Nemko Test Report: 6L0668RUS1

Applicant: AirGATE Technologies, Inc.
710 Century Parkway
Allen, TX 75013
USA

Equipment Under Test: (E.U.T.) RF-IDT

In Accordance With: **FCC Part 15, Subpart C, 15.249**
Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY: Brian Boyea, Wireless Engineer **DATE:** 12 January 2007

APPROVED BY: David Light, Senior Wireless Engineer **DATE:** 12 January 2007

Total Number of Pages: 16

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Section 1. Summary Of Test Results

Manufacturer: Carinthian Tech Research
Europastrasse 4/1
Villach, Austria 9524

Model No.: RF-IDT

Serial No.: 01034

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15.249. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP®
LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Conducted Emissions	15.207	Complies
Radiated Emissions	15.249	Complies

Footnotes For N/A's:

Section 2. General Equipment Specification

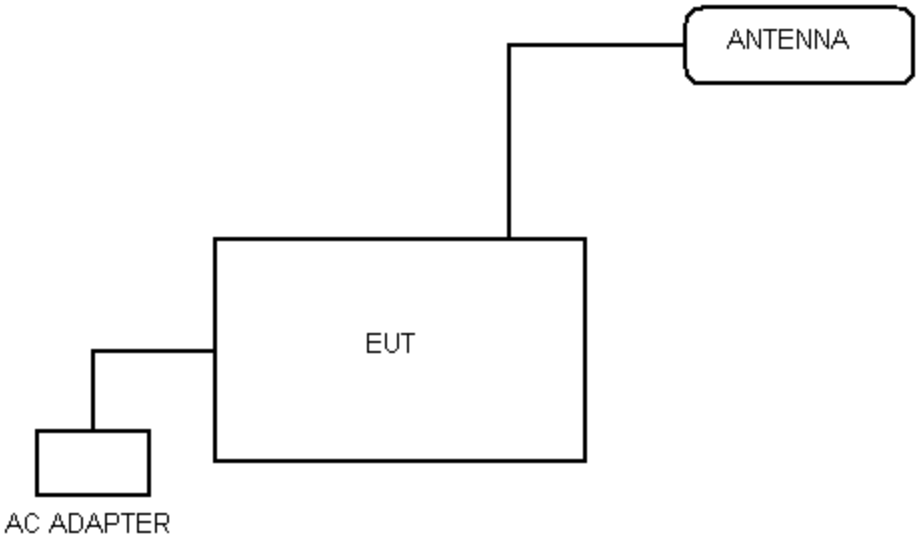
Frequency Range:	2400-24835 MHz
Operating Frequency(ies) of Sample:	2402-2482.375 MHz
Tunable Bands:	Full band coverage
Number of Channels:	636
Channel Spacing:	125 kHz
User Frequency Adjustment:	None

	Yes	No
Integral Antenna	☐	☒

Description of EUT

The SAW Reader Unit is based on the frequency-stepped continuous wave (FSCW) radar technique and operates in the ISMband at 2.4 GHz. It supports multiplexed measurements of up to four independent channels or up to two 2-channel systems with separate transmit and receiver antennae.

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: Brian Boyea	DATE: 11 January 07

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBmV) Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Results: Complies. The worst case emission was 41.7 dBµV at 1.44 MHz on L1. This is 4.3 dB below the quasi-peak specification limit of 46 dBµV.

Measurement Data: See attached data.

Method of Measurement: (Procedure ANSI C63.4-2003)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak Detector.

Equipment Used: 1188-704-1652-1978-1659-674

Measurement Uncertainty: +/- 1.7 dB

Temperature: 24 °C

Relative Humidity: 43 %

Test Data – Powerline Conducted Emissions

Specification :	CFR 47 Part 15.207			Reference :	
Transducer # :	1188	Temp. (deg. C) :	24	Date :	01/11/07
HP Filter # :	704	Humidity (%) :	43	Time :	4:00 P.M.
Cable 1 # :	1652	EUT Voltage :	120 Vac	Staff :	Brian Boyea
Cable 2 # :	1978	EUT Frequency :	60 Hz	Location :	Lab 3
Detector 1 # :	1659	Peak Bandwidth:	10kHz	Photo ID:	6L0668E CEPV-01
Detector 2 # :	NA	QP Bandwidth	9kHz		
Limiter # :	674	Avg. Bandwidth	9kHz		

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
0.161	N	P	A	38.6	10	0	48.6	65.41	55.412	-6.8	Pass	
0.191	N	P	A	36.1	10	0	46.1	63.99	53.993	-7.9	Pass	
1.53	N	P	A	31.5	10	0	41.5	56	46	-4.5	Pass	
3.512	N	P	A	27.3	10	0	37.3	56	46	-8.7	Pass	
7.67	N	P	A	27.3	10	0	37.3	60	50	-12.7	Pass	
11.98	N	P	A	26.7	10	0	36.7	60	50	-13.3	Pass	
11.98	H	P	A	26.5	10	0	36.5	60	50	-13.5	Pass	
7.67	H	P	A	27.7	10	0	37.7	60	50	-12.3	Pass	
3.512	H	P	A	26.6	10	0	36.6	56	46	-9.4	Pass	
1.44	H	P	A	31.7	10	0	41.7	56	46	-4.3	Pass	
0.16	H	P	A	39.0	10	0	49.0	65.46	55.464	-6.5	Pass	

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Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: Brian Boyea	DATE: 11 January 07

Minimum Standard: Para no. 15.249

(a) The field strengths shall not exceed the following:

Carrier (MHz)	Field Strength (mV/m)	Field Strength (dBµV)	Harmonic (µV/m)	Harmonic (dBµV)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

(b) Field strength limits are specified at a distance of 3 metres.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits of 15.209 whichever is the less attenuation.

(d) …for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Test Results: Complies. The worst case emission was dBµV/m at MHz. This is dB below the specification limit of dBµV/m.

Measurement Data: See attached table.

Duty Cycle Calculation:

Duty Cycle correction factor(dB) = 20 log (rf_{ON} in ms/100ms)

20 log (2.4/100) = -32.3

Notes:

☐ For handheld devices, the EUT was tested on three orthogonal axis'

☒ The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33

☒ The device was tested on three channels per 15.31(l).

☒ No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o). Band edge data is presented below.

Equipment Used: 1464-1484-1485-791-1016-759-1195-993

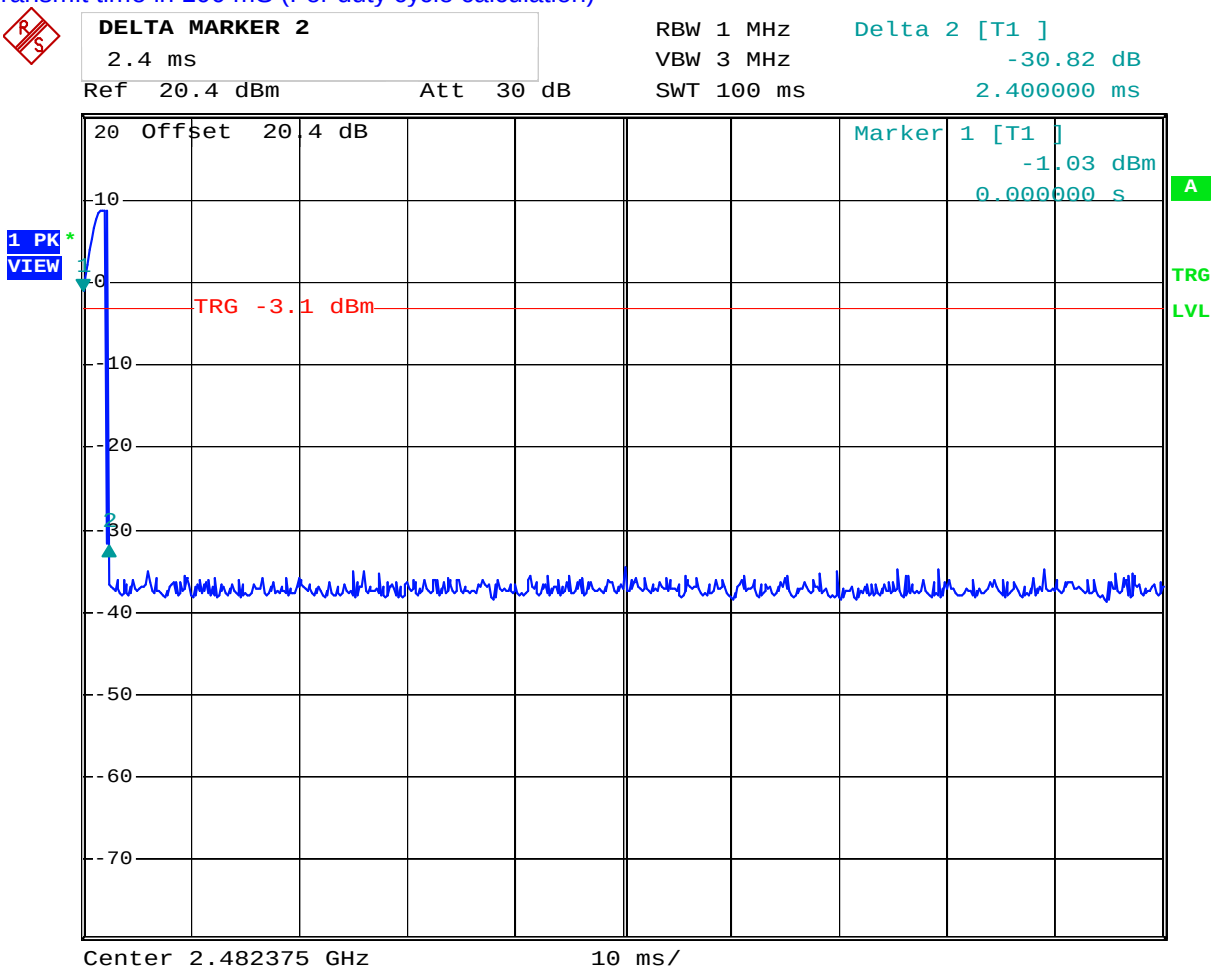
Measurement Uncertainty: +/-3.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Test Data - Radiated Emissions

Transmit time in 100 mS (For duty cycle calculation)



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Test Data - Radiated Emissions

Carrier

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable dB	Duty dB	Horn dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2403.000 Peak	75.0	+0.7	+2.3	+0.0	+28.9	+0.0	106.9	114.0	-7.1	Vert
2	2403.000 Average	75.0	+0.7	+2.3	-32.3	+28.9	+0.0	74.6	94.0	-19.4	Vert
3	2442.635 Peak	75.3	+0.8	+2.3	+0.0	+28.9	+0.0	107.3	114.0	-6.7	Vert
4	2442.635 Average	75.3	+0.8	+2.3	-32.3	+28.9	+0.0	75.0	94.0	-19.0	Vert
5	2482.400 Peak	74.2	+0.8	+2.3	+0.0	+29.0	+0.0	106.3	114.0	-7.7	Vert
6	2482.400 Average	74.2	+0.8	+2.3	-32.3	+29.0	+0.0	74.0	94.0	-20.0	Vert
7	2403.050 Peak	70.0	+0.7	+2.3	+0.0	+28.9	+0.0	101.9	114.0	-12.1	Horiz
8	2403.050 Average	70.0	+0.7	+2.3	-32.3	+28.9	+0.0	69.6	94.0	-24.4	Horiz
9	2442.685 Peak	71.2	+0.8	+2.3	+0.0	+28.9	+0.0	103.2	114.0	-10.8	Horiz
10	2442.685 Average	71.2	+0.8	+2.3	-32.3	+28.9	+0.0	70.9	94.0	-23.1	Horiz
11	2482.450 Peak	71.8	+0.8	+2.3	+0.0	+29.0	+0.0	103.9	114.0	-10.1	Horiz
12	2482.450 Average	71.8	+0.8	+2.3	-32.3	+29.0	+0.0	71.6	94.0	-22.4	Horiz

Band Edge

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable dB	Pre-A dB	Horn dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2483.500 Peak	45.2	+0.8	+2.3	+32.8	+29.0	+0.0	44.5	54.0	-9.5	Vert
2	2483.500 Peak	42.5	+0.8	+2.3	+32.8	+29.0	+0.0	41.8	54.0	-12.2	Horiz

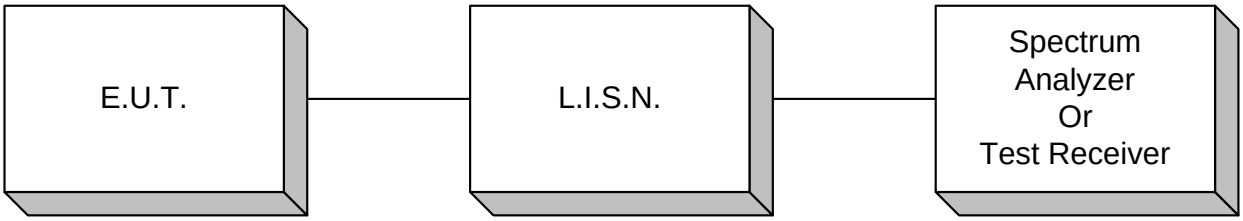
Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1484	Cable	Storm PR90-010-072	N/A	10/02/06	10/02/07
1485	Cable	Storm PR90-010-216	N/A	10/02/06	10/02/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	04/20/06	04/20/07
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	04/20/06	04/20/07
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	02/13/06	02/13/07
1195	ANTENNA,BICONICAL	A.H. SYSTEMS SAS-200/542	235	02/10/06	02/10/07
1188	LISN	EMCO 3825/2	1214	04/19/06	04/19/07
704	FILTER, HIGH PASS, 5 KHz	SOLAR 7930-5.0	933126	04/20/06	04/20/07
1652	CABLE	Nemko USA, Inc. RG223	NA	03/09/06	03/09/07
1978	CABLE, 2.8m.	Nemko USA, Inc. RG223	N/A	03/09/06	03/09/07
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/10/06	01/10/07
674	LIMITER	HP 11947A	3107A02200	04/19/06	04/19/07

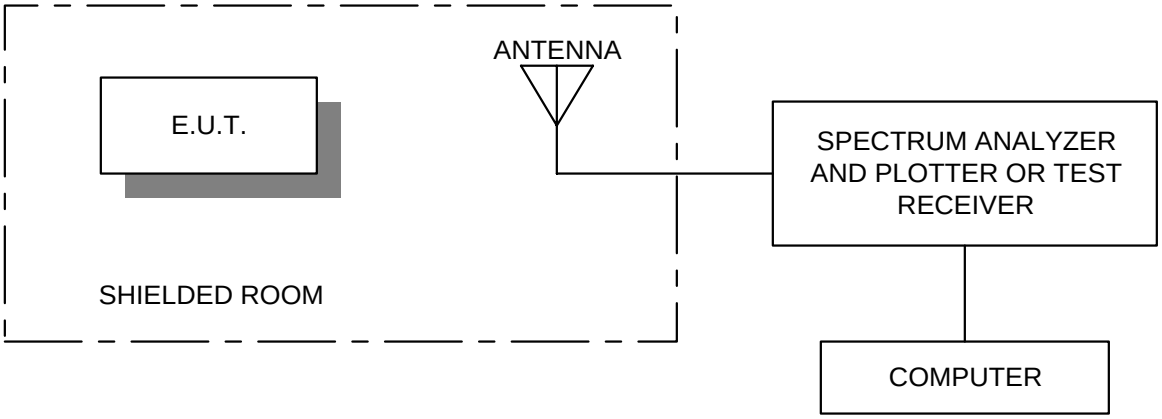
ANNEX A

TEST DIAGRAMS

Conducted Emissions



Radiated Prescan



Test Site For Radiated Emissions