

Tantalus Systems Corp.

LM-153(x)

Class II Permissive Change Report of Measurements

per

Industry Canada RSS-GEN Issue 4 & RSS-210

and

FCC CFR47 Part 15/C – 15.247

Revision 1.0
May. 20, 2015

Reviewed By:	<hr/> Parm Singh, EMC Division Manager	<hr/> May 20 2015 Date
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Tested By:	<hr/> Aman Jathaul, EMC Lab Manager	<hr/> May 20 2015 Date
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Quality Auditing Institute
19473 Fraser Way, Pitt Meadows, BC, V3Y 2V4, Canada

Test Report Summary

FCC 15.247 / IC RSS-210 Issue 8

Frequency Hopping 902.17 – 927.83MHz Communication Module

FCC ID: OZFDCNIC1 **IC:** 3669A-DCNIC1

Organization Requesting Report: Tantalus Systems Corp.

Contact: Mark Fairburn, RF Design Engineer

Test Organization: Quality Auditing Institute Ltd.

Contact: Aman Jathaul, EMC Lab Manager

Test Personnel: Aman Jathaul

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Section 1: Information for Test Report of Measurements

Testing Details

TESTED BY: Aman Jathaul
 TEST CONDITIONS: Temperature and Humidity: 22°, 47%
 TEST VOLTAGE: 240V A.C./60Hz

Test Facilities

Main Laboratory Headquarters: Quality Auditing Institute
 Headquarters Location/Address: 16 – 211 Schoolhouse Street, Coquitlam, BC, 3K 4X9, Canada

Associated Laboratory: Quality Auditing Institute (Remote Location)

EMC Test Laboratory Location/Address: 19473 Fraser Way, Pitt Meadows, BC, V3Y 2V4, Canada

FCC Designation Number: CA9543

Industry Canada Test Site Registration Number (3m SAC): 9543B-1

Standard Council of Canada: ISO/IEC 17025:2005 Accredited Laboratory No. 743

International Accreditation Service Inc.: ISO/IEC 17025:2005 Accredited Laboratory: No. TL-239

Test Equipment List

Device	Model Number	Equipment Description	Serial No.	Last Cal	Next Cal
Antenna	Sunol Sciences JB3	Biconilog Antenna (30MHz-3GHz)	A042004	28-Oct-2013	28-Oct-2015
EMI Receiver	Rohde & Schwarz ESU40	EMI Receiver (20Hz-40GHz)	100011	Nov 20, 2014	Nov 20, 2017
LISN	FCC FCC-LISN-50-25-2	LISN (150kHz-30MHz)	9929	30-Nov-2012	30-Nov-2015
Horn Antenna	ETS Lindgren	Horn Antenna (1-18Ghz)	00075944	29-Aug-2013	29-Aug-2016
EMCO	6502	Loop Antenna (10k-30MHz)	2178	8/21/2014	8/21/2017
Turntable	ETS Lindgren 2165	00043677	N/A	N/A	N/A
Mast	ETS Lindgren 2165	00077487	N/A	N/A	N/A

Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$ MHz
Radiated Emissions	± 3 dB
Temperature	$\pm 1^\circ\text{C}$
Humidity	± 5 %
DC and low frequency voltages	± 3 %

Company Tested

NAME: Tantalus Systems Corp.
ADDRESS: 301-3480 Gilmore Way
Burnaby, BC V5G 4Y1
Canada
CONTACT PERSON: Mr. Mark Fairburn
PHONE NUMBER: 1-604-299-0458 x229

Equipment Under Test

THE TEST SYSTEM: EUT: The Tantalus Systems LM-153(x) module provides utilities the ability to shed power during periods of peak demand on their network. These modules connect back to the utility central office via the Tantalus Utility Network TUNet© and can be remotely controlled to provide real time load demand control. The communication module can support a variety of data rates and multi-level FSK modulation formats to achieve data rates upto 640kbps.

Product ID: LM-1531
Manufacturer: Tantalus Systems Corp.
Part Numbers: 100-0127-I

LAN Controller
Part Numbers: 100-0169-SD-C
Serial number: 001C5BADDE

Load Management Controller
Part Numbers: GAK00-S041911M1-1
Serial number: 0000107

TEST SETUP: This EUT is designed to communicate with a base unit using a Frequency Hopping Spread Spectrum (FHSS) system operating on the 902-928 MHz band. To test the relevant parametrics, a coaxial pigtail was used.

MODIFICATIONS: No modifications were made for this unit to pass.

CONCLUSION: The Class II modifications to the LM153(x) series of communication modules complies with the requirements of FCC CFR47 and the requirements of Industry Canada RSS-GEN Issue 4.

Section II: IC RSS-210 Issue 8 Emissions Testing

DATE: April 3, 2015

Test Results – Summary

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with IC standards RSS-Gen - Issue 4 and RSS-210 - Issue 8. The Testing was performed pursuant to ANSI 63.4, 2003.

Test	Standard	Description	Result
Intentional Radiated Emissions	RSS-210 A8.5	The radiated emissions are measured in the 902MHz -9280MHz range	Complies
EIRP Emissions	RSS-210 A8.4(1)	Output power will not exceed 1 Watt and the E.I.R.P. will not exceed 4 Watts	Complies

PERFORMANCE: Complies.

Section III: FCC 15.247 Emissions Testing

DATE: April 3, 2015

Test Results – Summary

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15 – Subpart C - Intentional Radiators. The Testing was performed pursuant to ANSI 63.4, 2003.

Additionally, the specific section used for compliance is 15.247 – Operation within the bands 902-928MHz – limited to frequency hopping intentional radiator. This includes the use of the FCC Public Notice DA 00-705 (Filing and Measurement Guidelines for Frequency hopping Spread Spectrum Systems) that was used as a guide to the tests that were performed.

Test	Standard	Description	Result
Antenna Requirement	FCC Part 15 Subpart 15.203	Proper Antenna is specified and used	Complies
EIRP Emissions	FCC Part 15 Subpart C 15.247(b)(2)	For the band 902-928MHz, the transmitter output power shall not exceed 1.0 watt and the E.I.R.P shall not exceed 4W for systems employing at least 50 Hopping Channels.	Complies
Restricted Bands Review	FCC Part 15 Subpart 15.205	Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.	Complies

PERFORMANCE: Complies.

Appendix A: Intentional Radiated Emissions Test

Radiated Power (EIRP)

Freq(MHz)	Corrected Field at 3m (dB μ V/m)	3m EIRP (dBm)
902.17	121.9	26.7
915	122.0	26.8
927.83	121.6	26.4

Table 1: EIRP Measurements

Intentional Spurious Emissions**Setup:**

Correction factor includes antenna, cables.

NOTE: The EUT worst case "ON" time was measured to be 4.4 ms per 100ms. This equates to a duty cycle correction factor of -27.1 dB that has been applied to the measured average values in accordance with 15.35(c). In accordance with 15.31(o), emissions that are 20dB below the permissible value have not been reported.

Frequency (MHz)	Pol. V	Corrected Value (Avg. Detector) (dBuV/m)	Average Limit at 3m (dBuV/m)	Duty Cycle Correction (dB)	Delta Limit-Meas. (dB)	Peak Limit at 3m dB(uV/m)	Delta Limit-Meas (dB)
2706.9	V	68.0	54	27.1	13.1	74	6.0
2706.9	H	63.5	54	27.1	17.6	74	10.5
3608.6	H	55.5	54	27.1	25.6	74	18.5
4511.3	H	56.8	54	27.1	24.3	74	17.2
5413.7	V	63.0	54	27.1	18.1	74	11.0
5413.7	H	58.9	54	27.1	22.2	74	15.1

Table 2: Harmonics at Low Frequency

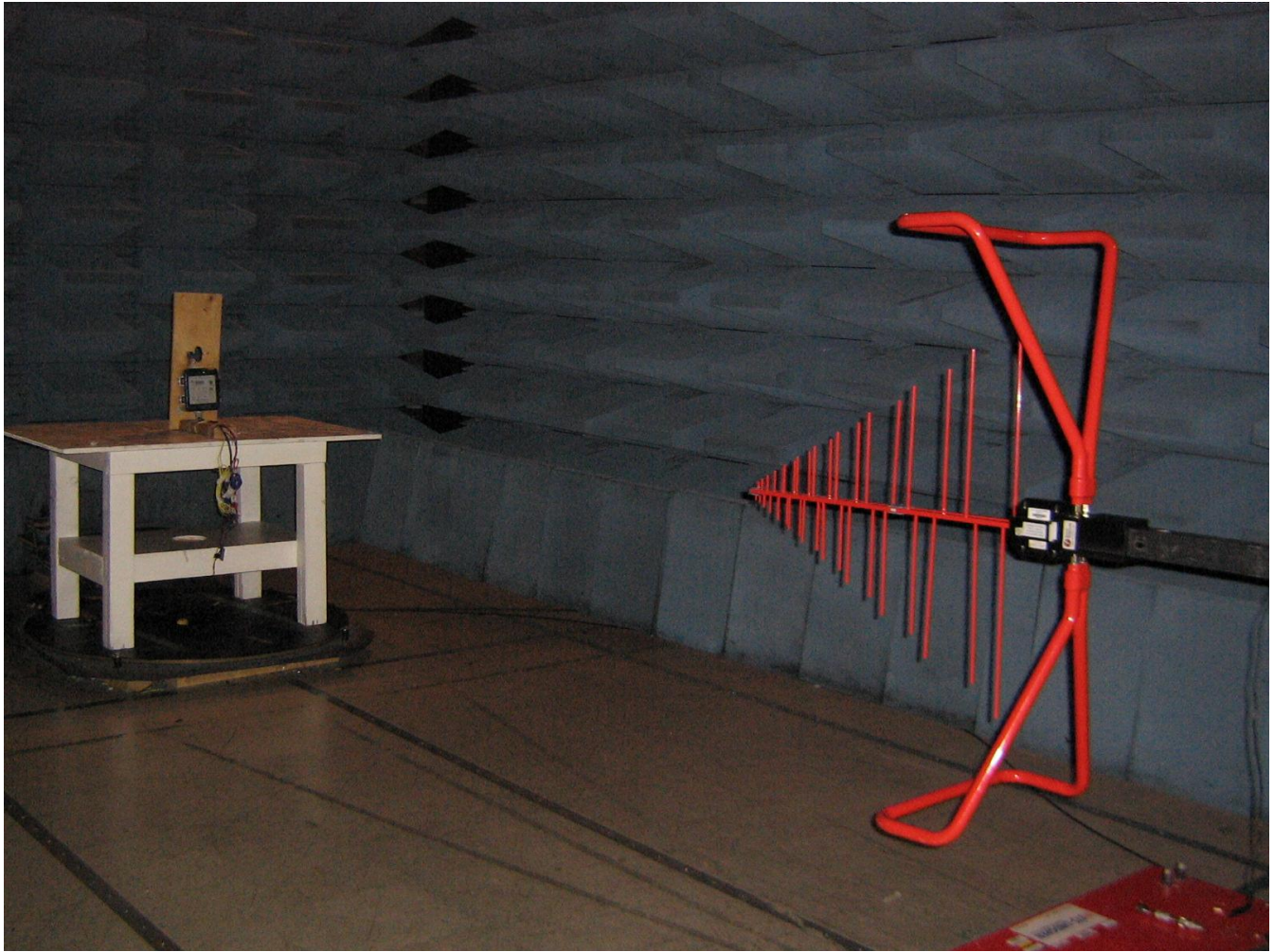
Frequency (MHz)	Pol. V	Corrected Value (Avg. Detector) (dBuV/m)	Average Limit at 3m (dBuV/m)	Duty Cycle Correction (dB)	Delta Limit-Meas. (dB)	Peak Limit at 3m dB(uV/m)	Delta Limit-Meas (dB)
2745.4	V	66.7	54	27.1	14.4	74	7.3
2745.4	H	64.7	54	27.1	16.4	74	9.3
3660.1	H	54.7	54	27.1	26.4	74	19.3
4575.3	V	55.3	54	27.1	25.8	74	18.7

Table 3: Harmonics at Mid Frequency

Frequency (MHz)	Pol. V	Corrected Value (Avg. Detector) (dBuV/m)	Average Limit at 3m (dBuV/m)	Duty Cycle Correction (dB)	Delta Limit-Meas. (dB)	Peak Limit at 3m dB(uV/m)	Delta Limit-Meas (dB)
2783.15	V	61.9	54	27.1	19.2	74	12.1
2783.15	H	64.6	54	27.1	16.5	74	9.4
3711.5	V	56.7	54	27.1	24.4	74	17.3
3711.4	H	56.2	54	27.1	24.9	74	17.8
4638.7	H	54.4	54	27.1	26.7	74	19.6

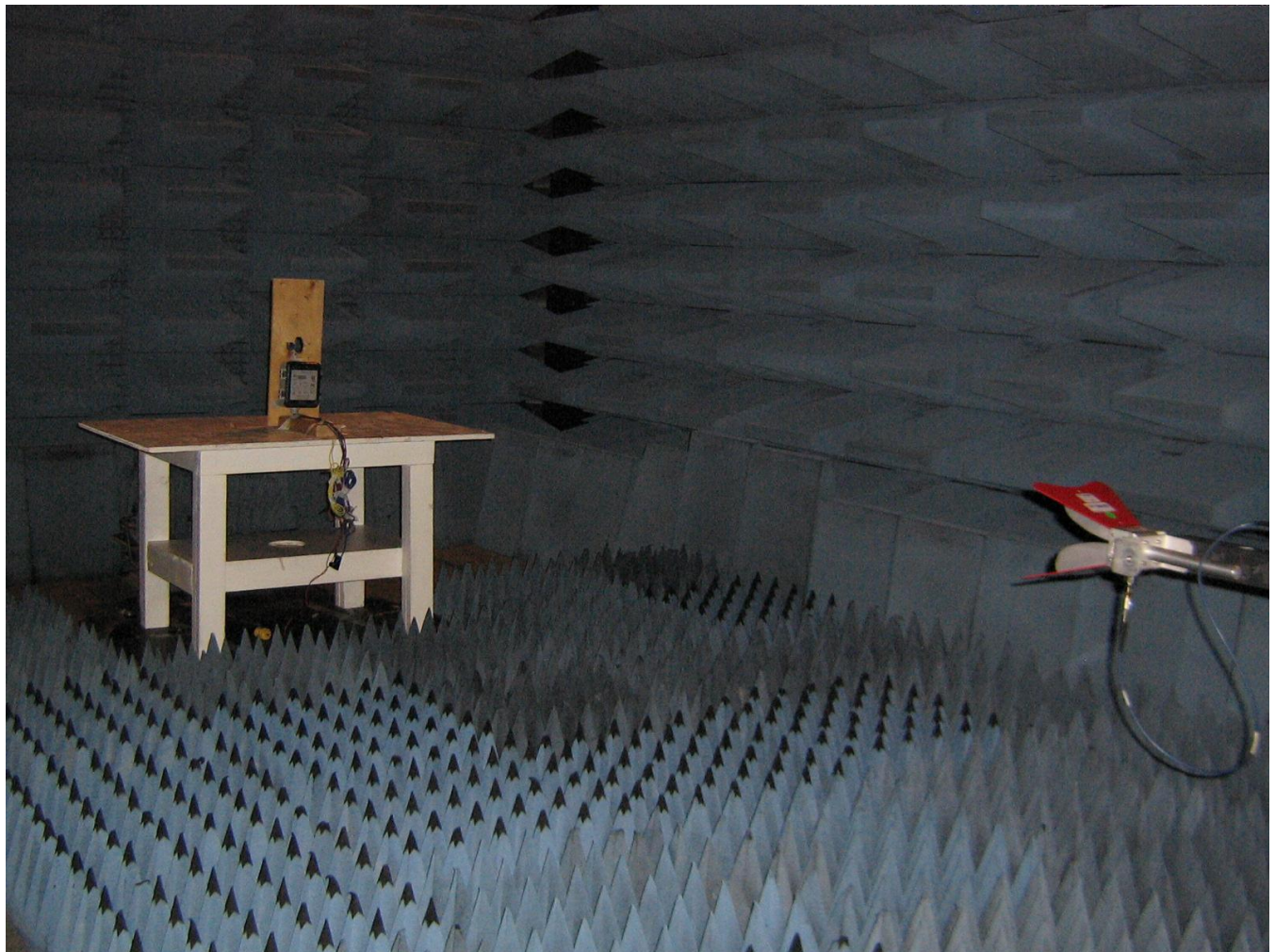
Table 4: Harmonics at High Frequency

Appendix B: Test Setup Photos



Intentional / Unintentional Radiated Emission 30 – 1000 MHz setup.

Figure 1: Emissions Test Setup – Intentional / Unintentional Radiated Emissions



Intentional Radiated Emissions 1000 – 10000 MHz setup.

Figure 2: Emissions Test