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Testing of

Electromagnetic Emissions

per

USA: CFR Title 47, Part 15.247 (Emissions) USA: CFR Title 47, Part 2.1091;2.1093 (Exposure) Canada: ISED RSS-247/GENe (Emissions) Canada: ISED RSS-102 (Exposure)

are herein reported for

Nutek Corporation 4360568

Test Report No.: 20160407-RPTVOXX10001Cr1 Copyright © 2016

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Report by:	Dr. Joseph Frunett, EMC-002790-NE	Report Date of Issue:	April 7, 2016

Results of testing completed on (or before) March 16, 2016 are as follows.

Emissions: The transmitter intentional emissions **COMPLY** with the regulatory limit(s) by no less than 11.1 dB. Transmit chain spurious or harmonic emissions **COMPLY** by no less than 3.0 dB.

Revision History

Rev.	No.	Date	Details	Revised By
r0 r1		April 7, 2016 May 29, 2016	Initial Release. Update RF Exposure for Mobile Use.	J. Brunett J. Brunett
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1 Test Specifications, Procedures, Location, and Equipment List

1.1 Test Specification and General Procedures

The ultimate goal of Nutek Corporation is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Nutek Corporation 4360568 for compliance to:

Country/Region	Rules or Directive	Referenced Section(s)
United States	Code of Federal Regulations	CFR Title 47, Part 15.247
Canada	ISED Canada	ISED RSS-247/GENe

Nutek Corporation has determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

ANSI C63.4:2014	"Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" $$
ANSI C63.10:2013 (USA)	"American National Standard of Procedures for Compliance Testing of Unli- censed Wireless Devices"
FCC DA 00-705	"Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems"
CFR 47 2.1091/1093	"447498 D01 General RF Exposure Guidance v06: RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices"
ISED Canada	"The Measurement of Occupied Bandwidth"
ISED Canada RSS-102	"Radio Frequency (RF) Exposure Compliance of Radiocommunication Appa- ratus (All Frequency Bands)"

1.2 Test Location

The EUT was fully tested by **Willow Run Test Labs, LLC**, 8501 Beck Road, Building 2227, Belleville, Michigan 48111 USA. Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: 688478) and with ISED Canada, Ottawa, ON (File Ref. No: IC 8719A-1). Table 1 lists all site(s) employed herein. Specific test sites utilized are also listed in the test results sections of this report.

Table 1: Test Site List.

Description	Location	Quality Num.
OATS (3 meter)	8501 Beck Rd. Bldg 2227, Belleville MI 48111	OATSA

1.3 Equipment Used

Pertinent test equipment used for measurements at this facility is listed in Table 2. The quality system employed at Willow Run Test Labs, LLC has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards.

Description	Manufacturer/Model	\mathbf{SN}	Quality Num.	Last Cal By / Date Due
Spectrum Analyzer	Rhode-Schwarz / FSV30	101660	RSFSV30001	RS / May-2018
Dipole Set (20-1000 MHz)	EMCO / 3121C	9504 - 1121	DIPEMC001	Lib. Labs / Sep-2016
Quad Ridge Horn	ETS Lind. / 3164-04	00066988	HRNQR316401	Lib. Labs / April-2017
LS-Band Horn	JEF / NRL Std.	001	HRN15001	WRTL / Jul-2016
S-Band Horn	SA / NRL Std.	1854	HRNS001	WRTL / Jul-2016
C-Band Horn	SA / NRL Std.	-	HRNC001	WRTL / Jul-2016
Quad Ridge Horn	Singer / A6100	C35200	HQR2TO18S01	Lib. Labs / April-2017

2 Configuration and Identification of the Equipment Under Test

2.1 Description and Declarations

The EUT is a vehicular FHSS transceiver. The EUT is approximately 14 x 12 x 2 cm in dimension, and is depicted in Figure 1. It is powered by a 12.0 VDC vehicular power system. This device is a wireless FHSS communication device for control of vehicle remote start functionality. Table 3 outlines provider declared EUT specifications.



Figure 1: Photos of EUT.

Table 3: EUT Declarations	Table 3	3:	EUT	Declarations.
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General Declarations			
Equipment Type:	FHSS Transceiver	Country of Origin:	Taiwan
Nominal Supply:	12.0 VDC	Oper. Temp Range:	-20° C to $+85^{\circ}$ C
Frequency Range:	904 - 923.6 MHz	Antenna Dimension:	Not Declared
Antenna Type:	Integral or Ext. Dipole	Antenna Gain:	3.1 dBi (Int), 1.6 dBi (Ext)
Number of Channels:	50	Channel Spacing:	400 kHz
Alignment Range:	Not Declared	Type of Modulation:	GFSK
United States			
FCC ID Number:	ELVATRPG	Classification:	FHSS
Canada			
IC Number:	3671B-43605680	Classification:	Spread Spectrum

2.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 2.

2.1.2 Modes of Operation

The EUT is capable of only a single operating mode, as an FHSS transceiver employing GFSK modulation over 50 channels from 904 MHz to 923.6 MHz with 400 kHz channel spacing. Only one antenna may be employed by the EUT at a time.

2.1.3 Variants

There is only a single variant of the EUT, as tested.

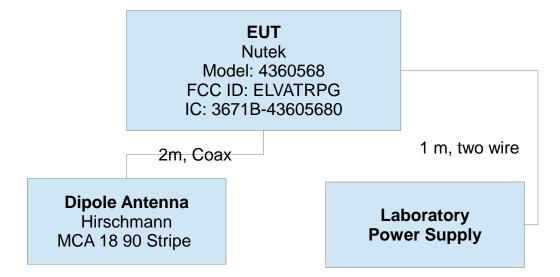


Figure 2: EUT Test Configuration Diagram.

2.1.4 Test Samples

Four samples in total were provided. Two software modified samples capable of CW transmission on the Low, Middle, and High channels for the internal and external antennas, a normal operating sample, and a normal sample modified with an RF coaxial cable attached to the internal antenna output were provided. A fifth unmodified sample was provided for photographs.

2.1.5 Functional Exerciser

Normal operating EUT functionality was verified by observation of transmitted signal.

2.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory.

2.1.7 Production Intent

The EUT appears to be a production ready sample.

2.1.8 Declared Exemptions and Additional Product Notes

The EUT is permanently installed in a transportation vehicle. As such, digital emissions are exempt from US and Canadian digital emissions regulations (per FCC 15.103(a) and ISED correspondence on ICES-003). There is an external antenna port populated on the device to allow for a manufacturer supplied alternative antenna to be used in the vehicle. The transceiver will switch over the use the antenna populating the external port only if a proper DC return level is detected on the antenna port. This prevents use of any antenna other than the one supplied by the manufacturer from being used. The EUT employs a unique antenna connector (Hirose GT21T-1S-HU).

3 Emissions

3.1 General Test Procedures

3.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first pre-scanned in our shielded anechoic chamber or GTEM test cell. Spectrum and modulation characteristics of all emissions are recorded. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.2 are employed. After pre-scan, emission measurements are made on the test site of record. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in relevant test standards are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 3. All intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded.

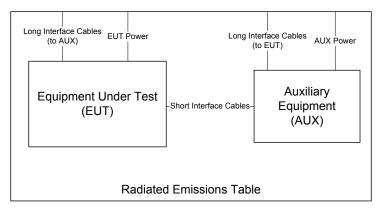


Figure 3: Radiated Emissions Diagram of the EUT.

If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied. For devices with intentional emissions below 30 MHz, a shielded loop antenna is used. It is placed at a 1 meter receive height. Emissions between 30 MHz and 1 GHz are measured using tuned dipoles and/or calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360° in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain horn or broadband ridge-horn antennas on our OATS with a 4×5 m rectangle of H-4 absorber placed over the ground screen covering the OATS ground screen. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to $dB\mu V/m$ at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where P_R is the power recorded on spectrum analyzer, in dBm, K_A is the test antenna factor in dB/m, K_G is the combined pre-amplifier gain and cable loss in dB, K_E is duty correction factor (when applicable) in dB, and C_F is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is computed, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.

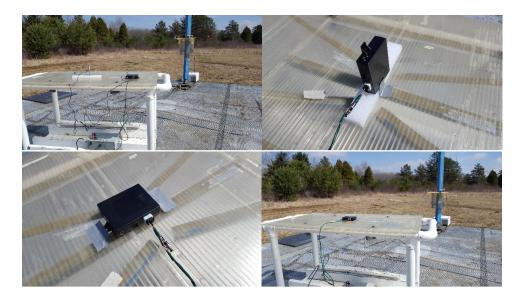


Figure 4: Radiated Emissions Test Setup Photograph(s).

3.1.2 Conducted Emissions Test Setup and Procedures

Transmit Antenna Port Conducted Emissions At least one sample EUT supplied for testing was provided with a 50Ω antenna port. Conducted transmit chain emissions measurements (where applicable) are made by connecting the EUT antenna port directly to the test receiver port. Photographs of the test setup employed are depicted in Figure 5.



Figure 5: Conducted RF Test Setup Photograph(s).

Vehicle Power Conducted Spurious The EUT is not subject to power line conducted emissions regulations as it is powered solely by the vehicle power system for use in said motor vehicle.

3.1.3 Power Supply Variation

Tests at extreme supply voltages are made if required by the the procedures specified in the test standard, and results of this testing are detailed in this report.

3.1.4 Thermal Variation

Tests at extreme temperatures are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report. The provider has declared that the EUT is designed for operation over the temperature range -20° C to $+85^{\circ}$ C. Before any temperature measurements are made, the equipment is allowed to reach a thermal balance in the test chamber, temperature and humidity are recorded, and thermal balance is verified via a thermocouple–based probe.

3.2 Intentional Emissions

3.2.1 Duty and Transmission Cycle, Pulsed Operation

The details and results of testing the EUT for pulsed operation are summarized in Table 4.

Table 4: Pulsed Emission Characteristics (Duty Cycle).

	requency Rang 914 MHz IMHz to 929 MI		Det Pk Pk	IFBW 100 kHz 28 MHz	VBW 300 kHz 28 MHz		Test Date: st Engineer: EUT s. Distance:	15-Mar-16 Joseph Brunett Nutek IVU – Small Conducted		
Pulsed Operation / Duty Cycle										
Transmit Mode	Symbol Rate	Mod. / Data Rate	Voltage	Observation Freq	Tx Cycle Time*	On-Time**	Duty Cycle	Single Channel Duty Correction		
Transmit Wode	(Msym/s)	(Mbps)	(V)	(MHz)	(ms)	(ms)	(%)	(dB)		
Hopping	-	GFSK	12.0	914.0	>100	62.5	62.5	4.1		
Transmit Mode	Symbol Rate	Mod. / Data Rate	Voltage	Observation Freq	Exposure Window	On-Time***	Duty Cycle	Exposure Duty Correction		
Transmit Wode	(Msym/s)	(Mbps)	(V)	(MHz)	(min)	(s)	(%)	(dB)		
Hopping	-	GFSK	12.0	Full Band	6.0	7.2	2.000	17.0		
		ITT'		1. 1	1 1. 1 .1	1	1	1		

* For a single remote button press, the EUT's response hopping transmission only traverses each channel twice, thus only two frames are observed.

** Worst case observed on-time at a single channel (same on average for all channels in pseudo-random FHSS protocol).

*** Worst case observed on-time over all channels upon single remote activation (button press).

Equipment Used: RSFSV30001

3.2.2 Hopping Channel Dwell Time

The average time of occupancy on any hopping channel must not be greater than 0.4 seconds within a 20 second period for FHSS device with 50 operating channels. For this test, the EUT was set for data transmission with hopping enabled. Results of this testing are depicted in Table 5. Plots showing example measurements made

Table 5: Hopping Channel Dwell Time.

Frequency 25 MHz f f f > 1 000	1 000 MHz		Det Pk/QPk Pk		IF Bandwidth 120 kHz 1 MHz	Video Bandwidth 300 kHz 3 MHz	Test Date: Test Engineer: EUT: Meas. Distance:	15-Mar-16 Joseph Brunett Nutek IVU – Small Conducted
				Dw	ell Time			
Mode	Frequency	# Bursts	Observation Time	Window	Active Time	Total On Time**	Limit	Pass/Fail
Mode	(MHz)	#	(sec)	(sec)	(sec)	(sec)	(sec)	
	904.0	1	10.0	20.0	0.1250	0.2500	<0.4	Pass
Hopping	914.0	1	10.0	20.0	0.1250	0.2500	<0.4	Pass
	923.6	1	10.0	20.0	0.1250	0.2500	<0.4	Pass

* Dwell Time Observed with EUT automatically activated hopping.

** Only two frames occur per channel in the hopping sequence for a single automatic activation in a 10 second window.

Equipment Used: RSFSV30001

to obtain these values are provided in Figure 6.

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						-														

Figure 6: Example Plots of Duty Cycle and Channel Dwell Time.

3.2.3 Channel Bandwidth

For this test, the EUT was set continuous data transmission (hopping disabled) in each modulation. The 20-dB bandwidth as well as 99% emission bandwidth were measured for the low, middle, and high channels. Results of these measurements are shown in Table 6. Plots showing example measurements employed to obtain this data are provided in Figure 8.

Table 6: Intentional Emission Bandwidth.

Frequency Range f > 1 000 MHz f > 1 000 MHz			Det Pk Pk	IFBW 30 kHz 30 kHz	VBW 100 kHz 100 kHz			Test Date: Test Engineer: EUT Meas. Distance:	03/15/16 Joseph Brunett Nutek IVU – Small Conducted
				(Occupied Ban	dwidth			
Transmit Mode	Symbol Rate	Data Rate	Voltage	Oper. Freq	6 dB BW	6 dB BW Limit	99% OBW	20 dB BW	Comments
I ransmit Mode	(Msym/s)	(Mbps)	(V)	(MHz)	(kHz)	(MHz)	(kHz)	(kHz)	
				904.0	48.45	-	88.412	92.41	
GFSK	-	-	3.0	914.0	48.45	-	86.913	91.41	

87.413

90.91

47.45

923.6

Equipment Used: RSFSV30001

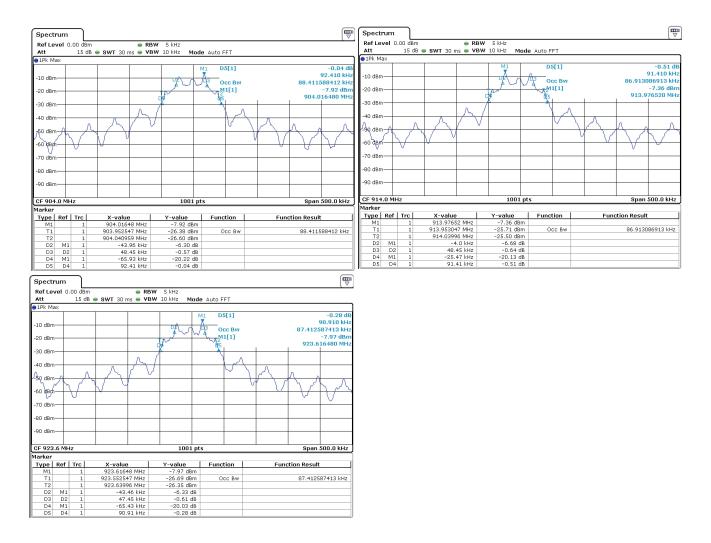


Figure 7: Intentional Emission Bandwidth.

3.2.4 Number of Hopping Channels

For this test, the EUT was enabled for data transmission with hopping. The number of channels measured is reported here in Table 7.

Frequency Range	Det	IF Bandwidth	Video Bandwidth	Test Date:	15-Mar-16
25 MHz f 1 000 MHz	Pk/QPk	100/120 kHz	300 kHz	Test Engineer:	Joseph Brunett
$f > 1 \ 000 \ MHz$	Pk	100 kHz	3 MHz	EUT:	Nutek IVU - Small
				Meas. Distance:	Conducted
	Num	ber of Honning Ch	annels		

	Number of Hopping Channels											
Mode	Start Frequency	Stop Frequency	Number of Channels Observed	Total Number	Limit	Pass/Fail						
Mode	(MHz)	(MHz)	(#)	(#)	(#)							
Hopping	902.0	928.0	50	50	50.0	Pass						

Equipment Used: RSFSV30001

3.2.5 Channel Separation

For this test, the EUT was enabled for data transmission with hopping. The Carrier Separation was measured for low, mid, and high channels. Results of these measurements are shown in Table 8.

Table 8: Measured (Channel Separation.
---------------------	---------------------

Frequency Range	Det	IF Bandwidth	Video Bandwidth	Test Date:	15-Mar-16
25 MHz f 1 000 MHz	Pk/QPk	100/120 kHz	300 kHz	Test Engineer:	Joseph Brunett
f > 1 000 MHz	Pk	100 kHz	3 MHz	EUT	Nutek IVU – Small
				Meas. Distance:	Conducted

Hopping Frequency Separation											
Mod	Low Channel	High Channel	Separation	Min. Separation Limit	Pass/Fail						
Iviou	(MHz)	(MHz)	(kHz)	(kHz)							
	904.0	904.4	398.000	92.41	Pass						
GFSK	914.0	914.4	403.500	92.41	Pass						
	923.2	923.6	400.000	92.41	Pass						

* Channel Separation Observed with the Device hopping over all available channels.

Equipment Used: RSFSV30001

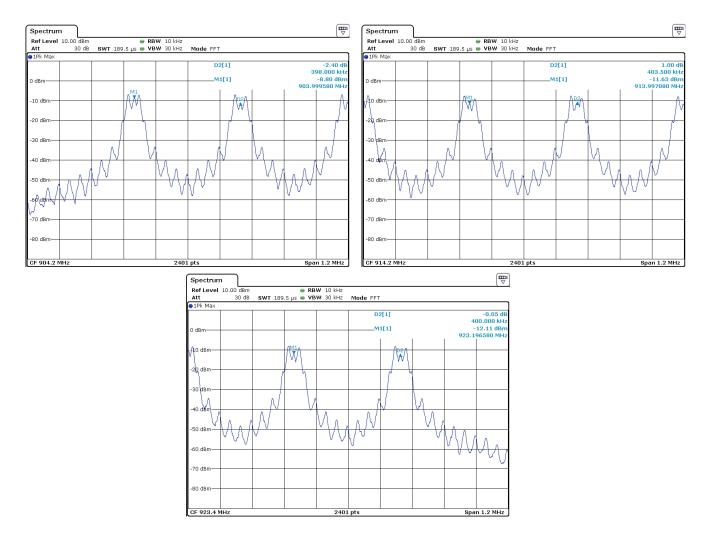


Figure 8: Measured Channel Separation.

3.2.6 Effective Isotropic Radiated Power

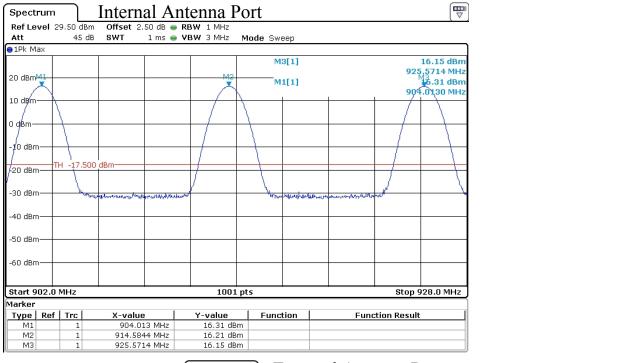
The EUT's radiated power is computed from antenna port conducted power measurements and the gain of the EUT antenna(s). Where the EUT is not sold with an antenna connector, a modified product has been provided including such. Peak conducted output power was measured directly from the EUT at the port where the antenna attaches. The test receiver bandwidth was set to be greater than the measured emission bandwidth of the EUT to capture the true peak. Antenna gain is either provided directly by the antenna manufacturer or measured by comparison between calculated EIRP and conducted output power. Table 9 details the results of these measurements. Plots showing conducted measurements made are depicted in Figure 9.

Table 9: Radiated Power Results.

	Frequency F	Range		Det	IFI	Bandwidth		Video	Bandwidth		Test Date:	17-Feb-16	
	25 MHz f	0	Hz	Pk/OPk		20 kHz			0 kHz		Test Engineer:	Joseph Brun	
	f > 1 000 MF			Pk/Avg		3 MHz			MHz		EUT:	Nutek IVU – S	
		ent Used:	HRN15	0				0			Meas. Distance:	3m	
	Equipin	ent obeu.	man	501, 1015	15000	,1					incus: Distunce:	5111	
						1				,			FCC/IC
			Freq.	Ant.	Ant.	Pr (Pk)**	Ka	Kg	EIRP (Pk)	Pout* (Pk)	Ant Gain	EIRP (Avg) Limit	Pass
#	Antenna	Channel	MHz	Used	Pol.	(dBm)	(dB/m)	(dB)	(dBm)	(dBm)	(dBi)	(dBm)	(dB)
1		1	904.0	Dipole	Н	7.1	28.3	28.7	18.6	16.3	2.3	30.0	11.4
2		1	904.0	Dipole	V	6.3	28.3	28.7	17.9	16.3	1.6	30.0	12.1
3	Internal	25	914.0	Dipole	Η	7.2	28.5	28.6	18.9	16.2	2.7	30.0	11.1
4	Internat	25	914.0	Dipole	V	6.0	28.5	28.6	17.7	16.2	1.5	30.0	12.3
5		50	923.6	Dipole	Η	6.9	28.6	28.5	18.8	16.2	2.6	30.0	11.2
6		50	923.6	Dipole	V	5.1	28.6	28.5	17.0	16.2	0.8	30.0	13.0
7													
8		1	904.0	Dipole	Н	5.1	28.3	28.7	16.6	16.3	0.3	30.0	13.4
9	1	1	904.0	Dipole	V	4.6	28.3	28.7	16.2	16.3	-0.1	30.0	13.8
10		25	914.0	Dipole	Н	5.4	28.5	28.6	17.1	16.1	1.0	30.0	12.9
11	External	25	914.0	Dipole	V	5.0	28.5	28.6	16.7	16.1	0.6	30.0	13.3
12		50	923.6	Dipole	Η	5.8	28.6	28.5	17.7	16.1	1.6	30.0	12.3
13		50	923.6	Dipole	V	4.1	28.6	28.5	16.0	16.1	-0.1	30.0	14.0
14													
			Freq.	Supply	Ant.	Pout* (Pk)	1						
#	Antenna	Channel	MHz	Voltage	Pol.	(dBm)							
8			914.0	14.0	H/V	7.1							
9	Internal	25	914.0	12.0	H/V	7.2							
10	-		914.0	10.0	H/V	7.2							
	* Measured o						mula			I	1		

* Measured conducted from the radio using conducted test sample.

** Measured radiated at 3 meter distance. Peak power measured with IFBW > OBW



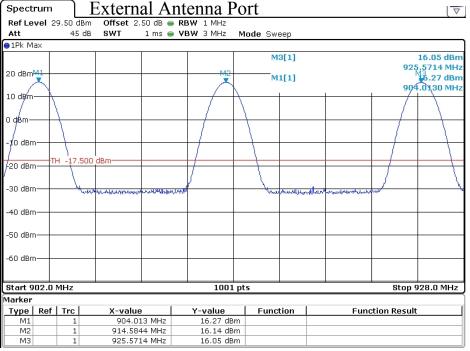


Figure 9: Conducted RF Power Plots

3.2.7 Exposure and Potential Health Hazard

To demonstrate compliance with with regulations that place limitations on human electromagnetic field exposure for both the general public and for workers, we compute EIRP from measured emission data. These levels are compared with limits placed by the directives and recommendations detailed in Section 1.1. Table 10 details the results of these computations.

Table 10: Electromagnetic Field Exposure.

USA REF: 2.1091/1093, 447498 D01 General RF Exposure Guidance v06	Test Date:	17-Feb-16
IC REF: RSS-102 Issue 5	Test Engineer:	Joseph Brunett
Sep. Distance: >20cm	EUT:	Nutek IVU – Small
	EUT Mode:	Hopping
	Meas. Distance:	3 meters

					Canada	USA
					Worst Case	
			Worst Case		Source Based	
			Source Based		Time Averaged	
			Time Averaged	Power Density	Threshold	Power Density
Freq.	Pout* (Pk)	EIRP* (Pk)	Po/EIRP(Pk)**	S @ 20cm	(Avg)	Limit S @ 20cm
MHz	dBm	dBm	mW	mW/cm^2	mW	mW/cm^2
904.0	16.3	18.6	72.0	0.0143	1372.5	1.0
914.0	16.2	18.9	77.5	0.0154	1382.9	1.0
923.6	16.2	18.8	75.9	0.0151	1392.8	1.0

*As Measured / Computed from highest fundamental emission, see fundamental emission section of this report.

**Only RMS level is required, RMS/6min << Pk, Peak emission employed to demonstrate compliance.

3.3 Unintentional Emissions

3.3.1 Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 11. Measurements are performed to 10 times the highest fundamental operating frequency.

Table 11: Transmit Chain Spurious Emissions.

r > 1 00 Hz PL 00 Hz PL 02 PL 02<	Frequency Range 25 MHz f 1 000 MHz		0	Det Pk/OPk	IF Bandwidth Video Bandwidth						Test Date: Engineer:			
Fey Bar Jey												0	1	
Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Processes Proces Pro													Mode:	Hopping / CW
Freq. Starl. Freq. Starl. Ant. Ant. Pr (Pk/Avg) Ka Kg EXPR> EXAPL BiA vgLim Pass 1 External Ant=mart Used Ant. Ant. Ant. Pr (Opk/Avg) Ads BdB/W B			1	Equipment Used:	RSFSV3	0001						Meas.	Distance:	3m
#MHzMHzUsedPol.dBmdBmdBdBpdBp/VmdB														FCC/IC
1 External Automatical Band Edge (Low Side) 2 Fundamental Band Edge (Low Side) 3 902.0 Dipole H/V -56.9 -64.8 28.3 28.7 49.7 41.8 46.0 4.2 hopping 5 928.0 Dipole H/V -59.9 -66.2 28.6 28.4 47.3 41.0 46.0 5.0 hopping 6 Harmonic / Spurious Emiscions		Freq. Start	Freq. Stop	Ant.	Ant.	Pr (Pk/Avg)	Pr (Qpk/Avg)*	Ka	Kg	E3(Pk)	E3(Avg)	E3 Avg Lim	Pass	
2 Fundamental Band Edge (Low Side) 3 902.0 902.0 Bropie HV -56.9 -64.8 28.3 28.7 41.8 46.0 4.2 hopping 5 928.0 928.0 Dipole HV -59.9 -662.2 28.6 28.4 47.3 41.0 40.0 45.0 hopping 6 Harmonic /// Survis Emistre Emistre Emistre Emistre Emistre Emistre Emistre 10.2 42.9 38.8 54.0 15.2 8 1828.0 187.2 HRNIS HV -48.2 -48.3 20.2 30.1 35.0 54.0 19.2 10 212.0 271.2 HRNS HV -76.8 -80.9 21.6 -0.3 48.8 44.7 54.0 6.0 10.1 270.8 HRNS HV -76.8 -80.9 21.6 -0.3 52.1 48.0 10.1 1.0 1.0 1.0 4.0 4.0 <t< td=""><td>#</td><td>MHz</td><td>MHz</td><td>Used</td><td>Pol.</td><td>dBm</td><td>dBm</td><td>dB/m</td><td>dB</td><td>$dB\mu V\!/\!m$</td><td>$dB\mu V\!/\!m$</td><td>dBµV/m</td><td>dB</td><td>Comments</td></t<>	#	MHz	MHz	Used	Pol.	dBm	dBm	dB/m	dB	$dB\mu V\!/\!m$	$dB\mu V\!/\!m$	dBµV/m	dB	Comments
3902.0902.0DipoleH/V-56.9-66.228.028.747.841.846.04.2hopping6928.0DipoleH/V-59.9-66.228.628.447.341.045.05.0hopping6HarrowHarrowHarrowHKNH/V-59.9-66.228.628.447.341.045.05.0hopping71808.0HRNSH/V-87.2-91.320.8-0.240.938.854.017.2-91847.2HRNSH/V-87.2-91.320.8-0.239.135.054.019.0-102712.0HRNSH/V-87.0-81.021.6-0.352.047.954.06.0-112742.0274.0HRNSH/V-76.948.1021.6-0.352.047.954.06.0-12270.8365.0HRNSH/V-76.948.021.6-0.352.144.040.054.017.1-13361.0HRNSH/V-76.948.023.36.044.440.354.016.1-14365.0365.0HRNSH/V-78.948.023.36.044.440.355.037.442.115369.4HRNSH/V-83.945.443.554.443.055.037.4-15 <td>1</td> <td>External A</td> <td>ntenna</td> <td></td>	1	External A	ntenna											
4 Fundamental Bande Ether Bisle V -5.9 0.662 2.8.6 2.8.4 47.3 41.0 46.0 5.0 hopping 5 928.0 928.0 Bislos HEMMOIC Symptones Theores V 47.3 41.0 46.0 5.0 hopping 7 1898.0 HENLS HV -85.2 -89.3 20.9 4.2. 42.9 38.8 54.0 17.2 1818.2 HENLS HV -85.2 -93.0 20.8 -0.2 39.0 35.0 54.0 19.0 10 2171.20 HRNS HV -88.0 43.0 21.6 -0.3 48.8 44.7 54.0 6.0 12 270.8 HRNS HV -76.8 48.09 21.6 -0.3 52.1 48.0 54.0 11.3 13 3616.0 365.0 HRNS HV -85.2 48.9 42.1 45.0 14.0 10.0 12.3 13 3616.0	2	Fundamenta	al Band Edg	e (Low Side)										
5 9280 9280 Dipole HV -599 -662 28.6 28.4 47.3 41.0 46.0 5.0 hopping 6 Harrox Variou Variou Variou 42.9 48.8 41.0 15.0 15.0 8 18820 18820 HRNLS HV 8.72 4.903 20.8 40.2 30.1 5.80 54.0 17.2 9 18720 21720 HRNLS HV -880.0 4.81.0 20.6 30.1 5.80 54.0 9.3 10 27120 21720 HRNS HV -860.0 4.81.0 21.6 4.03 52.0 45.0 5.0 6.0 12 2778.0 JRNS HV -76.0 4.80.0 21.6 4.03 5.10 5.0 6.0 13 364.0 364.0 HRNS HV -76.9 4.80.0 4.02 4.10 5.0 1.0 1.2 14 365.0 369.4 HRNS HV 4.83.0 4.0 4.5 4.1 5.0 1.2 15 364.0 10.2 HRNS HV 4.83.0 4.0 4.5 4.1 5.0 1.2		/ 0=10			H/V	-56.9	-64.8	28.3	28.7	49.7	41.8	46.0	4.2	hopping
6 Harnonic / Spurious Emissions 100 100 100 100 100 100 100 100 100 7 1808.0 1808.0 HRNLS H/V 485.2 -490.3 20.9 -0.2 42.9 38.8 54.0 15.2 9 1847.2 1847.2 HRNLS H/V -85.2 -93.0 20.8 -0.2 39.1 35.0 54.0 19.0 10 2712.0 HRNS H/V -86.1 -484.2 21.6 -0.3 48.4 44.7 54.0 9.3 11 242.0 HRNS H/V -76.8 -80.9 21.6 -0.3 52.1 48.0 54.0 6.0 12 2770.8 277.8 HRNS H/V -75.8 -80.9 22.3 -0.4 44.4 40.3 54.0 6.1 13 3616.0 365.0 HRNS H/V -85.2 -89.3 22.3 -0.4 45.8 41.7 54.0 18.2 14 3654.0 HQZTO18501 H/V -85.2 -102.3			-	-			1							
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8 182.00 182.00 1RNLS H/V 4.87.2 -9.1.3 20.8 0.2 40.9 36.8 54.00 17.2 9 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.2 1847.5 140.0 36.0 54.0 19.0 11 2712.0 2712.0 HRNS H/V -86.0 21.6 0.3 45.0 45.0 6.1 12 277.0 270.8 HRNS H/V -76.8 -80.9 21.6 0.3 42.0 46.0 45.0 6.1 13 3616.0 HRNS H/V -76.8 -80.9 22.3 0.4 46.2 42.1 54.0 1.3 14 3656.0 JRNS H/V 483.5 -87.6 22.3 0.4 452.8 54.0 1.3 15 3604.0 360.0 HRNS H/V -83.0 24.7 35.6 64.0 82.0 16 4000.0 600.0 HQR2T018801 H/V -98.2 -102.3 32.8 0.8 42.4 38.3 54.0 15.7 18 600.0 HQR2T018801 H/V <			1											
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as born b	35				H/V		-83.4	22.3	-0.4	50.4	46.3	54.0		
38 5424.0 5424.0 HRNC H/V -77.2 -81.3 24.7 -0.5 55.1 51.0 54.0 3.0 39 6000.0 8400.0 HQR2TO18S01 H/V -95.2 -99.3 32.8 -0.8 45.4 41.3 54.0 12.7 40 8400.0 12500.0 HQR2TO18S01 H/V -94.2 -98.3 34.3 -1.1 48.2 44.1 54.0 9.9	36	3694.4	3694.4	HRNS	H/V	-80.1	-84.2	22.3	-0.4	49.6	45.5	54.0	8.5	
10 11<	37	4000.0	6000.0	HQR2TO18S01	H/V	-88.9	-93.0	33.6	-0.6	52.3	48.2	54.0	5.8	
40 8400.0 12500.0 HQR2TO18S01 H/V -94.2 -98.3 34.3 -1.1 48.2 44.1 54.0 9.9	38	5424.0	5424.0	HRNC	H/V	-77.2	-81.3	24.7	-0.5	55.1	51.0	54.0	3.0	
	39	6000.0	8400.0	HQR2TO18S01	H/V	-95.2	-99.3	32.8	-0.8	45.4	41.3	54.0	12.7	
41	40	8400.0	12500.0	HQR2TO18S01	H/V	-94.2	-98.3	34.3	-1.1	48.2	44.1	54.0	9.9	
	41													

*Avg computed from Peak/Avg by duty cycle.

3.3.2 Relative Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions relative to the fundamental in a 100 kHz receiver bandwidth (at the nominal voltage and temperature) are provided in Figure 10 below.



Figure 10: Conducted Transmitter Emissions Measured.

4 Measurement Uncertainty

The maximum values of measurement uncertainty for the laboratory test equipment and facilities associated with each test are given in the table below. This uncertainty is computed for a 95.45% confidence level based on a coverage factor of k = 2.

Table 12: Measurement Uncertainty.

Measured Parameter	${\bf Measurement} ~ {\bf Uncertainty}^{\dagger}$
Radio Frequency	$\pm (f_{Mkr}/10^7 + RBW/10 + (SPN/(PTS - 1))/2 + 1 \text{ Hz})$
Conducted Emm. Amplitude	$\pm 1.8\mathrm{dB}$
Radiated Emm. Amplitude $(30 - 200 \text{ MHz})$	$\pm 2.7\mathrm{dB}$
Radiated Emm. Amplitude $(200 - 1000 \text{ MHz})$	$\pm 2.5\mathrm{dB}$
Radiated Emm. Amplitude $(f > 1000 \text{ MHz})$	$\pm 3.7\mathrm{dB}$
DC and Low Frequency Voltages	$\pm 2\%$
Temperature	$\pm 0.5^{\circ}\mathrm{C}$
Humidity	$\pm 5\%$

[†]Ref: CISPR 16-4-2:2011+A1:2014