

# EMISSION TEST REPORT

Test Report No. : **22BE0028-YW-1**

**Applicant:** OMRON CORPORATION

**Type of Equipment:** Keyless Entry System (Transmitter)

**Model No.:** G8D-333A-A

**FCC ID** OUCG8D-333A-A

**Test standard:** FCC Part 15 Subpart C Section 15.231


**Test Result:** Complies

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The results in this report apply only to the sample tested.

Date of test: September 11, 2001

Tested by:   
Makoto Kosaka

Approved by:   
Kazutoyo Nakanishi  
Site Operation Manager of EMC section

Issued date: September 14, 2001

Testing Laboratory

**A-pex International Co., Ltd.**

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## 1 GENERAL INFORMATION

Applicant : OMRON CORPORATION  
Trade Name : OMRON  
Address : 6368 Nenjo-Zaka, Okusa, Komaki-City,  
Aichi 485-0802 Japan  
Telephone Number : +81-568-78-6170  
Facsimile Number : +81-568-78-6179  
Regulation(s) : FCC Part 15 Subpart C Section 15.231  
Model Number : G8D-333A-A  
FCC ID : OUCG8D-333A-A  
Serial Number : Sample No.1  
Condition of EUT : Engineering Prototype  
Kind of Equipment : Keyless Entry System (Transmitter)  
Tested Date : September 11, 2001  
Receipt Date of Sample : September 7, 2001  
Report File Number : 22BE0028-YW-1  
Test Site : A-PEX Yokowa No.3 Open Test Site

Testing Laboratory

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### 1.1 Product Description

Model: G8D-333A-A(referred to as the EUT in this report) is a Keyless Entry System (Transmitter).

The specification is as following :

- Carrier Frequency : 313.85 MHz
- Modulation : FSK
- Other Clock Frequency : 5.0MHz
- Information antenna : Integral / P.C.B pattern antenna
- Operation Voltage : Lithium Battery DC 3.0V(CR2025)

### 1.2 Test Specification

- Test Specification : FCC Part 15 Subpart C
- Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart C Intentional Radiators  
§ 15.231 Periodic operation in the band 40.66 – 40.70 MHz and above 70MHz

### 1.3 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:1992	§ 15.231	3m
2	Electric Field Strength of Spurious Emission	ANSI C63.4:1992	§ 15.205 § 15.209 § 15.231	3m
3	-20dB Bandwidth	ANSI C63.4:1992	§ 15.231	3m

### 1.4 Test Location

A-PEX International Co.,Ltd. Yokowa No.3 test site  
 108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 Japan  
 Telephone number : +81-596-39-1485  
 Facsimile number : +81-596-39-0232

This site has been fully described in a report submitted to FCC office, and listed on September 12, 2000 (Registration number: 90412).

\*NVLAP Lab. code : 200109-0

Testing Laboratory <b>A-pex International Co., Ltd.</b> 108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN	Telephone: +81 596 39 1485 Facsimile: +81 596 39 0232
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## 2 SYSTEM TEST CONFIGURATION

### 2.1 Operation Environment

Temperature : See data

Humidity : See data

### 2.2 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

### 2.3 EUT Exercise Software

The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

The sequence is used:

Operation Mode : Transmitting

### 2.4 Test Procedure

Tabletop Equipment Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. The measurement distance was 3m.

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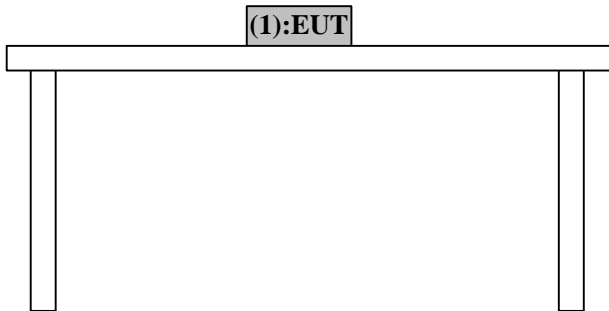
108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN

Telephone: +81 596 39 1485

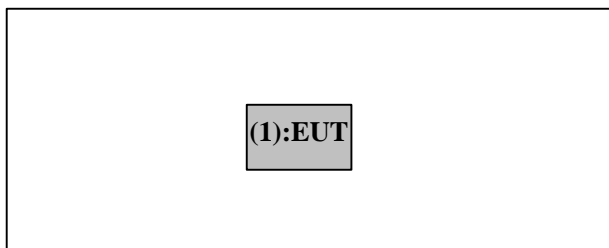
Facsimile: +81 596 39 0232

**Figure2.1 Configuration of Tested System**

Front View



Top View



\*Test data was taken under worse case conditions.

No.	Item	Model number	Serial number	Manufacturer	FCC ID
1	Keyless Entry System (Transmitter)	G8D-333A-A	Sample No.1	OMRON Corporation	OUCG8D-333A-A

**Test report**

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**3 RADIATED EMISSION DATA**

The initial step in collecting radiated data was a spectrum analyzer peak scan of the measurement range (30MHz-3200MHz).

The final data was reported in the worst-case emissions.

The minimum margin to the limit is as follows :

No	Ant Pol	Freq [MHz]	Reading [dB μ V]	Antenna Factor [dB]	Cable Loss [dB]	ATT [dB]	AMP Gain [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Remark
1	H	313.89	76.2	14.4	3.6	5.8	27.6	72.4	75.6	3.2	Fundamental
2	H	1255.59	53.3	26.1	4.9	0.0	35.1	49.2	55.6	6.4	Spurious

Remark:

Below 1GHz: Test Receiver Setting : QP Detect / IF Band width 120kHz

Above 1GHz: Spectrum Analyzer Setting : AV Detect/ RBW 1MHz and VBW 10Hz)

**3.1 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor, Cable Factor and Antenna Pad, and subtracting the Amplifier Gain from the measured reading. The sample calculation is as follows :

$$FS = RA + AF + CF + AT - AG$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Factor

AT = Antenna Pad

AG = Amplifier Gain

Assume a receiver reading of 76.2 dB μ V is obtained. The antenna Factor of 14.4 dB, Cable Factor of 3.6 dB and Antenna Pad of 5.8 dB is added. The Amplifier Gain of 27.6 dB is subtracted, giving a field strength of 72.4 dB μ V/m.

$$FS = 76.2 + 14.4 + 3.6 + 5.8 - 27.6 = 72.4 \text{ dB } \mu \text{ V/m}$$

**3.2 -20dB Bandwidth**

Bandwidth Limit: Fundamental Frequency 313.85MHz × 0.25% = 784.625kHz

Bandwidth Limit	measurement data (20dB down) Center Freq: 313.850MHz	Result
Upper frequency Limit (314.2423125MHz:392.3125kHz)	314.071MHz(221kHz)	Pass
Lower frequency Limit (313.4576875MHz:392.3125kHz)	313.604MHz(246kHz)	Pass
-20dB Bandwidth (784.625kHz)	Uf + Lf = 467kHz	Pass

\* See Appendix A2 and A3

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### 3.3 Measurement Uncertainty

#### Radiated Emission Test

Measurement distance of 3m (30-1000MHz):

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.4$ dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 3.2$ dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

The data listed in this test report has enough margin, more than site margin.

Measurement distance of 3m (1000-3200MHz):

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 5.8$ dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

The data listed in this test report has enough margin, more than site margin.

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#### 4 TEST EQUIPMENT USED

Instrument	Mfr.	Model No.	Control No.	Calibration Date / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	March 31, 2001 / 1 year
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 5, 2000 / 1 year
Attenuator	Anritsu	MP721B	AT-06	March 31, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	May 1, 2001 / 1 year
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-06	May 1, 2001 / 1 year
Horn Antenna	A.H. Systems	SAS200/571	HA-01	May 20, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	March 31, 2001 / 1 year
Spectrum Analyzer	Advantest	R3271	SA-05	February 1, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	August 24, 2001 / 1 year

\*All measurement equipment is traceable to national standard.

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## 5 RADIATED MEASUREMENT PHOTOS

### 5.1 Radiated Measurement Photos



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## APPENDIX

### A : Test Data

Radiated emissions and -20dB Bandwidth

A1 - A3

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# DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.  
YOKOWA NO.3 OPEN SITE

COMPANY : OMRON Corporation  
 TRADE NAME: OMRON  
 EQUIPMENT : keyless Entry System(Transmitter)  
 MODEL : G8D-333A-A  
 POWER : DC3.0V(CR2025)  
 Mode : Transmitting  
 Serial No. : sample No.1  
 Temperature : 25°C  
 Humidity : 64%

REPORT NO : 22BE0028-YW-1  
 REGULATION : FCC15.231(b) / 15.205  
 TEST DISTANCE : 3m  
 DATE : 2001/9/11  
 FCC ID : OUCG8D-333A-A

  
ENGINEER : Makoto Kosaka

**Below 1GHz QP DETECT(Test Receiver: BW 120kHz)**

**Above 1GHz PK DETECT (Spectrum Analyzer : REW 1MHz and VBW 1MHz)**

No.	FREQ [MHz]	ANT TYPE	READING		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1	313.89	BB	76.2	58.9	14.4	5.8	3.6	27.6	72.4	55.1	75.6	3.2	20.5
2	627.78	BB	23.2	21.3	19.3	5.9	5.4	27.3	26.5	24.6	55.6	29.1	31.0
3	941.67	BB	33.2	26.6	22.8	5.9	7.1	26.7	42.3	35.7	55.6	13.3	19.9
4	1255.59	BB	55.9	50.7	26.1	0.0	4.9	35.1	51.8	46.6	75.6	23.8	29.0
5	1569.45	BB	51.2	45.3	27.8	0.0	5.4	34.7	49.7	43.8	74.0	24.3	30.2
6	1883.34	BB	52.0	47.2	29.6	0.0	6.1	34.5	53.2	48.4	75.6	22.4	27.2
7	2197.23	BB	49.1	48.3	30.8	0.0	6.7	34.4	52.2	51.4	75.6	23.4	24.2
8	2511.12	BB	42.0	42.6	31.6	0.0	7.2	34.5	46.3	46.9	75.6	29.3	28.7
9	2825.01	BB	44.3	44.7	31.5	0.0	7.5	34.9	48.4	48.8	74.0	25.6	25.2
10	3138.90	BB	42.9	44.7	31.6	0.0	7.9	34.9	47.5	49.3	75.6	28.1	26.3

\*Above 1GHz PK LIMIT= AV LIMIT + 20dB(Section 15.35(b))

**Above 1GHz AV DETECT (Spectrum Analyzer : REW 1MHz and VBW 10Hz)**

No.	FREQ [MHz]	ANT TYPE	READING		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		AV LIMIT [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
4	1255.59	BB	53.3	46.5	26.1	0.0	4.9	35.1	49.2	42.4	55.6	6.4	13.2
5	1569.45	BB	46.7	36.7	27.8	0.0	5.4	34.7	45.2	35.2	54.0	8.8	18.8
6	1883.34	BB	47.6	39.8	29.6	0.0	6.1	34.5	48.8	41.0	55.6	6.8	14.6
7	2197.23	BB	43.3	42.5	30.8	0.0	6.7	34.4	46.4	45.6	55.6	9.2	10.0
8	2511.12	BB	32.2	32.9	31.6	0.0	7.2	34.5	36.5	37.2	55.6	19.1	18.4
9	2825.01	BB	34.1	34.2	31.5	0.0	7.5	34.9	38.2	38.3	54.0	15.8	15.7
10	3138.90	BB	32.4	33.1	31.6	0.0	7.9	34.9	37.0	37.7	55.6	18.6	17.9

**REMARKS**

ANTENNA TYPE: 30-300MHz Biconical / 300-1000MHz Logperiodic / 1-3.2GHz DRG Horn  
 CALCULATION(30MHz to 1000MHz) : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain  
 CALCULATION(1.0GHz to 3.3GHz) : READING + ANT Factor + Cable Loss - AMP Gain

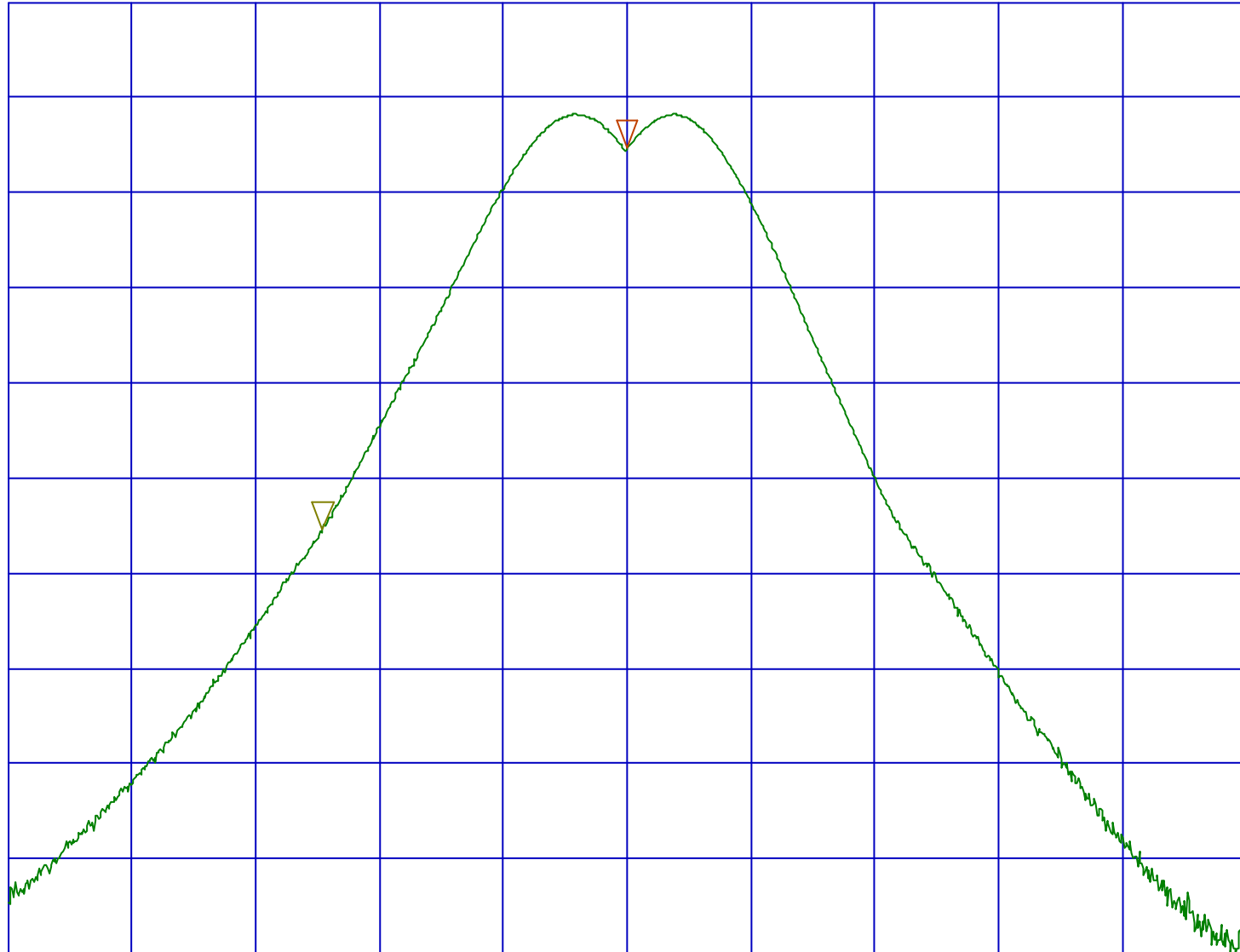
\*Except for the above table : adequate margin data below the limits.

OMRON / G8D-333A-A / FCC ID: OUCG8D-333A-A  
-20dB Bandwidth(Hor) 15.231(c) / Page A2  
REF 80.0 dBuV ATTEN 10 dB

MAKER  
313.8500 MHz  
72.35 dBuV

MAKER  
-246.0000 kHz  
-20.05 dBuV

5 dB/



START 313.35 MHz  
RES BW 100 kHz

VBW 10 kHz

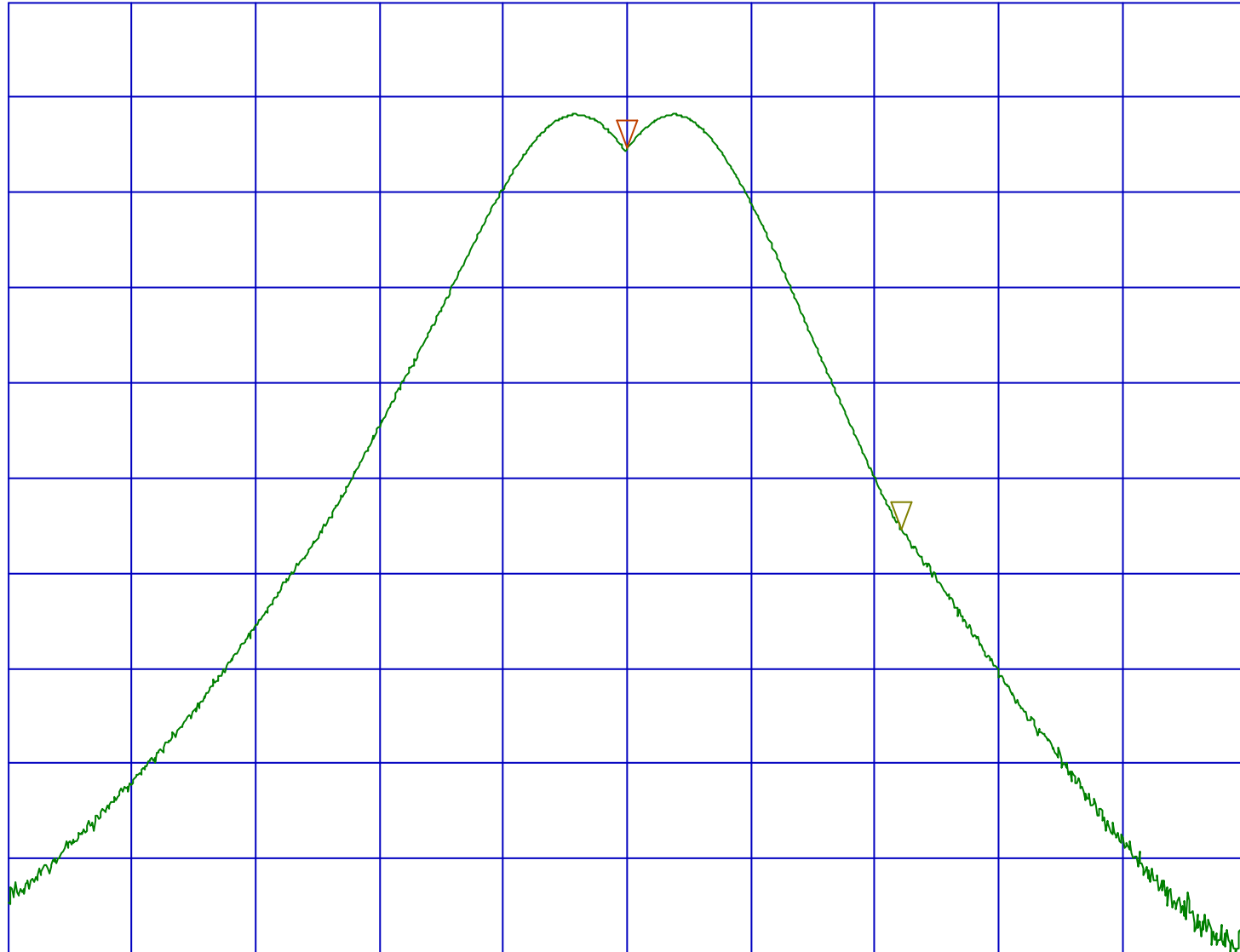
STOP 314.35 MHz  
SWP 20 msec

OMRON / G8D-333A-A / FCC ID: OUCG8D-333A-A  
-20dB Bandwidth(Hor) 15.231(c) / Page A3  
REF 80.0 dBuV ATTEN 10 dB

MAKER  
313.8500 MHz  
72.35 dBuV

MAKER  
221.0000 kHz  
-20.05 dBuV

5 dB/



START 313.35 MHz  
RES BW 100 kHz

VBW 10 kHz

STOP 314.35 MHz  
SWP 20 msec