EMI TEST REPORT

Test Report No. : 22AE0081-YW-1

Applicant:	**CalsonicKansei Corp.**
Type of Equipment:	**Immobilizer System (RF module + Body control module)**
Model No.:	**BSVU17**
Test standard:	**FCC Part 15 Subpart C §15.209(a)**
Test Result:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International Co., Ltd.

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

3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.

4. The test results in this report are traceable to the national or international standards.

5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test: September 17, 2001 **Issued date:** October 3, 2001

Tested by: Makoto Kosaka

Approved by: Kazutoyo Nakanishi
Site Operation Manager of EMC section

A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

CONTENTS

SECTION 1: Client information

Company name : ClsonicKansei Corp.

Trade name : CALSONOC KANSEI

Address : 5-24-15 Minamidai, Nakano-Ku, Tokyo, 164-8602 JAPAN

Telephone Number : +81-3-5385-0111

Facsimile Number : +81-3-3383-1171

Contact Person : Yasuo Saruki

SECTION 2: Equipment under test (E.U.T.)

Type of Equipment : Immobilizer System (RF module + Body control module)

Model No. : BSVU17

FCC ID : KBRBSVU17

Serial No. : Sample No.1

Condition of EUT : Production prototype

Rating : DC 12.0V (Car Battery)

Country of Manufacture : Germany and Japan

Receipt Date of Sample : August 9, 2001

2.2 Product Description

Model: BSVU17, referred to as the EUT in this report, is a Immobilizer System (RF module + Body control module).

The specification is as follows :
Carrier Frequency : 125 kHz
Modulation : AM
Information antenna : Loop antenna

SECTION 3: Test specification, methods & procedures

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
§ 15.209 Radiated emission limits; general requirements

3.2 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	ANSI C63.4:1992	§ 15.207(a)	-
2	Radiated emission	ANSI C63.4:1992	§ 15.209(a)	3m

*These tests were performed without any deviations from test procedure except for below exclusions.

3.3 Additions or deviations to standards

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	ANSI C63.4:1992	§ 15.207(a)	-

* This test is not applicable since the EUT does not have AC Port.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

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

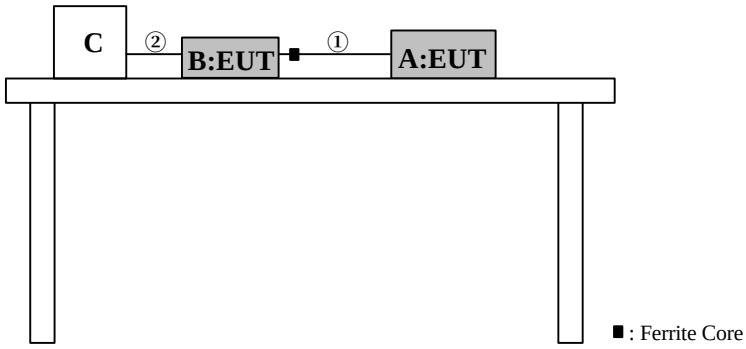
The operating mode/system were as follows:

Operation : Communication mode

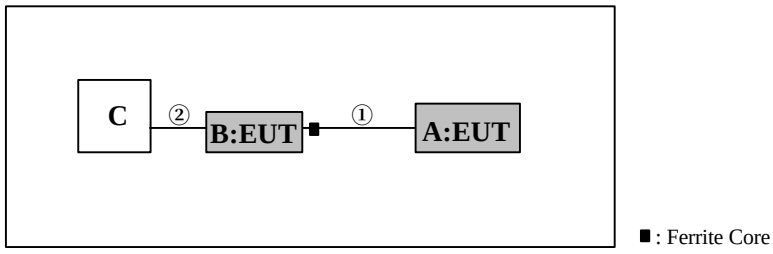
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Front View



Top View



*Cabling was taken into consideration and test data was taken under worse case conditions.

A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	RF module	BSVU17	Sample No.1	SIEMENS	KBRBSVU17 (EUT)
B	Body control module	BSVU17	Sample No.1	CalsonicKansei Corp.	KBRBSVU17 (EUT)
C	Car Battery	50B24L	-	YUASA	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material	Remark
①	I/O Cable	1.0	N	Polyvinyl chloride	-
②	DC Power Cable	0.3	N	Polyvinyl chloride	-

SECTION 5: Summary of test results

5.1 Test results

No.	Item	Test Procedure	Worst margin	Result
1	Radiated emission	ANSI C63.4:1992	**Fundamental** 21.6dB (0.1250MHz: 0degrees) **Spurious** 7.0dB (57.9500MHz: Horizontal)	Complied

A-PEX INTERNATIONAL hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part15 Subpart C §15.209(a).

<–20dB Bandwidth>
See Appendix A2 and A3

5.2 Uncertainty

Radiated Emission Test
Measurement distance of 3m:

The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ±2.5dB.
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.4dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±4.8dB.

☐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.

5.3 Test equipment used

See SECTION 6: Test instruments

5.4 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

5.5 Test Configuration Photographs

See Appendix 1.

5.6 Data of EMI Test

See Appendix 2.

SECTION 6: Test instruments

Instrument	Mfr.	Model No.	Control No.	Test Item	Calibration Date / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	RE	March 31, 2001 / 1 year
Attenuator	Anritsu	MP721B	AT-06	RE	March 31, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	RE	May 1, 2001 / 1 year
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-06	RE	May 1, 2001 / 1 year
Loop Antenna	Rohde & Schwarz	HFH2-Z2	ELPA-01	RE	March 7, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	RE	March 31, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESHS10	TR-05	RE	August 24, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	RE	August 24, 2001 / 1 year
Yokowa No.3 Open Test Site	JSE	3m	YOATS-03	RE	May 1, 2001 / 1 year
Yokowa No.3 Open Coaxial (0.01-1000MHz)	A-PEX	CC-31~37, SW-31, 32	CC-3ORC	RE	March 31, 2001 / 1 year

* Test Item ; RE: Radiated emission
*All measurement equipment are traceable to national or international standard.

A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

SECTION 7: Radiated emission

7.1 Operating environment

The test was carried out in an open site.

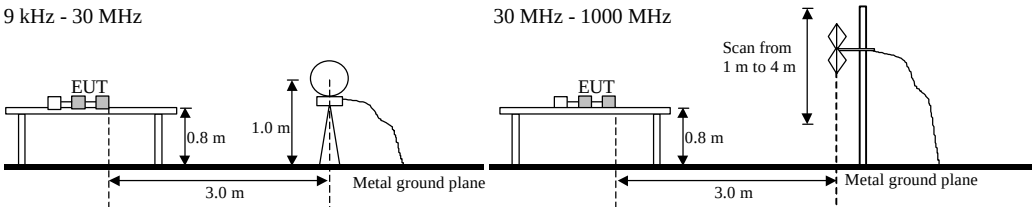
Temperature : See data
Humidity : See data

7.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1m, raised 80cm above the conducting ground plane. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane.

A drawing of the set up is shown in the pictures of Figure 1 and the photos of Appendix 1.

Figure 1 Drawing of the test set-up



7.3 Test conditions

Frequency range : 9kHz-30MHz (Loop antenna) / 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)
Test distance : 3m
EUT position : Table top

7.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.
Pre check measurements were performed within a screened room for ambient noise at high-level, especially from 80-90MHz, 270-290MHz and 500-700MHz.Measurements were performed with a quasi-peak detector.
Measurements were performed with average and quasi-peak detector.
The loop antenna height was fixed 1m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both 0 deg. and 90 deg. antenna polarization.
The Biconical and Logperiodic antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both horizontal and vertical antenna polarization.
The EUT was put into operation at Communication mode.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency Range : 110kHz – 490kHz
Detector Type : AV
IF Bandwidth : 10kHz

Frequency Range : 500kHz – 30MHz
Detector Type : QP
IF Bandwidth : 10kHz

Frequency Range : 30MHz – 1000MHz
Detector Type : QP
IF Bandwidth : 120kHz

7.5 Results

Summary of the test results: Pass

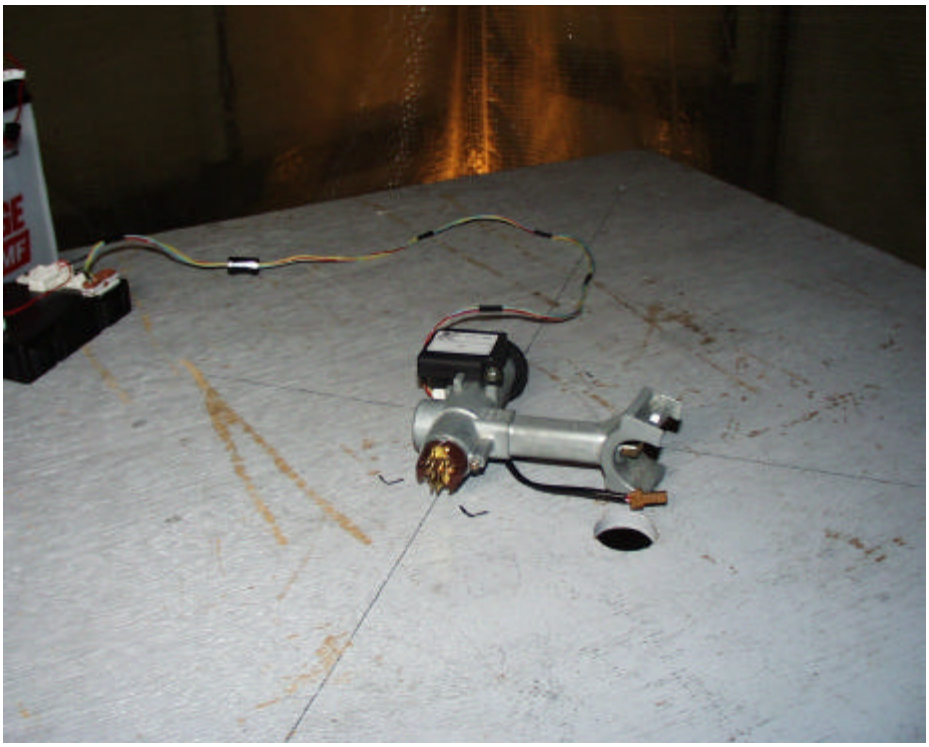
Date: 2001-09-17 Tested by: M. Kosaka

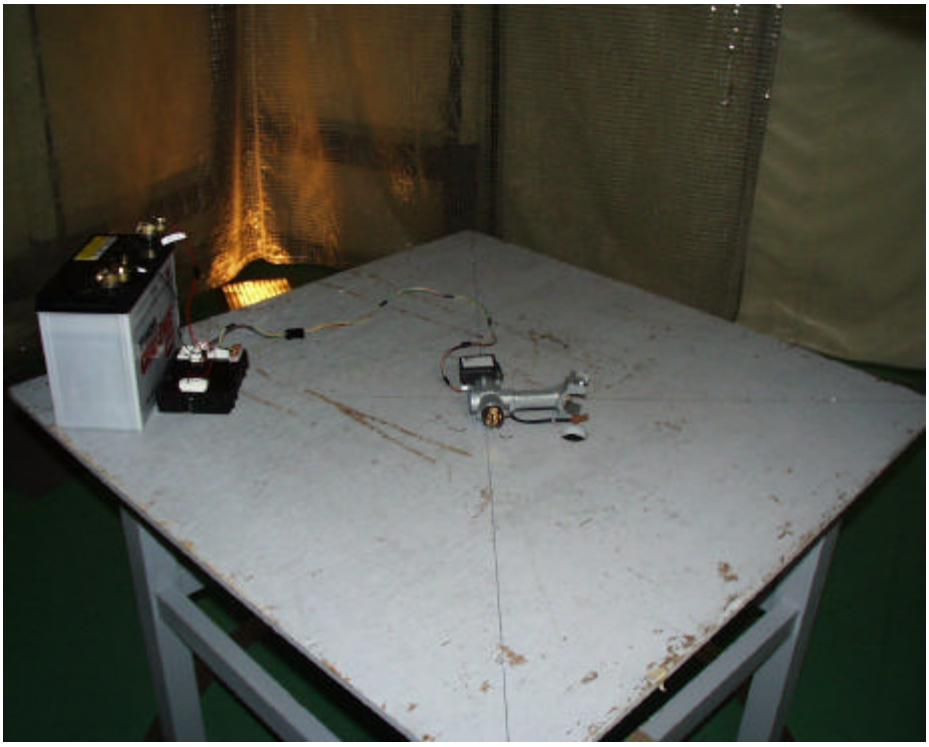
APPENDIX 1: Photographs of test setup

This section contains the following photographs:

A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

Radiated emission





A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

APPENDIX 2: Data of EMI test

This section contains the following data

14 - 16 : Radiated emission test

A-pex International Co., Ltd.
YOKOWA LAB.
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN
Telephone: int +81 596 39 1485
Facsimile: int +81 596 39 0232

DATA OF RADIATION TEST

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

COMPANY : CalsonicKansei Corp.
EQUIPMENT : Imobilizer System (RF module + BCM)
MODEL : BSVU17
POWER : DC12.0V
Mode : Communication
Fundamental : 125kHz
Serial No. : sample No.1
Temperature : 20℃
Humidity : 69%

REPORT NO : 22AE0081-YW-1
REGULATION : FCC 15.209(a)
TEST DISTANCE : 3m
DATE : 2001/9/17
FCC ID : KBRBSVU17

ENGINEER : Makoto Kosaka

Frequency Rage :110kHz-490kHz AV DETECT(Test Receiver: BW 10kHz)
Frequency Rage :500kHz-30MHz QP DETECT(Test Receiver: BW 10kHz)

No.	FREQ	ANT	READING		ANT	ATTEN	CABLE	AMP	RESULT		LIMIT	MARGIN	
		TYPE	0 deg	90 deg	Factor		LOSS	GAIN	0deg	90deg		0deg	90deg
	[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	0.1250	BB	87.4	82.9	19.6	5.9	0.1	29.0	84.0	79.5	105.6	21.6	26.1
2	0.2500	BB	34.3	32.6	19.6	5.9	0.1	28.8	31.1	29.4	99.6	68.5	70.2
3	0.3750	BB	47.7	45.6	19.6	5.9	0.2	28.6	44.8	42.7	96.1	51.3	53.4
4	0.5000	BB	34.2	34.0	19.6	5.9	0.2	28.5	31.4	31.2	73.6	42.2	42.4
5	0.6250	BB	40.0	38.7	19.6	5.9	0.2	28.4	37.3	36.0	71.7	34.4	35.7
6	0.7500	BB	33.1	33.1	19.6	5.9	0.2	28.4	30.4	30.4	70.1	39.7	39.7
7	0.8750	BB	36.0	35.2	19.6	5.9	0.2	28.4	33.3	32.5	68.8	35.5	36.3
8	1.0000	BB	32.6	32.8	19.5	5.9	0.2	28.4	29.8	30.0	67.6	37.8	37.6
9	1.1250	BB	33.9	33.8	19.5	5.9	0.2	28.4	31.1	31.0	66.6	35.5	35.6
10	1.2500	BB	32.7	32.8	19.5	5.9	0.2	28.4	29.9	30.0	65.7	35.8	35.7

Frequency Rage :30MHz-1000MHz QP DETECT(Test Receiver: BW 120kHz)

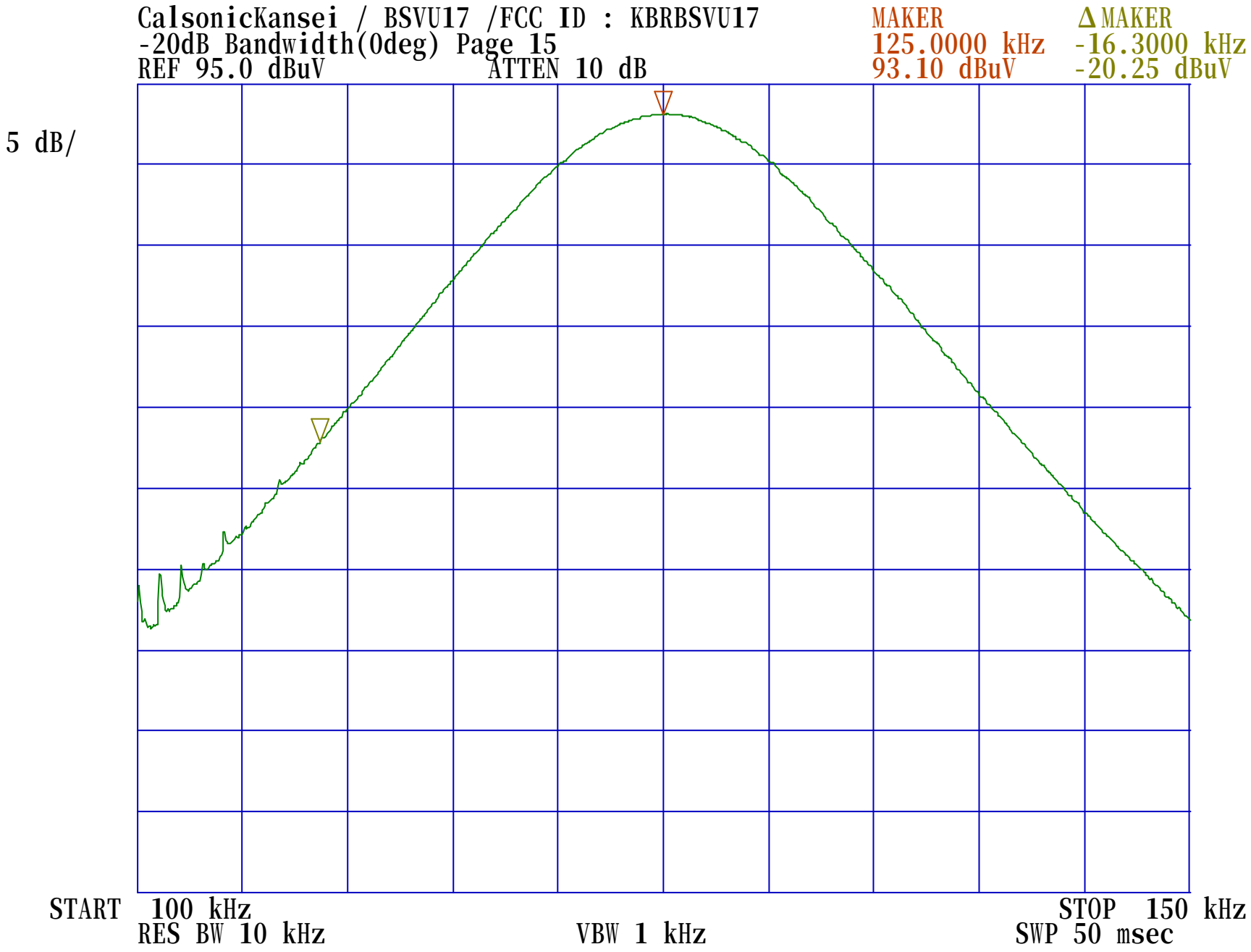
No.	FREQ	ANT	READING		ANT	ATTEN	CABLE	AMP	RESULT		LIMIT	MARGIN	
		TYPE	HOR	VER	Factor		LOSS	GAIN	HOR	VER		HOR	VER
	[MHz]		[dB μ V]	[dB μ V]	[dB]	[dB]	[dB]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB μ V/m]	[dB]	[dB]
11	42.9000	BB	35.2	35.6	13.4	6.0	1.2	28.1	27.7	28.1	40.0	12.3	11.9
12	57.9500	BB	45.6	42.6	8.1	5.9	1.4	28.0	33.0	30.0	40.0	7.0	10.0
13	65.4700	BB	45.4	41.4	6.7	5.9	1.5	27.9	31.6	27.6	40.0	8.4	12.4
14	80.0100	BB	41.0	36.1	6.3	5.9	1.7	27.9	27.0	22.1	40.0	13.0	17.9
15	99.5800	BB	39.6	33.5	10.0	5.9	1.9	27.9	29.5	23.4	43.5	14.0	20.1

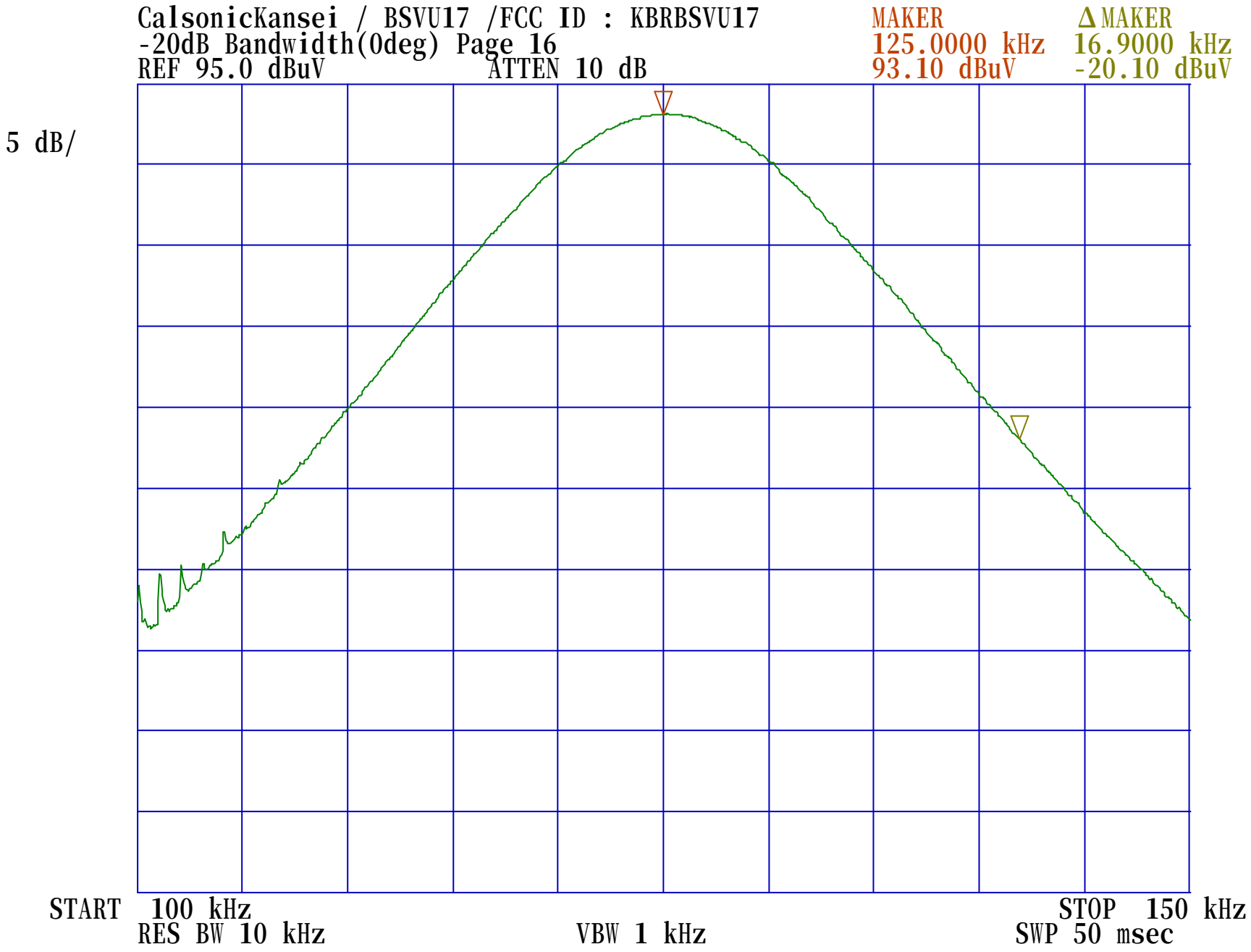
REMARKS
ANTENNA TYPE : 10kHz-30MHz (Loop Antenna)
CALCULATION(125kHz to 375kHz) : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain
fundamental freq(125kHz) : 84dB μ V - 40log$_{10}$(300/3) = 84dB μ V - 80dB = 4dB at 300m
Limit for fundamental : 20log$_{10}$(2400/F) = 20log$_{10}$(2400/125) = 25.6dB μ V *F = kHz

CALCULATION(500kHz to 1250kHz) : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain
Spurious freq(625kHz) : 37.3dB μ V - 40log$_{10}$(30/3)= 37.3dB μ V - 40dB = -2.7dB at 30m
Limit for : 20log$_{10}$(24000/F) = 20log$_{10}$(24000/625) = 31.7dB μ V *F = kHz

CALCULATION(30MHz to 1GHz) : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain

All other spurious emissions are more than 20dB below the limits.


CalsonicKansei / BSVU17 /FCC ID : KBRBSVU17
-20dB Bandwidth(0deg) Page 15
REF 95.0 dBuV
ATTEN 10 dB
MAKER
125.0000 kHz
93.10 dBuV
ΔMAKER
-16.3000 kHz
-20.25 dBuV
5 dB/
START 100 kHz
STOP 150 kHz
RES BW 10 kHz
VBW 1 kHz
SWP 50 msec


CalsonicKansei / BSVU17 /FCC ID : KBRBSVU17
-20dB Bandwidth(0deg) Page 16
REF 95.0 dBuV
ATTEN 10 dB
MAKER
125.0000 kHz
93.10 dBuV
ΔMAKER
16.9000 kHz
-20.10 dBuV
5 dB/
START 100 kHz
RES BW 10 kHz
VBW 1 kHz
STOP 150 kHz
SWP 50 msec