

1.2 Related Submittal/Grant

There are no related submittal documents.

1.3 Tested System Details

Model No. Serial No.	FCC ID	Description	Cable Description
G8D-521M-A	E4EG8DP	Transmitter	None #

: The equipment is not designed to be connected to public utility (AC) power lines.

The test sample was identified by the client as follows:

Product : Transmitter of remote door lock control

Model No. : G8D-521M-A

FCC ID : E4EG8DP

Manufacturer : OMRON Corporation

Nominal Frequency : 315MHz

CPU Clock Frequency : 500kHz

Type of Modulation : A1D

Antenna : Built-in Type

Rating : DC 3V (Lithium battery), 10mA

Weight : 20 g

1.4 Test Methodology

The measurement method used conformed to FCC Measurement Procedure ANSI C63.4-1992 (Revision of ANSI C63.4-1991) "Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurements were made as per FCC Part 15, Subpart C requirements. The electric field testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The electric field measurement was made at Chemitox EMC open field test site. The location is:

Chemitox EMC Research, Inc.
3rd Open Site
14979, Egusa, Sudama-cho, Kitakoma-gun
Yamanashi-ken, 408-0103 Japan

The Chemitox EMC open site is located approximately 160 km north-west of Tokyo in a mountainous area. There are no residences, stores or factories around this open site. The open site is surrounded by mountains, consequently television and FM radio broadcast signals are completely blocked out. The open site is therefore able to easily avoid overlapping from such signals and can more accurately measure computer device noise. The Chemitox EMC test facility at the above address was filed with the FCC under reference number 31040/SIT on June 18, 1997 and certified by NVLAP under code number 200120-0 on March 31, 1997.

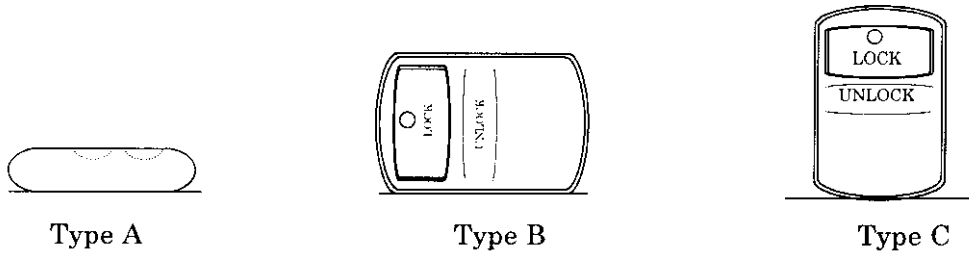
1.6 Referenced Rules Section

<u>Rules Section</u>	<u>Rules Title-Brief Description</u>
2.925	Identification of Equipment - The equipment described in this document shall comply with the identification requirements of this part.

SECTION 3
SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was measured in three orthogonal planes as shown below:



The type A mode was found to have the worst electric field level of fundamental frequency. The test results of all three orthogonal planes are shown in Attachment B.

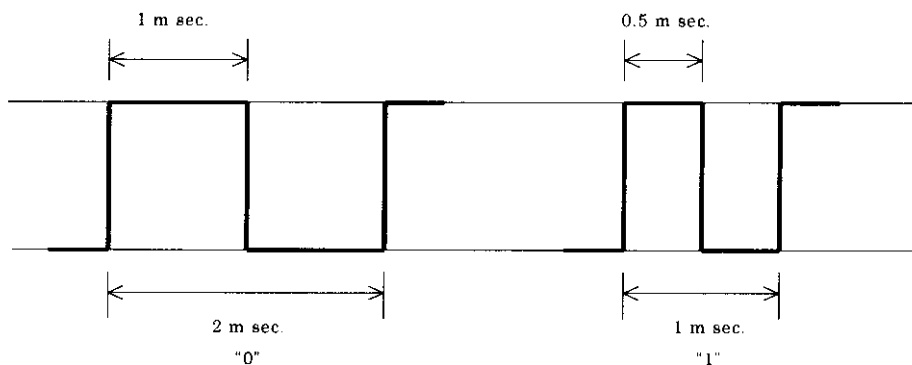
3.2 Video Mode Justification

The equipment does not have a video device.

3.3 EUT Exercise Software

The EUT transmitter using a battery. Its operation is automatically terminated within a maximum of 690 milliseconds. For measurement purposes, the EUT transmitted continuously in an unmodulated test mode. There is no difference between the LOCK and UNLOCK switches in regard to the transmitter's electrical and mechanical functions. There is also no difference between them regarding the frequency of radiated emissions. The only difference is in regard to transmission code. The transmission code has a range of 63 bits. The first 12 bits comprise the synchronous region. The second 46 bits are the vehicle identification code. The third 4 bits are for each button code. The last 1 bit make up the ending code. The following figure explains the code and timing chart of each code:

LOCK : "1110" (E)
UNLOCK : "1101" (D)



3.4 Special Accessories

The EUT does not have a special accessory.

3.5 Equipment Modification

To achieve compliance with Section 15.231 of Subpart C requirements, there were no changes to the equipment made by Chemitox EMC Research test facilities during compliance testing.

Test Signature : 
Takaaki Nittono
Position : Manager

Date : April 6, 1998

3.6 Configuration of tested System

Since the EUT is not connected to any other devices when in use, such a configuration is not shown in this Section.

SECTION 5
MEASUREMENT PHOTOGRAPHS

SECTION 6
CONDUCTED POWER-LINE DATA

6.1 Conducted Power-Line Data per Section 15.207

Since the equipment is operated by a battery and is not designed to be connected to public utility (AC) power lines, conducted power-line measurements were not performed.

SECTION 7
ELECTRIC FIELD DATA

7.1 Test Procedure

The electric field strength was measured in the preliminary test by using a spectrum analyzer with a peak detector function. The noise strength below 1000 MHz was read by using a field strength meter with a peak detector function and converted to the average value in accordance with the duty cycle. The noise strength above 1000 MHz was read by a spectrum analyzer with a peak detector function and converted to the average value in accordance with the duty cycle.

The data in this section includes the significant emission frequencies, measured levels, correction factors (including cable loss, pre-amplifier gain and antenna factor), the corrected reading, and the limit. An explanation of the correction factor are given in paragraph 7.4. The frequency range investigated was 30 MHz to 3200 MHz.

7.2 Test Data

7.2.1 Electric Field Strength of Fundamental per Section 15.231

The electric field strength of the fundamental frequency was read by a field strength meter with a peak detector function and converted to average values in accordance with the duty cycle. The result is shown in a table in Attachment B.

The maximum electric field strength of the fundamental is indicated below:

Test Mode: TYPE A

Measuring Frequency (MHz)	Electric Field Strength (dB μ V/m)	Margin (dB)	Limit at 3 m (dB μ V/m)	Antenna Polarization
314.899	68.2	7.4	75.6 ✓	Horizontal

The electric field strength of the fundamental frequency at both the vertical and horizontal polarization limit meets the requirements of Section 15.231 (b) of Subpart C, Part 15.

7.2.2 Electric Field Strength of Spurious per Section 15.231

The electric field strength of the spurious below 1000 MHz was read by a field strength meter with a peak detector function and converted to average values in accordance with the duty cycle. The electric field strength of the spurious above 1000 MHz was read by a spectrum analyzer with a peak detector function and converted to average values in accordance with the duty cycle. The results are shown in a table in Attachment B with includes the following data:

The three highest electric field strength of the spurious are indicated below:

Test Mode: TYPE A

Measuring Frequency (MHz)	Electric Field Strength (dB μ V/m)	Margin (dB)	Limit at 3 m (dB μ V/m)	Antenna Polarization
629.795	48.3	7.3	55.6 ✓	Horizontal
2519.200	42.6	13.0	55.6	Vertical
2519.200	40.3	15.3	55.6	Horizontal

The electric field strength of the spurious frequency at both the vertical and horizontal polarization limits meets the requirements of Section 15.231 (b) of Subpart C, Part 15.

7.2.3 Electric Field Strength of Harmonic per Section 15.209

There was no electric field strength of the harmonic from the EUT found by either a spectrum analyzer or a field strength meter.

7.2.4 Electric Field Strength of Restricted Band per section 15.205

The electric field strength of the restricted band below 1000 MHz was read by a field strength meter with a peak detector function and converted to the average values in accordance with the duty cycle. The electric field strength of the restricted band above 1000 MHz was also read by a spectrum analyzer with a peak detector function and converted to the average values in accordance with the duty cycle. The results are shown in a table in Attachment A which includes the following data:

The three highest electric field strength of the restricted band are indicated below:

Test Mode: TYPE A

Measuring Frequency (MHz)	Electric Field Strength (dB μ V/m)	Margin (dB)	Limit at 3 m (dB μ V/m)	Antenna Polarization
2204.302	40.7	13.3	54.0 ✓	Vertical
2834.098	42.1	11.9	54.0	Vertical
2834.098	43.3	10.7	54.0	Horizontal

The electric field strength of the restricted band frequency at both the vertical and horizontal polarization limit meets the requirements of Section 15.205 (a), (b) and section 15.209(a) of Subpart C, Part 15.

7.3 Test Instrumentation Used, Electric Field Measurement

Equipment	Model No.	Serial No.	Manufacturer	Calibration
Field Strength Meter	ESS	843513/002	Rohde & Schwarz	May. 22, 1997
Spectrum Analyzer	8566B		Hewlett Packard	Aug. 16, 1997
Display	85662A	2534A10467		
RF Section	85660B	2532A02163		
QP Adapter	85650A	2521A00921	Hewlett Packard	N/A
Dipole Antenna	VHA9103	C001/C002 C004	Schwarzbeck	Nov. 4, 1997
Dipole Antenna	UHA9105	C005 C006	Schwarzbeck	Nov. 4, 1997
Logbicon Antenna	VULB9160	3020	Schwarzbeck	May. 19, 1997
Double Ridge Guide Horn Antenna	3115	9005-3434	EMCO	N/A
Pre Amplifier	8447D	2648A04892	Hewlett Packard	Nov. 25, 1997
Fixed Gain Preamplifier	NSP1800-N	417721	MITEQ	Oct. 31, 1997

Calibration: Data of Calibration

Measuring instrumentation must be checked and calibrated at least every 12 months.

7.4 Electric Field Strength Calculation

The electric field strength was calculated by adding the calibration factor to the measured reading and multiplying the total by the duty cycle.

The basic equation and a sample calculation are as follows:

$$EFS = FSM + CF$$

$$EFS1 = 10 \exp(EFS / 20)$$

$$DCF = \frac{\left(\begin{array}{l} \text{One complete pulse train time} \\ \text{including blanking interval} \end{array} \right)}{\left(\begin{array}{l} \text{Total pulse time of transmitter} \\ \text{in the one complete pulse train} \end{array} \right)}$$

$$AEFS1 = EFS1 \times DCF$$

$$AEFS = 20 \times \log(AEFS1)$$

where

FSM	:	Field Strength Meter Reading (dB μ V)
EFS	:	Electric Field Strength (dB μ V/m)
EFS1	:	Electric Field Strength (μ V/m)
DCF	:	Duty Cycle Factor
AEFS1	:	Average Values of Electric Fields Strength (μ V/m)
AEFS	:	Average Values of Electric Field Strength (dB μ V/m)
CF	:	Calibration Factor (dB/m)

The calibration factor includes pre-amplifier gain, cable loss and antenna factor.

SECTION 8
FREQUENCY TOLERANCE

8.1 Bandwidth Tolerance of Fundamental Frequency

The bandwidth of the carrier must be within 0.25 % of the center frequency. The test results are as shown below:

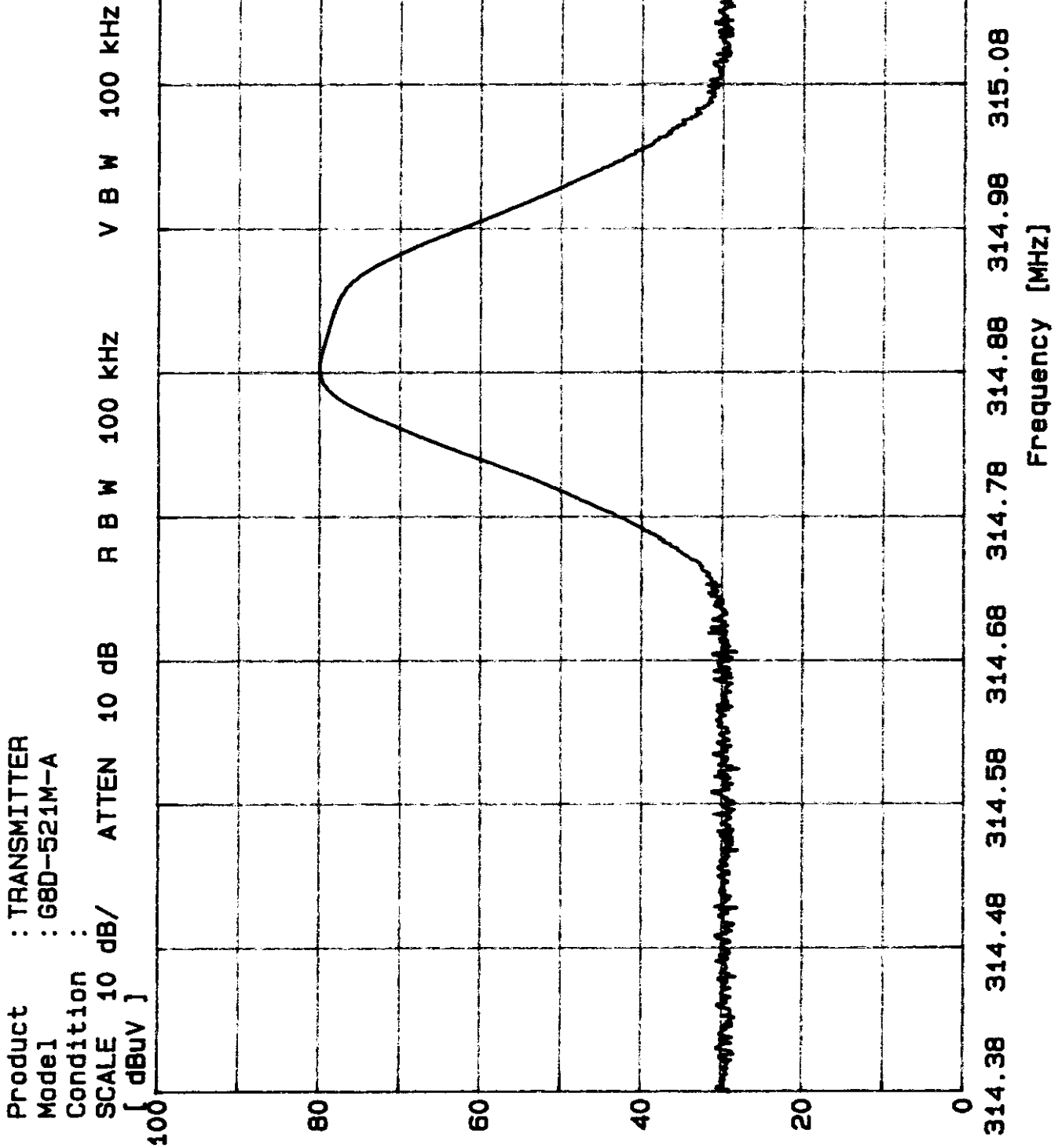
Center Frequency of Carrier : 314.899 (MHz)

Field Strength of Carrier : 79.2 (dB μ V/m)

Points 20 dB Down from Modulated Carrier (dB μ V/m)	Measuring Frequency (MHz)	Frequency Deviation (%)
59.2	314.784	0.0365
59.2	315.019	0.0381

(Bandwidth : 0.235 MHz)

File : B: \Rchart.28
Date : Apr. 06, 98
Data No.28
S W P 500 msec
No.3 test site



SECTION 9
PHOTOGRAPHS OF TESTED EUT

ATTACHMENT B
PRODUCT DATA SHEET

B.1 List of Table

o Test Results of Electric Field Strength

Type A Mode

Table 1.1	Electric Field Strength of Fundamental (Vertical / Horizontal Polarization)
Table 1.2	Electric Field Strength of Spurious (Vertical / Horizontal Polarization)
Table 1.3	Electric Field Strength of Restricted Band (Vertical / Horizontal Polarization)

Type B Mode

Table 2.1	Electric Field Strength of Fundamental (Vertical / Horizontal Polarization)
Table 2.2	Electric Field Strength of Spurious (Vertical / Horizontal Polarization)
Table 2.3	Electric Field Strength of Restricted Band (Vertical / Horizontal Polarization)

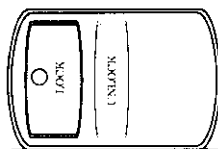
Type C Mode

Table 3.1	Electric Field Strength of Fundamental (Vertical / Horizontal Polarization)
Table 3.2	Electric Field Strength of Spurious (Vertical / Horizontal Polarization)
Table 3.3	Electric Field Strength of Restricted Band (Vertical / Horizontal Polarization)

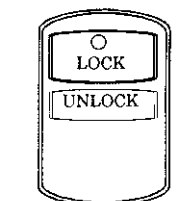
The EUT was measured in three orthogonal planes as shown below:



Type A



Type B



Type C

***** Test Results of Electric Field Strength of Fundamental *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 1.1

Product : Transmitter of remote door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type A
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
314.899	62.1	-5.0	57.1	716.1	0.5	358.1	6043.1	51.1	24.5	75.6
*** Horizontal Polarization ***										
314.899	79.2	-5.0	74.2	5128.6	0.5	2564.3	6043.1	68.2	7.4	75.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
314.899	25.5	0.0	2.4	18.1

Tested by: *Tr. Almond*

***** Test Results of Electric Field Strength of Spurious *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 1.2

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type A
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***			9K		-6 dB			AVE		AVC Lm
629.795	41.5	2.0	43.5	149.6	0.5	74.8	604.3	37.5	18.1	55.6
944.707	30.5	8.0	38.5	84.1	0.5	42.1	604.3	32.5	23.1	55.6
1259.584	34.8	-1.6	33.2	45.7	0.5	22.9	604.3	27.2	28.4	55.6
1889.388	32.5	4.7	37.2	72.4	0.5	36.2	604.3	31.2	24.4	55.6
2519.200	41.3	7.3	48.6	269.2	0.5	134.6	604.3	42.6	13.0	55.6
3149.021	31.4	9.0	40.4	104.7	0.5	52.4	604.3	34.4	21.2	55.6
*** Horizontal Polarization ***										
629.795	52.3	2.0	54.3	518.8	0.5	259.4	604.3	48.3	7.3	55.6
944.707	35.1	8.0	43.1	142.9	0.5	71.4	604.3	37.1	18.5	55.6
1259.584	34.7	-1.6	33.1	45.2	0.5	22.6	604.3	27.1	28.5	55.6
1889.388	34.0	4.7	38.7	86.1	0.5	43.0	604.3	32.7	22.9	55.6
2519.200	39.0	7.3	46.3	206.5	0.5	103.3	604.3	40.3	15.3	55.6
3149.021	33.4	9.0	42.4	131.8	0.5	65.9	604.3	36.4	19.2	55.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
629.795	27.1	0.0	3.8	25.3
944.707	26.7	0.0	5.0	29.7
1259.584	30.8	0.0	5.1	24.1
1889.388	30.4	0.0	6.3	28.6
2519.200	30.1	0.0	7.3	30.1
3149.021	30.2	0.0	8.3	30.9 ✓

Tested by:



***** Test Results of Electric Field Strength of Restricted Band *****
as per Section 15.209(a)(b) and 15.209(a) of FCC Part 15 Subpart C

Table 1.3

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type A
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***			38.0	79.4	0.5	39.7		32.0		54.0
1574.497	36.7	1.3	38.0	79.4	0.5	39.7	500.0	32.0	22.0	54.0 ✓
2204.302	40.5	6.2	46.7	216.3	0.5	108.1	500.0	40.7	13.3	54.0
2834.098	39.4	8.7	48.1	254.1	0.5	127.0	500.0	42.1	11.9	54.0
*** Horizontal Polarization ***										
1574.497	43.0	1.3	44.3	164.1	0.5	82.0	500.0	38.3	15.7	54.0
2204.302	38.6	6.2	44.8	173.8	0.5	86.9	500.0	38.8	15.2	54.0
2834.098	40.6	8.7	49.3	291.7	0.5	145.9	500.0	43.3	10.7	54.0

FSM : Field Strength Meter Reading (dB μ V)

CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]

EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]

EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]

DCF : Duty Cycle Factor

AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]

AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]

MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
1574.497	30.5	0.0	5.7	26.1
2204.302	30.1	0.0	6.8	29.5
2834.098	30.1	0.0	7.8	31.0

Tested by:

***** Test Results of Electric Field Strength of Fundamental *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 2.1

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type B
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
314.899	75.5	-5.0	70.5	3349.7	0.5	1674.8	6043.1	64.5	11.1	75.6 ✓
*** Horizontal Polarization ***										
314.899	73.7	-5.0	68.7	2722.7	0.5	1361.4	6043.1	62.7	12.9	75.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
314.899	25.5	0.0	2.4	18.1

Tested by: 

***** Test Results of Electric Field Strength of Spurious *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 2.2

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type B
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
629.795	50.2	2.0	52.2	407.4	0.5	203.7	604.3	46.2	9.4	55.6
944.707	31.4	8.0	39.4	93.3	0.5	46.7	604.3	33.4	22.2	55.6
1259.584	38.3	-1.6	36.7	68.4	0.5	34.2	604.3	30.7	24.9	55.6
1889.388	32.9	4.7	37.6	75.9	0.5	37.9	604.3	31.6	24.0	55.6
2519.200	42.4	7.3	49.7	305.5	0.5	152.7	604.3	43.7	11.9	55.6
3149.021	30.8	9.0	39.8	97.7	0.5	48.9	604.3	33.8	21.8	55.6
*** Horizontal Polarization ***										
629.795	49.6	2.0	51.6	380.2	0.5	190.1	604.3	45.6	10.0	55.6
944.707	33.0	8.0	41.0	112.2	0.5	56.1	604.3	35.0	20.6	55.6
1259.584	34.1	-1.6	32.5	42.2	0.5	21.1	604.3	26.5	29.1	55.6
1889.388	32.6	4.7	37.3	73.3	0.5	36.6	604.3	31.3	24.3	55.6
2519.200	37.4	7.3	44.7	171.8	0.5	85.9	604.3	38.7	16.9	55.6
3149.021	31.3	9.0	40.3	103.5	0.5	51.8	604.3	34.3	21.3	55.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
629.795	27.1	0.0	3.8	25.3
944.707	26.7	0.0	5.0	29.7
1259.584	30.8	0.0	5.1	24.1
1889.388	30.4	0.0	6.3	28.6
2519.200	30.1	0.0	7.3	30.1
3149.021	30.2	0.0	8.3	30.9

Tested by:



***** Test Results of Electric Field Strength of Restricted Band *****
as per Section 15.209(a)(b) and 15.209(a) of FCC Part 15 Subpart C

Table 2.3

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type B
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
1574.497	40.6	1.3	41.9	124.5	0.5	62.2	500.0	35.9	18.1	54.0
2204.302	40.6	6.2	46.8	218.8	0.5	109.4	500.0	40.8	13.2	54.0
2834.098	39.7	8.7	48.4	263.0	0.5	131.5	500.0	42.4	11.6	54.0
*** Horizontal Polarization ***										
1574.497	39.0	1.3	40.3	103.5	0.5	51.8	500.0	34.3	19.7	54.0
2204.302	37.6	6.2	43.8	154.9	0.5	77.4	500.0	37.8	16.2	54.0
2834.098	33.7	8.7	42.4	131.8	0.5	65.9	500.0	36.4	17.6	54.0

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
1574.497	30.5	0.0	5.7	26.1
2204.302	30.1	0.0	6.8	29.5
2834.098	30.1	0.0	7.8	31.0

Tested by: *Tr Atom*

***** Test Results of Electric Field Strength of Fundamental *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 3.1

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type C
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
314.899	75.1	-5.0	70.1	3198.9	0.5	1599.4	6043.1	64.1	11.5	75.6
*** Horizontal Polarization ***										
314.899	72.2	-5.0	67.2	2290.9	0.5	1145.4	6043.1	61.2	14.4	75.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
314.899	25.5	0.0	2.4	18.1

Tested by: 

***** Test Results of Electric Field Strength of Spurious *****
as per Section 15.231(b) of FCC Part 15 Subpart C

Table 3.2

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type C
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
629.795	50.5	2.0	52.5	421.7	0.5	210.8	604.3	46.5	9.1	55.6
944.707	31.8	8.0	39.8	97.7	0.5	48.9	604.3	33.8	21.8	55.6
1259.584	36.7	-1.6	35.1	56.9	0.5	28.4	604.3	29.1	26.5	55.6
1889.388	32.2	4.7	36.9	70.0	0.5	35.0	604.3	30.9	24.7	55.6
2519.200	39.6	7.3	46.9	221.3	0.5	110.7	604.3	40.9	14.7	55.6
3149.021	32.2	9.0	41.2	114.8	0.5	57.4	604.3	35.2	20.4	55.6
*** Horizontal Polarization ***										
629.795	44.5	2.0	46.5	211.3	0.5	105.7	604.3	40.5	15.1	55.6
944.707	29.9	8.0	37.9	78.5	0.5	39.3	604.3	31.9	23.7	55.6
1259.584	38.1	-1.6	36.5	66.8	0.5	33.4	604.3	30.5	25.1	55.6
1889.388	30.2	4.7	34.9	55.6	0.5	27.8	604.3	28.9	26.7	55.6
2519.200	35.7	7.3	43.0	141.3	0.5	70.6	604.3	37.0	18.6	55.6
3149.021	31.8	9.0	40.8	109.6	0.5	54.8	604.3	34.8	20.8	55.6

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
629.795	27.1	0.0	3.8	25.3
944.707	26.7	0.0	5.0	29.7
1259.584	30.8	0.0	5.1	24.1
1889.388	30.4	0.0	6.3	28.6
2519.200	30.1	0.0	7.3	30.1
3149.021	30.2	0.0	8.3	30.9

Tested by:



***** Test Results of Electric Field Strength of Restricted Band *****
as per Section 15.209(a)(b) and 15.209(a) of FCC Part 15 Subpart C

Table 3.3

Product : Transmitter of remort door lock control
Model : G8D-521M-A
Manufacturer : OMRON Corporation
Rating : DC 3V
File : RC980406
Date : Apr. 6, 1998
Condition : Type C
Control No. : C971125Z

Frequency (MHz)	FSM (dB μ V/m)	CF (dB/m)	EFS (dB μ V/m)	EFS1 (μ V/m)	DCF	AEFS1 (μ V/m)	Limit (μ V/m)	AEFS (dB μ V/m)	MARG (dB)	Limit (dB μ V/m)
*** Vertical Polarization ***										
1574.497	41.1	1.3	42.4	131.8	0.5	65.9	500.0	36.4	17.6	54.0
2204.302	39.2	6.2	45.4	186.2	0.5	93.1	500.0	39.4	14.6	54.0
2834.098	37.8	8.7	46.5	211.3	0.5	105.7	500.0	40.5	13.5	54.0
*** Horizontal Polarization ***										
1574.497	35.1	1.3	36.4	66.1	0.5	33.0	500.0	30.4	23.6	54.0
2204.302	34.0	6.2	40.2	102.3	0.5	51.2	500.0	34.2	19.8	54.0
2834.098	37.0	8.7	45.7	192.8	0.5	96.4	500.0	39.7	14.3	54.0

FSM : Field Strength Meter Reading (dB μ V)
CF : Calibration Factor (dB/m) [CF = AL + CL + AF - PAG]
EFS : Electric Field Strength (dB μ V/m) [EFS = FSM + CF]
EFS1 : Electric Field Strength (μ V/m) [EFS1 = 10exp(EFS / 20)]
DCF : Duty Cycle Factor
AEFS1 : Average Values of Electric Field Strength (dB μ V/m) [AEFS1 = EFS1 x DCF]
AEFS : Average Values of Electric Field Strength (μ V/m) [AEFS = 20 x log(AEFS1)]
MARG : Margin (dB) [MARG = Limit - AEFS]

Calibration Factor Lists

Frequency (MHz)	Pre-Amplifier Gain [PAG] (dB)	Attenuator Loss [AL] (dB)	Cable Loss [CL] (dB/m)	Antenna Factor [AF] (dB)
1574.497	30.5	0.0	5.7	26.1
2204.302	30.1	0.0	6.8	29.5
2834.098	30.1	0.0	7.8	31.0

Tested by:



ATTACHMENT C

DUTY CYCLE

C.1 Calculation of Duty Cycle

The duty cycle was obtained as follows:

$$\begin{aligned}
 \text{Frequency Measured :} & \quad 314.899 \text{ MHz} \\
 \text{Voltage Peak Level:} & \quad 74.2 \text{ dB } \mu \text{ V } (= 5128.6 \mu \text{ V}) \\
 \text{Voltage Average Level} & = (E_{\text{peak}} \times T) \div T_t \\
 & = (5128.6 \mu \text{ V} \times 48.0 \text{ msec.}) \div 96.0 \text{ msec.} \\
 & = 2564.3 \mu \text{ V} \\
 & = 68.2 \text{ dB } \mu \text{ V}
 \end{aligned}$$

$$\text{Duty Cycle} = \frac{\text{Voltage Average Level } (\mu \text{ V})}{\text{Voltage Peak Level } (\mu \text{ V})}$$

$$= 0.5$$

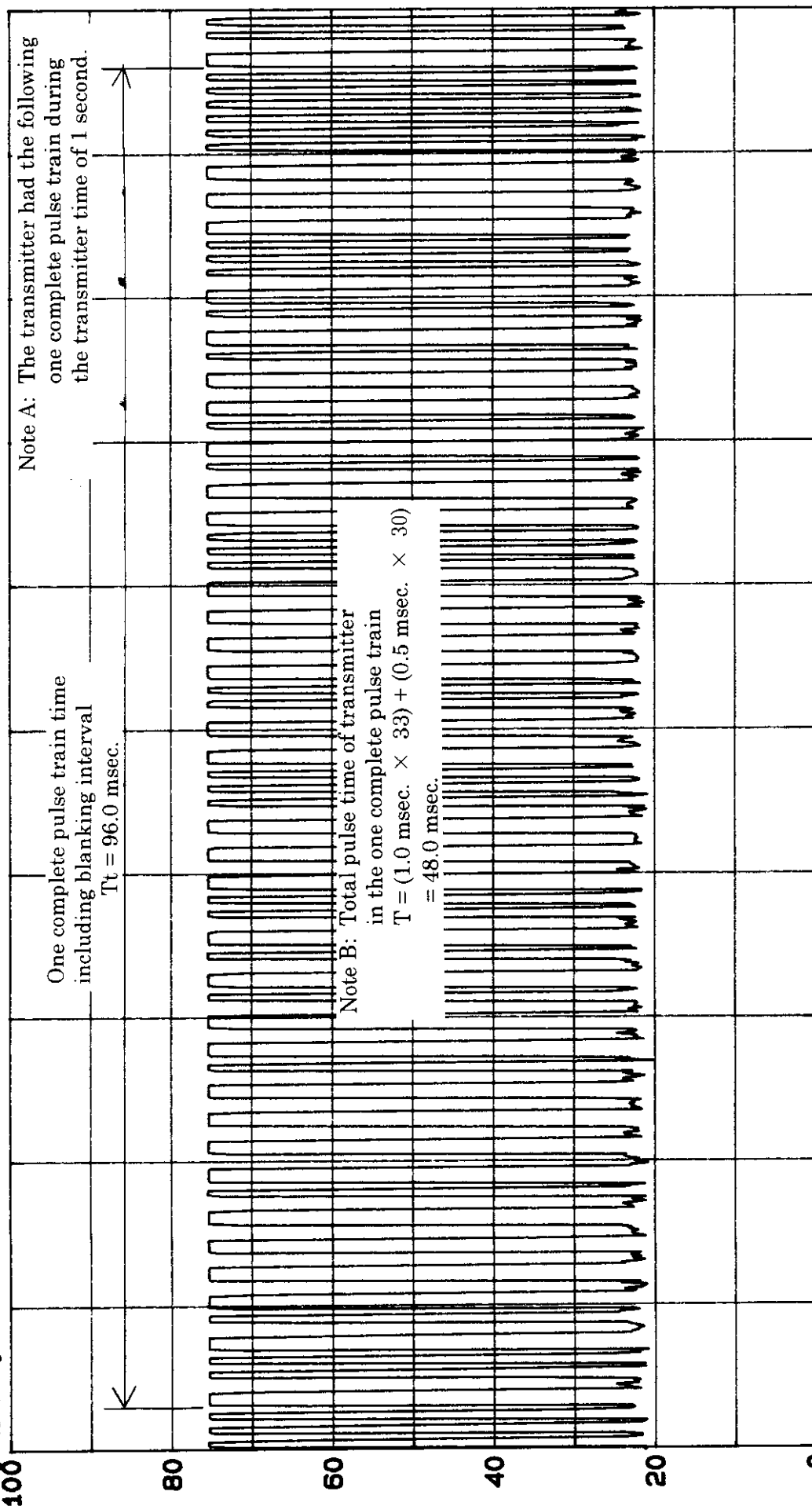
Note: E_{peak} : Voltage Peak Level
 T : Total pulse time of transmitter in the one complete pulse train
 T_t : One complete pulse train time including blanking interval

File : B:\Rchart.41
 Date : Apr. 06.98
 Data No.41
 S W P 100 msec
 No.3 test site

Product : TRANSMITTER
 Model : 68D-521M-A
 Condition :

SCALE 10 dB/
 [dBuV]

ATTEN 10 dB R B W 1 MHz V B W 10 kHz

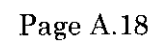


Frequency [MHz]

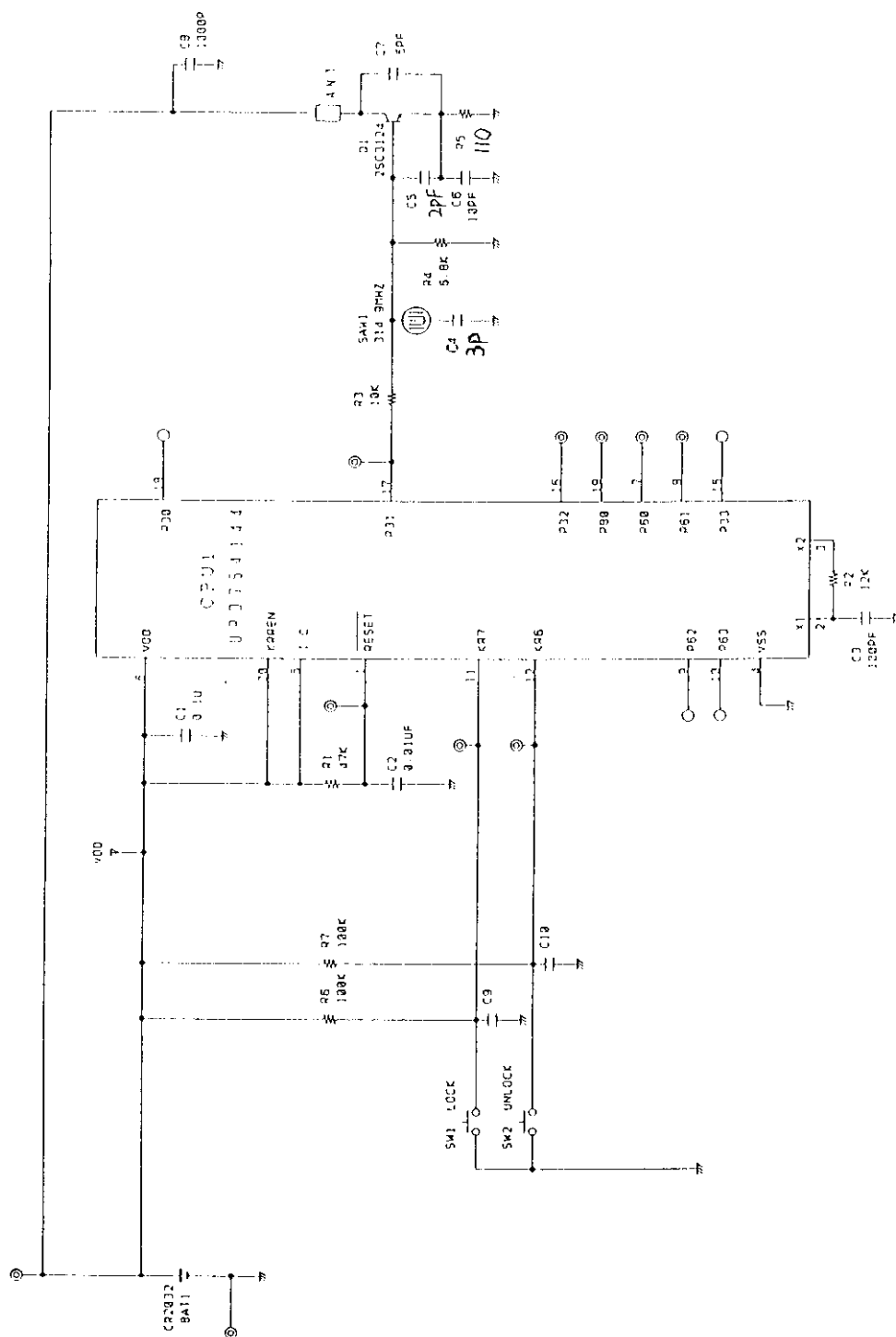
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Product      : TRANSMITTER
Model        : G8D-521M-A
Condition    :
SCALE 10 dB/ ATTN
[ dBuV ]

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ATTACHMENT D
SCHEMATIC AND PARTS LIST



SCHEMATICS DIAGRAM
G8D-521M-A
OMRON Corporation

No	PARTS NAME	MANUFACTURER	QTY	TYPE	SPECIFICATION	REMARK
22	RUBBER	SHINETSU POLYMER	1	KE961-U	BLACK	
23	TERMINAL(+)	SYOUSHIN	1	CS210R-H	t=0.15	
24	TERMINAL(-)	↑	1	CS210R-H	t=0.15	
25	KEY RING	COLD PARTS	1	PBW		
26	BATTERY	MATSUSHITA	1	CR2032		
27	KNOB, LOCK	SANSYU MOLD	1		BLACK	
28	KNOB, UNLOCK	↑	1		↑	
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						

					DESIGNED	CHECKED	APPLICATION TRANSMITTER PARTS LIST
					APPROVED		DWG No.
							DESIGN for
SYM	DATE	E/C CONTENTS	E/C No.	SIGN	SHEET No	2 / 2	G 8 D - 5 2 1 M - A

ATTACHMENT E
TEST METHODS

E.1 Electric field Measurements

The preliminary measurements were made by using a spectrum analyzer, a logbicon antenna (below 1000 MHz) and a horn antenna (above 1000 MHz). The measurements below 1000 MHz were then made by using a field strength meter and a tuned half-wave dipole antenna. The measurements above 1000 MHz were made by using a spectrum analyzer and a horn antenna. The horizontal distance between the EUT and the measurement antenna was 3 meters (m). The EUT was placed on a non-conductive rotating table, the top of which was 1.0 by 0.8 m in size. The height of the table was 0.8 m above the ground plane. The antenna orientation was both horizontal and vertical to determine maximum radiation from the EUT. Then the EUT was rotated and the antenna height was varied from 1 to 4 m. The measurements below 1000 MHz were set the 6 dB bandwidth of the field strength meter to 100 kHz and the detector function to the peak mode. The measurements above 1000 MHz were set the resolution bandwidth and video bandwidth of the spectrum analyzer to 1 MHz and the detector function to the peak mode. During the measurements, the EUT was operated in a manner intended to maximize its emission characteristics in a typical application.