

Nemko Test Report:

6L0754RUS1

**Applicant:** 

Sirit, Inc. 1321 Valwood Parkway Carrollton, TX 75006

Equipment Under Test: (E.U.T.)

IDentity Max Desktop Reader-016

In Accordance With:

FCC Part 15, Subpart C, 15.247 **Frequency Hopping Transmitters** 

**Tested By:** 

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

**TESTED BY:** 

DATE:

13 November 2006

David Light, Senior Wireless Engineer

**APPROVED BY:** 

Kevin Rose Wireless Engineer

DATE:

14 November 2006

Total Number of Pages: 41

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## Section 1. Summary of Test Results

Manufacturer: Sirit, Inc.

Model No.: Identity Max Reader-016

Serial No.: ENG001

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 Part 15, Subpart C, Paragraph 15.247 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



## 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. NONE See "Summary of Test Data".



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## Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Complies
Channel Separation	15.247(a)(1)	Complies
Time of Occupancy	15.247(a)(1)	Complies
20 dB Occupied Bandwidth	15.247(a)(1)	Complies
Peak Power Output	15.247(b)	Complies
Spurious Emissions (Antenna Conducted)	15.247(d)	Complies
Spurious Emissions (Radiated)	15.247(d)	Complies

## Footnotes:

## Section 2. Equipment Under Test (E.U.T.)

**General Equipment Information** 

Frequency Band:	⊠ 902 – 928 MHz □ 2400 – 2483.5 MHz □ 5725 – 5850 MHz
Operating Frequency Range:	902.79 to 927.29
Number of Channels:	50
Channel Spacing:	500 kHz
User Frequency Adjustment:	Software controlled

## Description of EUT

The Sirit Identity Max Desktop Reader is an RFID reader device that transmits and receives in the 900 MHz ISM band.

## System Diagram



## Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: David Light	DATE: 13 Nov 2006

- Test Results:Complies. The worst case emission was 51.09 dBµV at<br/>2.06 MHz. This is 4.91 dB below the average specification<br/>limit of 56 dBµV.
- Test Data:Refer to attached plots
- Equipment Used: 1114-1325-704-1258-1663-674
- Measurement Uncertainty: +/- 1.7 dB
- Temperature: 21 °C
- **Relative Humidity:** 35 %



Date: 13.NOV.2006 12:47:36



Date: 13.NOV.2006 11:24:51



Date: 13.NOV.2006 11:27:20



Date: 13.NOV.2006 11:25:44



## **Test Setup Photos – Powerline Conducted Emissions**



## Section 4. Channel Separation

NAME OF TEST: Channel Separation		PARA. NO.: 15.247(a)(1)
TESTED BY: David Light		DATE: 13 Nov 2006
Test Results:	Complies.	

- Measurement Data:See 20 dB BW plotMeasured 20 dB bandwidth:58.3 kHz MaxChannel Separation:500 kHz
- Equipment Used: 1464-1484-1485-993
- **Measurement Uncertainty:** <u>1X10<sup>-7</sup></u>ppm
- Temperature: 21 °C
- **Relative Humidity:** 35 %





## Test Data – 20 dB Bandwidth

Low Channel



## Test Data – 20 dB Bandwidth

Mid Channel



### High Channel



## Section 5. Time of Occupancy

NAME OF TEST: Time of Occupancy	PARA. NO.: 15.247(a)(1)
TESTED BY: David Light	DATE: 13 Nov 2006

Test Results:	Complies.	
Measurement Data:	Maximum Dwell Time On Any Channel: Number of Hopping Channels:	43.19 mS in 20 seconds 50
Equipment Used:	1464-1484-1485-993	
Measurement Uncert	t <b>ainty:</b> <u>1X10<sup>-7</sup></u> ppm	
Temperature:	21 °C	
Relative Humidity:	35 %	



## Test Data – Time of Occupancy

Duty cycle correction =  $20 \log (6.17/100) = -24.2 dB$ 

Time of Occupancy in 20 seconds =  $7 \times 6.17 = 43.19 \text{ mS}$ 



## Test Data – Time of Occupancy

Number of hopping channels = 50



## Section 6. Peak Power Output

NAME OF TEST: Peak Power Output				PARA	. NO.: 15.2	247 (b)
TESTED BY	: David Light			DATE	: 13 Nov 20	006
Test Results: Complies.		es.				
Measurement Data: See attached plots. Detachable antenna? If ves. state the type of non-standard connector used:				:		
Frequency	Peak	Peak	Antenna	Gain	E.I.R.P.	E.I.R.P.
(MHz)	Power	Power	Туре	(dBi)	(dBm)	(W)
	(dBm)	(W)				
902.79	8.5	0.0071	Linear	5.47	13.97	0.0249
914.7	8.6	0.0072	Linear	5.47	14.07	0.0255
927.7	8.8	0.0076	Linear	5.47	14.27	0.0267
Maximum EIRP (mW): 21.9						

Measurement Bandwidth: RBW=VBW=1 MHz Peak Detector

- This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.
- For battery powered equipment, the device was tested with a fresh battery per 15.31(e).
- The device was tested on three channels per 15.31(I).

This test was performed radiated.

**Equipment Used:** 1464-1083-1472-1469

Measurement Uncertainty: <u>1.7</u> dB

Temperature: 21 °C

**Relative Humidity:** 35 %

## Section 7. Spurious Emissions (Antenna Conducted)

NAME OF TEST: Spurious Emissions (Antenna Conducted)	PARA. NO.: 15.247(d)
TESTED BY: David Light	DATE: 13 Nov 2006

Test Results:	Complies.
Measurement Data:	Refer to attached plots
Equipment Used:	1464-1484-1485-993
Measurement Uncertainty:	<u>1X10<sup>-7</sup>ppm</u>

Temperature: 21 °C

**Relative Humidity:** 35 %

**Spectrum Analyzer Settings:** RBW=VBW=100 kHz Peak Detector

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

The spectrum was searched from 30 MHz to the 10<sup>th</sup> harmonic of the highest carrier frequency.



Lower Band Edge



## Upper Band Edge



## Test Data – Spurious Emissions at Antenna Terminals

Low Channel



## Mid Channel



## Test Data – Spurious Emissions at Antenna Terminals

High Channel



## Section 8. Spurious Emissions (Radiated)

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247(d)
TESTED BY: David Light	DATE: 13 Nov 2006
0	

Test Results:Complies. The worst case emission was 66.9 dBµV/m<br/>at 2708.4 MHz. This is 7.1 dB below the peak<br/>specification limit of 74 dBµV/m.

## Measurement Data: See attached table.

## **Duty Cycle Calculation:**

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

Duty cycle correction =  $20 \log (6.17/100) = -24.1 dB$ 

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(I).

All emissions within 20 dB of the specification limit are reported per 15.31(o).

**Equipment Used:** 1195-759-1514-678-1663-1464-1484-1485-1016-993

Measurement Uncertainty: +/-3.6 dB

Temperature:21 °C

Relative Humidity:3535

## Test Data - Radiated Emissions

Low Meas Data:	Channel <i>urement</i>	Read	ding liste	d by ord	er taken		Tes	t Distance	e: 3 Meter	s	
			Cable	Cable	Pre-A	Horn					
#	Freq	Rdng		Duty			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2708.370	66.7	+0.8	+2.8	-32.7	+29.3	+0.0	66.9	74.0	-7.1	Vert
	Peak			+0.0							
2	2708.370	66.7	+0.8	+2.8	-32.7	+29.3	+0.0	42.8	54.0	-11.2	Vert
	Average			-24.1							
5	4513.950	49.5	+1.0	+3.1	-31.6	+32.1	+0.0	54.1	74.0	-19.9	Vert
	Peak			+0.0							
7	5416.740	50.0	+1.2	+3.5	-31.9	+33.6	+0.0	56.4	74.0	-17.6	Vert
	Peak			+0.0							
11	7222.320	47.0	+1.2	+3.9	-32.1	+35.8	+0.0	55.8	74.0	-18.2	Vert
	Peak			+0.0							
17	2708.370	56.8	+0.8	+2.8	-32.7	+29.3	+0.0	57.0	74.0	-17.0	Horiz
	Peak			+0.0							
23	5416.740	49.5	+1.2	+3.5	-31.9	+33.6	+0.0	55.9	74.0	-18.1	Horiz
	Peak			+0.0							
24	5416.740	49.5	+1.2	+3.5	-31.9	+33.6	+0.0	31.8	54.0	-22.2	Horiz
	Average			-24.1							
25	6319.530	42.0	+1.3	+3.9	-30.7	+34.9	+0.0	51.4	74.0	-22.6	Horiz
	Peak			+0.0							
26	6319.530	42.0	+1.3	+3.9	-30.7	+34.9	+0.0	27.3	54.0	-26.7	Horiz
	Average			-24.1							
27	7222.320	48.8	+1.2	+3.9	-32.1	+35.8	+0.0	57.6	74.0	-16.4	Horiz
	Peak			+0.0							
28	7222.320	48.8	+1.2	+3.9	-32.1	+35.8	+0.0	33.5	54.0	-20.5	Horiz
	Average			-24.1							

Analyzer Settings: RBW=VBW=1 MHz Peak Detector

## Test Data - Radiated Emissions

Mid Channel

Meas Data:	urement	Read	ding liste	d by ord	er taken		Tes	t Distance	e: 3 Meter	S	
			Cable	Cable	Pre-A	Horn					
#	Freq	Rdng	Duty				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2744.368	56.7	+0.8	+2.9	-32.7	+29.4	+0.0	57.1	74.0	-16.9	Horiz
	Peak		+0.0								
3	3659.157	52.7	+0.8	+2.8	-32.3	+30.5	+0.0	54.5	74.0	-19.5	Horiz
	Peak		+0.0								
7	5488.735	50.7	+1.2	+3.5	-31.9	+33.6	+0.0	57.1	74.0	-16.9	Horiz
	Peak		+0.0								
9	6403.524	44.8	+1.3	+3.9	-30.9	+35.1	+0.0	54.2	74.0	-19.8	Horiz
	Peak		+0.0								
11	7318.313	49.5	+1.2	+4.0	-32.3	+35.8	+0.0	58.2	74.0	-15.8	Horiz
	Peak		+0.0								
12	7318.313	49.5	+1.2	+4.0	-32.3	+35.8	+0.0	34.1	54.0	-19.9	Horiz
	Average		-24.1								
17	2744.368	62.5	+0.8	+2.9	-32.7	+29.4	+0.0	62.9	74.0	-11.1	Vert
	Peak		+0.0								
18	2744.368	62.5	+0.8	+2.9	-32.7	+29.4	+0.0	38.8	54.0	-15.2	Vert
	Average		-24.1								
19	3659.157	53.0	+0.8	+2.8	-32.3	+30.5	+0.0	54.8	74.0	-19.2	Vert
	Peak		+0.0								
21	4573.946	52.8	+1.0	+3.1	-31.8	+32.3	+0.0	57.4	74.0	-16.6	Vert
	Peak		+0.0								
23	5488.735	51.7	+1.2	+3.5	-31.9	+33.6	+0.0	58.1	74.0	-15.9	Vert
	Peak		+0.0								
24	5488.735	51.7	+1.2	+3.5	-31.9	+33.6	+0.0	34.0	54.0	-20.0	Vert
	Average		-24.1								
27	7318.313	49.3	+1.2	+4.0	-32.3	+35.8	+0.0	58.0	74.0	-16.0	Vert
	Peak		+0.0								
29	8233.103	46.8	+1.3	+4.3	-33.3	+37.3	+0.0	56.4	74.0	-17.6	Vert
	Peak		+0.0								

Analyzer Settings: RBW=VBW=1 MHz Peak Detector

## Test Data - Radiated Emissions

High Meas Data:	n Channel urement	Read	ding liste	d by ord	ler taken.		Tes	t Distance	e: 3 Meter	s	
			Cable	Cable	Pre-A	Horn					
#	Freq	Rdng	Duty				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2781.866	63.2	+0.8	+2.9	-32.7	+29.4	+0.0	63.6	74.0	-10.4	Vert
	Peak		+0.0								
2	2781.866	63.2	+0.8	+2.9	-32.7	+29.4	+0.0	39.5	54.0	-14.5	Vert
	Average		-24.1								
3	3709.155	53.2	+0.8	+2.8	-32.2	+30.6	+0.0	55.2	74.0	-18.8	Vert
	Peak		+0.0								
5	4636.443	55.0	+1.0	+3.2	-32.1	+32.5	+0.0	59.6	74.0	-14.4	Vert
	Peak		+0.0								
6	4636.443	55.0	+1.0	+3.2	-32.1	+32.5	+0.0	35.5	54.0	-18.5	Vert
	Average		-24.1								
7	5563.732	51.8	+1.2	+3.5	-31.8	+33.7	+0.0	58.4	74.0	-15.6	Vert
	Peak		+0.0								
8	5563.732	51.8	+1.2	+3.5	-31.8	+33.7	+0.0	34.3	54.0	-19.7	Vert
	Average		-24.1								
11	7418.309	48.3	+1.2	+4.1	-32.5	+35.9	+0.0	57.0	74.0	-17.0	Vert
	Peak		+0.0								
13	8345.598	46.0	+1.2	+4.4	-33.5	+37.1	+0.0	55.2	74.0	-18.8	Vert
	Peak		+0.0								
17	2781.866	53.7	+0.8	+2.9	-32.7	+29.4	+0.0	54.1	74.0	-19.9	Horiz
	Peak		+0.0								
19	3709.155	53.8	+0.8	+2.8	-32.2	+30.6	+0.0	55.8	74.0	-18.2	Horiz
	Peak		+0.0								
23	5563.732	50.2	+1.2	+3.5	-31.8	+33.7	+0.0	56.8	74.0	-17.2	Horiz
	Peak		+0.0								
27	7418.309	49.5	+1.2	+4.1	-32.5	+35.9	+0.0	58.2	74.0	-15.8	Horiz
	Peak		+0.0								
28	7418.309	49.5	+1.2	+4.1	-32.5	+35.9	+0.0	34.1	54.0	-19.9	Horiz
	Average		-24.1								

Analyzer Settings: RBW=VBW=1 MHz Peak Detector

## Radiated Photographs





## Section 9. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration	Calibration
1114	CABLE, 7m	Nemko USA, Inc. RG223	N/A	08/22/06	08/22/07
1325	CABLE, .5m	Nemko USA, Inc. RG223	N/A	04/20/06	04/20/07
704	FILTER, HIGH PASS, 5 KHz	SOLAR 7930-5.0	933126	04/20/06	04/20/07
1258	LISN .15mhz-30mhz	EMCO 0	1305	04/19/06	04/19/07
1663	Spectrum Analyzer	Rhode & Schwarz FSP	973351	05/18/06	05/18/07
674	LIMITER	HP 11947A	3107A02200	04/19/06	04/19/07
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
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1083	Cable 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A
1469	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1195	ANTENNA, BICONICAL	A.H. SYSTEMS SAS-200/542	235	02/10/06	02/10/07
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	02/13/06	02/13/07
1514	CABLE ASSY, LAB 2- B OATS	Nemko USA, Inc. SITE B OATS	N/A	06/08/06	06/08/07
678	PREAMP	Nemko USA, Inc. 30MHZ-1.4GHZ	408	10/03/06	10/03/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	04/20/06	04/20/07

## ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions PARA. NO.: 15.207(a)

## 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 Conducted	Limit (dBmV)			
Emission (MHz)	Quasi-peak	Average		
	0.0 / = 0.*			
0.15-0.5	66 to 56*	56 to 46*		
0.5-5	56	46		
5-30	60	50		
	6 AL 6			

\* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

NAME OF TEST:	Channel Separation	PARA. NO.: 15.247(a)(1)

Minimum Standard: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

## NAME OF TEST: Time of Occupancy

PARA. NO.: 15.247(a)(1)

## Minimum Standard:

Frequency Band	20 dB	No. of	Average Time of Occupancy
(MHz)	Bandwidth	Hopping	
		Channels	
902 - 928	>250 kHz	50	=<0.4 sec. in 20 sec.
902 – 928	=<250 kHz	25	=<0.4 sec. in 10 sec.
			=<0.4 sec. in 0.4 seconds
2400 – 2483.5		75	multiplied by the number of
			hopping channels employed.
5725 - 5850		75	=<0.4 sec. in 30 sec.

## Method Of Measurement:

The spectrum analyzer is set as follows:

RBW: 1 MHz VBW: = RBW Span: 0 Hz LOG dB/div.: 10 dB Sweep: Sufficient to see one hop time sequence. Trigger: Video

The occupancy time of one hop is measured as above. The average time of occupancy is calculated over the appropriate period of time from above table

Avg. time of occupancy = (period from table/duration of one hop)/no. of channels multiplied by the duration of one hop.

For instance:

If a 2.4 GHz system has a measured hop duration time of 1 msec. and uses 75 channels, then the average time of occupancy would be:

(30 sec./.001 sec.)/75 chan. = 400 x 1 msec. = 400 msec. or 0.4 sec. in 30 sec.

## Nemko USA, Inc.

EQUIPMENT: Identity Max Desktop Reader-016 PROJECT NO.:6L0754RUS1

	NAME OF TEST:	Occupied Bandwidth	PARA, NO.: 15.247(a)(1)
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## Minimum Standard:

Frequency Band (MHz)	Maximum 20 dB Bandwidth
902 - 928	500 kHz
2400 – 2483.5	Not defined
5725 – 5850	1 MHz

## Method Of Measurement:

The spectrum analyzer is set as follows:

RBW: At least 1% of span/div. VBW: >RBW Span: Sufficient to display 20 dB bandwidth LOG dB/div.: 10 dB Sweep: Auto

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

## Nemko USA, Inc.

EQUIPMENT: Identity Max Desktop Reader-016 PROJECT NO.:6L0754RUS1

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247(b)
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### Minimum Standard:

Frequency	No. of	Maximum Peak
Band	Hopping	Power Output at
(MHz)	Channels	Antenna Port
902 - 928	at least 50	1 watt
902 - 928	25 - 49	0.25 watts
2400 –	75	1 watt
2483.5		
5725 - 5850	75	1 watt

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

### **Direct Measurement Method For Detachable Antennas:**

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

## Calculation Of EIRP For Integral Antenna:

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation  $GP/4\pi R^2 = E^2/120\pi$  and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts E = the maximum measured field strength in V/m R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

The RBW of the spectrum analyzer shall be set to a value greater than the measured 20 dB occupied bandwidth of the E.U.T.

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

## NAME OF TEST: Spurious Emissions at Antenna Terminals PARA. NO.: 15.247(d)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (μV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

### THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

#### Method Of Measurement:

30 MHz - 10th harmonic plot RBW: 100 kHz VBW: 300 kHz Sweep: Auto Display line: -20 dBc

#### Lower Band Edge

RBW: At least 1% of span/div. VBW: >RBW Span: As necessary to display any spurious at band edge. Sweep: Auto Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz Marker: Peak of fundamental emission Marker  $\Delta$ : Peak of highest spurious level below center frequency.

#### Upper Band Edge

RBW: At least 1% of span/div. VBW: >RBW Span: As necessary to display any spurious at band edge. Sweep: Auto Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz Marker: Peak of fundamental emission Marker  $\Delta$ : Peak of highest spurious level above center frequency.

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

## Nemko USA, Inc.

FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER PROJECT NO.:6L0754RUS1 EQUIPMENT: Identity Max Desktop Reader-016

NAME OF TEST: Radiated Spurious Emissions PARA. NO.: 15.247(d)

> Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

## Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (μV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

#### MHz MHz MHz GHz 0.09-0.11 16.42-16.423 399.9-410 4.5-5.25 0.495-0.505 16.69475-16.69525 608-614 5.35-5.46 2.1735-2.1905 16.80425-16.80475 960-1240 7.25-7.75 25.5-25.67 1300-1427 8.025-8.5 4.125-4.128 4.17725-4.17775 37.5-38.25 1435-1626.5 9.0-9.2 4.20725-4.20775 73-74.6 1645.5-1646.5 9.3-9.5 6.125-6.218 74.8-75.2 1660-1710 10.6-12.7 6.26775-6.26825 108-121.94 1718.8-1722.2 13.25-13.4 2200-2300 6.31175-6.31225 123-138 14.47-14.5 149.9-150.05 2310-2390 8.291-8.294 15.35-16.2 8.362-8.366 156.52475-156.52525 2483.5-2500 17.7-21.4 8.37625-8.38675 156.7-156.9 2655-2900 22.01-23.12 3260-3267 8.41425-8.41475 23.6-24.0 162.0125-167.17 3332-3339 31.2-31.8 12.29-12.293 167.72-173.2 240-285 3345.8-3358 36.43-36.5 12.51975-12.52025 3600-4400 12.57675-12.57725 322-335.4 Above 38.6 13.36-13.41 1718

## 15.205 Restricted Bands

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

## ANNEX B - TEST DIAGRAMS

## **Test Site For Radiated Emissions**



## **Conducted Emissions**



## Peak Power at Antenna Terminals

