	-1.4
2781.750000	39.23	73.98	34.75	1000.000	379.0	H	161.0	3.7
3709.000000	41.93	73.98	32.05	1000.000	410.0	H	140.0	5.4
17851.000000	58.00	73.98	15.98	1000.000	190.0	H	239.0	25.5

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1679.500000	21.64	53.98	32.34	1000.000	392.0	H	167.0	-1.4
2781.750000	25.80	53.98	28.18	1000.000	379.0	H	161.0	3.7
3709.000000	27.92	53.98	26.06	1000.000	410.0	H	140.0	5.4
17851.000000	44.29	53.98	9.69	1000.000	190.0	H	239.0	25.5

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 15C / RSS-247
Input Voltage: 7.4VDC
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 5/9/2019 – 5/19/2019
Limit Applied: FCC Part 15.205 / FCC Part 15.209
Ambient Temperature: 22.0°C
Relative Humidity: 37.0%
Atmospheric Pressure: 991.2mbar

Deviations, Additions, or Exclusions: None



8 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	6/18/2019	103831188LEX-001	MC	BCT	Original Issue