



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650)965-4000 Fax: (650)965-3000

*FCC PART 15.231, SUBPART C
IC RSS 210, ISSUE 8
TEST REPORT*

for

the

3-Series Garage Door Sensor

MODEL: Model 3220

Prepared for

CentraLite Systems, Inc.
1000 Cody Road South Ste-A
Mobile, Alabama, 36695

Prepared by: George Hsu
GEORGE HSU

Approved by: Kevin Bothmann
KEVIN BOTHMANN

ELECTRO MAGNETIC TEST, INC.
1547 PLYMOUTH STREET
MOUNTAIN VIEW, CALIFORNIA 94043
(650) 965-4000

DATE: June 25, 2015

	REPORT BODY	APPENDICES				TOTAL
		A	B	C	D	
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

The measurement data and conclusions contained in this test report are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003, Issue 5, August 2012.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	A-0118
	Open Field Test Site "A"	-
	Mains Conducted Emissions Test Site "A"	-
	Telecom Conducted Emissions Test Site "A"	-
	3 Meter Semi-Anechoic Chamber Site "E"	-
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	-
	Mains Conducted Emissions Test Site "E"	-
	Telecom Conducted Emissions Test Site "E"	-
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

*These agencies do not issue an identifying number to test labs.



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GENERAL REPORT SUMMARY (CONTINUED)

Device Tested: 3-Series Garage Door Sensor
 Model: Model 3220
 S/N: N/A

Product Description: 3-Series Garage Door Sensor

Modifications: The EUT was not modified during the testing.

Manufacturer: CentraLite Systems, inc.
 1000 Cody Road South, Ste A
 Mobile, Alabama, 36695

Test Date(s): November 19, 2015

Test Specifications: EMI requirements
 Limits: FCC Title 47, Part 15 Subpart C
 Test Procedure: ANSI C63.4: 2009

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	FCC STANDARD	IC STANDARD	REMARKS	RESULTS
7.1	Radiated Emissions (General Requirements and Field Strength Requirements)	15.209(a)(1), 15.231(b)	RSS-GEN Issue 4, [8.9] RSS 210 Issue 8[A1.1]	Radiated	PASS
7.2	Conducted Emissions	15.207(a)	RSS-GEN Issue 4 [8.8]	N/A***	N/A***
7.3	Transmitter Deactivation	15.231(a)(2)	RSS-210 Issue 8 [A1.1.1a]	Radiated	PASS
7.4	Occupied Bandwidth	15.231(c)	RSS-210 Issue 8 [A1.1.3]	Radiated	PASS
7.5	Antenna Requirement	15.203	RSS-GEN Issue 4	N/A	PASS

***The EUT is battery powered and does not plug into the power mains, therefore conducted emissions is not applicable


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TECHNICAL DESCRIPTION OF THE EUT

Manufacturer:	CentraLite Systems, Inc.		
EUT Name:	3-Series Garage Door Sensor		
Model No:	Model 3220		
Operating Frequency:	433.93 MHz		
Channel Number:	1		
Antenna Type:	PIFA		
Maximum Output Power:	79.8 dB μ V/m		
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	433.93		

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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the 3-Series Garage Door Sensor Model: Model 3220. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2009. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined in FCC Title 47, Part 15, Subpart C.

2. ADMINISTRATIVE DATA**2.1 Location of Testing**

The EMI tests described herein were performed at the test facility of Electro Magnetic Test, Inc., 1547 Plymouth Street, Mountain View, California, 94043.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The measurement results in this report and the calibration of the test equipment are traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant PersonnelCentralite Systems, Inc.

John Calagaz CTO

Electro Magnetic Test, Inc.

David Vivanco Test Technician
George Hsu Test Technician
Kevin Bothmann Lab Manager

2.4 Date Test Sample was Received

The test sample was received on June 16, 2015.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Centralite Systems, Inc..

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2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
CISPR	International Special Committee On Radio Interference
FCC	Federal Communications Commission

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3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15, Subpart C	FCC Rules - Radio frequency devices (including digital devices).
RSS 210, Issue 8, December 2010	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment
RSS-Gen Issue 4, November 2014	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.



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4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

The EUT does not have any ports and is battery operated. During testing the EUT was constantly transmitting the fundamental frequency.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix B.



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4.1.1 Cable Construction and Termination

The EUT does not have any cables.

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5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
3-Series Garage Door Sensor (EUT)	Centralite Systems, Inc.	3220	N/A	N/A


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5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	September 2, 2015	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	September 2, 2015	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00451	September 2, 2015	1 Year
Radiated EMI Software	Sector Design	N/A	Ver.1.4.6	N/A	N/A
Conducted EMI Software	Hewlett Packard	85869PC	Ver. A.02.03	N/A	N/A
Preamplifier	Com Power	PA-102	1482	March 4, 2015	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 11, 2014	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150701	July 16, 2015	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150702	July 16, 2015	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150703	July 16, 2015	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150704	July 16, 2015	1 Year
Biconical Antenna	Com Power	AB-100	01557	June 17, 2015	1 Year
Log Periodic Antenna	Com Power	AL-100	16001	June 17, 2015	1 Year
Horn Antenna	Com Power	AHA-118	711054	December 11, 2014	1 Year
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39A220ZD	N/A	N/A


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5.2 EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	January 16, 2015	1 Year
EMI Test Software	Rohde & Schwarz	EMC32	V8.40.0	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY53420778	July 1, 2015	1 Year
Passive Loop Antenna (9 KHz – 30 MHz)	ETS-Lindgren	6512	00128210	April, 23, 2015	2 Years
BiConiLog Antenna (30 MHz – 1 GHz)	ETS-Lindgren	3142D	00109337	July 8, 2015	1 Year
Horn Antenna (1 GHz – 18 GHz)	ETS-Lindgren	3117	00109294	July 8, 2015	1 Year
Preamplifier (1 GHz – 18 GHz)	Rohde & Schwarz	TS-PR18	100056	July 8, 2015	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Dell, Inc.	OPTIPLEX 745	4T50WC1	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A



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6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to the table below and section 7 of this report for the details of which sites were used for testing. All sites are located at 1547 Plymouth Street, Mountain View, California 94043.

Site Used For Test	Site Description
	Open Field Test Site "A"
	Mains Conducted Emissions Test Site "A"
	Telecom Conducted Emissions Test Site "A"
X	3 Meter Semi-Anechoic Chamber Site "E"
	Mains Conducted Emissions Test Site "E"
	Telecom Conducted Emissions Test Site "E"

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

All tests were performed in a climate controlled building. The temperature was 22° C, humidity 45%, and barometric pressure 102.6 kPa.



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7. TEST PROCEDURES

7.1 Radiated Emissions Test – Semi-Anechoic Chamber

7.1.1 General Requirements Limit (FCC PART 15 Section 15.209(a)(1), IC-RSS-GEN Issue 4, [8.9])

Frequency of Emission (MHz)	Field Strength		Measurement Distance (Meters)
	µV/m	dBµV/m	
0.009-0.49	2400/F(kHz)		300
0.49-1.705	24000/F(kHz)		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Field Strength Requirements (FCC PART 15 Section 15.231(b)), IC-RSS-210 Issue 8 [A1.1])

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m) @3m	Field Strength of Spurious/Unwanted Emissions (µV/m) @ 3m
40.66-40.70	Depends on Standard	225
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375*
174-260	3,750	375
260-470	3,750 to 12,500*	375 to 1,250*
Above 470	12,500	1,250

*Use linear interpolation to find value.

Frequencies within the restricted bands follow general limits as listed above.

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7.1 Radiated Emissions Test – Semi-Anechoic Chamber (Continued)

7.1.2 Test Procedure

The Rohde & Schwarz ESU40 EMI receiver was used as a measuring meter while under software control by the Rohde & Schwarz EMC32 software. To increase the sensitivity of the instrument, the built in preamplifier was used from 9 KHz to 1 GHz and an external preamplifier was used from 1 GHz to 26.5 GHz. The EMI receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI receiver records the highest measured reading over all the sweeps. The built in quasi-peak or average detector was used only for those readings which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was 100 kHz from 9 kHz to 26.5 GHz.

The Loop Antenna, Broadband BiConiLog and horn antennas were used as transducers during the measurement. The Loop antenna was used from 9 KHz to 30 MHz, the BiConiLog antenna was used from 30 MHz to 1000 MHz and horn antennas were used from 1GHz – 26.5 GHz. The frequency spans were wide (9 kHz to 150 kHz, 150 kHz to 30 MHz, 30 MHz to 88 MHz, 88 MHz to 216 MHz, 216 to 300 MHz, 300 MHz to 1 GHz, 1 GHz to 18 GHz and 18 GHz to 26.5 GHz) during preliminary investigations. The final data was taken with a frequency span of 1 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The 5 meter semi-anechoic chamber of Electro Magnetic Test, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2009. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. The EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The presence of non EUT signals was verified by turning the EUT off. In case a non EUT signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the other signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 9 kHz to 26.5 GHz. to obtain final test data.

Calculation Of Radiated Emission Test Data:

Amplitude - Gain + Antenna Factor + Cable Loss = Corrected Amplitude

Corrected Amplitude - Limit = Margin


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7.2 Conducted Emissions Test – Mains Ports

7.2.1 Limit (FCC PART 15 Section 15.207(a), IC RSS-GEN Issue 4 [8.8])

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

*Note: Decreases with the logarithm of the frequency

7.2.2 Test Procedure

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the HP 8566B spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 2009. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable and peripheral placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 85869PC software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.


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7.3 Transmission Deactivation
7.3.1 Limit (FCC PART 15 Section 15.231(a)(2), IC-RSS-210 Issue 8, [A1.1.1a])

Limit
Transmitter shall cease operation within 5 seconds after activation

7.3.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator, set the Spectrum Analyzer as below:

RBW: 100 KHz
 VBW: 300 KHz
 Detector: Peak
 Span: Zero
 Trace Mode: Max Hold

- 1.) Set sweep time to encompass more than 5 seconds after signal activation.
- 2.) Place analyzer marker at start of transmitter activation.
- 3.) Place marker 5 seconds after activation.
- 4.) Check to see if transmitter has ceased operation.



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7.4 Occupied Bandwidth

7.4.1 Limit

(FCC PART 15 Section 15.231(c))

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

(IC-RSS-210 Issue 8, [A1.1.3])

For the purpose of Section A1.1, the 99% bandwidth shall be no wider than 0.25% of the centre frequency for device operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency

Limit
$\leq 1084.83 \text{ KHz}$, For 433.93 MHz Transmitter

7.4.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator, set the Spectrum Analyzer as below:

- RBW: 1% to 5% of Emission bandwidth
- VBW: $\geq 3 \times \text{RBW}$
- Detector: Peak
- Trace Mode: Max Hold

Using the spectrum analyzer marker function, mark the occupied bandwidth 20db from the peak. For 99% occupied bandwidth set to measure for 99% power and use the automated feature.



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7.5 Antenna Requirement

7.5.1 Requirement (FCC PART 15 SECTION 15.203 , IC RSS-GEN Issue 4)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

7.5.2 Test Result

The antenna is integrated on the main PCB with no consideration for replacement on the 3-Series Garage Door Sensor.



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8. CONCLUSIONS / COMPLIANCE STATEMENT

Based upon the results contained in this report, Electro Magnetic Test, Inc. has determined that the 3-Series Garage Door Sensor, Model: Model 3220 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C.



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APPENDIX A

RADIATED AND CONDUCTED DATA SHEETS

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Radiated Emissions

EUT:	3-Series Garage Door Sensor	Model Name:	Model 3220
Test Mode:	TX Mode	Test Date:	6/16/2015
Test Engineer:	George Hsu	Measurement:	9 KHz to 30 MHz

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators were attenuated more than 20 dB below the permissible value



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Radiated Emissions

EUT:	3-Series Garage Door Sensor	Model Name:	Model 3220
Test Mode:	TX Mode	Test Date:	11/19/15
Test Engineer:	George Hsu	Measurement:	30 MHz to 1 GHz

The pulse train was greater than 100 ms, therefore Quasipeak or Average Detector was used instead of time based average.

Quasipeak Measurement:

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
88.500000	11.8	285.0	Horizontal	182.0	8.3	28.66	40.46
100.290000	12.4	109.0	Horizontal	200.0	9.2	28.06	40.46
105.720000	11.3	274.0	Horizontal	210.0	9.2	29.16	40.46
282.630000	12.0	348.0	Horizontal	58.0	14.2	35.46	47.46
364.020000	15.1	100.0	Horizontal	219.0	17.1	32.36	47.46
433.980000	58.0	140.0	Vertical	72.0	19.6	22.80	80.80*
434.010000	79.8	100.0	Horizontal	341.0	19.6	1.00	80.80*
687.480000	30.4	100.0	Vertical	194.0	24.7	17.06	47.46
867.990000	51.6	175.0	Vertical	180.0	27.5	9.20	60.80**
868.020000	60.7	100.0	Horizontal	100.0	27.5	0.10	60.80**

*Limit for Operating Fundamental.

**Limit for spurious emission



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Radiated Emissions

EUT:	3-Series Garage Door Sensor	Model Name:	Model 3220
Test Mode:	TX Mode	Test Date:	11/19/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 4.5 GHz

The pulse train was greater than 100 ms, therefore Quasipeak or Average Detector was used instead of time based average.

Average Measurement:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1301.750000	21.2	349.0	Vertical	145.0	-3.2	32.8	54.00*
1302.250000	36.4	138.0	Horizontal	221.0	-3.2	17.6	54.00*
1735.516000	55.1	112.7	Vertical	319.0	-1.4	5.7	60.80**
1736.250000	37.8	123.0	Horizontal	299.0	-1.4	23.0	60.80**
2169.558000	48.3	377.4	Vertical	126.8	1.0	12.5	60.80**
2170.250000	52.5	158.0	Horizontal	188.0	1.0	8.3	60.80**
2604.250000	44.6	357.7	Vertical	346.6	1.8	16.2	60.80**
2604.250000	50.8	124.0	Horizontal	66.0	1.8	10.0	60.80**
3037.500000	43.6	100.0	Vertical	39.4	3.1	17.2	60.80**
3038.500000	54.3	133.1	Horizontal	333.4	3.1	6.5	60.80**
3471.500000	41.5	223.0	Vertical	132.1	3.3	19.3	60.80**
3472.500000	51.1	113.0	Horizontal	194.0	3.3	9.7	60.80**
3906.250000	30.0	151.0	Vertical	0.0	4.3	24.0	54.00*
3906.500000	38.1	120.0	Horizontal	344.0	4.3	15.9	54.00*
4340.500000	27.5	131.0	Vertical	1.0	4.9	26.5	54.00*
4340.500000	30.2	120.0	Horizontal	313.0	4.9	23.8	54.00*

*Limit for Restricted Band

**Limit for Spurious Emission

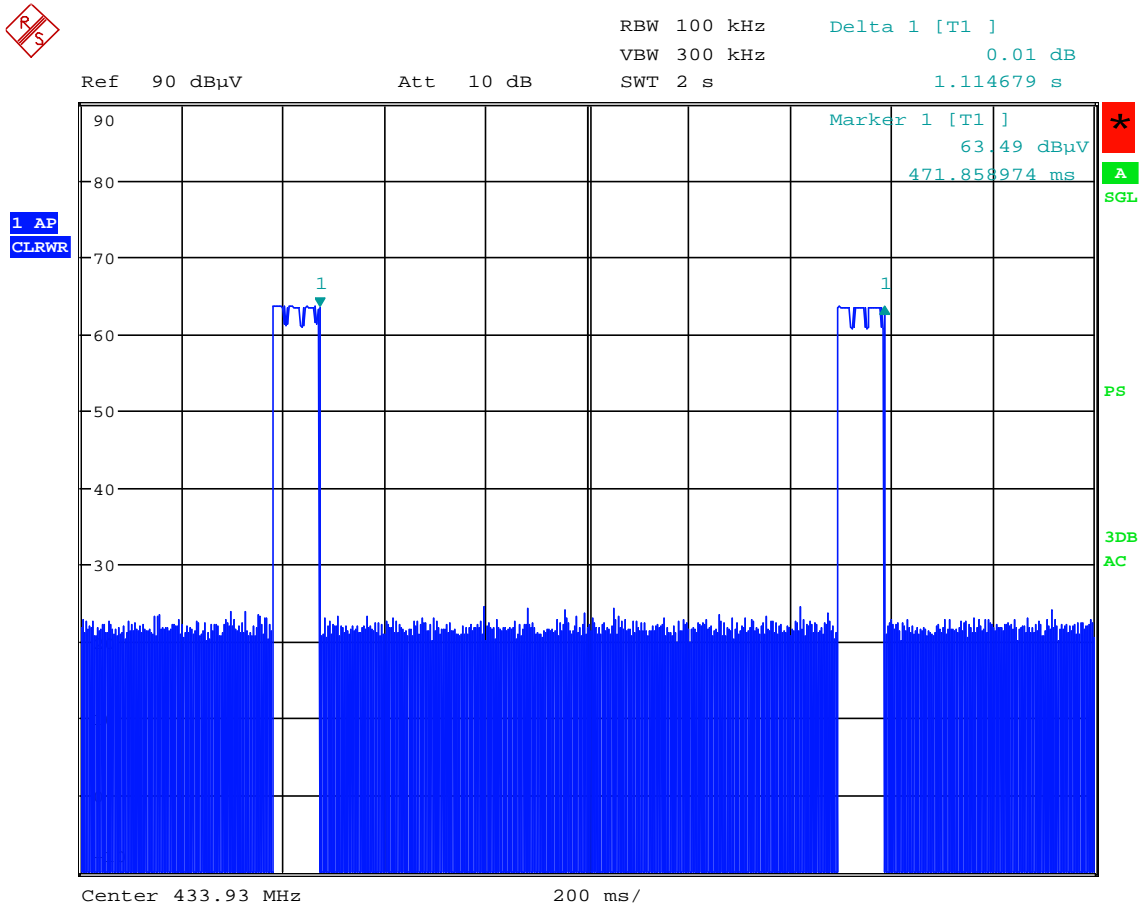


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650)965-4000 Fax: (650)965-3000

Pulse Train

EUT:	3-Series Garage Door Sensor	Model Name:	Model 3220
Test Mode:	TX Mode	Test Date:	11/19/15
Test Engineer:	George Hsu	Measurement:	Pulse Train



Pulse Train Length = 1.114s



ELECTRO MAGNETIC TEST, INC.

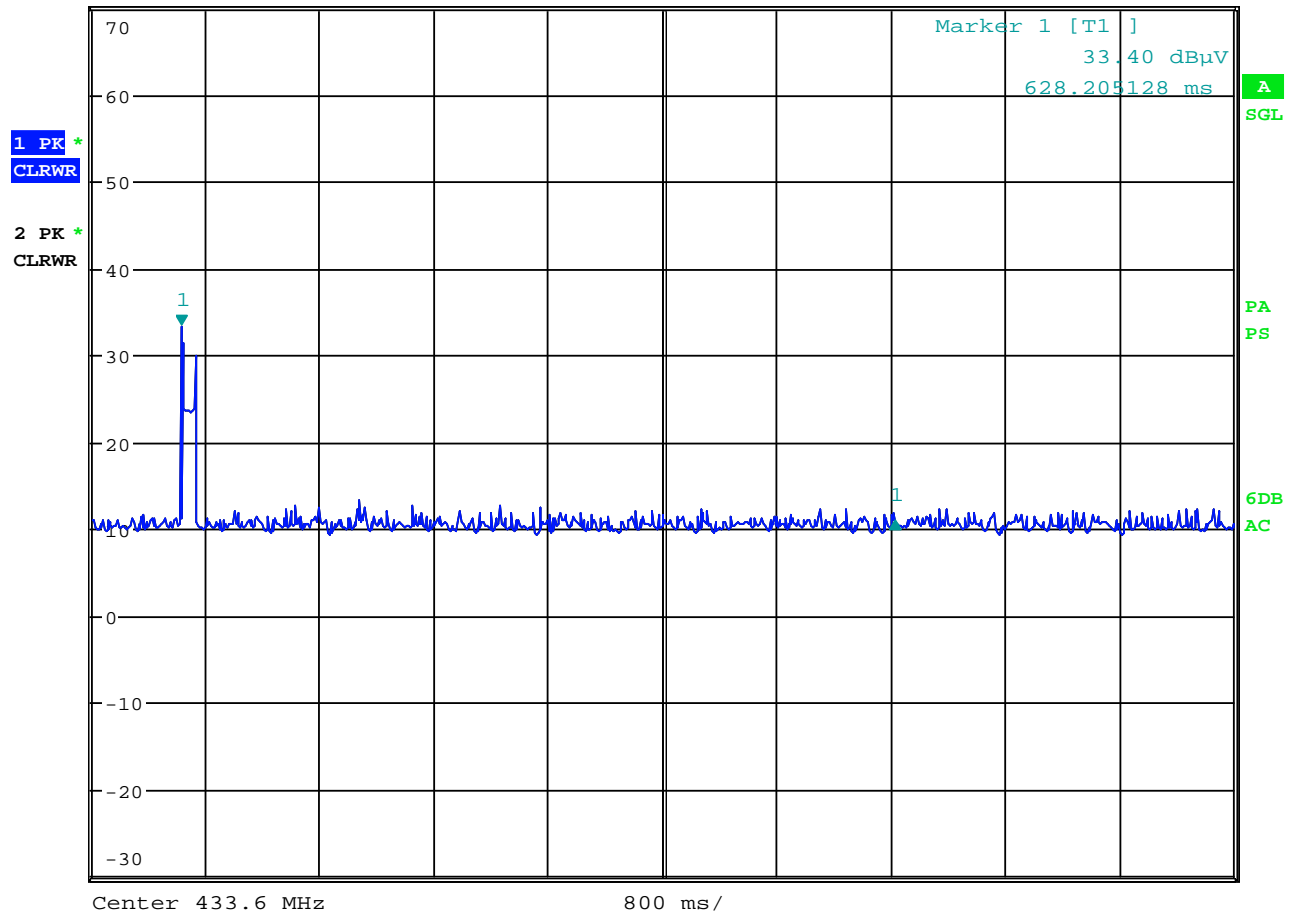
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Transmitter Deactivation

EUT:	3-Series Garage Door Sensor	Model Name:	Model 3220
Test Mode:	TX Mode	Test Date:	11/19/15
Test Engineer:	George Hsu	Measurement:	Pulse Train



Ref 70 dBµV Att 10 dB RBW 100 kHz Delta 1 [T1] -22.47 dB
 * VBW 300 kHz SWT 8 s 5.000000 s



Result: Transmission Stopped Before 5 Seconds


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Occupied Bandwidth(Conducted)

Company:	CentraLite Systems, Inc.	Test Date	7/13/15		
EUT Name	3-Series Garage Door Sensor	Test Engineer	George Hsu		
Model:	Model 3220	Test Result	PASS		
Operating Mode	TX Mode				
Frequency (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Limit (KHz)	Conclusion	
433.93	202.724	182.692	≤ 1084.83 KHz	PASS	
Test Equipment: Please refer to section 5.2					



ELECTRO MAGNETIC TEST, INC.

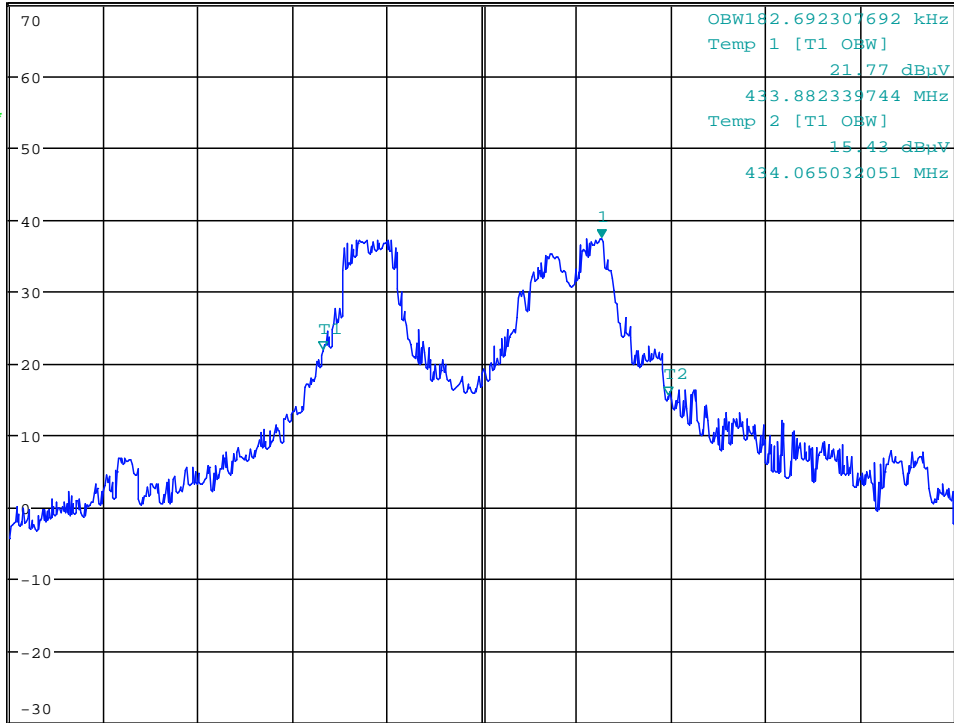
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99% Occupied Bandwidth



* RBW 5 kHz Marker 1 [T1]
 * VBW 20 kHz 37.35 dBuV
 Ref 70 dBuV * Att 0 dB SWT 45 ms 434.029775641 MHz

1 RM *
MAXH



Center 433.9664744 MHz 50 kHz/ Span 500 kHz



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20dB Occupied Bandwidth

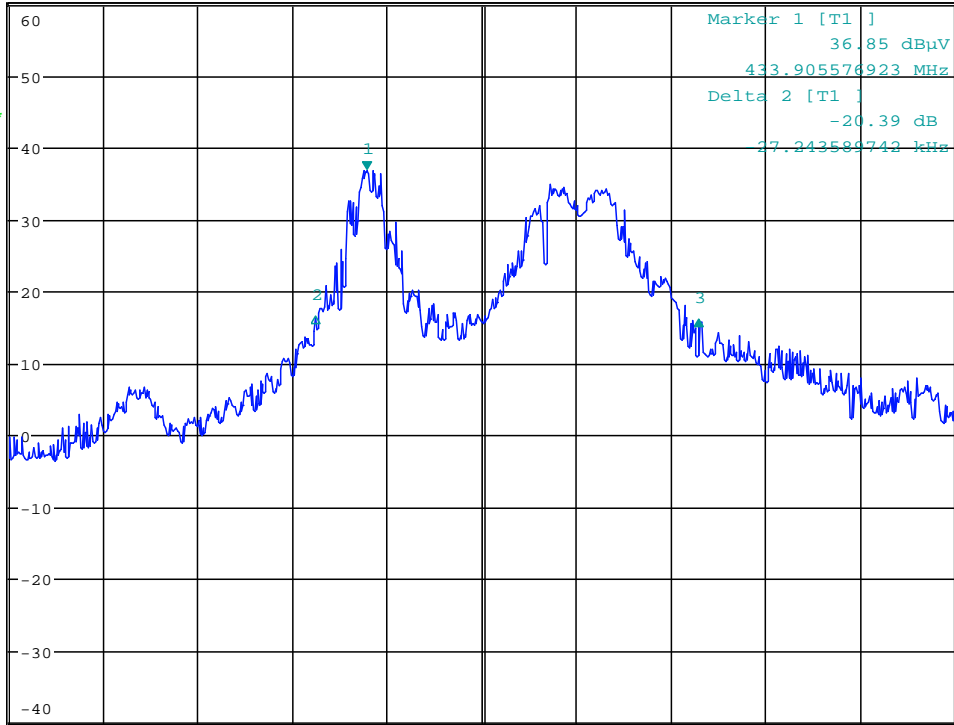


*RBW 5 kHz Delta 3 [T1]
 *VBW 20 kHz -20.88 dB
 SWT 45 ms 175.480769229 kHz

Ref 60 dB μ V

*Att 0 dB

1 RM
VIEW



Center 433.9664744 MHz

50 kHz/

Span 500 kHz



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APPENDIX B

TEST SETUP DIAGRAMS



ELECTRO MAGNETIC TEST, INC.

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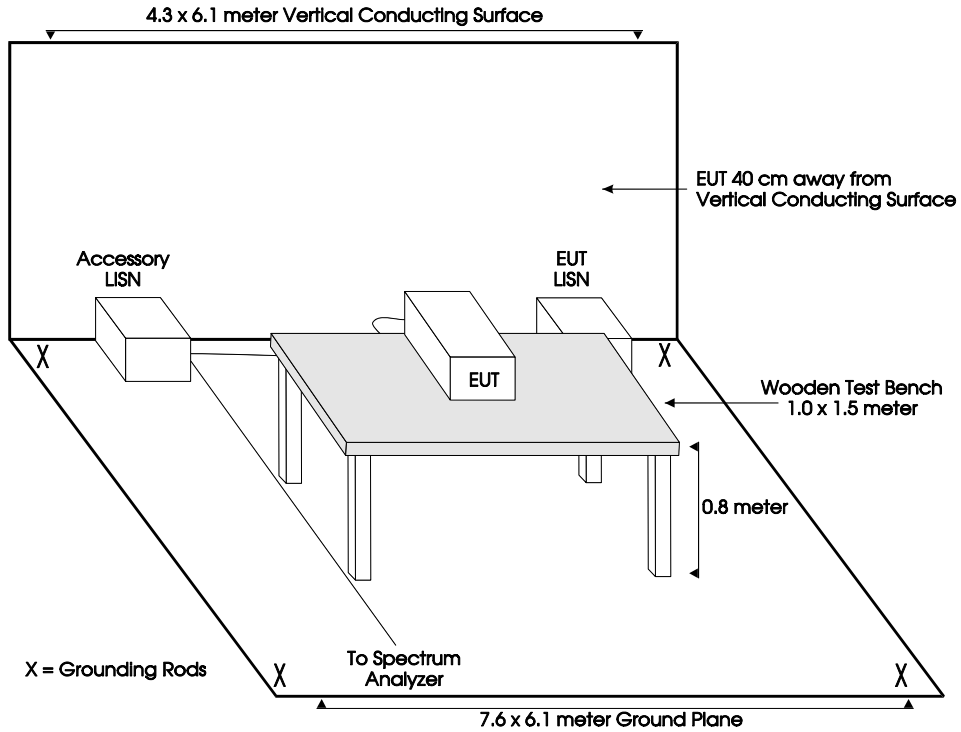


FIGURE 1 – TABLETOP CONDUCTED EMISSIONS TEST SETUP – SITE “A”

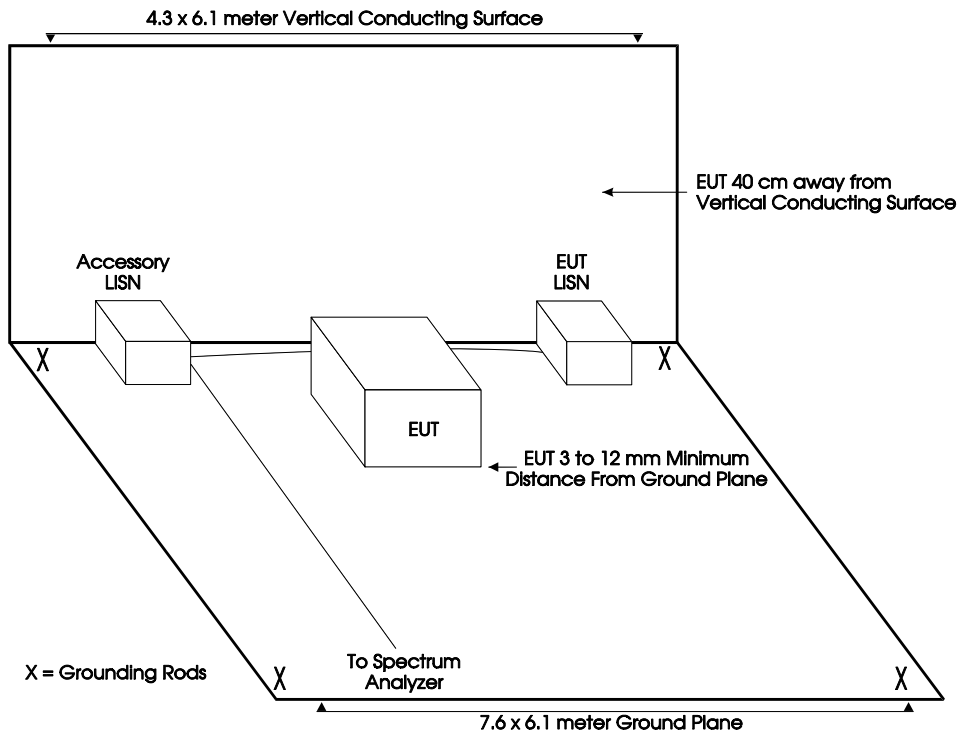


FIGURE 1a – FLOORSTANDING CONDUCTED EMISSIONS TEST SETUP – SITE “A”



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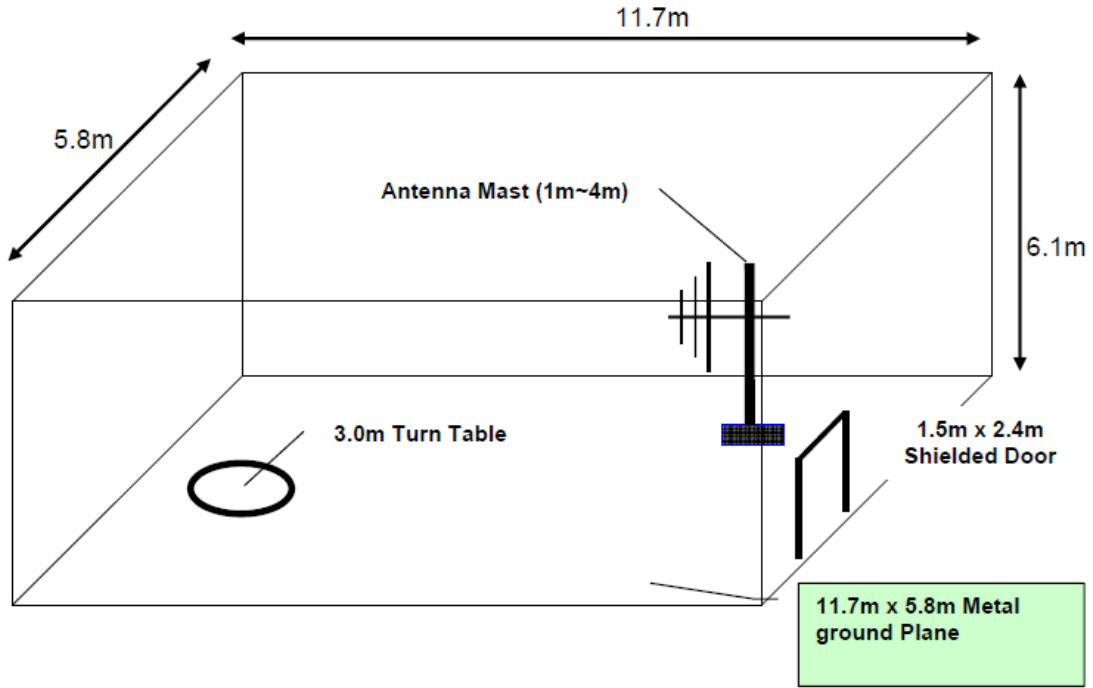


FIGURE 3 - LAYOUT OF 5 METER SEMI-ANECHOIC CHAMBER



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APPENDIX C

MODIFICATIONS TO THE EUT



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650)965-4000 Fax: (650)965-3000

MODIFICATIONS TO THE EUT

No modifications were made to the EUT by Electro Magnetic Test, Inc. personnel during the testing.



ELECTRO MAGNETIC TEST, INC.

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APPENDIX D

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

3-Series Garage Door Sensor

Model: 3220

S/N: N/A

ALSO APPROVED UNDER THIS REPORT:

Model: 3220-E

The only difference between this model and the model tested is the different SKU or model number.

Model: 3223

The only difference between this model and the model tested is the different SKU or model number.