EMI TEST REPORT

Test Report No. : 27HE0238-YK

Applicant	:	**HERUTU ELECTRONICS CORPORATION**
Type of Equipment	:	**POKAYOKE TRANSMITTER**
Model No.	:	**TWF-600T**
FCC ID	:	**T82TWF600T**
Test Standard	:	**FCC Part15 Subpart C Section 15.209, Section 15.231: 2006**
Test Result	:	**Complied**

1. This test report shall not be reproduced except in full, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: May 10, 2007

Tested by: T. Arai
Tatsuya Arai

Approved by: O. Watatani
Osamu Watatani
Manager of Yamakita EMC Lab.

UL Japan, Inc.
YAMAKITA EMC LAB.
907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone: +81 465 77 1011
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Table of Contents Page

1 Applicant Information

Company Name	:	HERUTU ELECTRONICS CORPORATION
Address	:	62-1 Toyooka-cho, Kita-ku, Hamamatsu-shi, Shizuoka-ken, 433-8103 JAPAN
Telephone Number	:	+81-53-438-3555
Facsimile Number	:	+81-53-438-3411
Contact Person	:	Masayuki Oishi

2 Product Description

Type of Equipment	:	POKAYOKE TRANSMITTER
Model No.	:	TWF-600T
Serial No.	:	Automatically deactivate: 001, Other test: 002
Rating	:	DC 3.0V
Country of Manufacture	:	Japan
Receipt Date of Sample	:	May 7, 2007
Condition of EUT	:	Production model
Modification of EUT	:	No modification by the test lab.

Model: TWF-600T (referred to as the EUT in this report) is a POKAYOKE TRANSMITTER which is composed of a fitting frame equipped with touch sensor and a radio transmitter.

Equipment type	:	Transmitter
Operation temperature range	:	0 ~ 50 deg. C.
Other clock frequency	:	5.0MHz (CPU)
Emission designation	:	F1D
Frequency of operation	:	426.100000MHz (multiple: ×6)
Crystal oscillation frequency	:	71.016666MHz
Modulation	:	FSK
Antenna type	:	Built to the foundation

FCC Part15.31 (e)
The EUT provides stable voltage, DC2.2V constantly to RF module regardless of input voltage, and the test was performed with the new battery. Therefore, the EUT complies with the power supply regulation.

FCC Part15.203 Antenna requirement
It is impossible for users to replace the antenna because the antenna is mounted inside the EUT. Therefore, the EUT complies with the antenna requirement.

3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2006
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.209 Radiated emission limits, general requirements
Section 15.231 Periodic operation in the band 40.66 - 40.70 MHz and above 70 MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Section 15.207(a)	AC Mains	N/A *1	-	N/A
Automatically Deactivate	ANSI C63.4: 2003	Section 15.231(a)(1)	Radiated	N/A	-	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.231(b)	Radiated	N/A	9.5dB (PK, Horizontal)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.209 *2	Radiated	N/A	7.8dB (1917.48MHz, AV, Vertical)	Complied
-20dB Bandwidth	ANSI C63.4: 2003 Annex H.6 Occupied bandwidth measurements	Section 15.231(c)	Radiated	N/A	-	Complied

*1) The test is not applicable since the EUT has no AC mains.
*2) For Spurious emission, Section 15.209 has been applied since the limit is stricter than in Section 15.231(b).
Note: UL Japan's EMI Work Procedures No.QPM05.

* Other than mentioned in 3.3, no addition, exclusion nor deviation has been made from the standard.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.4.1	RSS-Gen 4.4.1	Conducted	*See data.	Complied

3.4 Uncertainty

The measurement uncertainty (with a 95% confidence level) is as follows:

	No.1 open site	No.2 open site	No.1 anechoic chamber
Conducted emission			
150kHz-30MHz	2.8 dB	2.8 dB	2.8 dB
Radiated emission (3m)			
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB
1GHz<	5.7 dB	5.7 dB	5.7 dB
Radiated emission (10m)			
30-300MHz	4.5 dB	4.4 dB	-
300-1000MHz	4.1 dB	4.1 dB	-

Radiated Emission Test

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

3.5 Test Location

UL Japan, Inc. Yamakita EMC Lab.
907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN
Telephone number : +81 465 77 1011
Facsimile number : +81 465 77 2112
NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).
IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).
IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).
IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 EMS lab. (Semi-anechoic chamber)	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

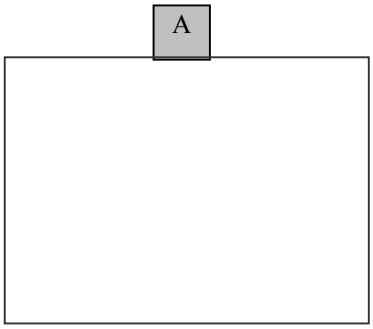
4 System Test Configuration

4.1 Justification

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

Test mode: Transmitting

4.2 Configuration of Tested System



* Test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number *1)	Manufacturer	FCC ID (Remarks)
A	POKAYOKE TRANSMITTER	TWF-600T	001 002	HERUTU ELECTRONICS CORPORATION	T82TWF600T (EUT)

*1) Automatically deactivate: 001, Other test: 002

5 Automatically deactivate

5.1 Operating environment

The test was carried out in No.2 open site.

5.2 Results

Limit: A manually transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Summary of the test results : Pass

Date : May 10, 2007 Test engineer : Tatsuya Arai

6 Radiated Emissions (Fundamental & Spurious)

6.1 Operating environment

The test was carried out in No.2 open site.

6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

6.3 Test conditions

Frequency range : 30 - 5000MHz
Test distance : 3m
EUT operation mode : Transmitting

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m. Pre check measurements were performed in a screened room with a search coil at 30-1000MHz to distinguish disturbances of EUT from the ambient noise.The measuring antenna height was varied between 1 and 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 vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	PK: BW 120kHz (Fundamental) QP: BW 120kHz (Spurious)	PK: RBW: 1MHz/VBW: 1MHz AV: RBW: 1MHz/VBW: 10Hz

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 13. With the position, the noise levels of all the frequencies were measured.

	Below 1GHz	Above 1GHz
Horizontal	X	Y
Vertical	Z	Z

6.5 Results

Summary of the test results : Pass

Date : May 10, 2007 Test engineer : Tatsuya Arai

7 Bandwidth

7.1 Operating environment

The test was carried out in No.2 open site.

7.2 Test procedure

The bandwidth was measured with a spectrum analyzer and an antenna which is placed by the EUT.

7.3 Results

Summary of the test results : Pass

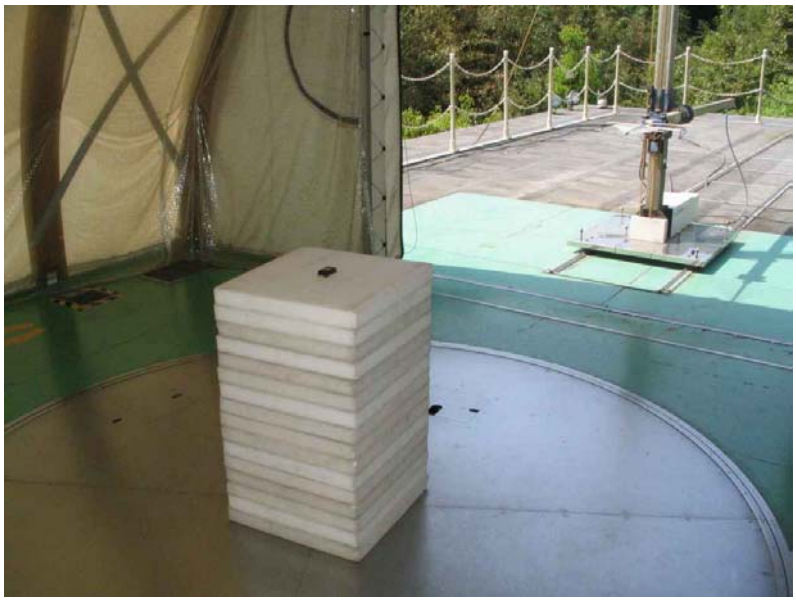
Date : May 10, 2007 Test engineer : Tatsuya Arai

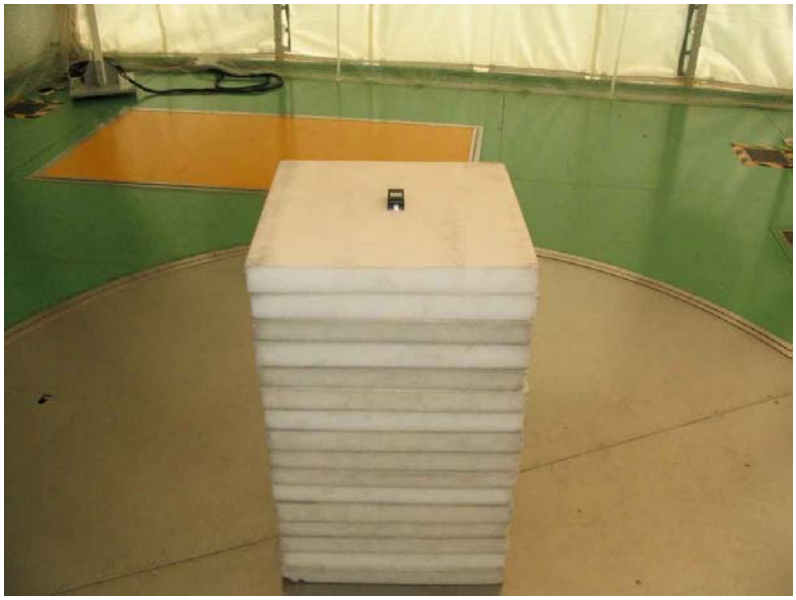
APPENDIX 1: Photographs of test setup

APPENDIX 2: Test Data

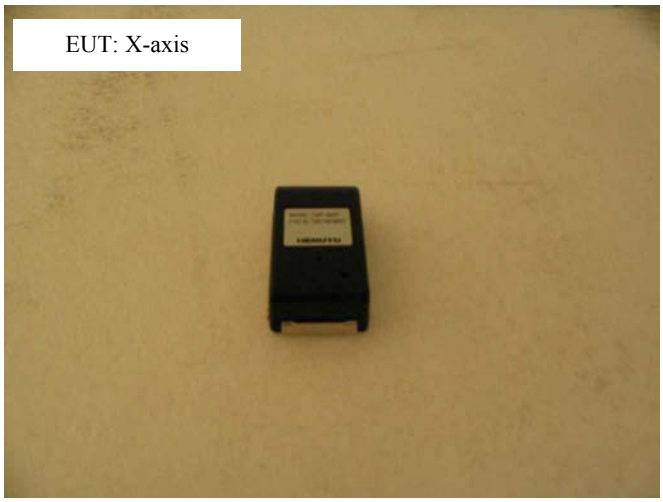
APPENDIX 3: Test instruments

Radiated emission





Pre-check of worst position

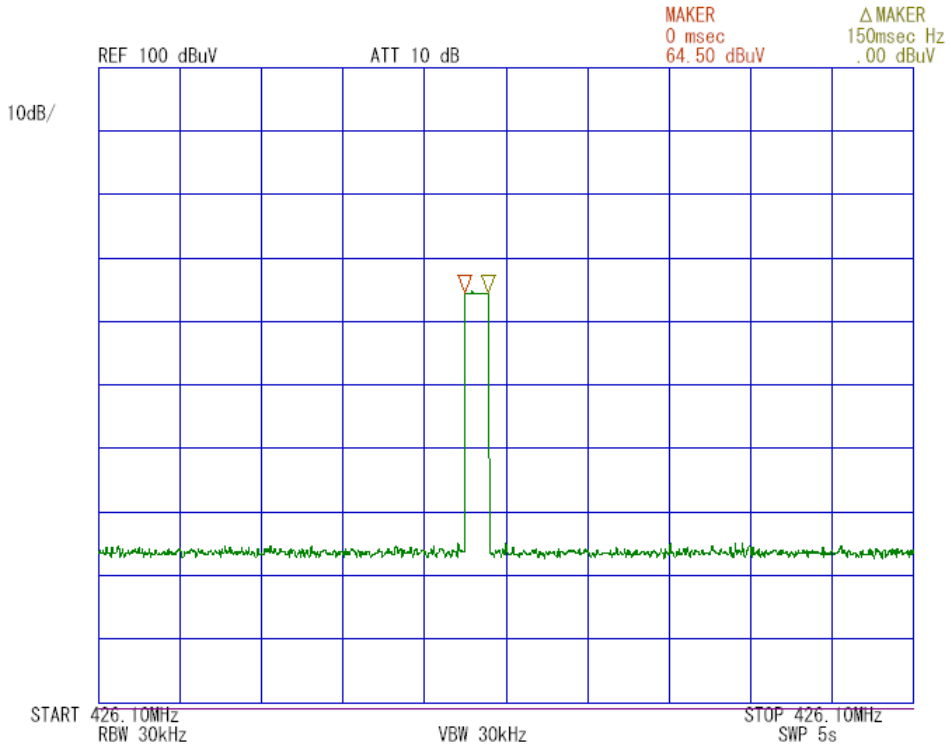


Automatically deactivate: FCC 15.231(a)(1)

UL Japan, Inc. Yamakita No.2 OPEN TEST SITE

COMPANY	: HERUTU ELECTRONICS CORPORATION	REPORT NO	: 27HE0238-YK
EQUIPMENT	: POKAYOKE TRANSMITTER	REGULATION	: Fcc Part15SubpartC 231(a)(1)
MODEL NUMBER	: TWF-600T	DATE	: 2007/05/10
SERIAL NUMBER	: 001	TEMP./HUMI	: 23℃/52%
FCC ID	: T82TWF600T	TEST MODE	: Transmitting
POWER	: DC3V	ENGINEER	: Tatsuya Arai

Time of Transmitting [sec]	Limit [sec]
0.15	5.00



Electric Field Strength of Fundamental

UL Japan, Inc.
YAMAKITA NO.2 OPEN TEST SITE
Report No. : 27HE0238-YK

Company : HERUTU ELECTRONICS CORPORATION
Equipment : POKAYOKE TRANSMITTER
Model : TWF-600T
Sample No. : 002
Power : DC3V
Mode : Transmitting
FCC ID : T82TWF600T
Remark : -

Regulation : FCC Part15C Section 15.231(b)
Test Distance : 3m
Date : 2007/5/10
Temperature : 23deg.C
Humidity : 53%

ENGINEER : Tatsuya Arai

Fundamental : PK DETECT(Test Receiver : IF BW 120kHz)

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	426.10	71.3	70.9	17.6	28.4	4.6	6.0	71.1	70.7	80.6	9.5	9.9

Sample Calculation :
RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss + ATT

DATA OF RADIATION TEST

UL Japan, Inc.
YAMAKITA No.2 OPEN TEST SITE
Report No.: 27HE0238-YK

Applicant	:	HERUTU ELECTRONICS CORPORATION	
Kind of Equipment	:	POKAYOKE TRANSMITTER	
Model No.	:	TWF-600T	
Serial No.	:	002	
Power	:	DC3.0V	
Mode	:	Transmitting	
Remarks	:	-	
Date	:	5/10/2007	
Test Distance	:	3 m	
Temperature	:	23 ℃	Engineer : Tatsuya Arai
Humidity	:	52 %	
Regulation	:	FCC Part15C §15.209	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	71.01	BB	27.5	27.4	6.1	27.9	1.7	6.0	13.4	13.3	40.0	26.6	26.7
2.	213.07	BB	31.0	26.0	16.6	27.4	3.1	6.0	29.3	24.3	43.5	14.2	19.2
3.	355.10	BB	24.1	25.3	15.9	27.7	4.1	6.0	22.4	23.6	46.0	23.6	22.4
4.	497.12	BB	24.4	25.3	17.7	28.7	4.9	6.0	24.3	25.2	46.0	21.7	20.8
5.	852.21	BB	25.3	27.6	21.6	28.7	6.7	6.0	30.9	33.2	46.0	15.1	12.8
6.	994.24	BB	24.2	24.8	23.1	28.3	7.3	6.0	32.3	32.9	54.0	21.7	21.1

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KBA-02(BBA9106)30-299MHz/KLA-02(USLP9143)300-1000MHz
■AMP:KAF-03(8447D) ■RECEIVER:KTR-04(ESVS10) ■CABLE:KCC-20/21/22/23/29

DATA OF RADIATION TEST

UL Japan, Inc.
YAMAKITA No.2 OPEN TEST SITE
Report No.: 27HE0238-YK

Applicant	:	HERUTU ELECTRONICS CORPORATION	
Kind of Equipment	:	POKAYOKE TRANSMITTER	
Model No.	:	TWF-600T	
Serial No.	:	002	
Power	:	DC3.0V	
Mode	:	Transmitting	
Remarks	:	AV (RBW: 1MHz, VBW: 10Hz)	
Date	:	5/10/2007	
Test Distance	:	3 m	
Temperature	:	23 ℃	Engineer : Tatsuya Arai
Humidity	:	52 %	
Regulation	:	FCC Part15C §15.209(AV Detection)1-26GHz:3m/26-40GHz:1m	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1065.25	BB	42.1	43.9	24.9	36.5	3.1	0.0	33.6	35.4	54.0	20.4	18.6
2.	1278.30	BB	46.3	50.7	25.3	36.2	3.4	0.0	38.8	43.2	54.0	15.2	10.8
3.	1704.40	BB	45.7	47.4	26.2	35.6	3.8	0.0	40.1	41.8	54.0	13.9	12.2
4.	1917.48	BB	48.5	50.9	26.6	35.3	4.0	0.0	43.8	46.2	54.0	10.2	7.8
5.	2130.50	BB	39.0	38.9	26.9	35.3	4.3	0.0	34.9	34.8	54.0	19.1	19.2
6.	2343.63	BB	40.5	42.1	27.2	35.5	4.7	0.0	36.9	38.5	54.0	17.1	15.5
7.	2556.60	BB	37.8	38.9	27.6	35.8	5.1	0.0	34.7	35.8	54.0	19.3	18.2
8.	2982.70	BB	32.3	38.0	28.3	36.3	5.4	0.0	29.7	35.4	54.0	24.3	18.6
9.	3408.80	BB	30.8	31.2	28.8	36.1	5.6	0.0	29.1	29.5	54.0	24.9	24.5
10.	3834.90	BB	29.7	29.6	29.5	35.8	6.3	0.0	29.7	29.6	54.0	24.3	24.4
11.	4261.00	BB	29.9	29.7	30.4	35.9	6.6	0.0	31.0	30.8	54.0	23.0	23.2

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-04(8449B) ■SPECTRUM ANALYZER:KSA-02 ■CABLE:KCC-D14/D15

DATA OF RADIATION TEST

UL Japan, Inc.
YAMAKITA No.2 OPEN TEST SITE
Report No.: 27HE0238-YK

Applicant	:	HERUTU ELECTRONICS CORPORATION	
Kind of Equipment	:	POKAYOKE TRANSMITTER	
Model No.	:	TWF-600T	
Serial No.	:	002	
Power	:	DC3.0V	
Mode	:	Transmitting	
Remarks	:	PK (RBW: 1MHz, VBW: 1MHz)	
Date	:	5/10/2007	
Test Distance	:	3 m	
Temperature	:	23 ℃	Engineer : Tatsuya Arai
Humidity	:	52 %	
Regulation	:	FCC Part15C §15.209(PK Detection)1-26GHz:3m/26-40GHz:1m	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	1065.25	BB	48.3	49.4	24.9	36.5	3.1	0.0	39.8	40.9	74.0	34.2	33.1
2.	1278.30	BB	51.9	53.1	25.3	36.2	3.4	0.0	44.4	45.6	74.0	29.6	28.4
3.	1704.40	BB	49.8	51.1	26.2	35.6	3.8	0.0	44.2	45.5	74.0	29.8	28.5
4.	1917.48	BB	51.6	53.3	26.6	35.3	4.0	0.0	46.9	48.6	74.0	27.1	25.4
5.	2130.50	BB	46.1	46.5	26.9	35.3	4.3	0.0	42.0	42.4	74.0	32.0	31.6
6.	2343.63	BB	47.1	47.8	27.2	35.5	4.7	0.0	43.5	44.2	74.0	30.5	29.8
7.	2556.60	BB	45.4	45.9	27.6	35.8	5.1	0.0	42.3	42.8	74.0	31.7	31.2
8.	2982.70	BB	43.1	45.3	28.3	36.3	5.4	0.0	40.5	42.7	74.0	33.5	31.3
9.	3408.80	BB	42.0	42.4	28.8	36.1	5.6	0.0	40.3	40.7	74.0	33.7	33.3
10.	3834.90	BB	41.3	40.9	29.5	35.8	6.3	0.0	41.3	40.9	74.0	32.7	33.1
11.	4261.00	BB	41.9	41.4	30.4	35.9	6.6	0.0	43.0	42.5	74.0	31.0	31.5

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

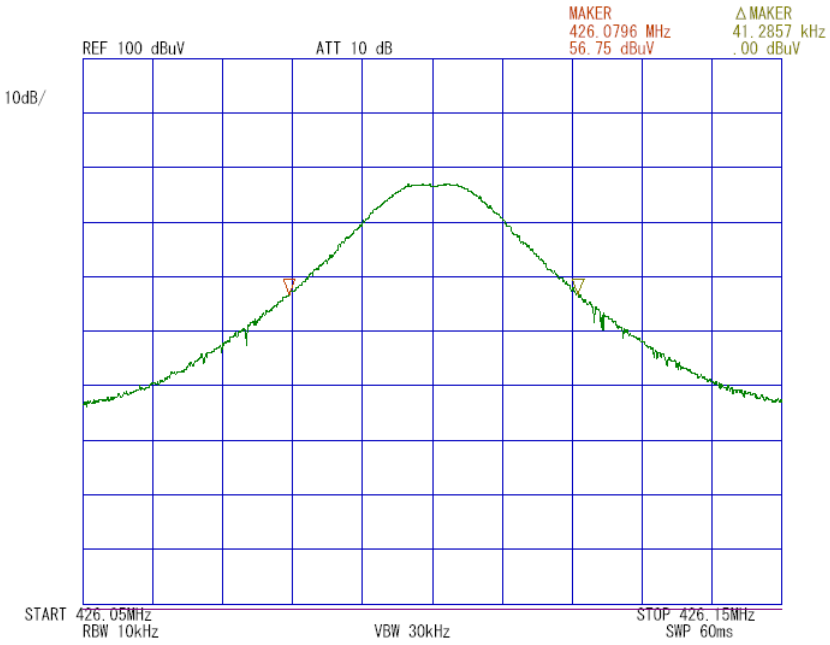
■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-04(8449B) ■SPECTRUM ANALYZER:KSA-02 ■CABLE:KCC-D14/D15

20dB Bandwidth: FCC 15.215(c)

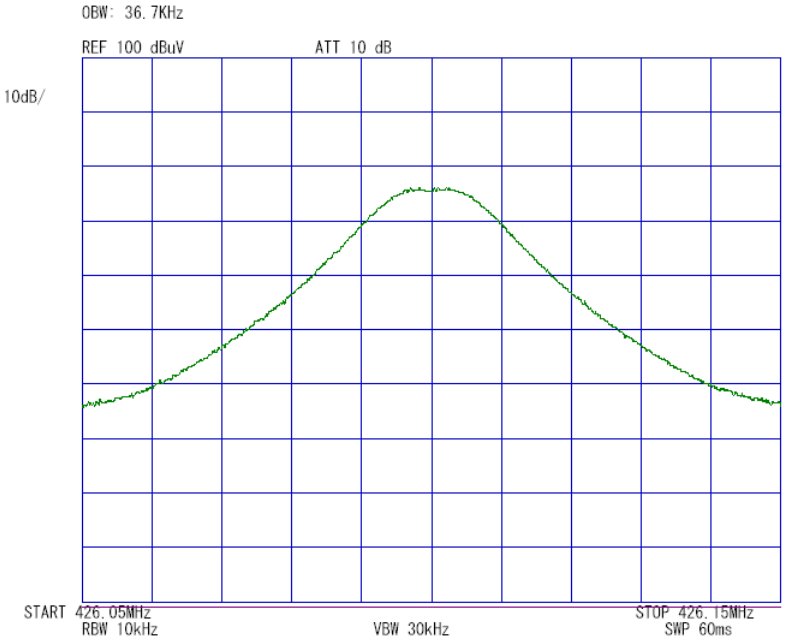
UL Japan, Inc. Yamakita NO.2 OPEN TEST SITE

COMPANY	: HERUTU ELECTRONICS CORPORATION	REPORT NO	: 27HE0238-YK
EQUIPMENT	: POKAYOKE TRANSMITTER	REGULATION	: Fcc Part15SubpartC 215(c)
MODEL NUMBER	: TWF-600T	DATE	: 2007/05/10
SERIAL NUMBER	: 002	TEMP./HUMI	: 23℃/52%
FCC ID	: T82TWF600T	TEST MODE	: Transmitting
POWER	: DC3V	ENGINEER	: Tatsuya Arai
Remarks	:		

20dB Bandwidth:41.29kHz



OBW(99%): 36.7kHz



APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
YA-RE	Radiated emission(software)	UL Japan	RE(Ver.1.5)	RE	-
KAF-03	Pre Amplifier	Hewlett Packard	8447D	RE	2006/09/26 * 12
KAT6-04	Attenuator	INMET	18N-6dB	RE	2007/03/28 * 12
KBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/07/22 * 12
KCC-20/21/22/23/29/KRM-02	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	8D-2W/12D-SFA/S04272B/S04272B/RFM-E321	RE	2006/09/22 * 12
KLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/07/22 * 12
KOTS-02	Open Test Site	JSE	10m	RE	2006/08/05 * 12
KOS-06	Humidity Indicator	Custom	CTH-190	RE	2006/07/14 * 24
KSA-02	Spectrum Analyzer	Advantest	R3265A	RE/BW/AD	2006/12/02 * 12
KTR-04	Test Receiver	Rohde & Schwarz	ESVS10	RE	2006/10/26 * 12
KJM-04	Measure	TAJIMA	GL19-55	RE	-
KAF-04	Pre Amplifier	Agilent	8449B	RE	2007/04/24 * 12
KCC-D14/D15	Coaxial cable	Suhner	SUCOFLEX 104	RE	2006/12/13 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2007/04/14 * 12
KSCA-02	Search coil	TSJ	SC01	BW/AD	Pre Check
KCC-B2	Coaxial Cable/Pulse Limitter/RF Relay Matrix	Fujikura/Suhner/PMM/TSJ	5D-2W/S04272B/5D-2W/S04272B/PL01/RFM-E321	BW/AD	2006/09/22 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
Test Item:
RE: Radiated emission,
BW: Bandwidth
AD: Automatically deactivate