Radiated Spurious Emissions Test Report
In accordance with
FCC Part 24
Industry Canada RSS 133

Telcosat
RPT-1900

FCC: UDIRPT1900
IC: 5842A-RPT1900

Project Code CG-1427

(Report CG-1427-EM-2-1)

Revision: 1

February 22, 2010

Prepared for: Telcosat Inc.

Author: Lixin Wang
EMC Technologist

Approved by: Nick Kobrosly
Director of Canadian Operations

Report Summary

Test Facility:	**National Technical Systems, Canada** Product Integrity Laboratory 5151-47th Street, N.E. Calgary Alberta T3J 3R2
Accreditation Numbers:	0214.22 Electrical 0214.23 Mechanical Accredited by A2LA The American Association for Laboratory Accreditation CLIENTS SERVED: All interested parties FIELDS OF TESTING: Electrical/Electronic, Mechanical/Physical ACCREDITATION DATE:: May 14, 2009 VALID TO: February 28, 2010
Applicant:	Telcosat Inc. 1#116, 1919-27th Ave N.E. Calgary, AB T2E 7E4
Customer Representative:	Aram Sukiasyan 403 291-4031 Aram.sukiasyan@telcosat.com
Responsible Manager:	Carl Bosnyak 403 291-4031 Carl.bosnyak@telcosat.com

Test Summary

Appendix	Test/Requirement Description	Deviations* from:			Pass / Fail	Applicable FCC Rule Parts	Applicable Industry Canada Rule Parts
		Base Standard	Test Basis	NTS Procedure			
A	Field Strength of Spurious Emissions	No	No	No	PASS	FCC 2.1053, 24.238	RSS-Gen 6.5

Test Result: The product sample presented for testing complied with test requirements as shown in this test summary.

Signatures

Prepared By: Lixin Wang 2010.02.22 16:16:28 -07'00'

Lixin Wang
EMC Technologist

Reviewed By: Glen Moore Digitally signed by Glen Moore DN: cn=Glen Moore, c=US, o=NTS, email=glen.moore@ntscorp.com Date: 2010.03.10 11:19:08 -07'00'

Glen Moore
Wireless/EMC Manager

Checked By: Alex Mathews 2010.02.22 15:10:11 -07'00'

Alex Mathews
Quality Manager

Table of Contents

Register of Revisions

Revision	Date	Description of Revisions
1	February 22 2010	Initial Release

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Canada to demonstrate compliance of RPT-1900 Repeater from Telcosat to the EMC requirements listed in the Test Summary and as detailed in the appendices.

2.0 EUT INFORMATION

2.1 CONFIGURATION

Description of EUT

	Name	Model	Revision	Serial Number
EUT	Repeater	RPT-1900	N/A	0001
Classification	Cellular Repeater			
Size (Cm)	36 X 41 X 29 (Cm)			
Frequency Range	Uplink: 1820 – 1910 MHz Downlink: 1930 – 1990 MHz			
Output Power	1.906 W			
Weight	55 Pound			
General Functional Description	Cellular booster/repeater. It increases the coverage and capacity of existing cellular wireless network for both indoor and outdoor use. GSM, EDGE and WCDMA protocols can simultaneously operate on the same unit.			

2.1.1 EUT POWER

Voltage	120 Vac
Number of Feeds	1
Gauge of cable	14
Current Draw	0.5 A
Special Requirements	None

2.2 CABLES

EUT Cable List

Qty	Routing		Description	Cable Length (m)
	From	To		
1	Chamber floor connector for signal generator	EUT	Coaxial cable	1
2	AC inlet	AC feed	Power cable	3

2.3 FREQUENCIES

EUT Frequency List

Module	Signal	Frequency (MHz)
Clock	N/A	10

2.4 EUT SOFTWARE

Software Name	Software Release Number	Software Configuration
N/A		

2.5 MODE OF OPERATION

A low level signal from signal generator of both uplink and downlink is feed to the input of the repeater. Output power of the repeater is 30dBm CW. Output of repeater is terminated with 30dB attenuator and 50 Ohm terminator.

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

Support Equipment/Assemblies

Position	Qty	Description	Model	Serial Number
Support room	1	Signal Generator	HP E44378	US39230102
Support room	1	10 dB Attenuator	N/A	AK5108

3.2 CABLES

Support Cable List

Quantity	Routing		Description	Cable Length (m)
	From	To		
1	Signal Generator	Chamber floor connector for EUT	Coaxial cables	20 m

APPENDICES

APPENDIX A: FIELD STRENGTH OF SPURIOUS EMISSIONS; 30 TO 20,000 MHZ

A.1. Base Standard & Test Basis

Base Standard	CFR 47 - FCC Part 24 Subpart E, CFR 47 - FCC Part 2 Subpart J IC RSS-133 6.5
Test Basis	EIA/TIA 603 C
Test Method	• NTS Emission Test Methods CAG EMC 02 • NTS Emission Verification Test Methods CAG EMC 01

A.2. Specifications

Frequency (MHz)	**CFR 47 FCC Part 22**	
	Theoretical Peak @ 3m[1] dBµV/m	**ERP[2] dBm**
30 - 20000	84.3	-13

Note 1: Calculated using: Pd-(43 + 10 log(Pw)

where Pd is the EUT power in dBm and Pw is the EUT power in watts

Note 2: Calculated using: 120+20log(SQRT(49.2*Pw)/3)

where Pw is the EUT power in watts

A.3. Measurement Uncertainty

Radiated Emissions	**Measurement Uncertainty (dB)**	**Expanded Uncertainty (K=2)**
30 MHz – 1 GHz	+2.32/-2.36	+4.65/-4.72
1 GHz – 20 GHz	+3.48/-3.51	+6.96/-7.02

A.4. Deviations

Deviation Number	**Time & Date**	**Descriptions**	**Deviation Reference**			**Approval**
			Base Standard	**Test Basis**	**NTS Procedure**	
None						

A.5. Special Considerations

None

A.6. Operating Mode During Test

The EUT was tested to determine worst case operating modes (Both uplink and downlink at low/mid/high channels) to produce maximum peak spurious emissions.

A.7. Tx Test Results

Compliance Scan Summary: 30 MHz to 1 GHz

There were no FCC Part 24 related emissions detected in this frequency range.

Table 1. Compliance Scan Summary: 1 GHz to 20 GHz

Frequency (MHz)	Polarization	Measured Level (dBµV/m)	Substitution Signal Generator Level (dBm)	Substitution Antenna Gain (dBd)	Tx Cable Loss (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
3919.84	H-pol	40.86	-62.27	9.97	2.07	-54.37	-13.00	41.37
5879.76	H-pol	43.07	-61.22	11.63	2.57	-52.16	-13.00	39.16
7839.68	H-pol	45.78	-58.00	11.50	2.95	-49.45	-13.00	36.45
3919.84	V-pol	41.16	-61.97	9.97	2.07	-54.07	-13.00	41.07
5981.96	V-pol	43.84	-60.48	11.67	2.60	-51.41	-13.00	38.41
7839.68	V-pol	45.83	-57.95	11.50	2.95	-49.40	-13.00	36.40

Note: All final reported values are corrected values.
There were no spurious emissions detected during test. Noise floor reading was given in the above table.

A.8. Observations

None.

A.9. Sample Calculation

Emission Level = Measured Level + Correction Factors

Margin = Limit – Emission Level

ERP Limit (dBm) = Pd-(43 + 10 log(Pw)

where Pd is the EUT power in dBm and Pw is the EUT power in watts

Theoretical ERP Limit (dBuV/m) 120+20log(SQRT(49.2*Pw)/3)

where Pw is the EUT power in watts

A.10. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation table 1; Quality Manual.

Name: Lixin Wang
EMC Technologist

A.11. Test Dates

Test date: February 01, 2010.

APPENDIX B: TEST EQUIPMENT LIST

B.1. Radiated Emissions 30-20000 MHz Measurement Equipment List

Description	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Bilog Antenna	Teseq	CBL 6112B	CG0314	23-Sep-10[1]	28-Oct-08
RF Cable	Sucoflex	Ferrite bead loaded cable	CG0398	N/A	N/A
Digital Barometer / Thermometer	Cole-Parmer	1870	CG0728	2-Sep-10	2-Sep-09
Horn Antenna 1-18 GH	EMCO	3115	CG0368	08-Sep-11	08-Sep-09
Standard Gain Horn (Rx) 18 GHz – 26.5 GHz	EMCO	3160-09	CG0075	N/A (2)	27NOV01
LNA 1 GHz<f<18 GHz	Miteq	JSD00121	CG0761	13-Nov-11	13-Nov-09
Cable from Antenna to LNA	Sucoflex 104	2422774A	CG0686	N/A	N/A
Cable from LNA to SA	Sucoflex 100	115757-4	CG0686	N/A	N/A
Spectrum Analyzer 9 kHz – 40 GHz	Rohde & Schwarz	FSEK-20	CG0118	6-Aug-11	6-Aug-09
LNA DC Power Supply	Xantrex	LXO 30-2	CG0493	N/A	N/A
HPIB Extender	HP	37204	CG0110	N/A	N/A
CONTROL ROOM					
Test Receiver	R & S	ESAI	CG0123 CG0124	26-Feb-10	26-Feb-09
Mast Controller	EMCO	2090	CG0179	N/A	N/A
Multi Device Controller TT1 (Turntable)	EMCO	2090	CG0178	N/A	N/A
RF 10m East site Link				N/A	N/A
- Cable 1	Sucoflex	N/A	CG0690		
- Cable 2	Sucoflex	N/A	CG0634		
- Cable 3	Sucoflex	N/A	CG0660		
- Cable 4	Sucoflex	N/A	CG0661		
- Amplifier	HP	8447F	CG0177	03DEC11	03DEC09

Note 1: Equipment was held “In Service Program” till 23 September, 2009
Note 2: As per manufacturer recommend, this item does not require periodic calibration. Its electromagnetic performance is almost exclusively depended on the physical dimension of the horn. A thorough mechanical check is all that is needed to guarantee the antenna performance.

END OF DOCUMENT