EMISSION TEST REPORT

Test Report No. : **21GE0053YW-1**

Applicant:	**CALSONIC KANSEI CORP.**
Type of Equipment:	**Keyless Entry System (Transmitter)**
Model No.:	**ASTU15**
Test standard:	**FCC Part 15 Subpart C**
Test Result:	**Complies**

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

Date of test: February 26, 2001

Tested by: Makoto Kosaka

Approved by: Kazuhiro Kitahara
Section Manager of EMC section

Issued date: March 1, 2001

Testing Laboratory
A-pex International Co., Ltd.
108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN
Telephone: +81 596 39 1485
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1 GENERAL INFORMATION

APPLICANT	: CALSONIC KANSEI CORP.
TRADE NAME	: CALSONIC KANSEI
ADDRESS	: 5-24-15 Minamidai, Nakano-ku, Tokyo 164-8602 Japan Tel: +81-283-21-8136 Fax: +81-283-23-9191
REGULATION(S)	: FCC Part 15 Subpart C
MODEL NUMBER	: ASTU15
FCC ID	: KBRASTU15
SERIAL NUMBER	: -
KIND OF EQUIPMENT	: Keyless Entry System (Transmitter)
TESTED DATE	: February 26, 2001
RECEIPT DATE OF SAMPLE	: February 19, 2001
REPORT FILE NUMBER	: 21GE0053YW-1
TEST SITE	: A-PEX Yokowa No.3 Open Test Site

1.1 Product Description

Model: ASTU15 (referred to as the EUT in this report) is a Keyless Entry System (Transmitter).
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The specification is as following :
Carrier Frequency : 315 MHz
Operation Voltage : Lithium Battery DC 3.0V(CR2025)
Modulation : AM
Type of antenna : P.C.B pattern antenna
Number of channels : 1

1.2 Test Specification

Test Specification : FCC Part 15 Subpart C

Title : FCC 47CFR Part15 Radio Frequency Device

Subpart C Intentional Radiators

§ 15.205 Restricted bands of operation

§ 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	Restricted bands of operation	FCC/ANSI C63.4:1992	§ 15.205	3m
2	Electric Field Strength of Fundamental Emission	FCC/ANSI C63.4:1992	§ 15.231(b)	3m
3	Electric Field Strength of Spurious Emission	FCC/ANSI C63.4:1992	§ 15.231(b)	3m
4	-20dB Bandwidth	FCC/ANSI C63.4:1992	§ 15.231(c)	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

2 SYSTEM TEST CONFIGURATION

2.1 Operation Environment

Temperature : 23℃

Humidity : 29%

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

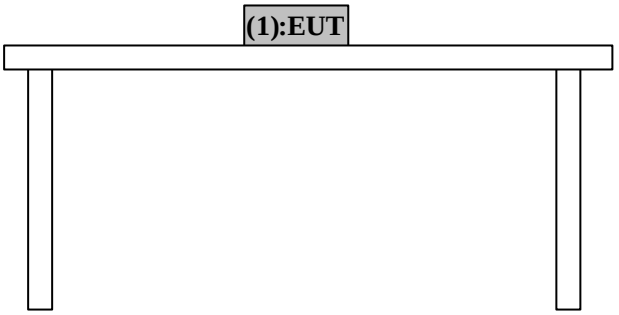
2.4 Test Procedure

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.

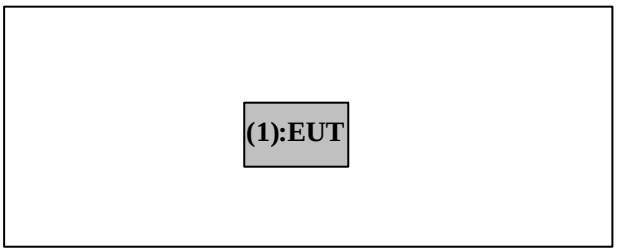
Figure2.1 Configuration of Tested System

Front View



* Test data was taken under worse case conditions.

Top View

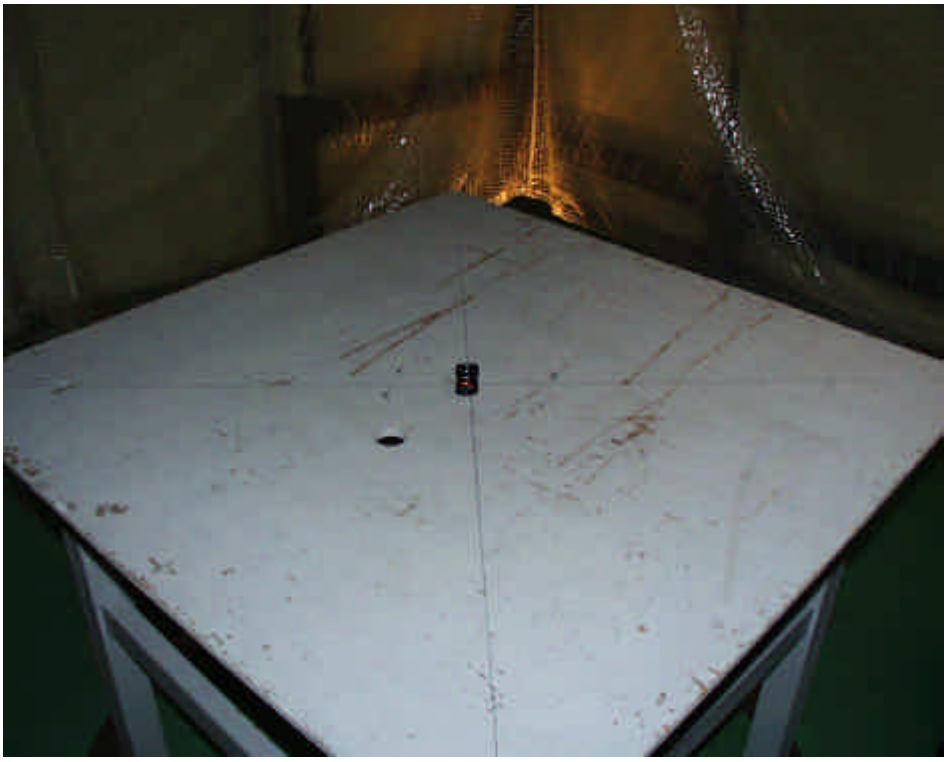


*Test data was taken under worse case conditions.

No.	Item	Model number	Serial number	Manufacturer	FCC ID
1	Keyless Entry System (Transmitter)	ASTU15	-	CALSONIC KANSEI	KBRASTU15

3 RADIATED MEASUREMENT PHOTOS

Figure 3.1 Radiated Measurement Photos



3.1 Measurement Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ±3.3dB.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

■ The data listed in this test report has enough margin, more than 3.3dB.

4 RADIATED EMISSION DATA

The initial step in collecting radiated data was a spectrum analyzer peak scan of the measurement range (30MHz-3300MHz).
The final data was reported in the worst-case emissions.
The minimum margin to the limit is as follows :

Frequency (MHz)	Ant Pol	Receiver Reading (dBμV)	Correction Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
315.00	H	75.5	-4.3	71.2	75.6	4.4

* quasi-peak mode

§ 15.231(c) -20dB Bandwidth
Bandwidth Limit: Fundamental Frequency 315MHz × 0.25% = 787.5kHz

Bandwidth Limit	measurement data (20dB down)	Result
Upper frequency Limit (315.39375MHz:393.75kHz)	315.184MHz(168kHz)	Pass
Lower frequency Limit (314.60625MHz:393.75kHz)	314.843MHz(173kHz)	Pass
-20dB Bandwidth (787.5kHz)	341kHz	Pass

* See Appendix 2 and 3

5.1 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 75.5 dBμV is obtained. The antenna Factor of 14.5 dB, Cable Factor of 3.6 dB and Antenna Pad of 5.9 dB is added. The Amplifier Gain of 28.3 dB is subtracted, giving a field strength of 71.2 dBμV/m.

FS = 75.5 + 14.5 + 3.6 + 5.9 – 28.3 = 71.2 dBμV/m

6 Test EQUIPMENT USED

Instrument	Mfr.	Model No.	Control No.	Calibration Until / / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	November 5, 2001 / 1 year
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 4, 2001 / 1 year
Attenuator	Anritsu	MP721B	AT-06	June 8, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	April 28, 2001 / 1 year
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-06	April 29, 2001 / 1 year
Horn Antenna	A.H. Systems	SAS200/571	HA-01	January 31, 2003 / 3 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	May 5, 2001 / 6 months
Spectrum Analyzer	Advantest	R3271	SA-05	January 31, 2002 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	August 9, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESCS30	KTR-01	August 7, 2001 / 1 year

*All measurement equipment is traceable to national standard.

APPENDIX

A : Test Data

Radiated emissions A1 – A3

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DATA OF RADIATION TEST

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

COMPANY : CALSONIC KANSEI CORP
TRADE NAMI: CALSONIC KANSEI
EQUIPMENT : keyless Entry System(Transmitter)
MODEL : ASTU15
POWER : DC3.0V
Mode : Transmiting
Temperature : 23℃
Humidity : 29%

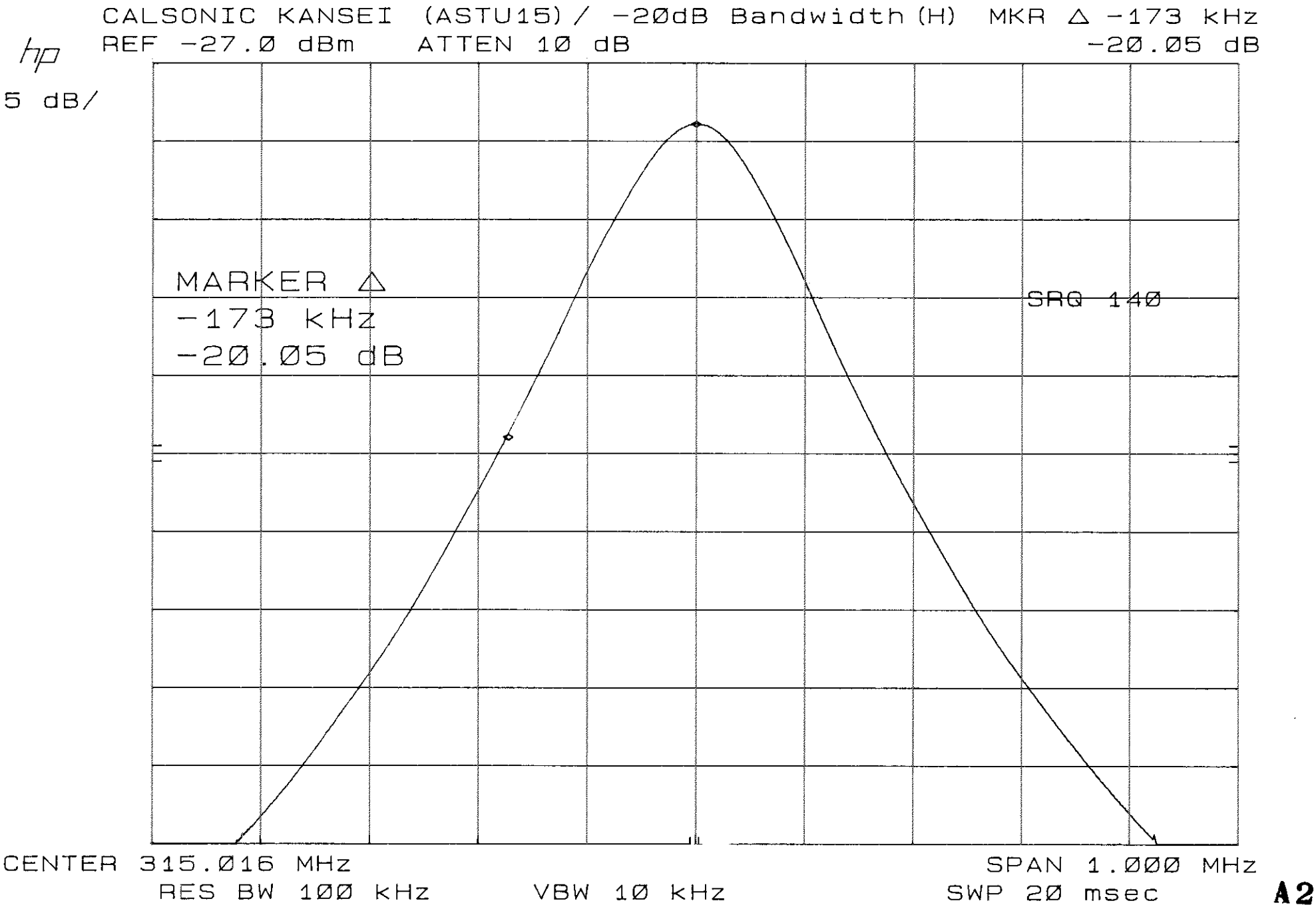
REPORT NO : 21GE0053YW-1
REGULATION : FCC15.231(b)/15.205
TEST DISTANCE : 3m
DATE : 2001/2/26
FCC ID : KBRASTU15

ENGINEER : Makoto Kosaka

No.	FREQ	ANT	READING		ANT	ATTEN	CABLE	AMP	RESULT		LIMIT	MARGIN	
		TYPE	HOR	VER	Factor		LOSS	GAIN	HOR	VER		HOR	VER
	[MHz]		[dB μ V]	[dB μ V]	[dB]	[dB]	[dB]	[dB]	[dB μ V/m]	[dB μ V/m]	dB μ V/m	[dB]	[dB]
1	315.00	BB	75.5	64.4	14.5	5.9	3.6	28.3	71.2	60.1	75.6	4.4	15.5
2	630.03	BB	41.1	34.5	18.9	6.1	5.4	27.9	43.6	37.0	55.6	12.0	18.6
3	945.04	BB	24.0	19.6	22.7	5.9	7.4	27.5	32.5	28.1	55.6	23.1	27.5
4	1260.00	BB	45.0	40.6	24.5	0.0	4.8	35.1	39.2	34.8	55.6	16.4	20.8
5	1575.00	BB	46.0	42.2	25.7	0.0	5.5	34.4	42.8	39.0	54.0	11.2	15.0
6	1890.00	BB	41.0	40.2	27.4	0.0	6.2	34.3	40.3	39.5	55.6	15.3	16.1
7	2205.00	BB	40.5	40.5	28.4	0.0	6.8	34.2	41.5	41.5	54.0	12.5	12.5
8	2520.00	BB	40.6	40.8	29.0	0.0	7.3	34.3	42.6	42.8	55.6	13.0	12.8
9	2835.00	BB	40.3	40.7	30.0	0.0	7.9	34.6	43.6	44.0	54.0	10.4	10.0
10	3150.00	BB	40.0	40.4	30.4	0.0	8.5	34.5	44.4	44.8	55.6	11.2	10.8

REMARKS:
Below the 1GHz QP DETECT(T/R: BW120kHz)
Upper the 1GHz PK DETECT(S/A:RES BW 1MHz / VBW 1MHz)
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.

FCC ID KBRASTU15



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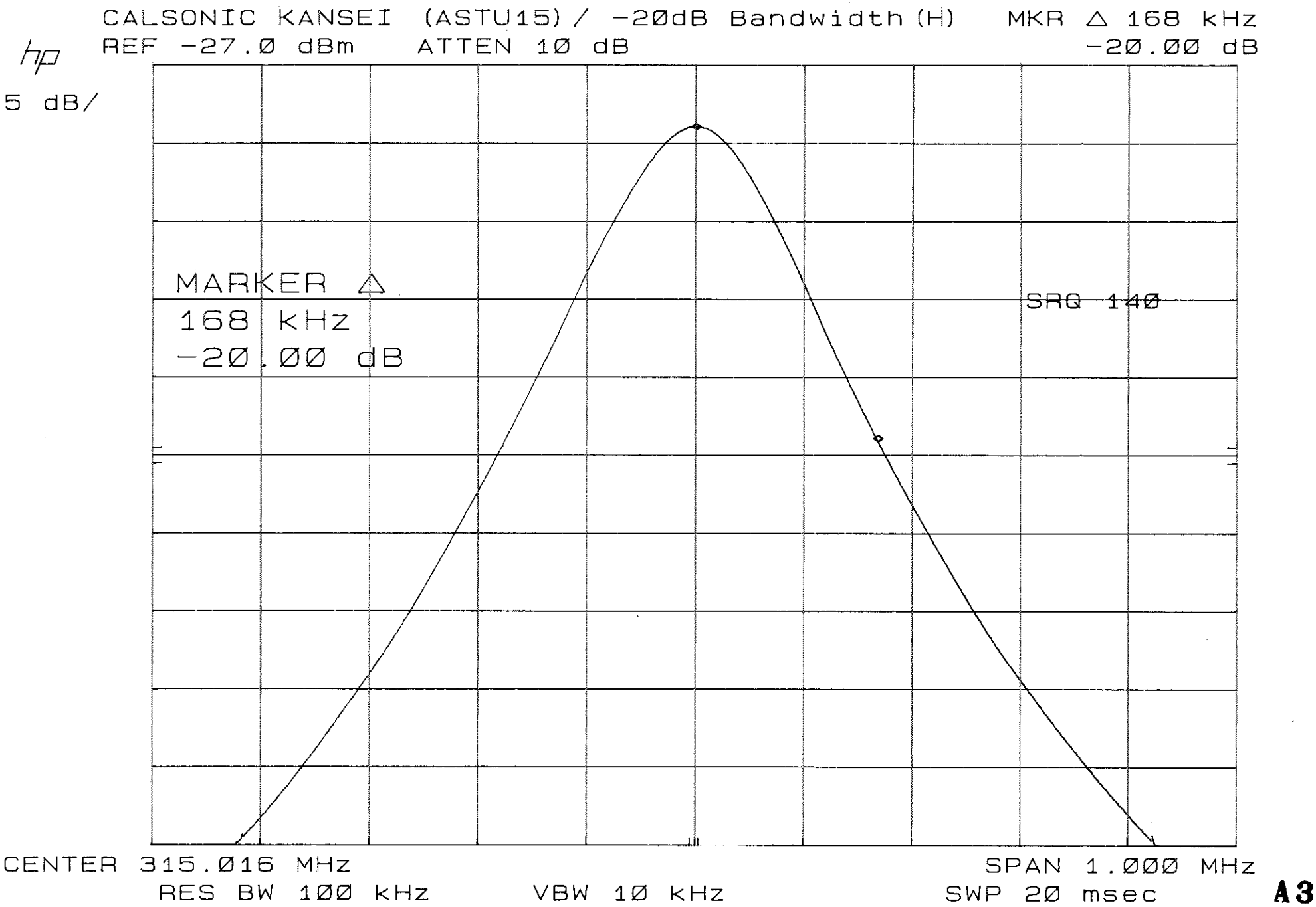

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