TIMCO ENGINEERING, Inc.

849 NW State Road 45
Newberry, FL 32669 USA
Ph.: 888.472.2424 or
352.472.5500
Fax: 352.472.2030
Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 15.249 & IC RSS-210

UNLICENSED INTENTIONAL RADIATOR

TEST REPORT

Applicant	**SAAB DEFENSE AND SECURITY USA LLC**
Address	**2602 CHALLENGER TECH COURT SUITE 130**
	ORLANDO FL 32826 USA
FCC ID	**R4AHGS2**
IC	**4660D-HGS2**
Model Number	HGS2
Product Description	HAND GRENADE SIMULATOR
Date Sample Received	9/19/2016
Final Test Date	9/20/2016
Tested By	Tim Royer
Approved By	Cory Leverett

Report Number	Version Number	Description	Issue Date
1059AZUT16TestReport_	Rev1	Initial Issue	9/29/2016

TABLE OF CONTENTS

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 and was selected by the customer.

☐ 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.

I attest that the necessary measurements were made at:

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

Tested by: _____
Name and Title: Tim Royer, Project Manager/Testing Engineer

Date: 9/20/2016

Reviewed and approved by:
Name and Title: Cory Leverett, Engineer

Date: 9/29/2016

GENERAL INFORMATION

EUT Specification

Regulatory Standards	FCC Title 47 CFR Part 15.249 IC RSS-210 Issue 8 A2.9 & RSS-GEN Issue 4		
FCC ID	**R4AHGS2**		
IC	**4660D-HGS2**		
Model	HGS2		
EUT Description	HAND GRENADE SIMULATOR		
Modulation Types	Mode 1: 2-FSK 25kbps (WLN Packet)		
Operating Frequency	TX: 915 MHz	RX: 915 MHz	
EUT Power Source	☐ 110–120Vac/50– 60Hz		
	☐ DC Power		
	☒ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☒ Production
Type of Equipment	☒ Fixed	☐ Mobile	☒ Portable
Antenna Connector	None		
Antenna	Integral		
Test Conditions	Temperature: 24-26ºC Relative humidity: 50-65%		
Measurement Standard	ANSI C63.10-2013 ANSI C63.4-2014 (Radiated Site Validation)		

Test Supporting Equipment

Device	Manufacturer	Model	S/N	Supplied By	Used For
N/A					

RESULTS SUMMARY

FCC Rule Part No.	IC Standard Ref.	Requirement	Test Item	Result
2.1049	RSS-GEN 6.6	Occupied Bandwidth	99% Bandwidth	Pass
15.249(a)(c)	RSS-210 § A2.9(a)	Fundamental and Harmonics	Radiated Spurious Emissions	Pass
15.249(d)(e)	RSS-247 § 5.5	Spurious Emissions	Bandedge	Pass
			Radiated Spurious Emissions	Pass
15.207(a)	RSS-GEN § 8.8	AC Conducted Emissions	AC Powerline Conducted Emissions	N/A

Notes:

OCCUPIED BANDWIDTH

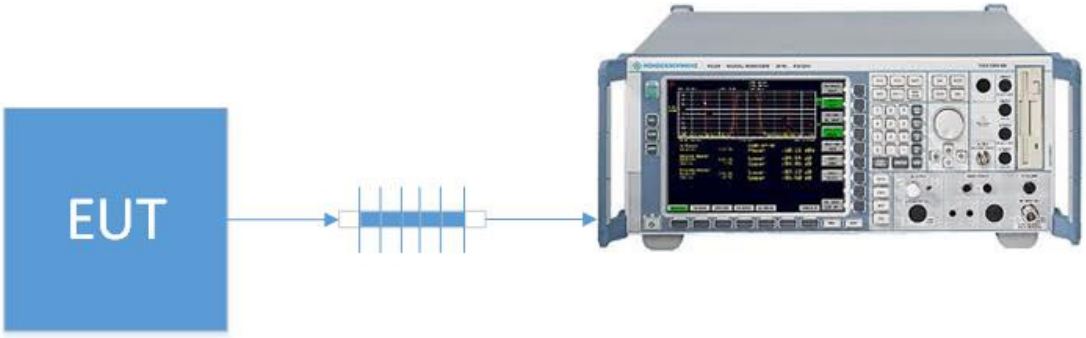
Rules Part No.: FCC 2.1049, IC RSS GEN § 6.6

FCC Requirements: Reporting only

IC Requirements: Reporting Only

Test Method: THE TEST PROCEDURES USED ARE DETAILED IN THE STANDARD LISTED ABOVE.

Setup:



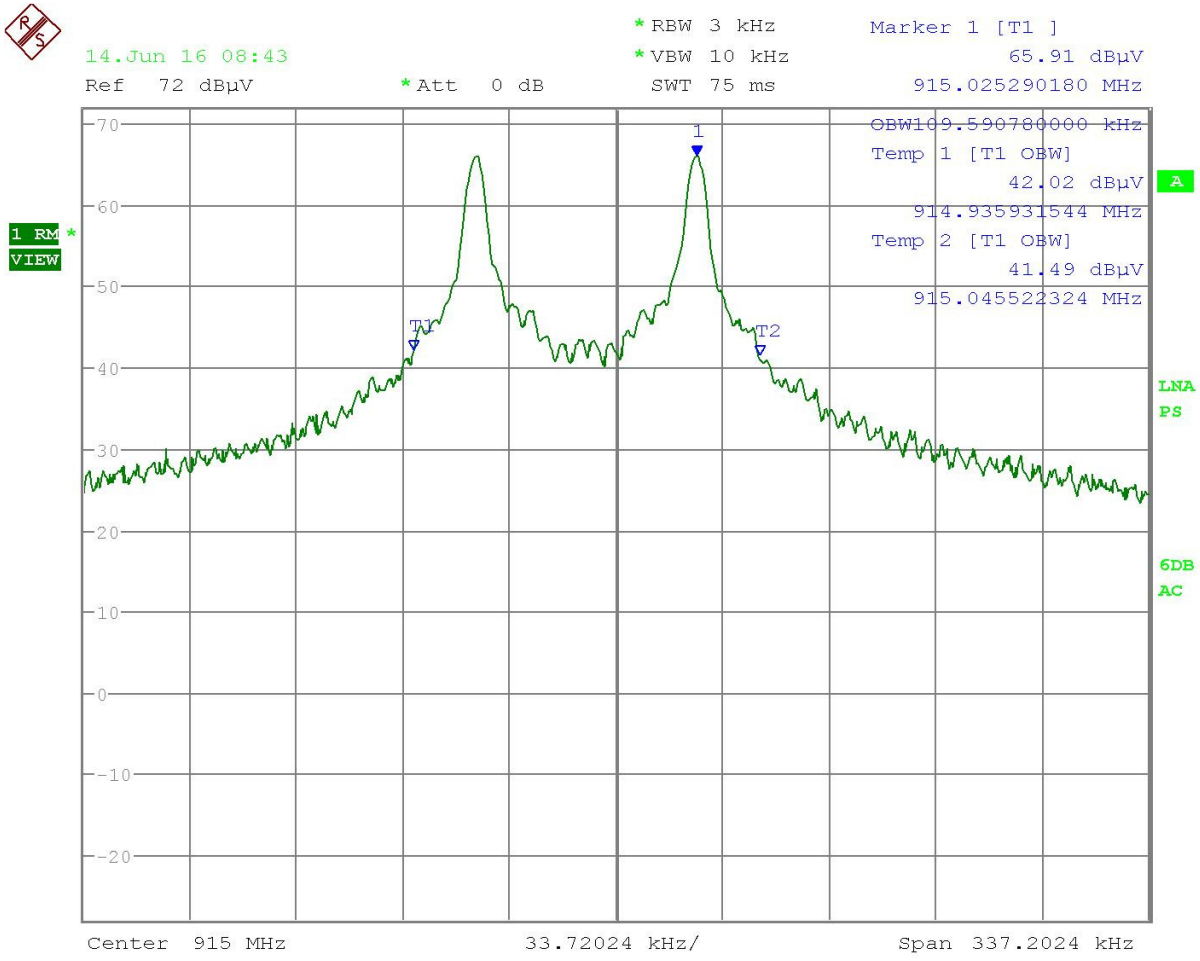
Test Data: **Mode 1 99% Occupied Bandwidth Measurement Table**

Tuned Frequency (MHz)	BW (KHz)
915	109.5

RESULTS: Meets Requirements

OCCUPIED BANDWIDTH

Test Data: **99% OBW Mode 1 Plot**



Date: 14.JUN.2016 08:43:44

RESULTS: Meets Requirements

BANDEDGE

Rule Part No.: FCC 15.249(d), IC RSS 210 § A2.9(b)

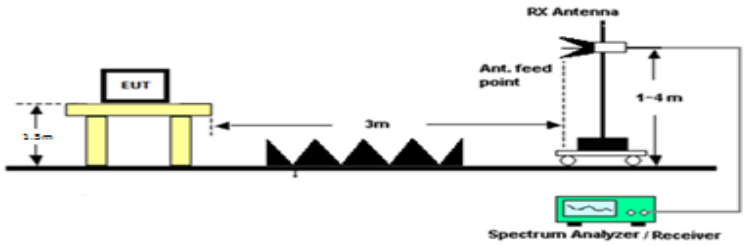
Requirements: Emissions must be at least 50 dB down from the highest emission level Within the authorized band as measured with a 100 kHz RBW, or to the limits of 15.209.

Test Method: THE TEST PROCEDURES USED ARE DETAILED IN THE STANDARD LISTED ABOVE.

Setup:

Emissions 30 – 1000 MHz

Emissions above 1 GHz

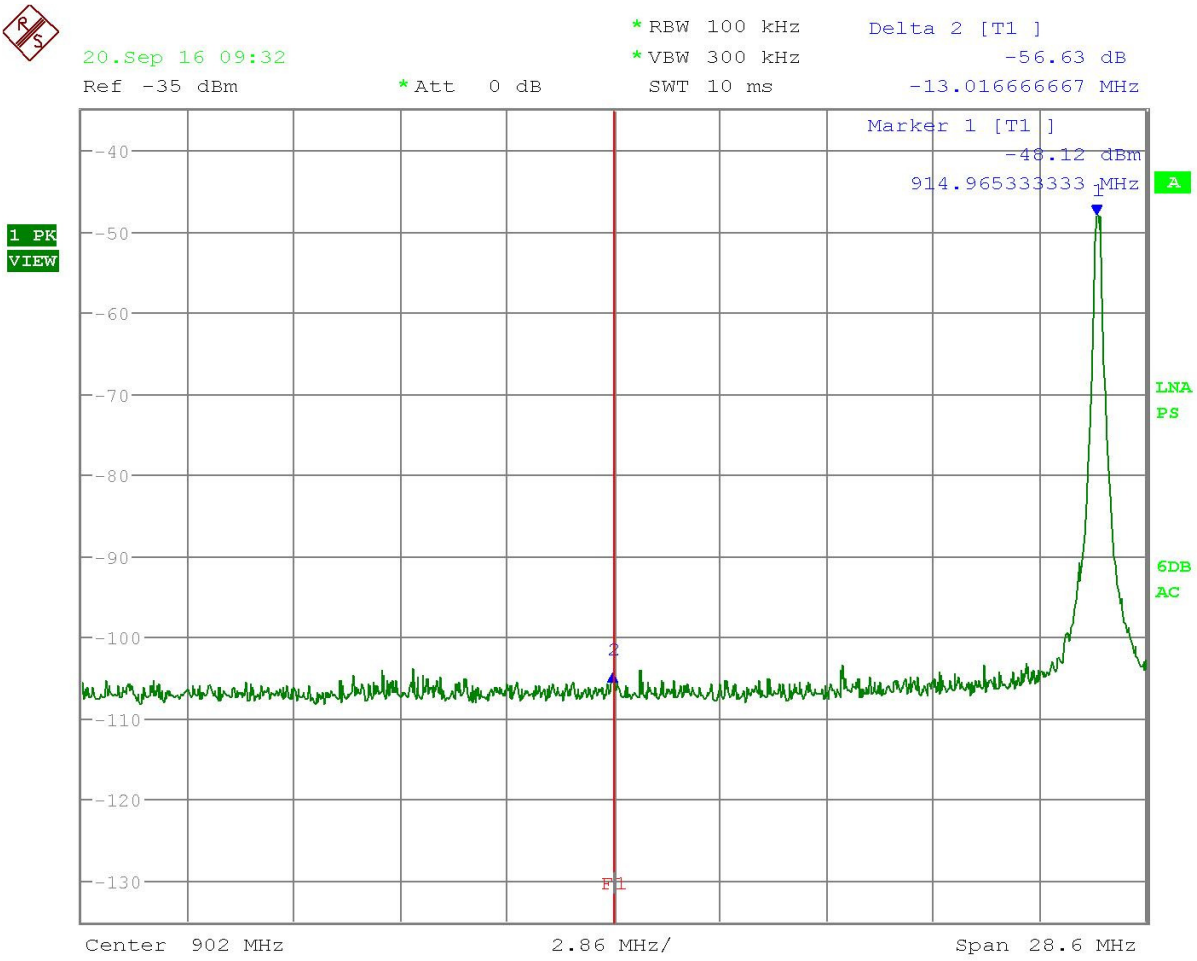


Test Data: **Mode 1 Bandedge Measurement Table**

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	915	56.63	50	6.63
Upper	915	57.41	50	7.41

Results Meet Requirements

Test Data: **Mode 1 Lower Band Edge Plot**

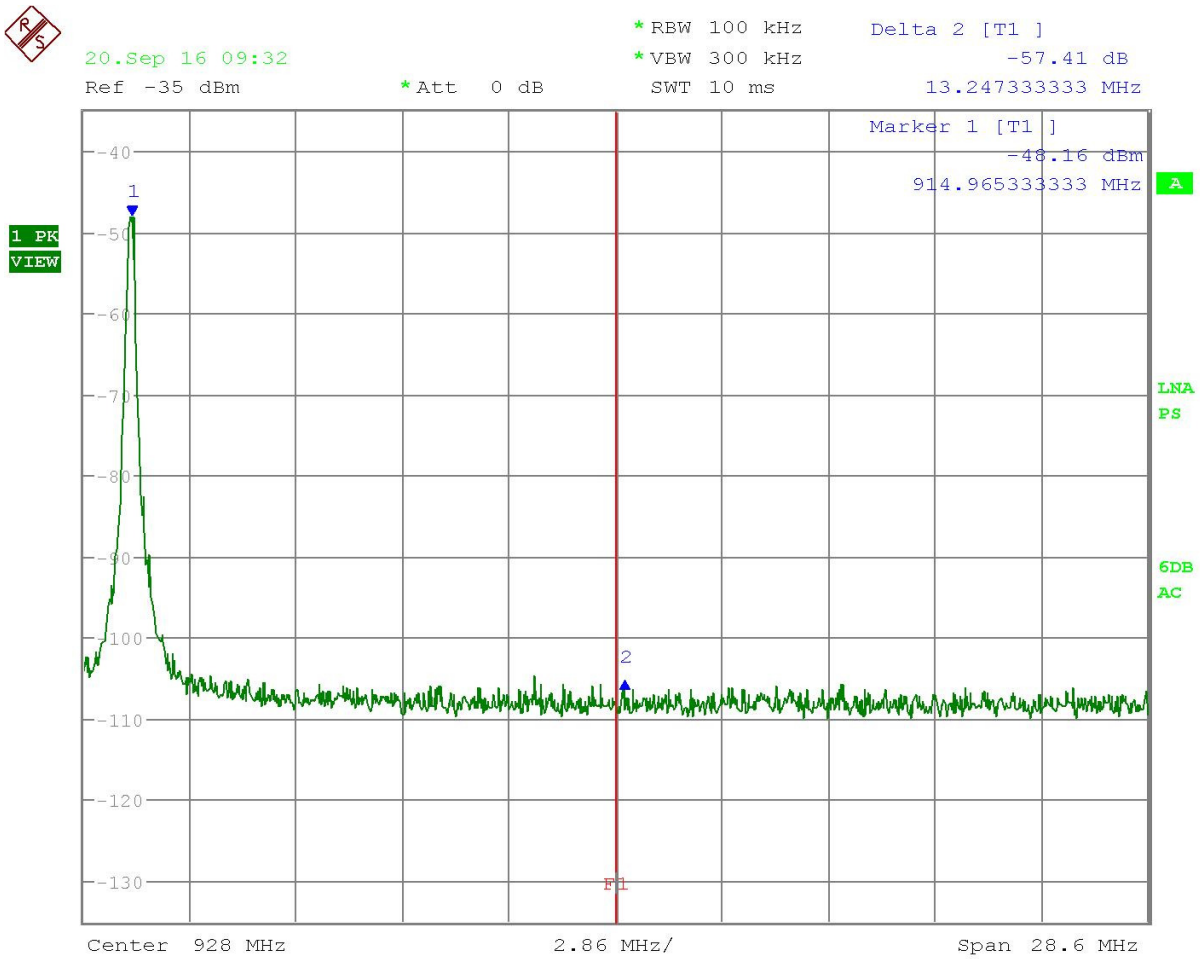


Date: 20.SEP.2016 09:32:02

RESULTS: Meets Requirements

BANDEDGE

Test Data: **Mode 1 Upper Band Edge Plot**



Date: 20.SEP.2016 09:32:53

RESULTS: Meets Requirements

RADIATED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.249 (d)(e), IC RSS 210 § A2.9(b)

Requirements: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below the fundamental output or to the limits of 15.209 whichever is lesser

FCC part 15.209 General Emission Limits

Frequency	Limits
FCC Part 15.209, IC RSS-GEN 8.9	
9 to 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m @ 30 meters
30 – 88	40.0 dBµV/m @ 3 meters
80 – 216	43.5 dBµV/m @ 3 meters
216 – 960	46.0 dBµV/m @ 3 meters
Above 960	54.0 dBµV/m @ 3 meters

Test Method: THE TEST PROCEDURES USED ARE DETAILED IN THE STANDARD LISTED ABOVE.

Field Strength Calculation:

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

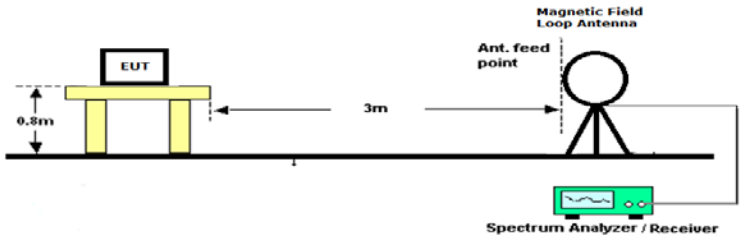
Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dBµV	+ 10.36 dB	+ 0.5 = 30.86 dBµV/m @ 3m

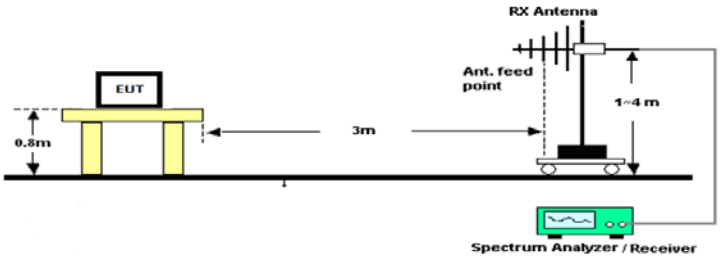
RADIATED SPURIOUS EMISSIONS

Setup:

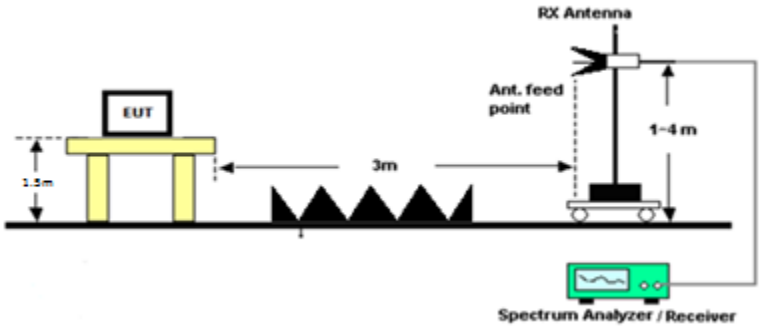
Emissions below 30 MHz



Emissions 30 – 1000 MHz



Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Notes: The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

Only emissions within 20dB of the limit are reported.

The spectrum was measured from 9 KHz to 10 GHz

Test Data: **Mode 1 Field Strength at 3 Meters Measurement Table**

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dBu V/m	Margin dB
915.00	19.83	PK	0.940	V	0.69	10.11	11.74	17.80
915.00	189.10	PK	9.030	V	1.56	13.91	24.50	19.00
915.00	216.00	PK	14.650	V	1.68	10.68	27.01	19.01
915.00	915.00	QP	55.230	H	3.47	22.50	81.20	12.80
915.00	915.00	QP	65.510	V	3.47	22.50	91.48	2.52
915.00	2745.00	PK	19.640	V	6.08	32.48	58.19	15.81
915.00	2745.00	AV	15.360	V	6.08	32.48	53.92	0.08

Results: Meet Requirements

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical 1057	Eaton	94455-1	1057	11/18/15	11/18/17
Antenna: Log-Periodic 1243	Eaton	96005	1243	02/09/16	02/09/18
CHAMBER	Panashield	3M	N/A	04/25/16	12/31/17
Software: Field Strength Program	Timco	N/A	Version 4.0	N/A	N/A
Antenna: Active Loop	ETS-Lindgren	6502	00062529	11/18/15	11/18/17
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-01; KMKM-0670-00; KFKF-0198-01	08/08/16	08/08/18
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	N/A	N/A

*** EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT