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Report Reference ID:	151491-1TRFWL
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Test specification:	Title 47 – Telecommunication Chapter I – Federal Communications Commission Subchapter D – Safety and special radio services Part 90 – Private land mobile services Subpart M – Intelligent transportation systems radio service Section 90.353 – LMS operations in the 902–928 MHz band.
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Applicant:	Mark IV Industries Corp. 6030 Ambler Drive Mississauga, ON L4W 2P1, Canada
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Apparatus:	CVO Pre-trip Inspection Transponder
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FCC ID:	JQU802155
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Model:	802155-TAB
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Testing laboratory:	Nemko Canada Inc. 303 River Road Ottawa, ON, Canada K1V 1H2 Telephone: (613) 737-9680 Facsimile: (613) 737-9691
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	Name and title	Date
Tested by:	Andrey Adelberg, Senior Wireless/EMC Specialist	August 5, 2010
Reviewed by:	<i>Kevin Ma</i> Kevin Ma, Wireless/EMC Specialist	August 5, 2010



Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada.
The tests included in this report are within the scope of this accreditation.



Nemko Canada Inc.
303 River Rd, Ottawa, ON, Canada, K1V 1H2

Product: CVO Pre-trip Inspection Transponder

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Section 1: Report summary

1.1 Test specification

Specifications

Part 90.353 – LMS operations in the 902–928 MHz band.

1.2 Statement of compliance

Compliance

In the configuration tested the EUT was found compliant

Yes

No

This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Canada Inc. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90; Subpart I. Radiated tests were conducted in accordance with ANSI C63.4-2003.

1.3 Exclusions

Exclusions

None

1.4 Registration number

Test site FCC ID number

176392 (3 m Semi anechoic chamber)

1.5 Test report revision history

Revision

Details of changes made to test report

TRF

Original report issued

1.6 Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 2: Summary of test results

2.1 FCC Part 90 test results

Part	Test description	Verdict
Subpart I		
§90.205(l)	Power and antenna height limits	Pass
§90.209	Bandwidth limitations	Pass
§90.210(k)	Emission masks	Pass
§90.210(k)	Spurious emissions	Pass
§90.213	Frequency stability	N/A*
Subpart M		
§90.353(h)	Authorized bands	Pass
§90.357(b)	Frequencies for LMS systems in the 902–928 MHz band	Pass
* - The EUT is a mobile transponder therefore it is exempt from this requirement.		



Section 3: Equipment under test (EUT) and application details

3.1 Applicant details

Applicant complete business name	Name:	Mark IV Industries Corp.
	Federal Registration Number (FRN):	0005125109
	Grantee code	JQU
Mailing address	Address:	6030 Ambler Drive
	City:	Mississauga
	Province/State:	Ontario
	Post code:	L4W 2P1
	Country:	Canada

3.2 Modular equipment

a) Single modular approval	Single modular approval Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
b) Limited single modular approval	Limited single modular approval Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

3.3 Product details

FCC ID	Grantee code:	JQU
	Product code:	802155
Equipment class	LMS	
Description of product as it is marketed	CVO Pre-trip Inspection Transponder	
	Model name/number:	802155-TAB
	Serial number:	CVOSTQA3-212

3.4 Application purpose

Type of application	<input checked="" type="checkbox"/> Original certification <input type="checkbox"/> Change in identification of presently authorized equipment Original FCC ID: _____ Grant date: _____ <input type="checkbox"/> Class II permissive change or modification of presently authorized equipment
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3.5 Composite/related equipment

a) Composite equipment	The EUT is a composite device subject to an additional equipment authorization Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
b) Related equipment	The EUT is part of a system that operates with, or is marketed with, another device that requires an equipment authorization Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
c) Related FCC ID	If either of the above is "yes": <input type="checkbox"/> has been granted under the FCC ID(s) listed below: <input type="checkbox"/> is in the process of being filled under the FCC ID(s) listed below: <input type="checkbox"/> is pending with the FCC ID(s) listed below: <input type="checkbox"/> has a mix of pending and granted statuses under the FCC ID(s) listed below: i FCC ID: ii FCC ID:

3.6 Sample information

Receipt date:	June 10, 2010
Nemko sample ID number:	Item # 3

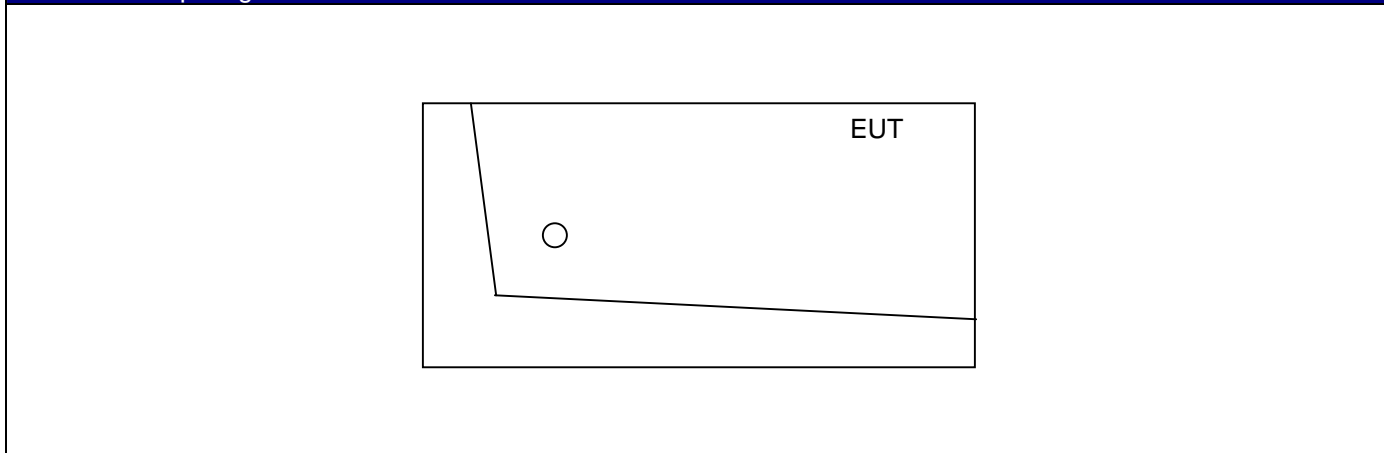
3.7 EUT technical specifications

Operating band:	902–928 MHz
Operating frequency:	915 ±0.6 MHz
Modulation type:	OOK
Occupied bandwidth:	4.2 MHz (20 dB BW); 7.27 MHz (99 % OBW)
Emission designator:	7M27P1D
Antenna type:	Printed antenna
Power source:	3.6 Vdc Lithium battery

3.8 Operation of the EUT during testing

Details:	The EUT was modified for continuous transmission upon pressing on the button. The EUT is a battery-operated device; therefore all tests were performed using fresh batteries.
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3.9 EUT setup diagram



Section 4: Engineering considerations

4.1 Modifications incorporated in the EUT

Modifications

Modifications performed to the EUT during this assessment
 None Yes , performed by Client or Nemko
 Details:

4.2 Deviations from laboratory tests procedures

Deviations

Deviations from laboratory test procedures
 None Yes - details are listed below:

4.3 Technical judgment

Judgment

None

Section 5: Test conditions

5.1 Power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions

Temperature: 15–30 °C
 Relative humidity: 20–75 %
 Air pressure: 86–106 kPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

Power supply range:

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6: Measurement uncertainty

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95 % and can be found in Nemko Canada document MU-003.



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Section 7: Test equipment


Product: CVO Pre-trip Inspection Transponder

Section 7: Test equipment

7.1 Test equipment list

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next cal.
3 m EMI Test Chamber	TDK	SAC-3	FA002047	Mar. 09/11
Flush Mount Turntable	Sunol	FM2022	FA002082	NCR
Controller	Sunol	SC104V	FA002060	NCR
Antenna Mast	Sunol	TLT2	FA002061	NCR
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU 26	FA002043	Jan. 14/11
Bilog Antenna	Sunol	JB3	FA002108	Jan. 18/11
Horn Antenna #2	EMCO	3115	FA000825	Jan. 18/11
1–18 GHz Amplifier	JCA	JCA118-503	FA002091	Oct. 07/10

Note: N/A = Not applicable, NCR = No cal required, COU = Cal on use

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
	Test name: Clause 90.205 Effective radiated power of carrier			
	Test date: June 29, 2010		Test engineer: Andrey Adelberg	
	Verdict: Pass		Supply input: Battery	
	Temperature: 23 °C	Air pressure: 1009 mbar	Relative humidity: 35 %	
	Specification: FCC Part 90 Subpart I			

Section 8: Testing data

8.1 Clause 90.205 Effective radiated power of carrier

Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation. Except where otherwise specifically provided for, the maximum power that will be authorized to applicants whose license applications for new stations are filed after August 18, 1995 is as follows:

(l) 902–928 MHz.

LMS systems operating pursuant to subpart M of this part in the 902–927.25 MHz band will be authorized a maximum of 30 watts ERP. LMS equipment operating in the 927.25–928 MHz band will be authorized a maximum of 300 watts ERP. ERP must be measured as peak envelope power. Antenna heights will be as specified in §90.353(h).

Assigned frequency band (MHz)	ERP	
	(W)	(dBm)
902.00–927.25	30	44.8
927.25–928.00	300	54.8

Special notes

The test was performed using peak detector of the spectrum analyzer with RBW and VBW of 10 MHz. The test was performed radiated at the distance of 3 m. The EUT was tested at two typical installation positions: side and top positions. Test was performed at the vertical and horizontal receiving antenna polarizations.

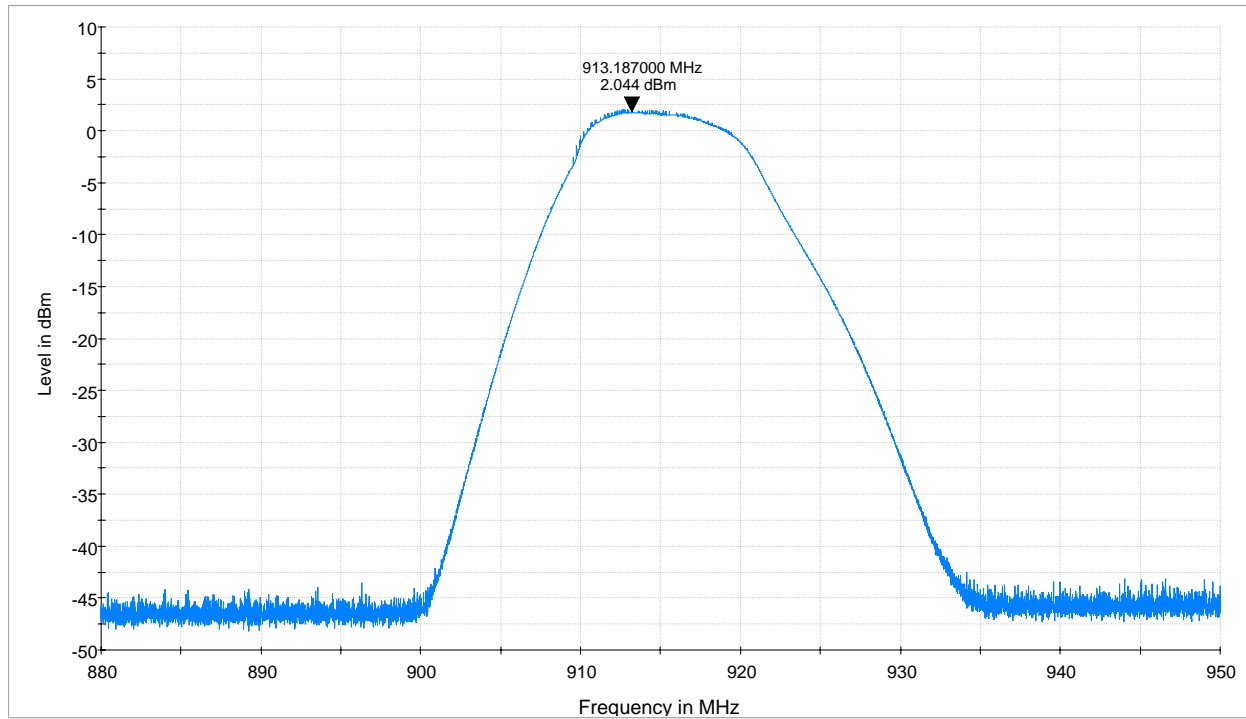


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.205 Effective radiated power of carrier			
Test date: June 29, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Relative humidity: 35 %	
Specification: FCC Part 90 Subpart I			

Test data

Measured results



ERP at horizontal polarization on side position
 — MaxPeak-MaxHold

Frequency (MHz)	Field strength (dB μ V/m)	Substitution factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
915	73.044	-76.710	2.044	44.800	42.756

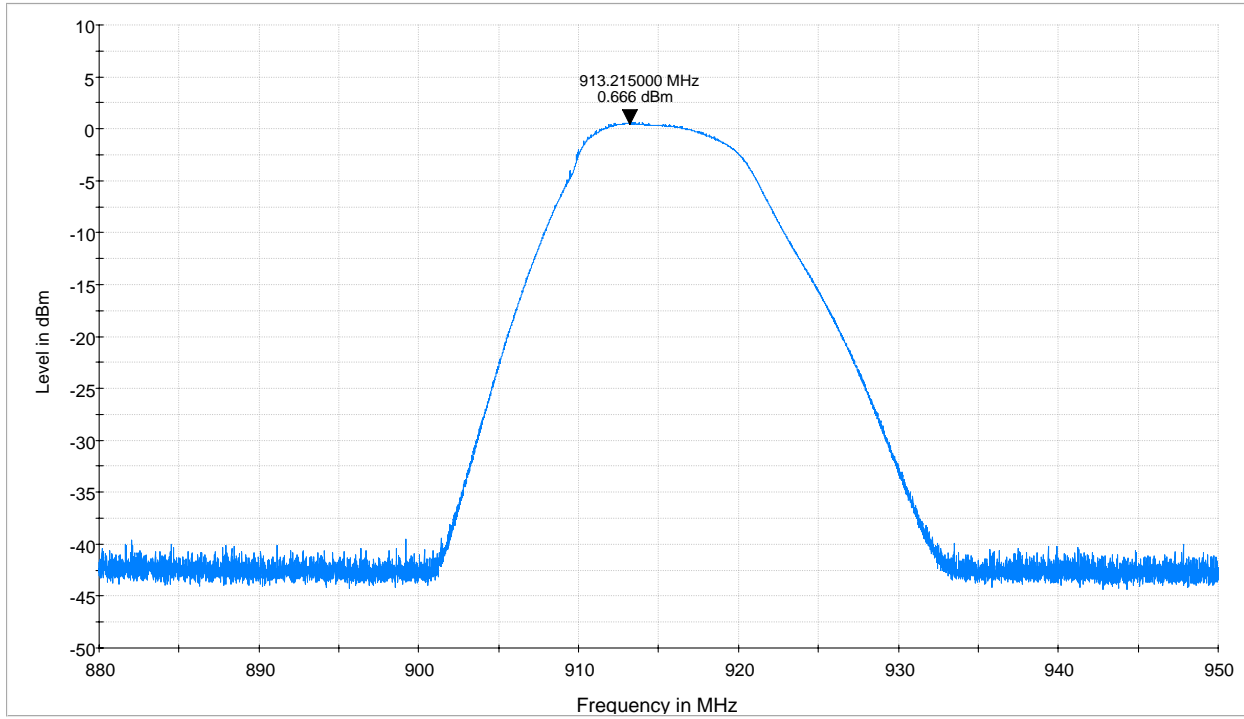


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.205 Effective radiated power of carrier			
Test date: June 29, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Relative humidity: 35 %	
Specification: FCC Part 90 Subpart I			

Test data, continued

Measured results, continued



ERP at vertical polarization on side position
 — MaxPeak-MaxHold

Frequency (MHz)	Field strength (dB μ V/m)	Substitution factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
915	75.056	-74.390	0.666	44.800	44.134

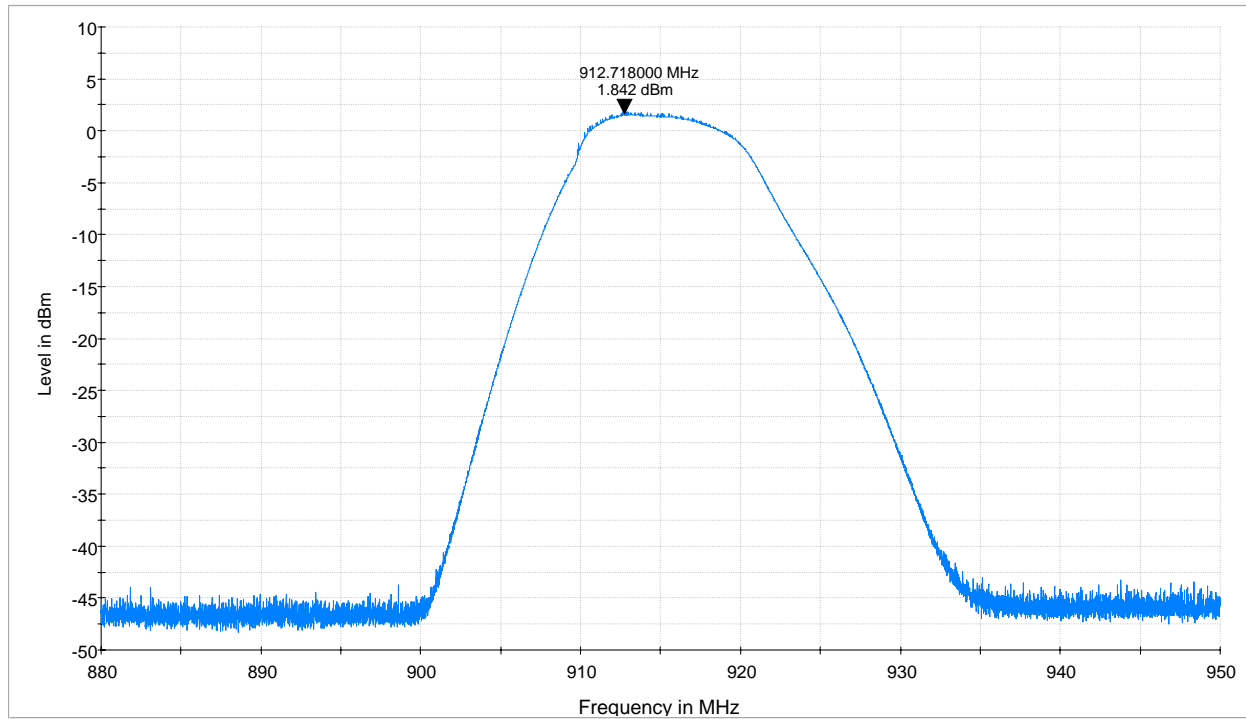


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.205 Effective radiated power of carrier			
Test date: June 29, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Relative humidity: 35 %	
Specification: FCC Part 90 Subpart I			

Test data, continued

Measured results, continued



ERP at horizontal polarization on top position
 — MaxPeak-MaxHold

Frequency (MHz)	Field strength (dB μ V/m)	Substitution factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
915	78.552	-76.710	1.842	44.800	42.958

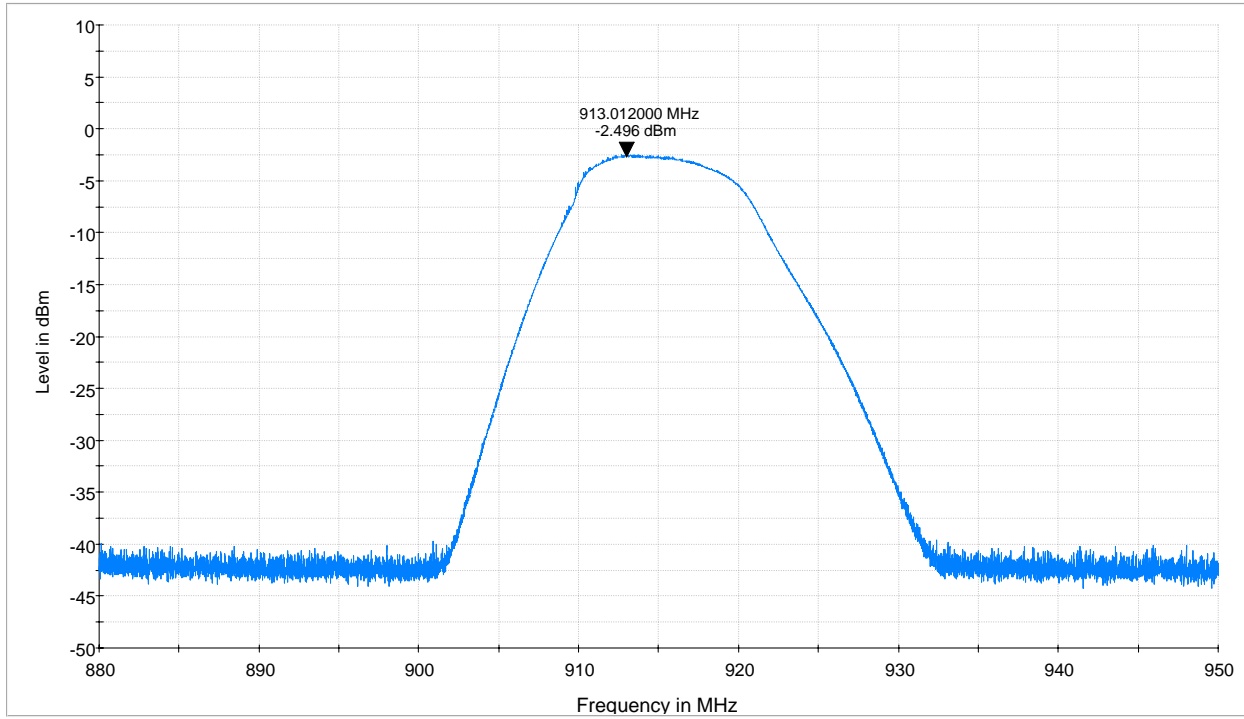


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.205 Effective radiated power of carrier			
Test date: June 29, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Relative humidity: 35 %	
Specification: FCC Part 90 Subpart I			


Test data, continued

Measured results, continued



ERP at vertical polarization on top position
 — MaxPeak-MaxHold

Frequency (MHz)	Field strength (dBμV/m)	Substitution factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
915	71.894	-74.390	-2.496	44.800	47.296

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder		
	Test name: Clause 90.209 Occupied bandwidth				
	Test date: June 11, 2010		Test engineer: Andrey Adelberg		
	Verdict: Pass		Supply input: Battery		
	Temperature: 23 °C		Air pressure: 1009 mbar	Temperature: 23 °C	
	Specification: FCC Part 90 Subpart I				

8.2 Clause 90.209 Occupied bandwidth

- (a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where §2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.
- (b) The maximum authorized single channel bandwidth of emission corresponding to the type of emission specified in §90.207 is as follows:
- (1) For A1A or A1B emissions, the maximum authorized bandwidth is 0.25 kHz. The maximum authorized bandwidth for type A3E emission is 8 kHz.
 - (2) For operations below 25 MHz utilizing J3E emission, the bandwidth occupied by the emission shall not exceed 3000 Hz. The assigned frequency will be specified in the authorization. The authorized carrier frequency will be 1400 Hz lower in frequency than the assigned frequency. Only upper sideband emission may be used. In the case of regularly available double sideband radiotelephone channels, an assigned frequency for J3E emissions is available either 1600 Hz below or 1400 Hz above the double sideband radiotelephone assigned frequency.
 - (3) For all other types of emissions, the maximum authorized bandwidth shall not be more than that normally authorized for voice operations.
 - (4) Where a frequency is assigned exclusively to a single licensee, more than a single emission may be used within the authorized bandwidth. In such cases, the frequency stability requirements of §90.213 must be met for each emission.
 - (5) Unless specified elsewhere, channel spacings and bandwidths that will be authorized in the following frequency bands are given in the following table:



Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.209 Occupied bandwidth			
Test date: June 11, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
Below 25*		
25–50	20	20
72–76	20	20
150–174	7.5	**20/11.25/6
216–220****	6.25	20/11.25/6
220–222	5	4
406–512*	6.25	**20/11.25/6
806–809/851–854	12.5	20
809–824/854–869	25	20
896–901/935–940	12.5	13.6
902–928**		
929–930	25	20
1427–1432****	12.5	12.5
2450–2483.5*		
Above 2500*		

* Bandwidths for radiolocation stations in the 420–450 MHz band and for stations operating in bands subject to this footnote will be reviewed and authorized on a case-by-case basis.

** Operations using equipment designed to operate with a 25 kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized a 11.25 kHz bandwidth. Operations using equipment designed to operate with a 6.25 kHz channel bandwidth will be authorized a 6 kHz bandwidth. All stations must operate on channels with a bandwidth of 12.5 kHz or less beginning January 1, 2013, unless the operations meet the efficiency standard of §90.203(j)(3).

*** The maximum authorized bandwidth shall be 12 MHz for non-multilateration LMS operations in the band 909.75–921.75 MHz and 2 MHz in the band 902.00–904.00 MHz. The maximum authorized bandwidth for multilateration LMS operations shall be 5.75 MHz in the 904.00–909.75 MHz band; 2 MHz in the 919.75–921.75 MHz band; 5.75 MHz in the 921.75–927.25 MHz band and its associated 927.25–927.50 MHz narrowband forward link; and 8.00 MHz if the 919.75–921.75 MHz and 921.75–927.25 MHz bands and their associated 927.25–927.50 MHz and 927.50–927.75 MHz narrowband forward links are aggregated.

****See §90.259.

Special notes

The RBW was set to 1 % of occupied bandwidth. VBW was set wider than RBW. The test was performed using a peak detector of spectrum analyzer.

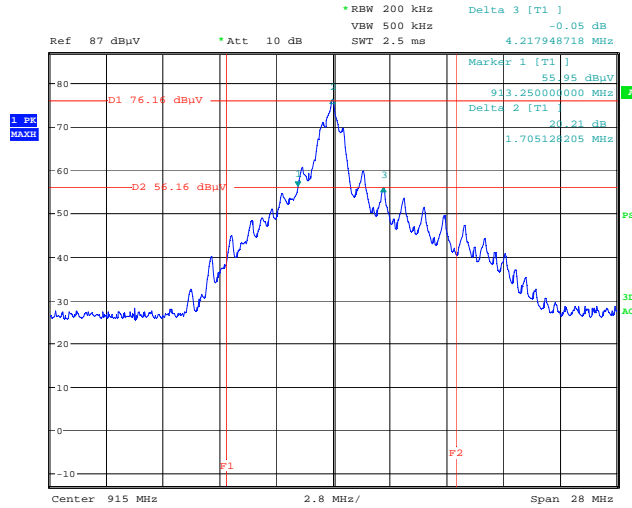


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.209 Occupied bandwidth			
Test date: June 11, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

Test data

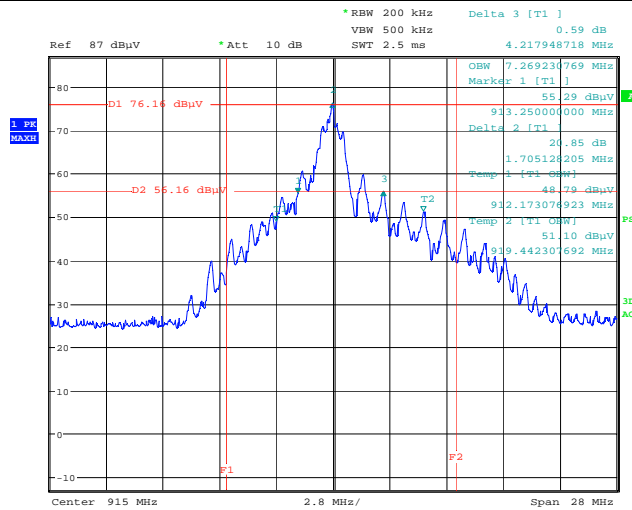
20 dB bandwidth results:



Date: 11.JUN.2010 08:11:45


Frequency (MHz)	Occupied bandwidth (MHz)	Limit (MHz)	Margin (MHz)
915	4.218	12.00	7.782

99 % occupied bandwidth results:



Date: 11.JUN.2010 08:12:22

Frequency (MHz)	99 % Occupied bandwidth (MHz)
915	7.269

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
	Test name: Clause 90.210 Emission mask			
	Test date: August 5, 2010		Test engineer: Andrey Adelberg	
	Verdict: Pass		Supply input: Battery	
	Temperature: 23 °C		Air pressure: 1009 mbar	Temperature: 23 °C
	Specification: FCC Part 90 Subpart I			

8.3 Clause 90.210 Emission mask

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating in the frequency bands governed under this part.

Frequency band (MHz)	Mask for equipment with Audio low pass filter	Mask for equipment without Audio low pass filter
Below 25	A or B	A or C
25–50	B	C
72–76	B	C
150–174	B, D, or E	C, D, or E
150 Paging only	B	C
220–222	F	F
421–512	B, D, or E	C, D, or E
450 Paging only	B	G
806–809/851–854	B	H
809–824/854–869	B	G
896–901/935–940	I	J
902–928	K	K
929–930	B	G
4940–4990	L or M	L or M
5850–5925		
All other bands	B	C

(k)(3) *Other transmitters.* For all other transmitters authorized under subpart M that operate in the 902–928 MHz band, the peak power of any emission shall be attenuated below the power of the highest emission contained within the licensee's sub-band in accordance with the following schedule:

- (i) On any frequency within the authorized bandwidth: Zero dB.
- (ii) On any frequency outside the licensee's sub-band edges: $55 + 10 \log(P)$ dB, where (P) is the highest emission (watts) of the transmitter inside the licensee's sub-band.

(4) In the 902–928 MHz band, the resolution bandwidth of the instrumentation used to measure the emission power shall be 100 kHz, except that, in regard to paragraph (2) of this section, a minimum spectrum analyzer resolution bandwidth of 300 Hz shall be used for measurement center frequencies with 1 MHz of the edge of the authorized subband. The video filter bandwidth shall not be less than the resolution bandwidth.

(5) Emission power shall be measured in peak values.

(6) The LMS sub-band edges for non-multilateration systems for which emissions must be attenuated are 902.00, 904.00, 909.75 and 921.75 MHz.

Special notes

The test was performed conducted on the specially modified unit for conducted measurements. The test was done using spectrum analyzer with peak detector and RBW was set to 100 kHz.

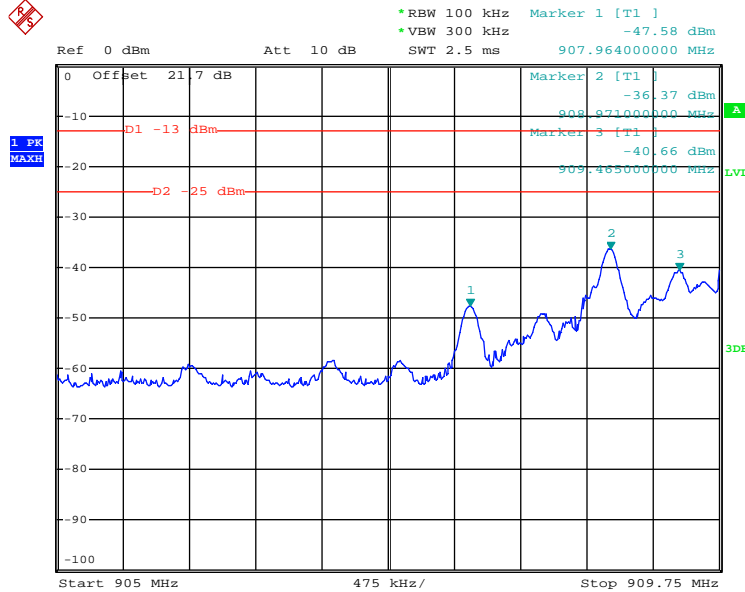


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.210 Emission mask			
Test date: August 5, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

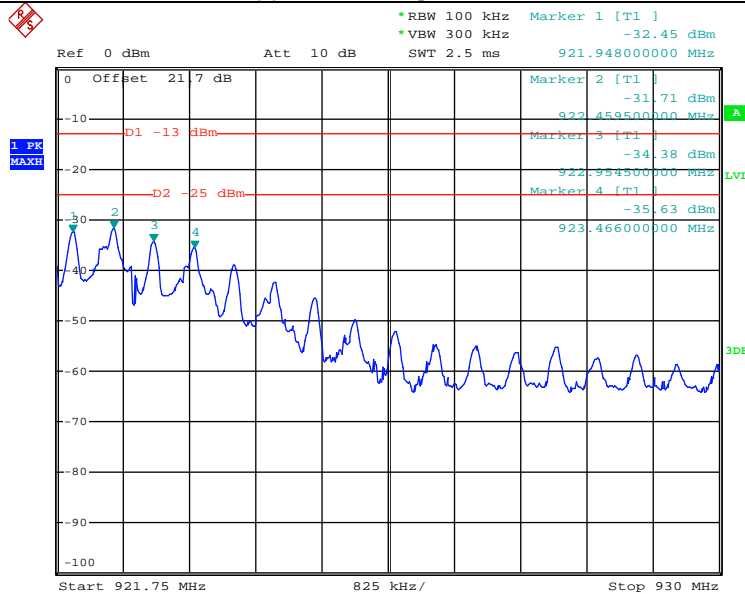
Test data

Lower band edge at 909.75 MHz




Date: 5.AUG.2010 06:23:14

Upper band edge at 921.75 MHz



Date: 5.AUG.2010 06:24:15

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
	Test name: Clause 90.210 Spurious emissions			
	Test date: June 11, 2010		Test engineer: Andrey Adelberg	
	Verdict: Pass		Supply input: Battery	
	Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I				

8.4 Clause 90.210 Spurious emissions

(k)(3)(ii) On any frequency outside the licensee's sub-band edges: $55 + 10 \log(P)$ dB, where (P) is the highest emission (watts) of the transmitter inside the licensee's sub-band.

Frequency range (MHz)	Attenuation below carrier (dBc)	ERP of spurious emissions (dBm)
30–10 th harmonic	$55 + 10 \log(P)$	-25

Special notes

The minimum RBW was set to 100 kHz. VBW was wider than RBW at any time. Radiated measurements were performed at the distance of 3 m. Two EUT possible positions were assessed; only worst-case emissions are reported.

Test data

Radiated measurements

Frequency (MHz)	Field strength (dB μ V/m)	Substitution factor (dB)	ERP (dBm)	Margin (dB)	Limit (dBm)
1681.6	64.37	115.40	-51.03	26.03	-25.00
1829.8	81.74	114.80	-33.06	8.06	-25.00
2744.5	77.90	110.50	-32.60	7.60	-25.00
3659.5	60.47	107.00	-46.53	21.53	-25.00

ERP = Field strength level – substitution factor.

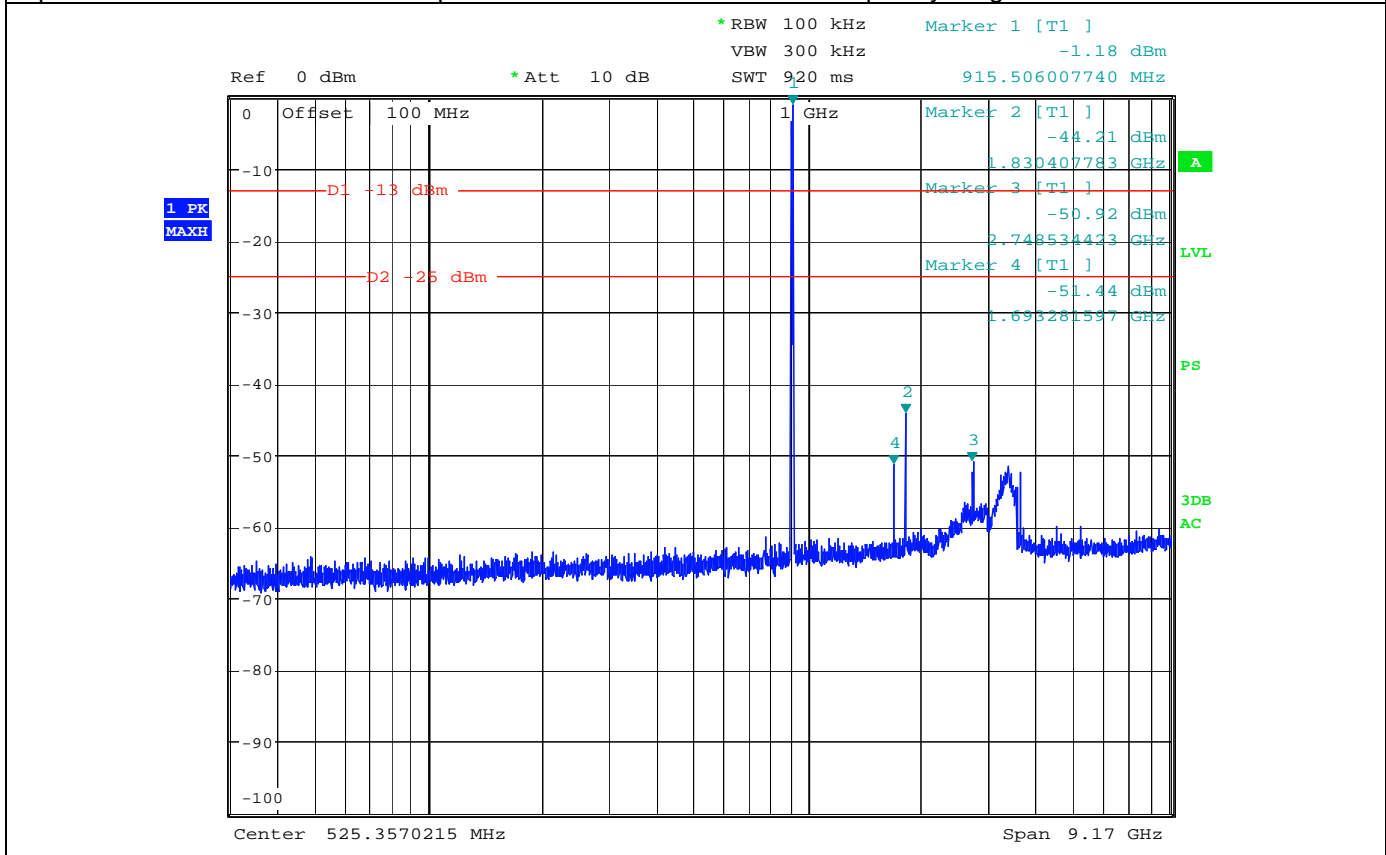


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Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.210 Spurious emissions			
Test date: June 11, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

Test data, continued

Spurious emissions at the antenna port within 30 MHz to 9200 MHz frequency range



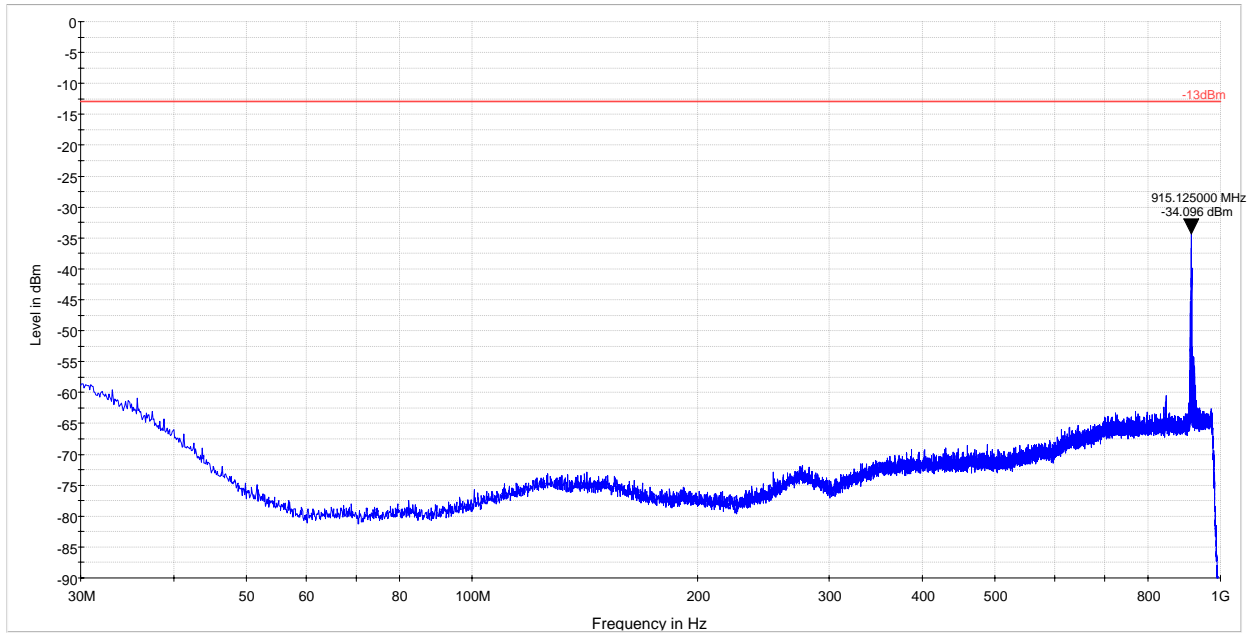


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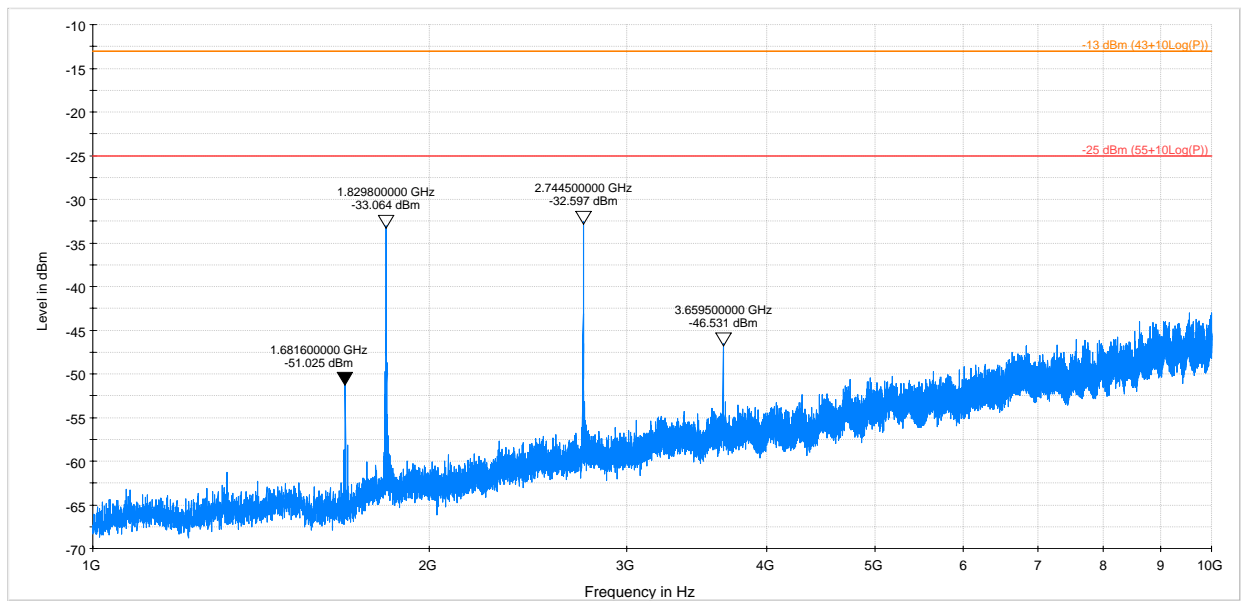
Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.210 Spurious emissions			
Test date: June 11, 2010		Test engineer: Andrey Adelberg	
Verdict: Pass		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

Test data, continued

Radiated spurious emissions



Radiated ERP emissions
— Peak detector
— -13dBm



Radiated spurious emissions
— -13 dBm (43+10Log(P))
— Peak detector
— -25 dBm (55+10Log(P))



Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
Test name: Clause 90.213 Frequency stability			
Test date: June 11, 2010		Test engineer: Andrey Adelberg	
Verdict: Noted		Supply input: Battery	
Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
Specification: FCC Part 90 Subpart I			

8.5 Clause 90.213 Frequency stability

a) Unless noted elsewhere, transmitters used in the services governed by this part must have minimum frequency stability as specified in the following table.

Frequency range (MHz)	Fixed and base stations (ppm)	Mobile stations (ppm)	
		Over 2 W output power	2 W or less output power
Below 25	100	100	200
25–50	20	20	50
72–76	5		50
150–174	5	5	50
216–220	1		1
220–222	0.1	1.5	1.5
421–512	2.5	5	5*
806–809	1	1.5	1.5
809–824	1.5	2.5	2.5
851–854	1	1.5	1.5
854–869	1.5	2.5	2.5
896–901	0.1	1.5	1.5
902–928	2.5	2.5	2.5
902–928*	2.5	2.5	2.5
929–930	1.5		
935–940	0.1	1.5	1.5
1427–1432	300	300	300
Above 2450			

* - Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.


Special notes

Since the EUT is a mobile transponder it is exempt from this requirement.

Test data

Test conditions	Frequency (Hz)	Offset* (ppm)
+50 °C, Nominal	914958229.636	3.39
+40 °C, Nominal	914959442.958	4.72
+30 °C, Nominal	914957131.636	2.19
+20 °C, +15 %	914955120.314	-0.01
+20 °C, Nominal	914955128.205	Reference
+20 °C, -15 %	914955211.277	0.09
+10 °C, Nominal	914951746.284	-3.70
0 °C, Nominal	914950744.064	-4.79
-10 °C, Nominal	914950266.067	-5.31
-20 °C, Nominal	914948705.220	-7.02
-30 °C, Nominal	914949954.020	-5.66

* Note: Offset calculation:
$$\frac{F_{Measured} - F_{reference}}{F_{reference}} \times 10^6$$

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder		
	Test name: Clause 90.353 LMS operations in the 902–928 MHz band				
	Test date: June 11, 2010		Test engineer: Andrey Adelberg		
	Verdict: Pass		Supply input: Battery		
	Temperature: 23 °C		Air pressure: 1009 mbar	Temperature: 23 °C	
	Specification: FCC Part 90 Subpart M				

8.6 Clause 90.353 LMS operations in the 902–928 MHz band


LMS systems may be authorized within the 902–928 MHz band, subject to the conditions in this section. LMS licensees are required to maintain whatever records are necessary to demonstrate compliance with these provisions and must make these records available to the Commission upon request:

(h) Non-multilateration stations are authorized to operate on a shared, non-exclusive basis in the 902–904 MHz and 909.75–921.75 MHz sub-bands. Non-multilateration systems and multilateration systems will share the 919.75–921.75 MHz band on a co-equal basis. Non-multilateration LMS systems may not provide non-vehicular location services. The maximum antenna height above ground for non-multilateration LMS systems is 15 meters.

(i) Non-multilateration LMS licenses will be issued on a site-by-site basis, except that municipalities or other governmental operatives may file jointly for a non-multilateration license covering a given U.S. Department of Commerce Bureau of Economic Analysis Economic Area (EA). Such an application must identify all planned sites. After receiving the license, the non-multilateration EA licensee must notify the Commission if sites are deleted or if new sites are added, before those sites may be put into operation.

Special notes

The EUT operates within 909.75–921.75 MHz band. The only operational frequency is 915 ±0.6 MHz.

 Nemko Canada Inc., 303 River Rd, Ottawa, ON, Canada, K1V 1H2	Section 8: Testing data		Product: CVO Pre-trip Inspection Transponder	
	Test name: Clause 90.357 Frequencies for LMS systems in the 902–928 MHz band			
	Test date: June 11, 2010		Test engineer: Andrey Adelberg	
	Verdict: Pass		Supply input: Battery	
	Temperature: 23 °C	Air pressure: 1009 mbar	Temperature: 23 °C	
	Specification: FCC Part 90 Subpart I			

8.7 Clause 90.357 Frequencies for LMS systems in the 902–928 MHz band

(b) Non-multilateration LMS systems will be authorized in the following frequency bands:

LMS sub-band*
902.00–904.00 MHz
909.75–921.75 MHz

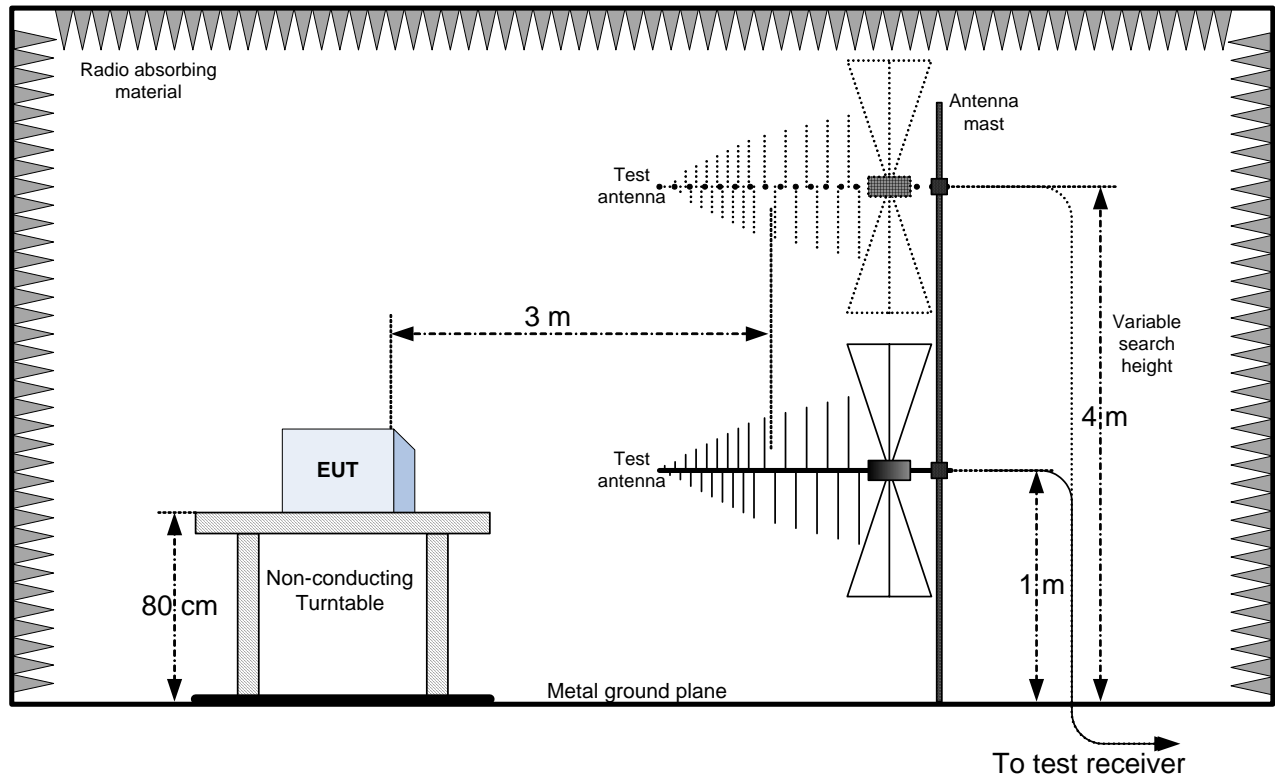
*- Applicants for non-multilateration LMS systems should request only the minimum amount of bandwidth necessary to meet their operational needs.

Special notes

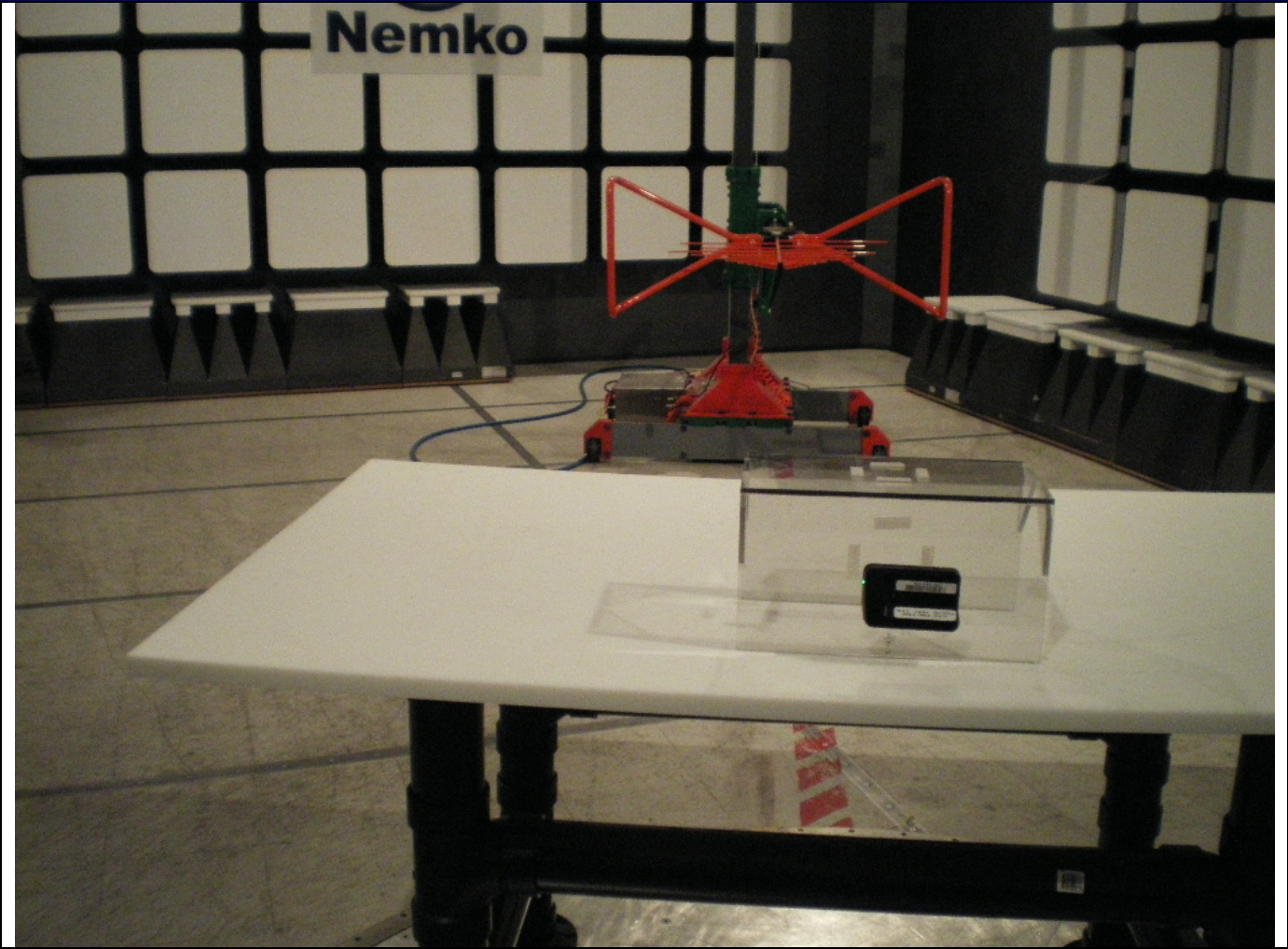
The EUT operates within 909.75–921.75 MHz band. The only operational frequency is 915 ±0.6 MHz.

Section 9: Block diagram and photos of test set-up

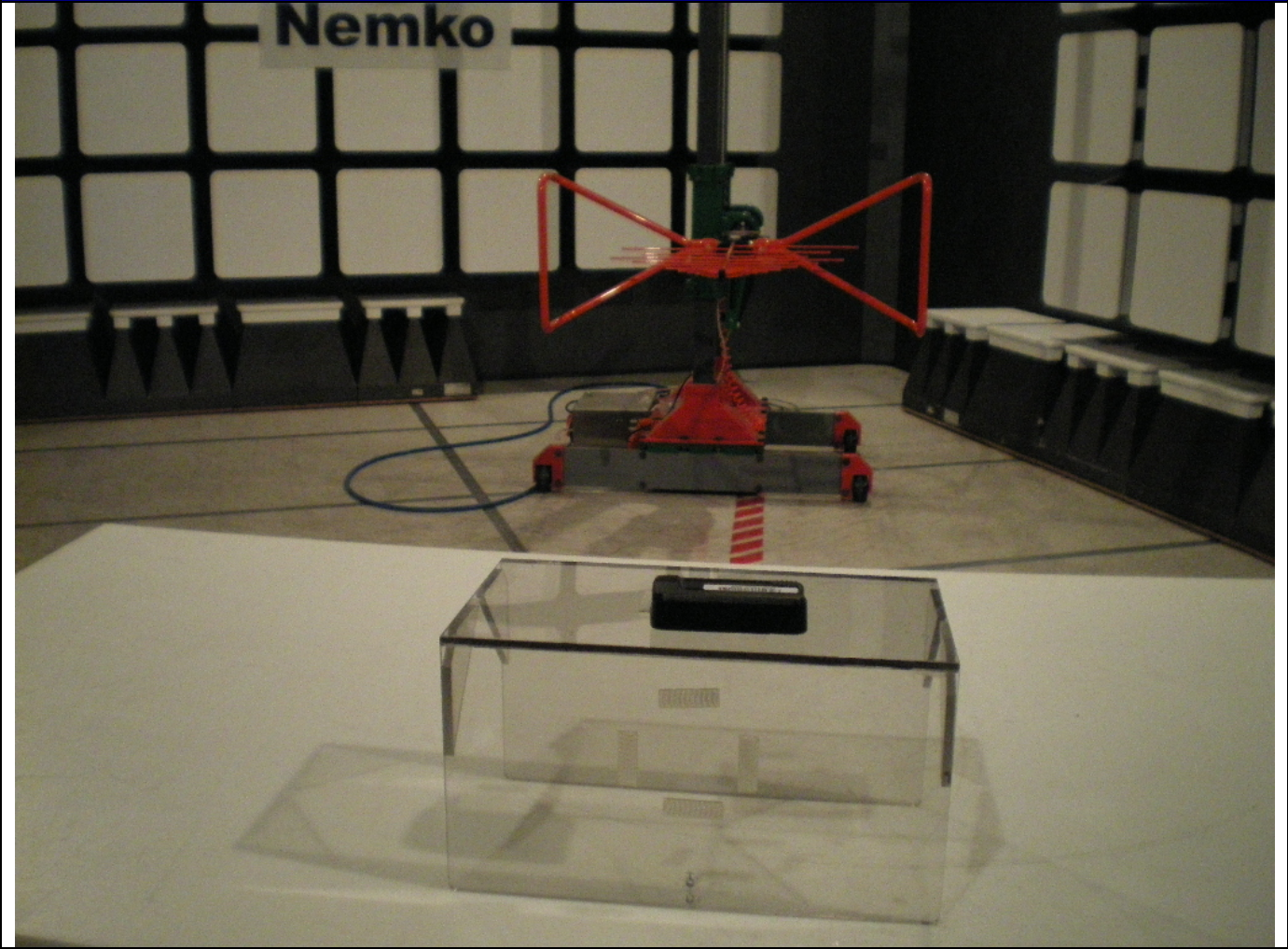
Radiated emissions set-up



EUT on side position setup



EUT on top position setup



Section 10: EUT photos

EUT external photos



EUT external photos, continued

