

TEST REPORT

Applicant : SEKONIC CORPORATION
Address : 7-24-14, OIZUMI-GAKUEN-CHO, NERIMA-KU,
TOKYO 178-8686 JAPAN

Products : Light Meter
Model No. : L-478DR
Serial No. : 2
4

FCC ID : PFK-478-01

Test Standard : CFR 47 FCC Rules and Regulations Part 15

Test Results : Passed

Date of Test : June 25 ~ 26, 2012



A handwritten signature in black ink, appearing to read 'K. Shibata'.

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

TABLE OF CONTENTS

	Page
1 Description of the Equipment Under Test.....	3
2 Summary of Test Results	4
3 Test Procedure	5
4 Test Location.....	5
5 Recognition of Test Laboratory.....	5
6 Details of the Equipment Under Test	6
7 Details of the Test Item.....	7

DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT**EUT** : Equipment Under Test**EMC** : Electromagnetic Compatibility**AE** : Associated Equipment**EMI** : Electromagnetic Interference**N/A** : Not Applicable**EMS** : Electromagnetic Susceptibility**N/T** : Not Tested☒ - indicates that the listed condition, standard or equipment is applicable for this report.☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

1 Description of the Equipment Under Test

- | | | |
|--------------------------|---|---|
| 1. Manufacturer | : | SEKONIC CORPORATION
7-24-14, OIZUMI-GAKUEN-CHO, NERIMA-KU,
TOKYO 178-8686 JAPAN |
| 2. Products | : | Light Meter |
| 3. Model No. | : | L-478DR |
| 4. Serial No. | : | 2
4 |
| 5. Product Type | : | Prototype |
| 6. Date of Manufacture | : | May, 2012 |
| 7. Power Rating | : | 3 VDC (for Battery) |
| 8. EUT Grounding | : | None |
| 9. Operating Frequency | : | 340 MHz – 354 MHz |
| 10. Modulation | : | ON/OFF Keying |
| 11. Antenna type | : | Integral PCB Antenna |
| 12. Temperature Range | : | -10°C to 50°C |
| 13. Received Date of EUT | : | June 5, 2012 |

2 Summary of Test Results

Applied Standard : CFR 47 FCC Rules and Regulations Part 15 – Radio Frequency Devices
Subpart C – Intentional Radiators

The EUT described in clause 1 was tested according to the applied standard shown above.

Details of the test configuration is shown in clause 6.

The conclusion for the test items of which are required by the applied standard is indicated under the test result.

☒ - The test result was **passed** for the test requirements of the applied standard.

☐ - The test result was **failed** for the test requirements of the applied standard.

☐ - The test result was **not judged** the test requirements of the applied standard.

In the approval of test results,

- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

Tested by:



Shigeru Kinoshita
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch



Shigeru Osawa
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

The tests documented in this report were performed in accordance with
CFR 47 FCC Rules and Regulations Part 15
Subpart C – Intentional Radiators
§15.231, §15.207 and §15.209

ANSI C63.4–2003

The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No. : VLAC-001-2 (Expiry date : March 30, 2014)
VCCI Registration No. : A-0002 (Expiry date : March 30, 2014)
BSMI Registration No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006
(Expiry date : September 14, 2013)
IC Registration No. : 2079E-3, 2079E-4 (Expiry date : July 20, 2014)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Expiry date : February 22, 2013)

6 Details of the Equipment Under Test

6.1 Operating Condition

Test Voltage : 3VDC (for Battery)

Operation Mode :

The EUT is set with the test mode, the specification of the test mode is as followings.

(1) Tx Mode (340 MHz)

(2) Tx Mode (347 MHz)

(3) Tx Mode (354 MHz)

Used application to controlled: The test mode is instructed by the applicant.

Internal Test Mode

The EUT was rotated through three orthogonal axis (X, Y and Z axis) in radiated measurement.

The EUT with temporary antenna port was used in conducted measurement.

6.2 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.
A	Light Meter	SEKONIC CORPORATION	L-478DR	2 *1) 4 *2)

*1) Used for Field Strength of Spurious Emission

*2) Used for Antenna Conducted Emission

The auxiliary equipment used for testing :

None

Type of Cable:

None

6.3 Test Arrangement (Drawings)

A:
(EUT)

7 Details of the Test Item

7.1 Conducted Emissions at the Mains Ports

For the requirements, ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

For the limits, ☐ - Passed ☐ - Failed ☐ - Not judged

7.2 Radiated Emission

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.2.1 Worst Point and Measurement Uncertainty

Min. Limit Margin (Average)	<u>3.6</u> dB	at	<u>347.0</u> MHz
Uncertainty of Measurement Results	9 kHz – 30 MHz	<u>+/-1.9</u>	dB(2 σ)
	30 MHz – 300 MHz	<u>+/-4.3</u>	dB(2 σ)
	300 MHz – 1000 MHz	<u>+/-5.4</u>	dB(2 σ)
	1 GHz – 6 GHz	<u>+/-4.6</u>	dB(2 σ)
Test Distance		<u>3</u>	m

Remarks : The measurement result is within the range of measurement uncertainty.

7.2.2 Test Site

KITA-KANSAI Testing Center SAITO EMC Branch

☐ - Anechoic chamber A1

☒ - Anechoic chamber A2

7.2.3 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESU 26	Rohde & Schwarz	A-6	2012/4	1 Year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	C-2	2011/8	1 Year
RF Cable	RG213/U	SUHNER	H-28	2011/8	1 Year
Biconical Antenna	VHA9103/BBA9106	Schwarzbeck	C-30	2012/5	1 Year
Log-periodic Antenna	UHALP9108-A1	Schwarzbeck	C-31	2012/5	1 Year
RF Cable	S 10162 B-11 etc.	SUHNER	H-4	2012/3	1 Year
Site Attenuation	--	----	H-15	2012/2	1 Year
Pre-Amplifier	WJ-6882-824	Watkins Johnson	A-21	2012/1	1 Year
Pre-Amplifier	WJ-6611-513	Watkins Johnson	A-23	2012/1	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2011/6	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2011/6	1 Year
Horn Antenna	3160-04	EMCO	C-55	2011/6	2 Years
Attenuator	54A-10	Weinschel	D-29	2011/9	1 Year
Attenuator	2-10	Weinschel	D-79	2011/11	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-66	2012/1	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-67	2012/1	1 Year
SVSWR	--	----	H-19	2012/2	1 Year

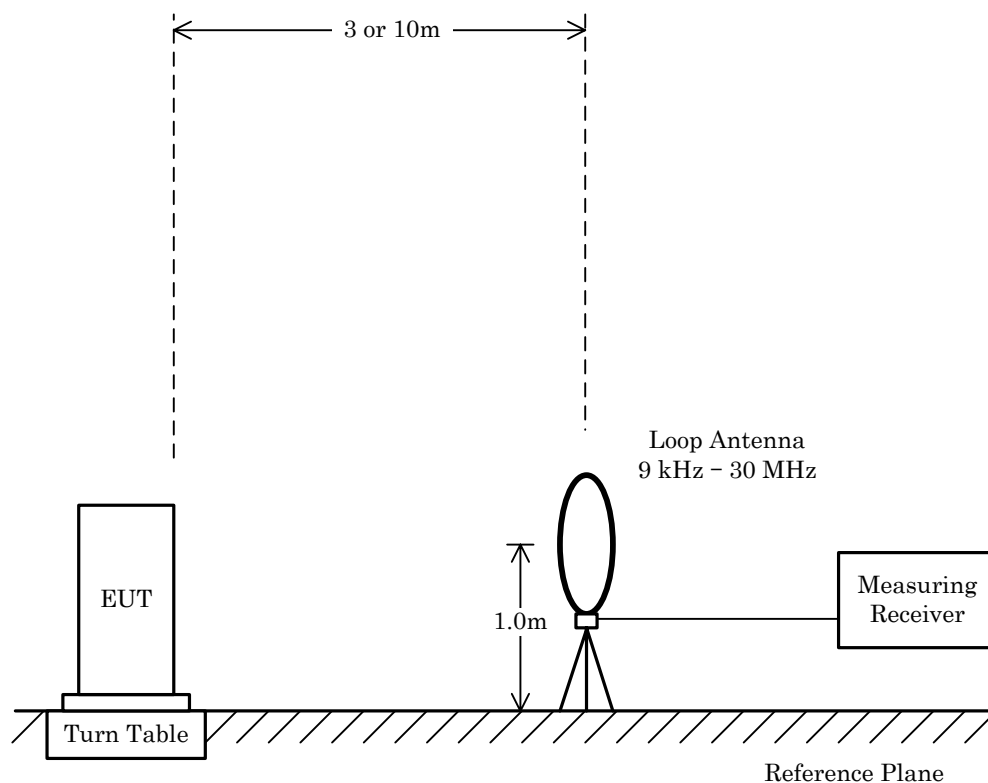
7.2.4 Test Method and Test Setup (Diagrammatic illustration)**7.2.4.1 Radiated Emission 9 kHz – 30 MHz**

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

(Reference divisional instruction No. G70364B)



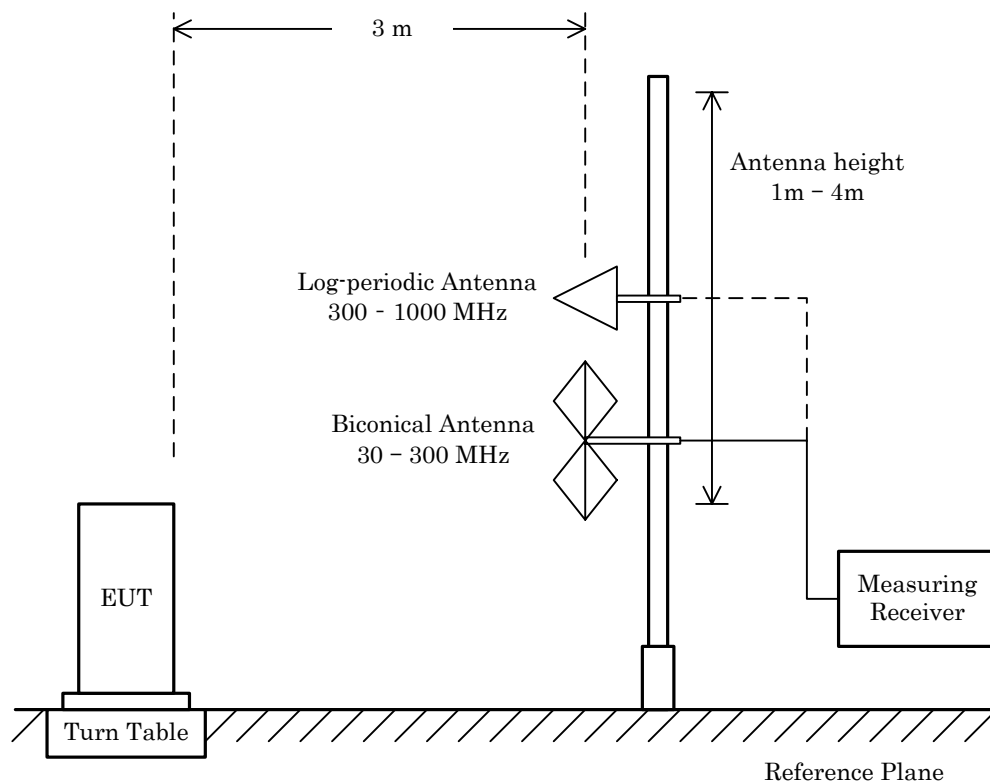
7.2.4.2 Radiated Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

(Reference divisional instruction No. G70364B)



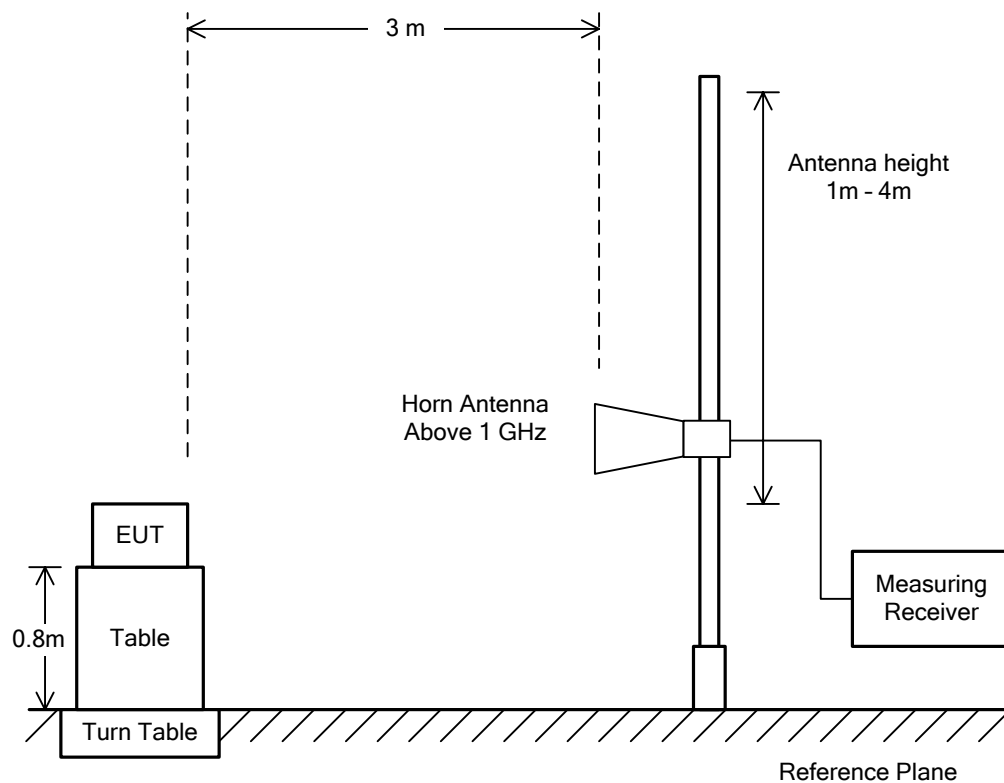
7.2.4.2 Radiated Emission Above 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

(Reference divisional instruction No. G70364C)



7.2.5 Test Data

7.2.5.1 Radiated Emission 9 kHz – 30 MHz

Test Date : June 25, 2012

Temp.:24°C, Humi:67%

Results : No spurious emissions in the range 20dB below the limit.

7.2.5.2 Radiated Emission Above 30 MHz

Mode of EUT: Tx Mode (340 MHz)

Test Port : Enclosure

Date : June 25, 2012

Temp. : 24 °C Humi. : 67 %

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV)			Limits (dBuV/m)		Emission Levels (dBuV/m)		Margins (dB)	
				QP	AV	Peak	QP/AV	Peak	QP/AV	Peak	QP/AV	Peak
340.0	-15.6	17.4	H	-	-	65.2	77.0	97.0	67.0	82.6	10.0	14.4
680.0	-15.6	24.3	H	-	-	22.0	57.0	77.0	30.7	46.3	26.3	30.7
1020.0	-15.6	-5.9	H	-	-	54.2	54.0	74.0	32.7	48.3	21.3	25.7
2380.0	-15.6	-0.7	V	-	-	49.7	54.0	74.0	33.4	49.0	20.6	25.0

Notes :

- 1) The spectrum was checked from 30 MHz to tenth harmonics.
- 2) The cable loss, amp. gain and antenna factor are included in the correction factor.
- 3) The symbol of "<" means "or less".
- 4) The symbol of ">" means "or greater".
- 5) A sample calculation(QP/AV) was made at 340 (MHz).
 $PA + Cf + Mr = -15.6 + 17.4 + 65.2(\text{Peak}) = 67 \text{ (dBuV/m)}$
 PA = Peak to Average Factor(P-A Factor)
 Cf = Correction Factor
 Mr = Meter Reading
- 6) Measuring Instrument Setting :

<u>Detector function</u>	<u>Resolution Bandwidth</u>	<u>Video Bandwidth</u>
Quasi-peak(QP)	120 kHz	-
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	3 MHz

Mode of EUT: Tx Mode (347 MHz)

Test Port : Enclosure

Date : June 25, 2012

Temp. : 24 °C Humi. : 67 %

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV)			Limits (dBuV/m)		Emission Levels (dBuV/m)		Margins (dB)	
				QP	AV	Peak	QP/AV	Peak	QP/AV	Peak	QP/AV	Peak
347.0	-15.6	17.7	H	-	-	71.7	77.4	97.4	73.8	89.4	3.6	8.0
694.0	-15.6	24.5	H	-	-	25.1	57.4	77.4	34.0	49.6	23.4	27.8
1041.0	-15.6	-6.2	H	-	-	56.0	54.0	74.0	34.2	49.8	19.8	24.2
2429.0	-15.6	-0.5	V	-	-	50.5	57.4	77.4	34.4	50.0	23.0	27.4

Notes :

- 1) The spectrum was checked from 30 MHz to tenth harmonics.
- 2) The cable loss, amp. gain and antenna factor are included in the correction factor.
- 3) The symbol of "<" means "or less".
- 4) The symbol of ">" means "or greater".
- 5) A sample calculation(QP/AV) was made at 347 (MHz).
 $PA + Cf + Mr = -15.6 + 17.7 + 71.7(\text{Peak}) = 73.8 \text{ (dBuV/m)}$
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading

6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Quasi-peak(QP)	120 kHz	-
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	3 MHz

Mode of EUT: Tx Mode (354 MHz)

Test Port : Enclosure

Date : June 25, 2012

Temp. : 24 °C Humi. : 67 %

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV)			Limits (dBuV/m)		Emission Levels (dBuV/m)		Margins (dB)	
				QP	AV	Peak	QP/AV	Peak	QP/AV	Peak	QP/AV	Peak
354.0	-15.6	17.9	H	-	-	63.4	77.7	97.7	65.7	81.3	12.0	16.4
708.0	-15.6	24.6	H	-	-	17.6	57.7	77.7	26.6	42.2	31.1	35.5
1062.0	-15.6	-6.2	V	-	-	58.0	54.0	74.0	36.2	51.8	17.8	22.2
2478.0	-15.6	-0.7	V	-	-	50.6	57.7	77.7	34.3	49.9	23.4	27.8

Notes :

- 1) The spectrum was checked from 30 MHz to tenth harmonics.
- 2) The cable loss, amp. gain and antenna factor are included in the correction factor.
- 3) The symbol of "<" means "or less".
- 4) The symbol of ">" means "or greater".
- 5) A sample calculation(QP/AV) was made at 354 (MHz).

$$PA + Cf + Mr = -15.6 + 17.9 + 63.4(\text{Peak}) = 65.7 \text{ (dBuV/m)}$$

$$PA = \text{Peak to Average Factor(P-A Factor)}$$

$$Cf = \text{Correction Factor}$$

$$Mr = \text{Meter Reading}$$

6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Quasi-peak(QP)	120 kHz	-
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	3 MHz

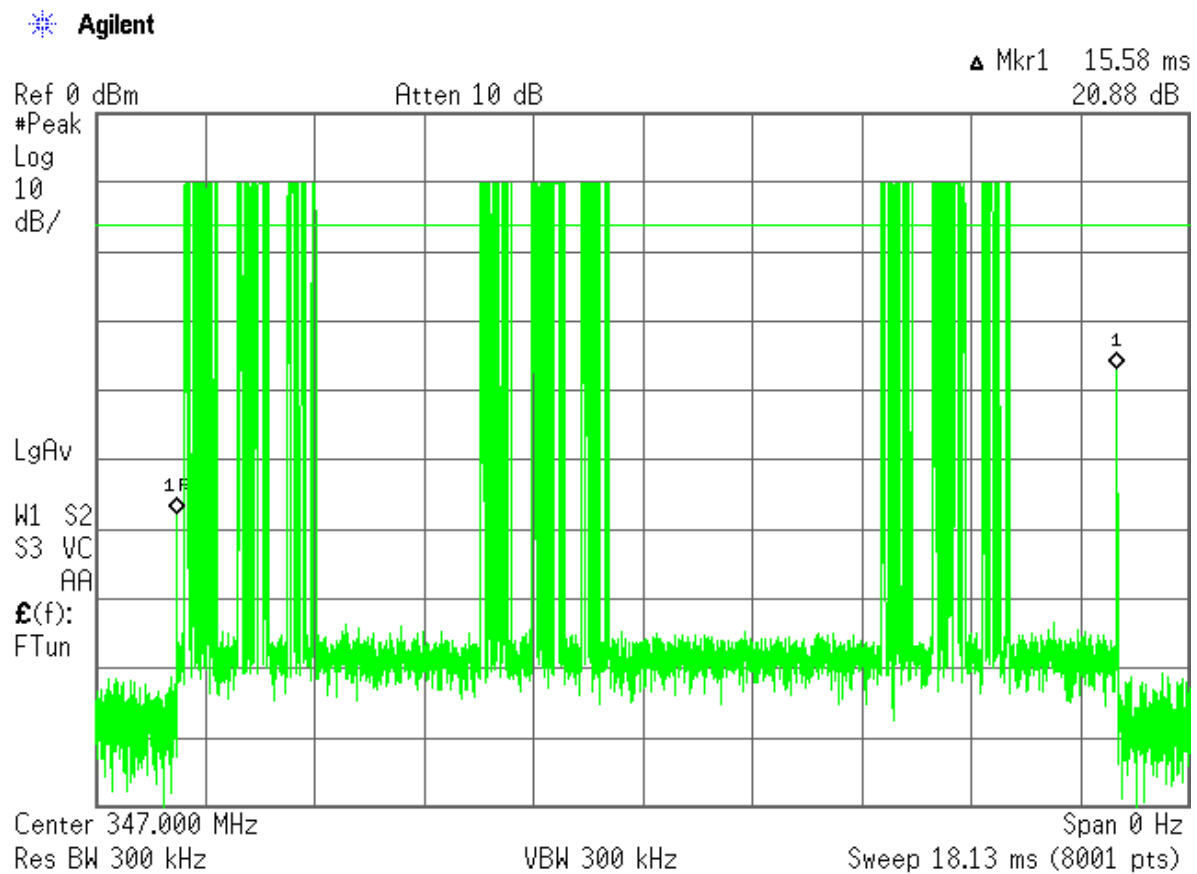
Holdover time after manual release[§15.231(a)(1)]

19 ms(Typical)

(Manufacturer designed)

The typical waveform in the time domain is indicated as follows:

Maximum level = -10.25 (dBm)
 Maximum Total On-time = 2.59 (msec)
 Peak-Average correction Factor = -15.59 (dB)



7.3 Antenna Conducted

For the requirements, ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable(Fix used)

For the limits, ☐ - Passed ☐ - Failed ☐ - Not judged

7.4 Frequency Stability

For the requirements, ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

For the limits, ☐ - Passed ☐ - Failed ☐ - Not judged

7.5 Occupied Bandwidth

For the requirements, ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.5.1 Worst Point and Measurement Uncertainty

The 99% Bandwidth is	<u>842.4</u>	kHz	at	<u>347.0</u>	MHz
The 20dB Bandwidth is	<u>424.5</u>	kHz	at	<u>340.0</u>	MHz

Uncertainty of Measurement Results +/- 0.9 %

Remarks : -20dBc minimum margin is 0.125 % at 340 MHz.

7.5.2 Test Site

KITA-KANSAI Testing Center

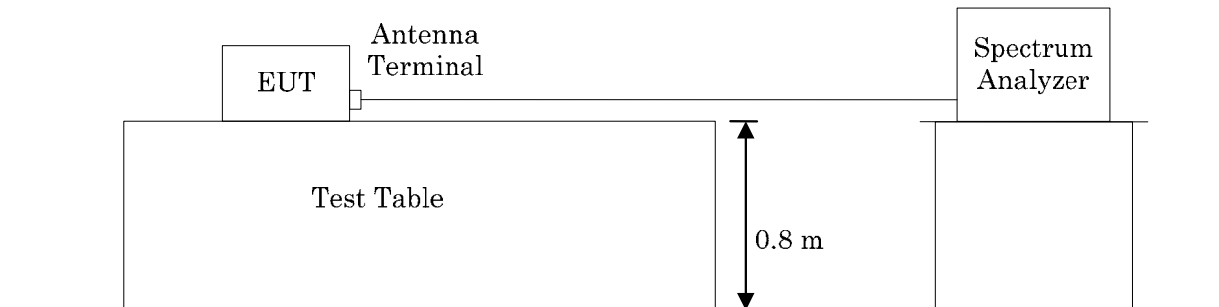
Test site : SAITO	<input type="checkbox"/> - Anechoic chamber (A1)	<input type="checkbox"/> - Measurement room (M1)
	<input type="checkbox"/> - Measurement room (M2)	<input type="checkbox"/> - Measurement room (M3)
	<input type="checkbox"/> - Shielded room (S1)	<input type="checkbox"/> - Shielded room (S2)
	<input type="checkbox"/> - Shielded room (S3)	<input checked="" type="checkbox"/> - Shielded room (S4)

7.5.3 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
RF Cable	SUCOFLEX102	SUHNER	C-52	2011/6	1 Year
Spectrum Analyzer	E4446A	Agilent	A-39	2011/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2011/9	1 Year

7.5.4 Test Method and Test Setup (Diagrammatic illustration)

The occupied bandwidth measurements were carried out. By using a spectrum analyzer , the measurements of the emission were made under the transmitting modes of the EUT. (referred documentation is No. G70364M)



7.5.5 Test Data

Test Date : June 26, 2012

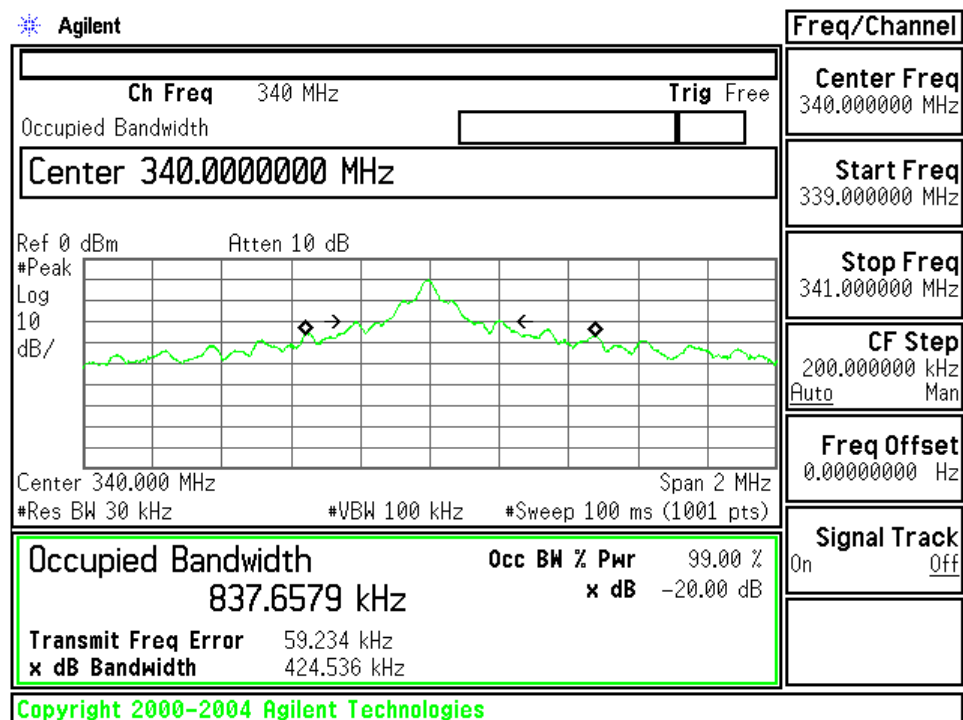
Temp.:28°C, Humi:50%

Mode of EUT: Tx Mode

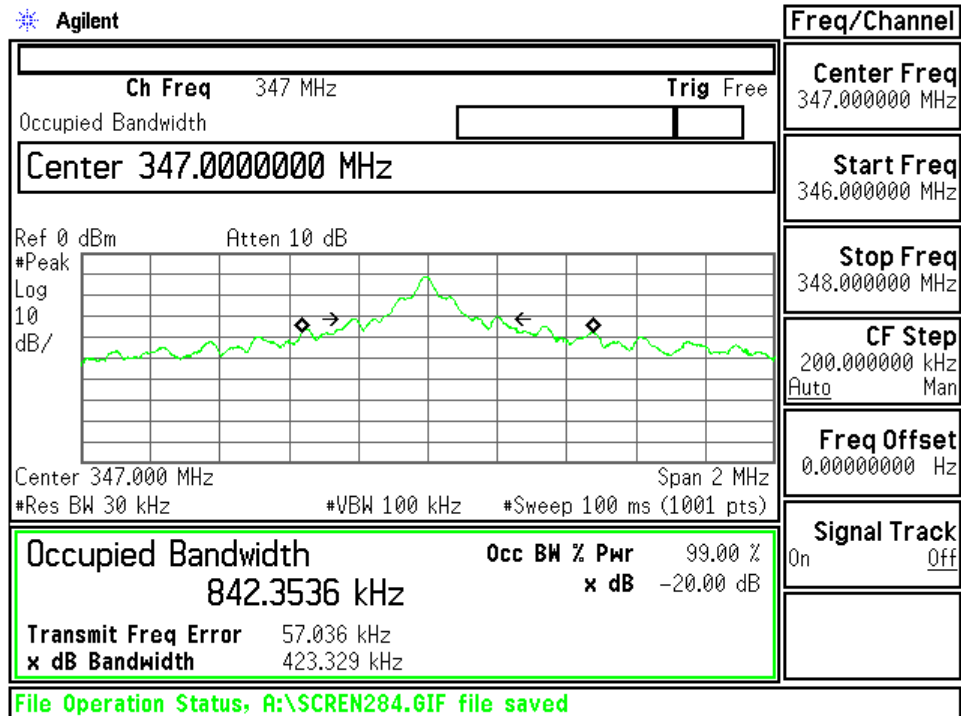
Test Port: Temporary antenna connector

Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth (kHz)	-20dBc Deviation (%)	-20dBc Limit (%)	Margin (%)
340.00	837.7	424.5	0.125	0.25	0.125
347.00	842.4	423.3	0.122	0.25	0.128
354.00	673.3	215.4	0.061	0.25	0.189

Low Channel



Middle Channel



High Channel

