

MEASUREMENT/TECHNICAL REPORT

**Company - Model: Visonic Inc
MCT-231 and MCT-201AT
FCC ID: GSAMCT231
June 1, 1998**

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Control transmitter.

Report prepared by:

Jon D. Curtis
Curtis-Straus LLC
527 Great Road
Littleton, MA 01460 USA
Phone: 978-486-8880
FAX: 978-486-8828

EXHIBIT 1:**1.0 Statement of Conformity**

The Visonic Inc. MCT-231 and MCT-201AT have been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
§2.925	15.19	The label is shown in the label exhibit.
	15.203	The antenna is a fixed trace on the printed circuit board.
	15.205	The fundamental is not in a Restricted band and the spurious and harmonics in Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is battery operated and the line conducted limits are therefore, not applicable.
	15.231(a)(1)	Unit transmits a control signal upon manual activation and signal ceases immediately upon switch release.
	15.231(b)	The unit complies with the field strength limits of the 15.231(b) table including the 20dB peak restriction of 15.35.
	15.231(c)	The occupied bandwidth complies and a plot is included.

EXHIBIT 2

2.0 General Description

2.1 Product Description

The product is a self-contained battery operated garage door opener. It transmits a PCM ON-OFF signal at 315 MHz to control devices.

2.2 Related Submittal(s) Grants

There are no other approvals required for this device.

2.3 Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters below 1 GHz, and at a distance of 3 or 1 meter(s) for signals above 1 GHz. The actual test distance used is noted in the test data sheets. The devices performance was investigated to 10 times the fundamental frequency. A fresh battery was used for all testing. Since the device does not contain voltage regulating circuitry, the emissions in each configuration were maximized and the battery changed in the maximized configuration just prior to the reading being taken to insure that maximum emissions were recorded.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report, Exhibit 3.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Site T was used. This test facility has been fully described in a report dated December 12, 1996 and accepted by your office on February 28, 1997. Please reference your file # 31040/SIT should you have any questions regarding the test site construction.

2.5 Test Equipment Used

SPECTRUM ANALYZER(S)

[]	RED 8591E	HP	S/N:3441A03559	Calibration Due:13-MAR-99
	9 kHz-1.8GHz			
[x]	WHITE 8593E	HP	S/N:3547U01252	Calibration Due:17-MAR-99
	9 kHz-26.5 GHz			
[]	BLUE 8591E	HP	S/N:3223A00227	Calibration Due:5-FEB-99
	9 kHz-1.8 GHz			
[]	YELLOW 8594E	HP	S/N:3523A01958	Calibration Due:18-MAR-99

[]	BLUE 8591E 9 kHz-1.8 GHz	HP	S/N:3223A00227	Calibration Due:5-FEB-99
[]	YELLOW 8594E 9 kHz-2.9 GHz	HP	S/N:3523A01958	Calibration Due:18-MAR-99
[]	BLACK 3585A 20 Hz-40.0 MHz	HP	S/N:A183438	Calibration Due:10-NOV-98
[]	8591EM 9 kHz-1.8 MHz	HP	S/N:3710A01179	Calibration Due:20-JAN-99

ANTENNA(S)

[]	GREEN CBL6112 Chase Biconilog 30 MHz-2 GHz	S/N:2067	Calibration Due:22-MAY-98
[x]	RED 3143 EMCO Biconilog 30 MHz-1.1 GHz	S/N:1270	Calibration Due:25-SEP-98
[]	BLUE 3143 EMCO Biconilog 30 MHz-1.1 GHz	S/N:1271	Calibration Due:25-SEP-98
[]	GREY 3141 EMCO Biconilog 26 MHz-2 GHz	S/N:9703-1038	Calibration Due:19-MAR-99
[x]	YELLOW 3115 EMCO Horn Antenna 1-18 GHz	S/N:9608-4989	Calibration Due:3-MAR-99
[]	BLACK 3115 EMCO Horn Antenna 1-18 GHz	S/N:9703-5148	Calibration Due:16-MAR-99
[]	WHITE 3160-09 EMCO Standard Gain Horn Antenna	S/N:9610-09 18-26.5 GHz	Calibration Due:8-DEC-98
[]	LOOP PLA-130/A ARA Passive Loop Antenna 9 KHz-30 MHz	S/N:1024	Calibration Due:13-AUG-98
[]	LOOP 6511 EMCO Passive Loop Antenna 20 Hz-5 MHz	S/N:9704-1154	Calibration Due:13-AUG-98
[]	MONOPOLE 3301B EMCO Active Monopole antenna 30 Hz-30 MHz	S/N:3824	Calibration Due:31-MAR-99
[]	DIPOLE 3121C EMCO Adjustable Dipole Antenna 30-1000 MHz	S/N:1370	Calibration Due:01-APR-99
[]	DIPOLE 3121C EMCO Adjustable Dipole Antenna 30-1000 MHz	S/N:1371	Calibration Due:01-APR-99

PREAMPLIFIER(S)

[]	RED ZFL-1000-LN MiniCircuits RF Preamplifier 10 - 2000 MHz		Calibration Due:16-APR-99
[]	BLUE ZFL-1000-LN MiniCircuits RF Preamplifier 10 - 2000 MHz		Calibration Due:15-MAY-99
[x]	GREEN ZFL-1000-LN MiniCircuits RF Preamplifier 10 - 2000 MHz		Calibration Due:24-SEP-98
[]	GOLD ZFL-1000-LN MiniCircuits RF Preamplifier 10 - 2000 MHz		Calibration Due:23-FEB-99
[x]	WHITE SMC-12A MITEQ RF Preamplifier 2000 - 18000 MHz	S/N:426643	Calibration Due:28-OCT-98
[]	YELLOW AFS4-18002650-60-8P-4 MITEQ RF Preamplifier 18 - 26.5 GHz	S/N:467559	Calibration Due:22-JAN-98

OPEN AREA TEST SITE(S)

☐ **SITE "F"**
☒ **SITE "T"**
☐ **SITE "A"**

Calibration Due: 9-OCT-98
Calibration Due: 21-JUN-98
Calibration Due: 25-SEP-98

Unless otherwise noted the calibration interval is one year.

EXHIBIT 3**3.0 Measurement Results****3.1 Operating Frequency**

The devices operating frequency is 315 MHz.

3.2 Electric Field Strength Radiation Measurements

Data was obtained using the procedures outlined in ANSI C63.4 (1992). All signals from the transmitter within 20 dB of the emission limit are reported in the following data table.

Radiated Emissions Chart								Curtis-Straus LLC		
Date: 03/23/98		Company: Visonic, Inc.				Distance: 3 m				
Engineer: David Heald		EUT Desc: MCT-201 AT				Table No: 1				
Notes:						Work Order: 980210				
Polarity (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Averaging Factor (dBµV/m)	Adjusted Reading (dBµV/m)	FCC Class B		
								Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
H	315.0	63.9	22.2	14.3	0.4	3.5	59.9	75.6	-15.7	Pass
H	630.0	39.5	21.9	19.2	0.6	3.5	33.9	55.6	-21.7	Pass
H	945.0	43.0	21.6	22.2	0.8	3.5	40.9	55.6	-14.7	Pass
H	1260.0	35.0	21.3	26.0	0.9	3.5	37.1	55.6	-18.5	Pass
H	1575.0	23.7	19.8	26.9	1.1	3.5	28.4	54.0	-25.6	Pass
H	1889.9	32.3	18.3	28.2	1.2	3.5	39.9	55.6	-15.7	Pass
H	204.9	25.5	19.2	29.2	1.3	3.5	33.3	54.0	-20.7	Pass
H	2519.8	24.5	19.2	29.9	1.5	3.5	33.2	55.6	-22.4	Pass
H	2835.0	27.0	19.1	30.8	1.6	3.5	36.8	54.0	-17.2	Pass
H	3150.0	24.2	19.0	31.8	1.7	3.5	35.2	55.6	-20.4	Pass
Pre-Amp: White, Green		OATS: "T"		Cable: 12' RG8A/U		Antenna: Red, Yellow		Analyzer: White		

Radiated Emissions Chart**Curtis-Straus LLC**

Date: 03/23/98

Company: Visonic, Inc.

Distance: 3 m

Engineer: David Heald

EUT Desc: MCT-231

Table No: 2

Notes:

Work Order: 980210

Polarity (H/V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Averaging Factor (dB)	Adjusted Reading (dBμV/m)	FCC Class B		
								Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
H	315.0	72.5	22.2	14.3	0.4	3.5	61.5	75.6	-14.1	Pass
H	630.0	48.8	21.9	19.2	0.6	3.5	43.2	55.6	-12.4	Pass
H	945.0	23.6	21.6	22.2	0.8	3.5	21.5	55.6	-34.1	Pass
H	1260.0	23.0	21.3	26.0	0.9	3.5	25.1	55.6	-30.5	Pass
H	1575.0	23.8	19.8	26.9	1.1	3.5	28.5	54.0	-25.5	Pass
H	1889.9	22.2	18.3	28.2	1.2	3.5	29.8	55.6	-25.8	Pass
H	2204.9	23.2	19.2	29.2	1.3	3.5	31.0	54.0	-23.0	Pass
H	2520.0	23.6	19.2	29.9	1.5	3.5	32.3	55.6	-23.3	Pass
H	2835.0	24.8	19.1	30.8	1.6	3.5	34.6	54.0	-19.4	Pass
H	3150.0	25.7	19.0	31.8	1.7	3.5	36.7	55.6	-18.9	Pass

Pre-Amp: White, Green

OATS: "T"

Cable: 12' RG8A/U

Antenna: Red, Yellow

Analyzer: White

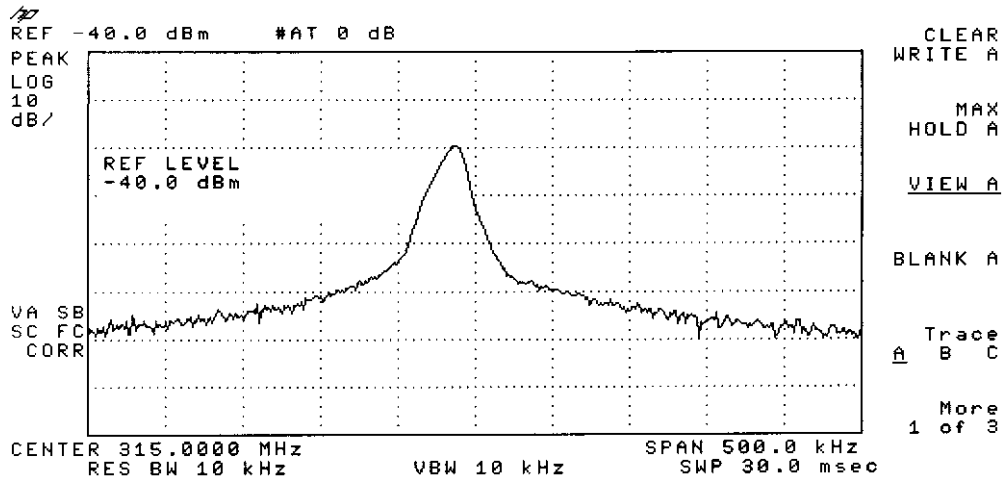
Radiated Test Configuration Photographs:

3.3 Occupied Bandwidth Measurements

A plot was obtained with the unit operating with modulation. The bandwidth observed to be less than 65kHz at the 20dB down points. Allowable bandwidth is 0.25% of 315 MHz or 0.78MHz. The plot is attached.

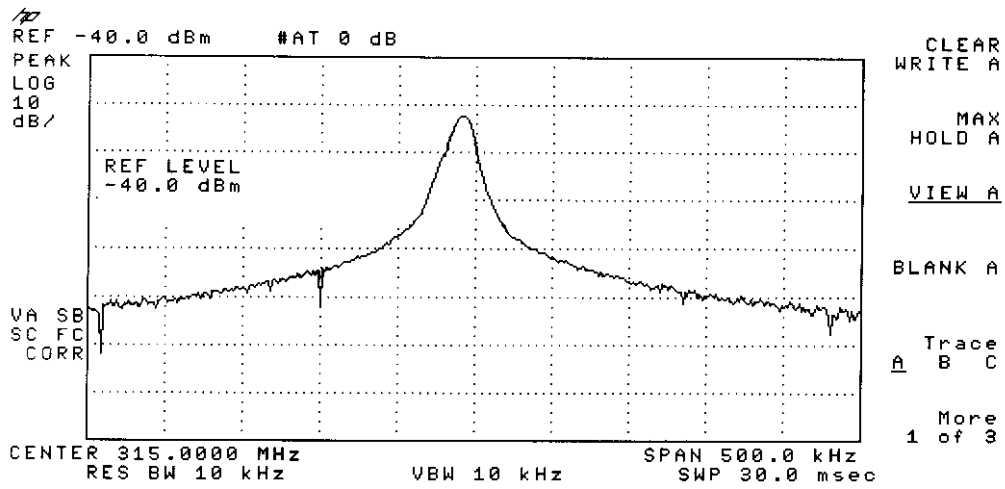
3.4 Averaging factor derivation based on worst case 100mS period.

Attached is a discussion of the pulse code modulation scheme employed by the device. As can be seen, the worst case 100mS second period results in an averaging factor of 3.5 dB.



MCT-201AT

BANDWIDTH PLOT < 65 kHz



MCT-231

BANDWIDTH PLT : < 65 KHz

231

EXHIBIT 4

4.0 *Equipment Photographs*