FCC/IC TEST REPORT

Reference No. : **G-44-2013-00364**

Applicant : **SEJIN ELECTRON INC.**

Equipment Under Test (EUT) :

Product Name : USB Dongle

Model Name : SWR-311U

(Alt.Model : SMT-WI100)

Applied Standards : **FCC Part 15 : 2010, Subpart B, Class B**

ANSI C63.4 : 2009

CISPR 22 : 2006

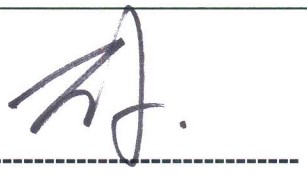
ICES-003 Issue 4 : 2004

Date of Receipt : **February 5, 2013**

Date of Test : **April 10, 2013**

Date of Issue : **April 10, 2013**

Test Results : **Complied**

Tested by : 

Hyunju Lee

Reviewed by : 

Julia Choi

Remarks :

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm.

Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested *and such sample(s) are retained for 90 days only.*

Contents

1. General Information

1.1 Client Information

Applicant	: SEJIN ELECTRON INC.
Address of Applicant	: 414-4F, SJ TECHNOVILE, 60-19, Gasan-dong, Geumchon-gu, Seoul, Korea. 153-796
Manufacturer	: SEJIN ELECTRON INC.
Address of Manufacturer	: 414-4F, SJ TECHNOVILE, 60-19, Gasan-dong, Geumchon-gu, Seoul, Korea. 153-796

1.2 Test Laboratory

Name and Address	: SGS Korea Co., Ltd.(Yongin) 705, Dongchun-Dong, Suji-Gu, Yongin-City, Gyeonggi-Do, Korea 449-840
FCC Registration No.	: 90734
IC Company No.	: 4620D
Name and Address	: SGS Korea Co., Ltd.(Giheung) 413-15, Gomae-Dong, Giheung-Gu, Yongin-City, Gyeonggi-Do, 446-901, Korea
FCC Registration No.	: 656853
IC Company No.	: 7837A

Phone	: + 82 31 263 0409
Fax	: + 82 31 263 0454
e-mail	: Julia.choi@sgs.com

1.3 General Information of E.U.T.

Product Name	USB Dongle
Model Name	SWR-311U
Add Model Name	SMT-WI100
Serial No.	-
Hardware Version	-
Software Version	-
EMI Classification	Class B
Highest Internal Frequency	2405~2480 ㎒
Frequency Range	-
Modulation	-
Bandwidth	-
Power	AA Battery 1.5 V 2EA:3 V
I/O Ports	USB
Functions	control the windows system by receiving 2.4 ㎓ wireless
Rated Voltage	-
Battery	-
Test Voltage	-
Antenna	-
Exclusion Bands	-
SRD Classification	-
3G module inside	-
WiFi module inside	-
Bluetooth inside	-

.

1.4 Alternative models

Model name	Information
SWR-311U	-Basic model -Used with SWP-2011MP(Remote Control)
SMT-WI100	-Sample to basic model but it is different below -Used with SMT-400R (Remote Control) derived from SWP-2011MP

Note

- Two models' design are identical.
- Software change only for pairing with different remote control.

1.5 Operating Modes and Conditions

Operating mode	Operating condition
-	control the windows system by receiving 2.4 GHz wireless

1.6 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
LCD Monitor	M2362D	103KCKJ49453	LG Electoronic
HUB	Ethernet Hub8	-	3 COM
Remote Control	SWP-2011MP	-	SEJIN ELECTRON INC.
USB Dongle	SWR-311U	-	SEJIN ELECTRON INC.
Notebook Computer	T410	-	Lenovo(Singapore) Pte.Ltd.

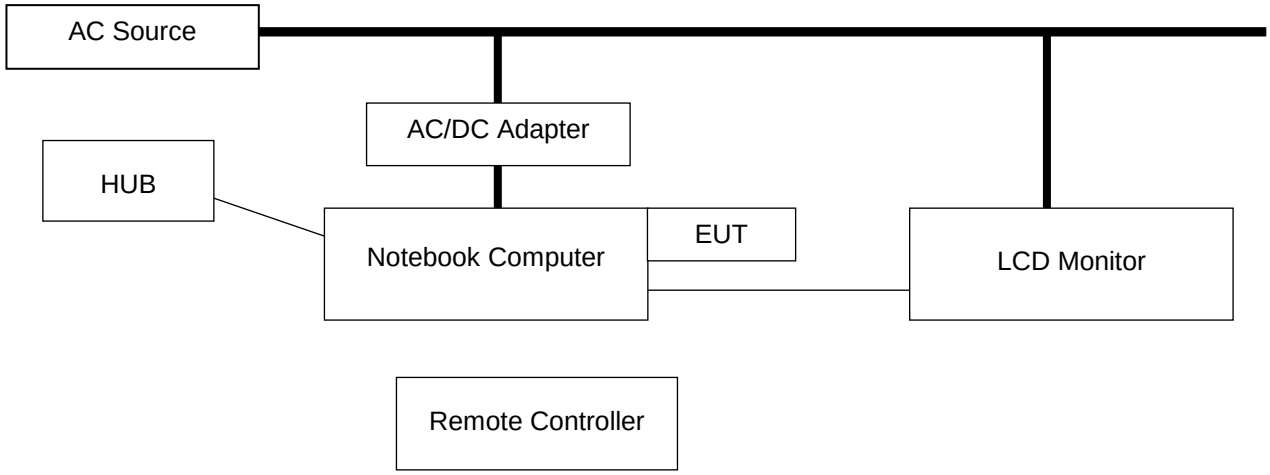
1.7 Cable List

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	USB	Notebook Computer	USB	-	-
Notebook Computer	USB	EUT	USB	-	-
	LAN	HUB	-	3.0	Unshielded
	RGB	LCD Monitor	RGB	1.8	Shielded
	DC IN	AC/DC Adapter	DC OUT	1.5	Unshielded
AC/DC Adapter	DC OUT	Notebook Computer	DC IN	1.5	Unshielded
	AC IN	AC Source	-	1.6	Unshielded

1.8 System Configurations

Description	Model	Serial No.	Manufacturer
MAIN BOARD	SWR-311U REV 0.4	-	SEJIN ELECTRON

1.9 Test System Layout



1.10 Modifications

There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : 2010, Subpart B ICES-003 Issue 4 : 2004	Applicable	No Deviation

1.11 Summary of Test Results

.Test Item	Basic Standards	Results
Conducted Emission	ANSI C63.4 : 2009	Complied
Radiated Emission	ANSI C63.4 : 2009	Complied

EMISSION

2.1 Test Results

Test Items	Basic Standards	Test Results
Conducted disturbance at mains terminal	ANSI C63.4 : 2009	**Complied**
Radiated disturbance	ANSI C63.4 : 2009	**Complied**

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 ㎒ ~ 30 ㎒	9 ㎑	N/A
Radiated Emission	30 ㎒ ~ 1 ㎓	120 ㎑	10 ㎙ & 3 ㎙
	Above 1 ㎓	1 ㎒	3 ㎙

Note : 10 m method of radiated emission measurement is only applied to Class A equipment over the frequency range of 30 ㎒ ~ 1 ㎓. Except this, 3 m method is applied to Class B equipment over the frequency range of 30 ㎒ ~ 1 ㎓ and Class A and Class B equipment above 1 ㎓.

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(㏈(㎶))		Class
	Quasi-peak	Average	
0.15 ㎒ ~ 0.5 ㎒	79	66	**Class A**
0.5 ㎒ ~ 30 ㎒	73	60	
0.15 ㎒ ~ 0.5 ㎒	66 to 56	56 to 46	**Class B**
0.5 ㎒ ~ 5 ㎒	56	46	
5 ㎒ ~ 30 ㎒	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒.

-Radiated Emission Limits below 1 ㎓

Frequency Range	Limits(dB(㎶/m))	Class
	Quasi-peak	
30 ㎒ ~ 88 ㎒	39.1	**Class A**
88 ㎒ ~ 216 ㎒	43.5	
216 ㎒ ~ 960 ㎒	46.4	
960 ㎒ ~ 1 ㎓	49.5	
30 ㎒ ~ 88 ㎒	40	**Class B**
88 ㎒ ~ 216 ㎒	43.5	
216 ㎒ ~ 960 ㎒	46	
960 ㎒ ~ 1 ㎓	54	

-Radiated Emission Limits above 1 ㎓

Frequency Range	Limits(dB(㎶/m))		Class
	Average	Peak	
Above 1 ㎓	60	80	**Class A**
Above 1 ㎓	54	74	**Class B**

Note : The limits of class A equipment is extrapolated using an extrapolation factor of 20 dB/decade because it was measured at 3m distance not 10m distance.

2.3 Conducted Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 ㎒ to 30 ㎒) using a max hold mode incorporating a Peak detector and Average detector and using the software of ESxS-K1(Version V2.12 from R&S). The final test data was measured using a Quasi-Peak detector and Average detector.

2.3.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Test Receiver	ESS	ROHDE&SCHWARZ	847151/001	2012.06.22
LISN	ENV216	ROHDE&SCHWARZ	101120	2013.01.03
Shielded Room	-	DAEIL EMC	-	-

2.3.2 Test Site

Shield Room in Yongin Laboratory

2.3.3 Environment Conditions and data

- Test Data of Conducted disturbance at mains terminal

Temperature : 21.8 ℃ ~ 21.9 ℃
Humidity : 32.0 %R.H. ~ 33.0 .H.
Atmospheric Pressure : 99.7
Test Date : April 10, 2013

Freq.	Line	Level (dBμV)		CL	LISN	Result (dBμV)		Limit (dBμV)		Margin (dB)	
(MHz)	(H/N)	Q/P	A/V	(dB)	(dB)	Q/P	A/V	Q/P	A/V	Q/P	A/V
0.19	N	39.20	21.80	0.55	0.10	39.85	22.45	64.04	54.04	24.19	31.59
0.23	N	41.10	31.70	0.55	0.10	41.75	32.35	62.45	52.45	20.70	20.10
0.71	N	40.00	23.50	0.55	0.10	40.65	24.15	56.00	46.00	15.35	21.85
0.78	N	40.10	24.00	0.55	0.10	40.75	24.65	56.00	46.00	15.25	21.35
0.85	N	39.50	26.60	0.55	0.10	40.15	27.25	56.00	46.00	15.85	18.75
22.60	N	38.90	34.00	0.77	0.40	40.07	35.17	60.00	50.00	19.93	14.83
0.19	H	35.50	24.10	0.55	0.10	36.15	24.75	64.04	54.04	27.89	29.29
0.23	H	41.00	31.90	0.55	0.10	41.65	32.55	62.45	52.45	20.80	19.90
0.71	H	40.30	26.00	0.55	0.10	40.95	26.65	56.00	46.00	15.05	19.35
0.78	H	40.20	25.80	0.55	0.10	40.85	26.45	56.00	46.00	15.15	19.55
0.85	H	38.90	27.60	0.55	0.10	39.55	28.25	56.00	46.00	16.45	17.75
22.60	H	38.30	33.50	0.67	0.40	39.37	34.57	60.00	50.00	20.63	15.43

Measurement Uncertainty : : ± 3.42 dB (The confidential level is about 95%, *k*=2)

Note : • Line (H) : Hot • Line (N) : Neutral
• C/L: Cable Loss • LISN : LISN Factor
• Result = Level + CL + LISN • Margin = Limit – Result

See Appendix A (Test Data of Hot Line)
See Appendix B (Test Data of Neutral Line)

2.4 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(30 ㎒ to 1 ㎓) using a max hold mode incorporating a Peak detector. The final test data was measured using a Quasi-Peak detector below 1 ㎓. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

2.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Test Receiver	ESVS 30	Rohde & Schwarz	829673/010	2013.01.17
Bilog Antenna	CBL6112D	TESEQ	25232	2011.05.13
Open Site	-	K.E.S	-	2013.02.28
RF Select S/W	CX-210N	DIAMOND Antenna	-	-
RF Amplifier	8447F	HEWLETT PACKARD	1937A00754	2012.09.03
EMI TEST RECEIVER	ESU8	R&S	100128	2012.05.31
DOUBLE-RIDGED	HF906	R&S	100564	2011.06.13
PREAMPLIFIER	AFS42-0010180025-S-42	MITEQ	900699	2012.07.07

Note : Only the calibration period of Antennas is 2 years but the period of every equipment is 1 year.

2.4.2 Test Site

10 m Open Area Test Site in Yongin Laboratory

3 m Chamber in Giheung Laboratory

2.4.3 Environment Conditions and data

Below 1 GHz (10 m method)

Temperature : 8.7 ℃ ~ 8.8 ℃
Humidity : 24.0 %R.H. ~ 25.0 %R.H.
Atmospheric Pressure : 99.7 kPa

Test Date : April 10, 2013

Freq. (MHz)	Level (dBμV)	Pol. (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
128.30	35.60	V	184.0	1.28	11.60	1.64	25.59	23.25	43.50	20.25
218.78	36.40	V	128.0	1.50	11.05	2.18	25.26	24.37	46.00	21.63
263.81	33.40	H	341.0	3.46	13.59	2.38	25.17	24.20	46.00	21.80
272.36	35.50	V	230.0	1.59	13.69	2.43	25.16	26.46	46.00	19.54
369.60	36.10	V	293.0	1.87	15.88	2.95	25.66	29.27	46.00	16.73
503.67	34.70	H	145.0	2.88	19.44	3.62	26.51	31.25	46.00	14.75

Measurement Uncertainty *U* = ± 3.90 dB (The confidential level is about 95%, *k*=2)

Note:
- AF = Antenna Factor
- CL = Cable Loss
- F/S = Field Strength
- Pol.(H) = Horizontal
- Pol.(V) = Vertical
- Amp. = Amplifier Gain
- Margin = Limit – F/S
- F/S = Level + AF + CL – Amp.
- A : Angle
- H : Height

Above 1 GHz (3 m method)

Temperature : 21.3 ℃ ~ 21.4 ℃
Humidity : 33.0 %R.H. ~ 34.0 %R.H.
Atmospheric Pressure : 100.1 kPa
Test Date : April 10, 2013

Frequency (MHz)	MaxPeak (dB μ V/m	Average (dB μ V/m	Bandwidth (kHz)	Height (cm)	Polariz ation	Azimuth (deg)	Corr. (dB)	Limit (dB μ V/m)	
								Peak	Average
1205.514639	38.0	22.8	1000.000	100.0	H	90.0	-9.6	74	54
1599.618489	43.2	24.4	1000.000	100.0	H	186.0	-7.6	74	54
1227.399334	39.8	23.5	1000.000	100.0	V	121.0	-9.5	74	54
1580.000000	39.4	26.0	1000.000	100.0	V	85.0	-7.8	74	54
1693.500000	42.2	31.2	1000.000	100.0	V	139.0	-7.1	74	54

Measurement Uncertainty *U* = ± 3.90 dB (The confidential level is about 95%, *k*=2)

See Appendix C (Test Data of Horizontal polarization)
See Appendix D (Test Data of Vertical polarization)

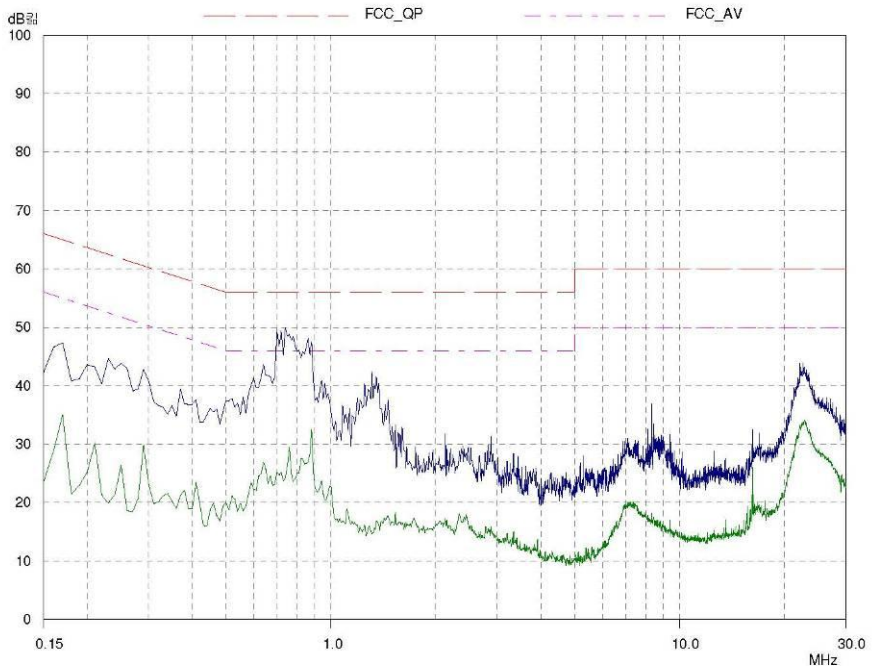
Appendix A : Mains Terminal Continuous Disturbance Voltage Test Data

SEJIN ELECTRON INC.
SWR-311U

EUT:	USB Dongle
Manuf:	SEJIN ELECTRON INC.
Op Cond:	HOT
Operator:	H.J.LEE
Test Spec:	FCC
Comment:	

Result File: 364H.dat : New Measurement

Prescan Measurement:	Detectors:	X PK / + AV
	Meas Time:	see scan settings
	Peaks:	8
	Acc Margin:	50 dB

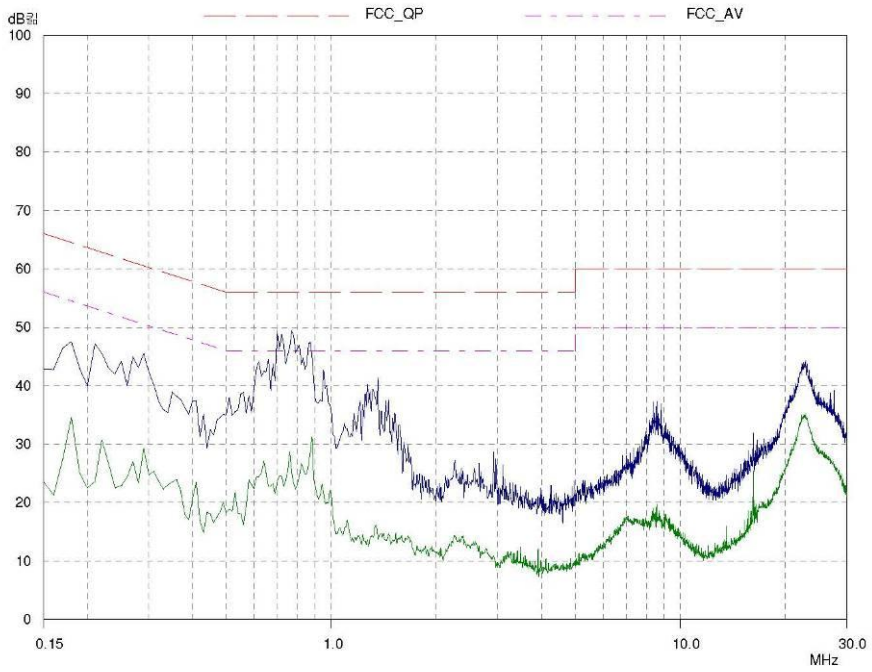


Appendix B : Mains Terminal Continuous Disturbance Voltage Test Data

SEJIN ELECTRON INC.
SWR-311U

EUT:	USB Dongle
Manuf:	SEJIN ELECTRON INC.
Op Cond:	NEUTRAL
Operator:	H.J.LEE
Test Spec:	FCC
Comment:	
Result File:	364N.dat : New Measurement

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	100msec
	Peaks:	8
	Acc Margin:	50 dB



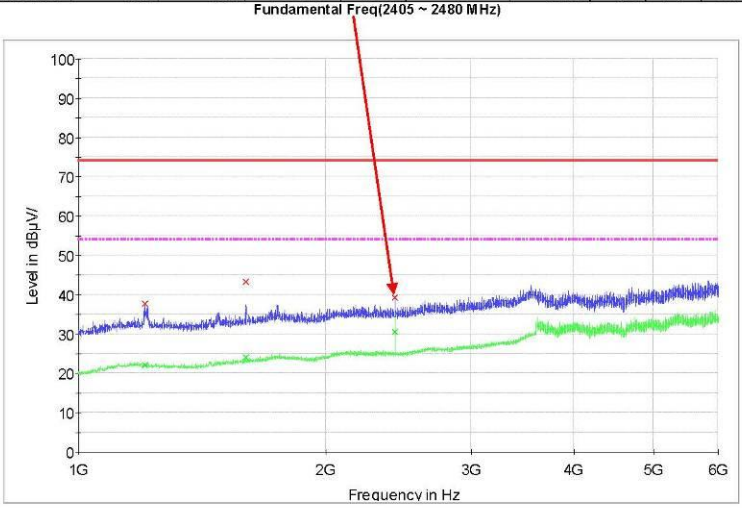
Appendix C : Radiated Emission Test Data (3 m method above 1 ㎓)

Test Report

Common Information
SEJIN ELECTRON INC.
SWR-311U
EUT : USB Dongle
Manuf : SEJIN ELECTRON INC.
Op Cond : H
Operator : H.J.LEE
Test Spec : FCC
MODE :

Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	
								Peak	Aver
1205.514639	38.0	22.8	1000.000	100.0	H	90.0	-9.6	74	54
1599.618489	43.2	24.4	1000.000	100.0	H	186.0	-7.6	74	54



Appendix D : Radiated Emission Test Data (3 m method above 1 ㎓)

Test Report

Common Information
SEJIN ELECTRON INC.
SWR-311U
EUT : USB Dongle
Manuf : SEJIN ELECTRON INC.
Op Cond : V
Operator : H.J.LEE
Test Spec : FCC
MODE :

Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	
								Peak	Aver
1227.399334	39.8	23.5	1000.000	100.0	V	121.0	-9.5	74	54
1580.000000	39.4	26.0	1000.000	100.0	V	85.0	-7.8	74	54
1693.500000	42.2	31.2	1000.000	100.0	V	139.0	-7.1	74	54