



LSRESEARCH, LLC

Wireless Product Development

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ENGINEERING TEST REPORT # 315006 A RFX

LSR Job #: C-2148

RF Exposure Compliance of:

Caretaker Sentry 2-way voice pendant

Test Date(s):

September 11, 12, 13, 16, 17, 27, and October 3, 4, 7 2013

January 14, and February 4-6, 2015

Prepared For:

Logic Mark, LLC

Attn: Douglas L. Ringer

10106 Bluegrass Parkway

Louisville, Kentucky 40299

This Test Report is issued under the Authority of: Adam Alger, EMC Engineer

Signature:

Date: 3-26-15

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Prepared For: LogicMark, LLC.	Name: Caretaker Sentry 2-way voice pendant
Report: TR 315006 A RFX	Model: 41915
LSR: C-2148	Serial: N/A (engineering sample)

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LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:



TESTING CERT #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation

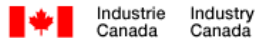
A2LA Certificate Number: 1255.01



Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948

FCC Registration Number: 90756



Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1

File Number: IC 3088-A

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1

File Number: IC 3088



U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility – Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2).

Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: November 20, 2002

Notified Body Identification Number: 1243

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1.0 Conformance Summary

The EUT was found to MEET the 5mm minimum test separation distance threshold for SAR test exclusion per FCC §2.1091(mobile) and §2.1093(portable) using methods of FCC KDB 447498 D01 General RF Exposure Guidance v05r02 as a standalone device.

2.0 SAR Test Exclusion Threshold

SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm

1-g SAR test exclusion threshold equation:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$$

10-g SAR test exclusion threshold equation:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 7.5$$

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3.0 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	Caretaker Sentry 2-way voice pendant
Model Number:	41915
Serial Number:	N/A (Engineering Sample)
FCC ID	TYD-CS41915
IC Number	8471A-CS41915

3.1 Product Description

EUT uses two integral antennas for diversity with a maximum 1.2 dBi peak gain. EUT fitted with a temporary connection (U.FL) for RF Conducted measurements.

EUT utilizes 5 RF Channels (1921.536-1928.448 MHz) with 6 timeslots for 30 TDMA Duplex Channels

3.2 Additional Information

EUT was programmed into continuous transmit via hyper-terminal commands for RF tests. Normal mode of operation achieved with companion device for spectrum etiquette tests.

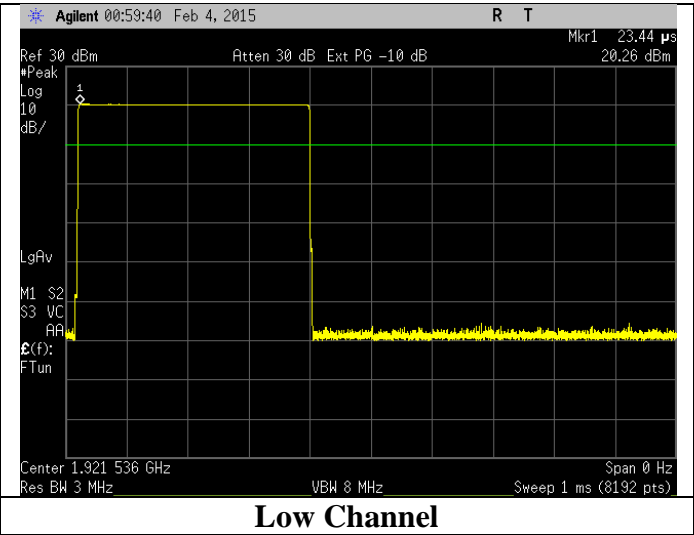
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4.0 RF Conducted Measurement Data

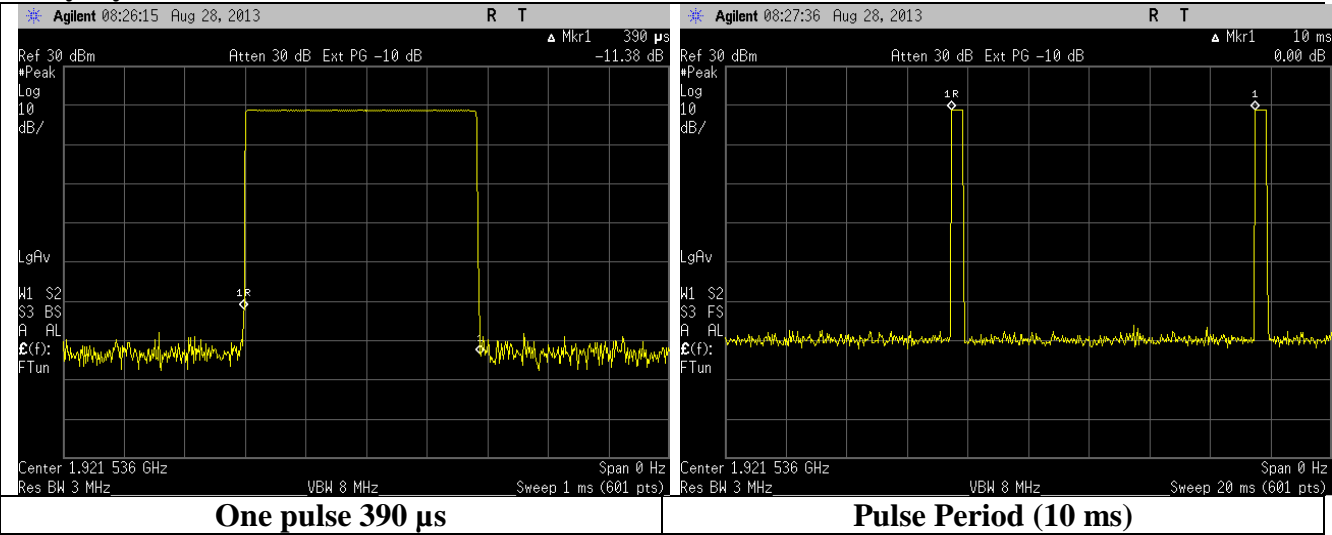
Table

Frequency (MHz)	Power Antenna (dBm)
1921.536	20.26
1924.992	20.19
1928.448	20.14

Plots



Duty Cycle



5.0 SAR Test Exclusion Calculation

Description	Line #	Data	Unit	Additional Description
Transmit Packet on time:	1	0.39	(ms)	Worst case
Packet repetition time:	2	10	(ms)	Worst case
Duty factor:	3	0.039		Transmit Packet on time / Packet repetition time (Line # 1/2)
Maximum peak output power at antenna input terminal:	4	20.26	(dBm)	Measured worst case
Maximum peak power:	5	106.170	(mW)	dBm to mW conversion
Prediction distance:	6	5	(mm)	Minimum test separation distance
Prediction frequency:	7	1.921536	(GHz)	Measured frequency
Square root of frequency (GHz):	8	1.386195		Calculation
Duty factor applied to maximum peak radiated power (mW):	9	4.140613	(mW)	duty factor * maximum peak power (Line # 11*3)
Source based power (mW) / min test separation distance (mm):	10	0.828123		Calculation (Line # 5/6)
SAR exclusion calculation:	11	1.15		Calculation (Line # 10*8)
Threshold:	12	3		
Margin:	13	1.85		Calculation (Line # 12-11)

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6.0 Industry Canada Low Power Exemption

RSS 102 Issue 5, Section 2.5 states that all transmitters that meet the output power requirements as stated in section 2.5.1 and 2.5.2 of RSS 102 are exempt from routine SAR and RF exposure evaluation.

Output Power Evaluation.

Evaluation Frequency = 1921.536 MHz

Device Operation separation distance: $\leq 20\text{cm}$

Maximum Effective Isotropic Radiated Power (dBm) = 20.26 dBm + 1.2 dBi = 21.46 dBm

Maximum Effective Isotropic Radiated Power (mW) = $\log^{-1}(\text{EIRP (dBm)}/10)$ = 139.9587 mW

Duty cycle (source-based, time-averaged) = $390\mu\text{s}/10\text{ms}$ = 0.039 * 139.9587 mW = 5.4584 mW

Section 2.5.1 general public use limit at for devices operating less than 20cm:

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤ 5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤ 300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Linear interpolation to obtain exemption limit at 1921.536 MHz = 6.8825 mW (at separation distance of ≤ 5 mm)

Conclusion:

Since the maximum effective radiated power (ERP) is less than the applicable section limit, the product is exempt from SAR/RF Evaluation.

END OF REPORT

Date	Version	Comments	Person
3-26-15	V0	Final	Adam A

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