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FCC PART 15.249 TEST REPORT

UNLICENSED INTENTIONAL RADIATOR

Applicant	SAAB DEFENSE AND SECURITY USA LLC	
Address	2602 CHALLENGER TECH PARK SUITE 130	
	ORLANDO FL 32826 USA	
FCC ID	R4ASID915	
Model Number	SID915	
Product Description	STRUCTURAL INFORMATION DEVICE	
FCC Standard Applied	47 CFR §15.249	
Date Sample Received	12/12/2013	
Date Tested	12/16/2013	
Tested By	JOE SCOGLIO	
/Approved By	JOE SCOGLIO	
Report Number	2128AUT13TestReport.docx	
Test Results	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



Testing Certificate # 0955-01



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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.



Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669



Authorized Signatory Name:

Joe Scoglio
Engineering Project Manager

Date: 12/16/2013

/

/

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GENERAL INFORMATION

EUT Specification

The test results relate only to the items tested.			
Applicable Standard	Part 15.249		
EUT Description	STRUCTURAL INFORMATION DEVICE		
FCC ID	R4ASID915		
Model Number	SID915		
Operating Frequency	TX: 915 MHz only	RX: none	
No. of Channels	1		
Modulations	FSK		
EUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz		
	<input type="checkbox"/> DC Power		
	<input checked="" type="checkbox"/> Battery Operated Exclusively		
Test Item	<input type="checkbox"/> Prototype	<input type="checkbox"/> Pre-Production	<input checked="" type="checkbox"/> Production
Type of Equipment	<input type="checkbox"/> Fixed	<input type="checkbox"/> Mobile	<input checked="" type="checkbox"/> Portable
Antenna Connector	FCC Rules require that the antenna connector be unique.		
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
Conditions in the Test laboratory	Temperature: 26°C Relative humidity: 50%		
Test Exercise	The EUT was placed in continuous transmit mode of operation.		
Revision History of EUT			

Test Supporting Equipment

Supporting Device	Manufacturer	Model / FCC ID	Serial Number
N/A			

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EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Frequency Counter	HP	5385A	2730A03025	08/22/13	08/22/15
Frequency Counter	HP	5352B	2632A00165	06/26/13	06/26/15
Digital Multimeter	Fluke	77	43850817	02/22/12	02/22/14
Frequency Counter	HP	5385A	3242A07460	06/16/13	06/16/15
Antenna: Active Loop	ETS-Lindgren	6502	00062529	10/09/13	10/09/15
Analyzer Open-Frame Tower Preamplifier	HP	8449B	3008A01075	07/22/09	09/15/13
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	06/19/12	06/19/14
LISN	Electro-Metrics	ANS-25/2	2604	10/28/11	10/28/13
LISN	Electro-Metrics	EM-7820	2682	02/26/13	02/26/15
DC Power Supply	HP	6264B		05/06/13	05/06/15
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	12/31/13
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/09/13	05/09/15
Digital Multimeter	Fluke	77	35053830	08/22/13	08/22/15
Antenna: Biconnical	Eaton	94455-1	1096	05/10/13	05/10/15
EMI Test Receiver	Rhode & Schwarz	ESU 40	100320	03/21/13	03/21/15

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TEST PROCEDURES

Radiation Interference: ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worst case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

$$\begin{array}{llll}
 \text{Freq (MHz)} & \text{Meter Reading} & + \text{ACF} & + \text{CL} = \text{FS} \\
 33 & 20 \text{ dBuV} & + 10.36 \text{ dB} & + 0.5 = 30.86 \text{ dBuV/m @ 3m}
 \end{array}$$

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

ANSI C63.4-2003 10.1 Measurement Procedures: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. Emissions attenuated more than 20 dB below the permissible value are not reported.

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RADIATION INTERFERENCE

Rules Part No.: 15.249, 15.209

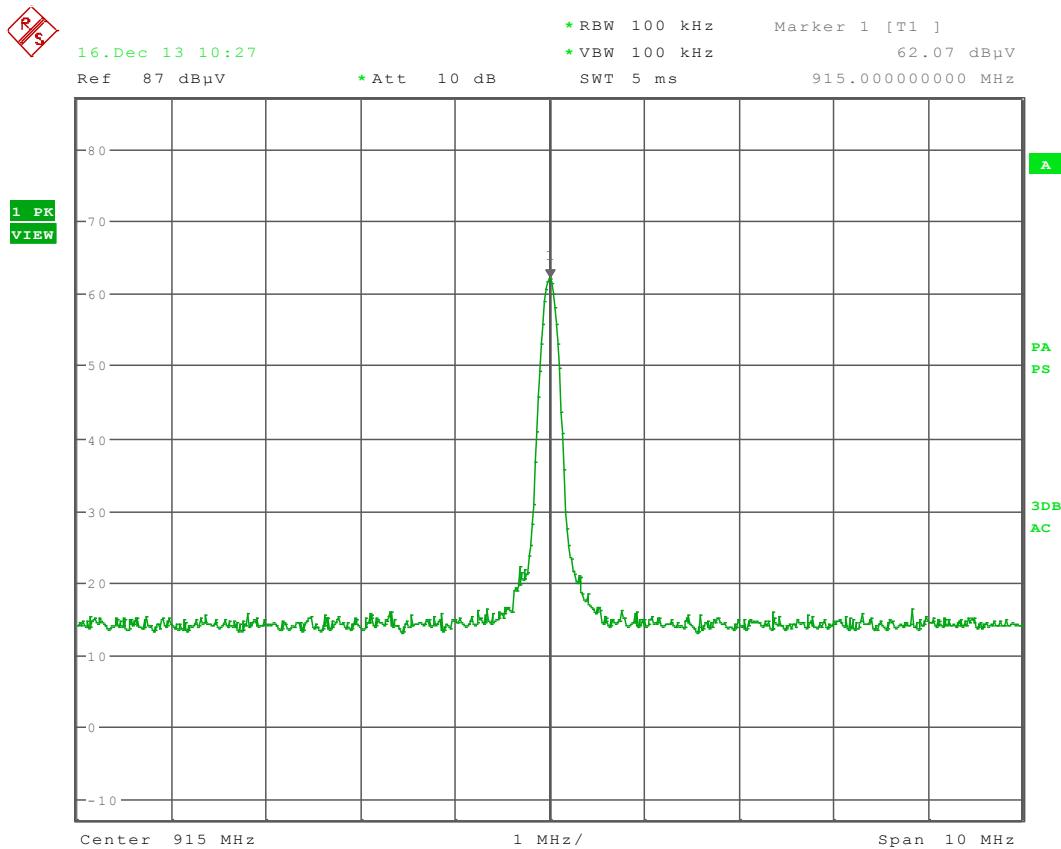
Requirements:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dB μ V/m @ 3 meters
Fundamental 2.4 – 2.4835 GHz	94.0 dB μ V/m @ 3 meters
Harmonics	54.0 dB μ V/m @ 3 meters

Test Data:

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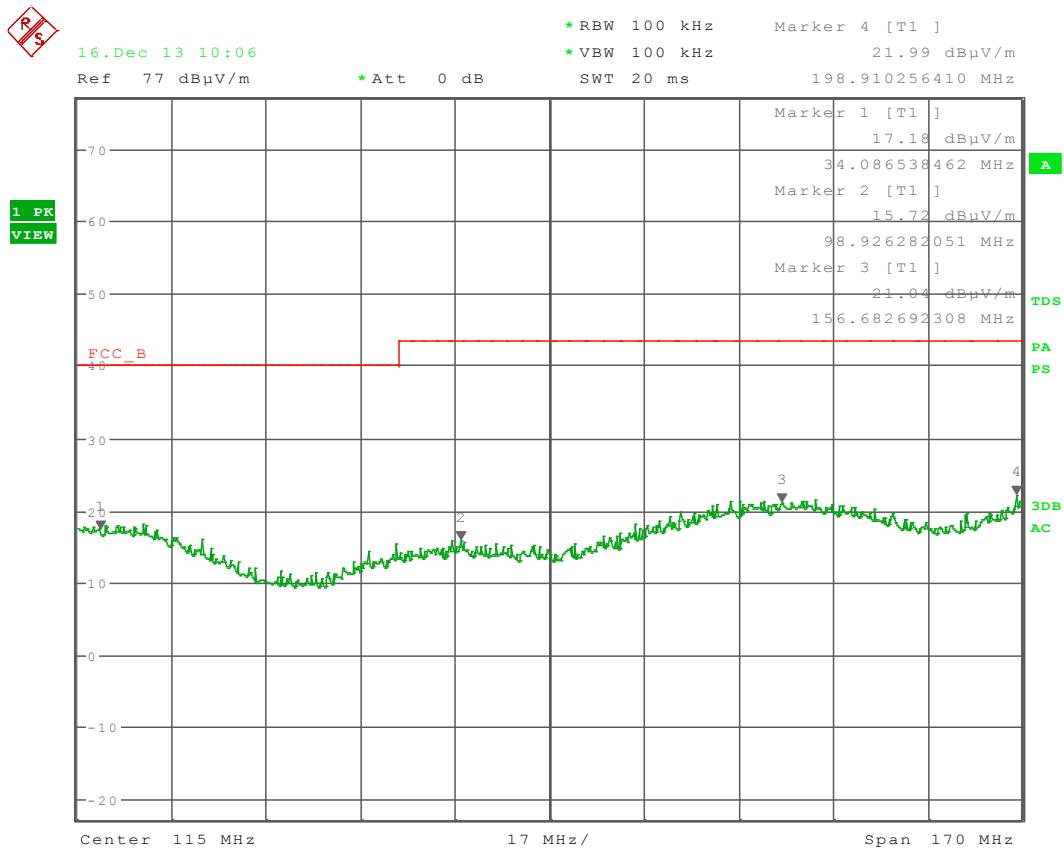


Date: 16.DEC.2013 10:27:53

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m	Margin dB
915.0	915.00	59.4	H	1.97	22.45	83.82	10.18
915.0	915.00	62.0	V	1.97	22.45	86.42	7.58

All the harmonics and other spurious emissions were 20 dB or more below the FCC limit. The emissions were checked from 9 kHz to at least the 10th harmonic.

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Date: 16.DEC.2013 10:06:19

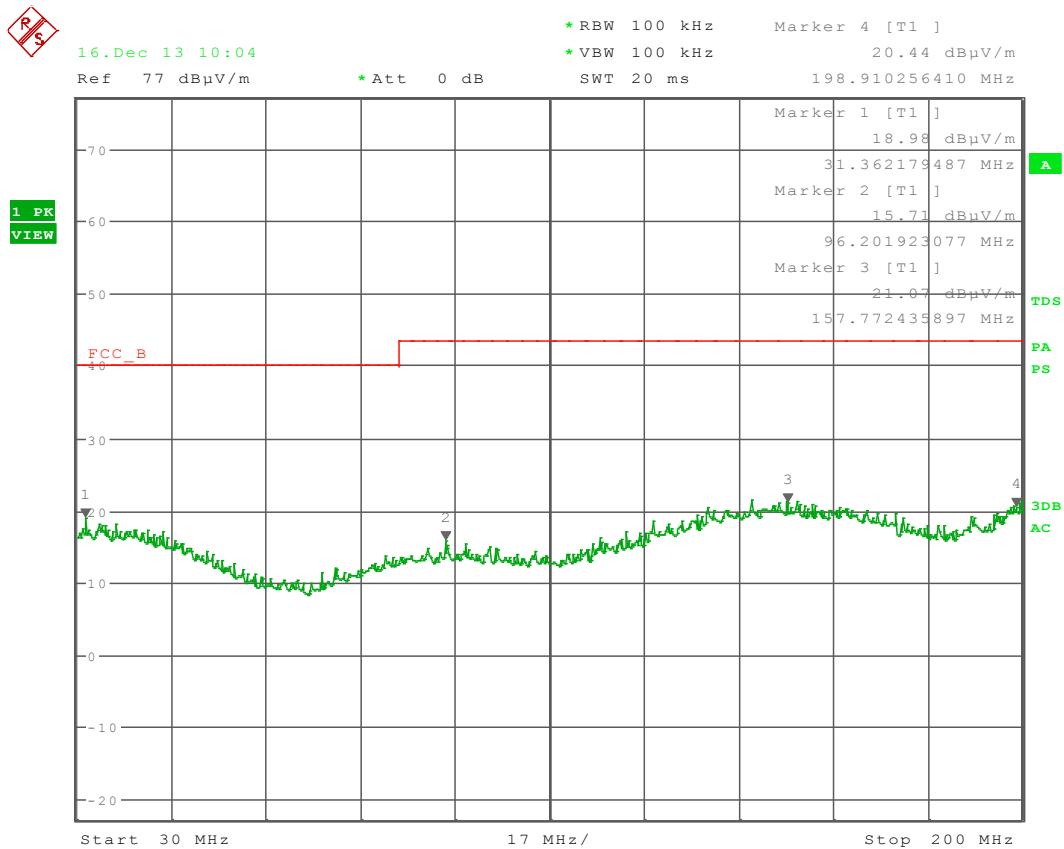
30 to 200 MHz Horizontal Plot

Emission Frequency MHz	Field Strength dB μ V/m
34.0	17.1
98.9	15.7
156.6	21.0
199.9	22.0

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Date: 16.DEC.2013 10:04:01

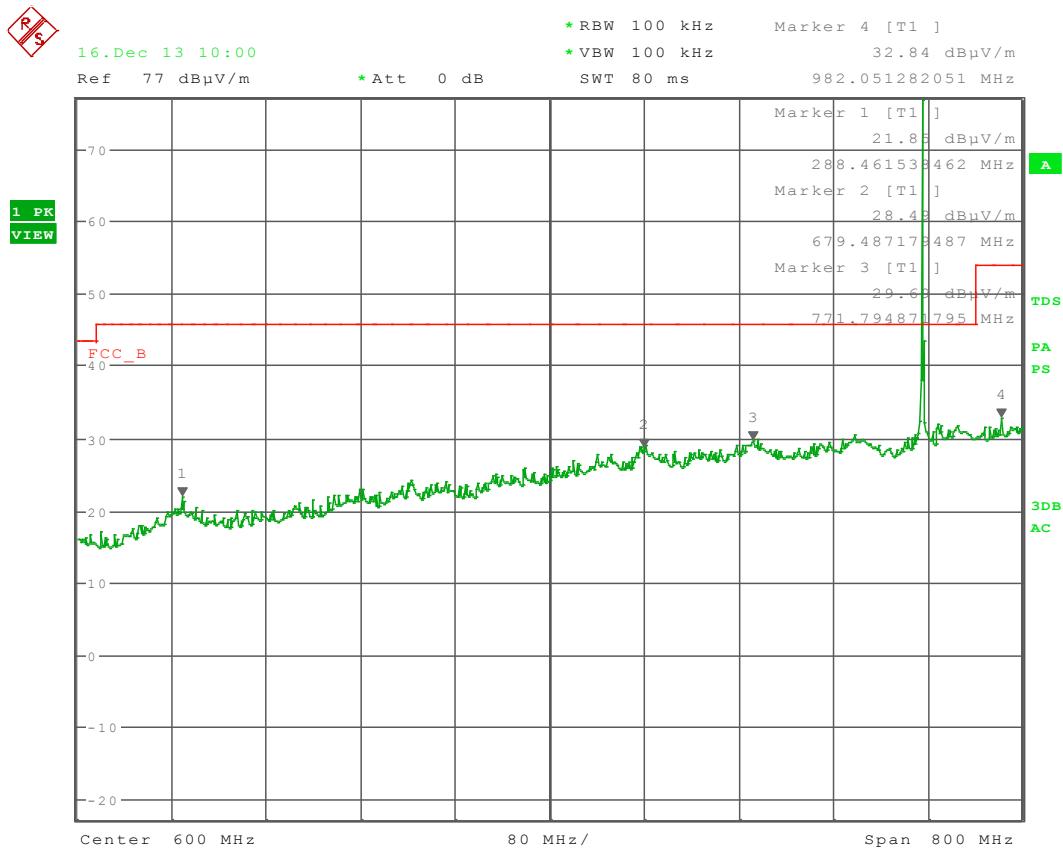
30 to 200 MHz Vertical Plot

Emission Frequency MHz	Field Strength dB μ V/m
31.3	18.9
56.2	15.7
157.7	21
198.9	20.4

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Date: 16.DEC.2013 10:00:11

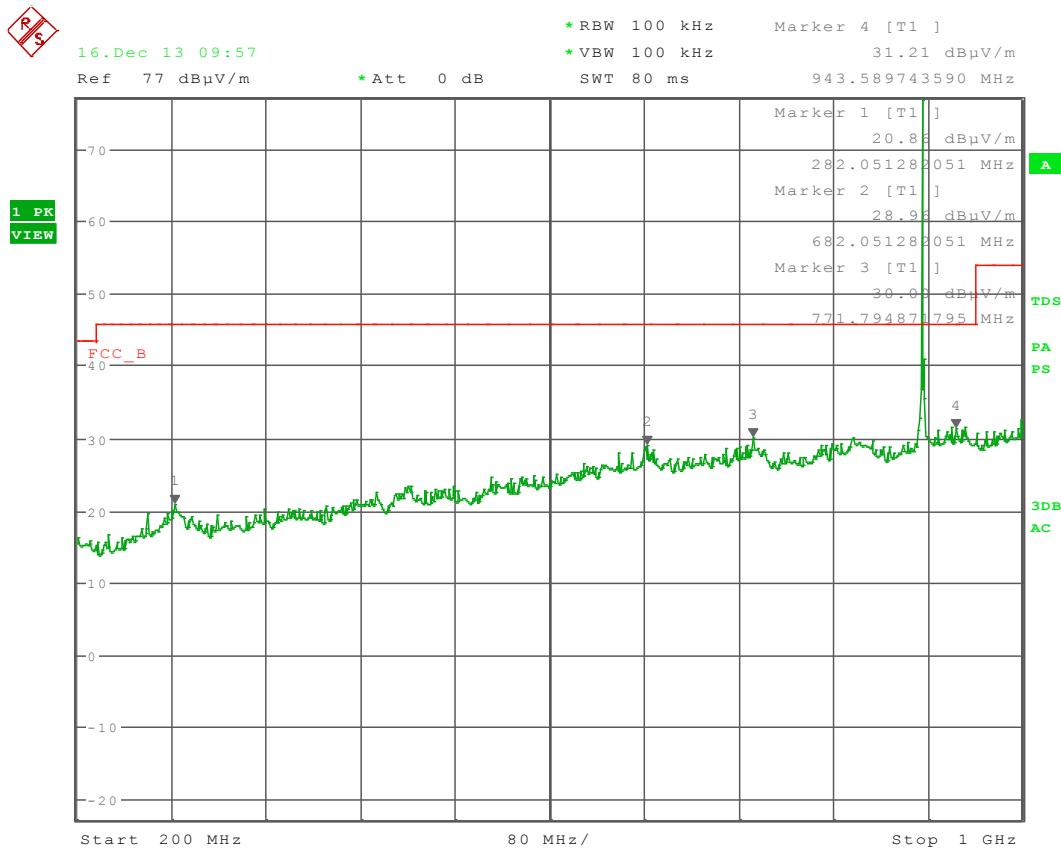
200 to 1000 MHz Horizontal Plot

Emission Frequency MHz	Field Strength dB μ V/m
288.4	21.8
679.4	28.4
771.7	29.6
982.0	32.8

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Date: 16.DEC.2013 09:57:41

200 to 1000 MHz Vertical Plot

Emission Frequency MHz	Field Strength dB μ V/m
282.0	20.8
682.0	28.9
771.7	30.0
943.5	31.2

APPLICANT: SAAB DEFENSE AND SECURITY USA LLC

FCC ID: R4ASID915

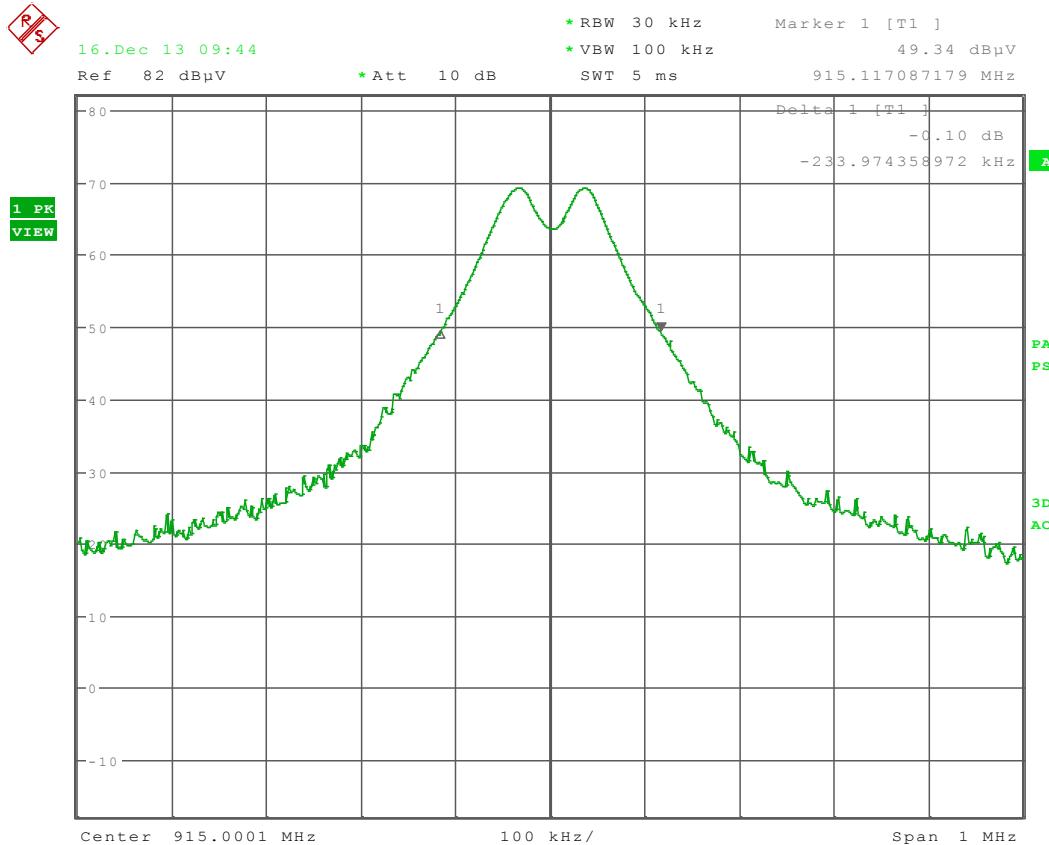
REPORT: S\SAAB\2128AUT13\2128AUT13TestReport.docx

OCCUPIED BANDWIDTH

Rules Part No.: 15.249 (d)

Requirements: The field strength of any emissions appearing outside the bandedges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

Test Data:



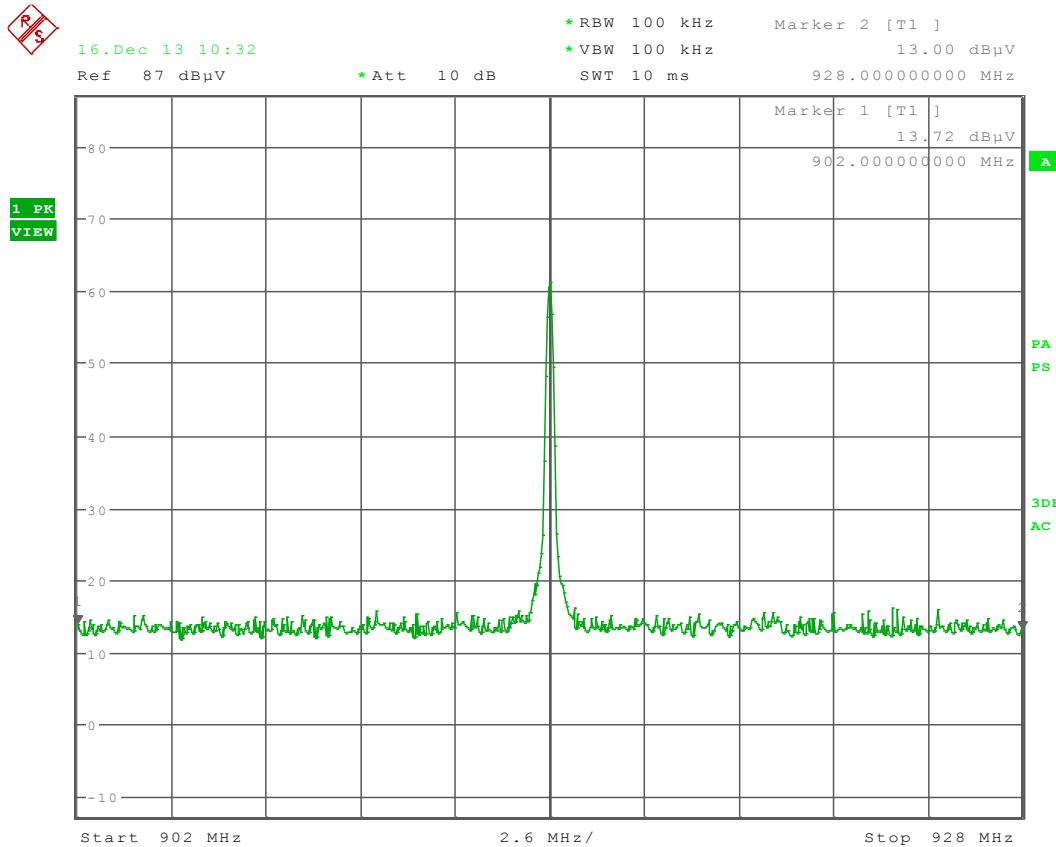
Date: 16.DEC.2013 09:44:58

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 FCC ID: R4ASID915
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BAND EDGE COMPLIANCE

Rules Part No.: 15.249 (d)

NOTE TRANSMITTER OPERATES ONLY AT 915 MHZ. CENTER OF BAND.



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Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m
902.00	13.7	V	1.95	21.82	37.47
928.00	13.0	V	1.99	23.16	38.15

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DUTY CYCLE

As per the manufacturer, the Duty Cycle is 100%

The device is only a transmitter.

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POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuv)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: The attached graphs represent the emissions read for power line conducted for this device. Both lines were observed.

N/A
Battery or vehicle powered EUT.

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