

# TEST REPORT

For

## Bluetooth device evaluation board

In conformity with

### FCC CFR 47 Part15 Subpart C

#### Product Marketing Name(PMN)

: SAPPHIRE-680FSG  
SAPPHIRE-681FSG

#### Hardware Version Identification Number(HVIN)

: SAPPHIRE-68XFSG

**FCC ID** : 2AKW4-68XFSG

**Report No.** : WE180621BD1-11

**Issue Date** : July 26, 2018

#### Prepared for

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## History

Report No.	Date	Revisions	Issued By
WE180621BD1-11	July 26, 2018	Initial Issue	T.Yonemura

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## 1 General information

### 1.1 Product description

Test item	: Bluetooth device evaluation board
Manufacturer	: SENSYST Co., Ltd.
Address	: 7F, Masuni Daiichi BLDG, 2-4-6, Shinyokohama, Kohoku-ku, Yokohama, Kanagawa 222-0033 Japan
Product Marketing Name(PMN)	: SAPPHIRE-680FSG SAPPHIRE-681FSG
Hardware Version Identification Number(HVIN)	: SAPPHIRE-68XFSG
FCC ID	: 2AKW4-68XFSG
Serial number	: A060002 (SAPPHIRE-680FSG) A070002 (SAPPHIRE-681FSG)
Hardware version	: 1.00
Software version	: 1.00
Operating frequency	: 2402 - 2480 MHz
Modulation	: GFSK
Antenna Gain	: 2.65 dBi
Receipt date of EUT	: June 21, 2018
Nominal power source voltages	: DC 5.0 V or DC 2.5 V

Similar model : This EUT has similar model.

Product Marketing Name(PMN)	Note
SAPPHIRE-680FSG	Tested Flash memory: Not include on RF chip
SAPPHIRE-681FSG	Tested Flash memory: Included on RF chip

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## 1.2 Test(s) performed/ Summary of test result

Test specification(s) : FCC CFR 47 Part 15 Subpart C (01 Oct. 2017)  
Test method(s) : ANSI C63.10: 2013  
Test(s) started : July 2, 2018  
Test(s) completed : July 6, 2018

Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.

The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.

Compliance of the EUT is more probable than non-compliance in case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer

  
T. Yonemura  
Engineer  
Wireless testing laboratory

Reviewer

  
T. Ikegami  
Wireless/EMC Service Manager  
Wireless testing laboratory

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JP 010597

## 1.3 Test facility

### [Yokohama Laboratory]

Address: 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan  
TEL: +81-45-534-0645  
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by ISED Number: The registered facility number is as follows;  
Test site (Semi-Anechoic chamber 3m): 6974A-1

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)  
Each registered facility number is as follows;  
Test site A-0045

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



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## 1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring ETSI TR 100 028-1 V1.4.1 (2001-12).

The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

Conducted emission (150 kHz - 30 MHz):	± 3.4 dB
Radiated emission (9 kHz - 30 MHz):	± 5.1 dB
Radiated emission (30 MHz - 1000 MHz):	± 5.3 dB
Radiated emission (1 GHz - 6 GHz):	± 5.2 dB
Radiated emission (6 GHz - 18 GHz):	± 5.2 dB
Radiated emission (18 GHz - 26 GHz):	± 5.7 dB

## 1.5 Summary of test results

Requirement	Section in FCC	Result	Section in this report
Occupied Bandwidth (99 %)	2.1049	Complied	2.1
Occupied Bandwidth (6 dB)	15.247 (a)(2)	Complied	2.2
Power Spectral Density	15.247 (e)	Complied	2.3
Peak Output Power	15.247 (b)(3)	Complied	2.4
Conducted Spurious Emissions	15.247 (d)	Complied	2.5
Tx Radiated Spurious Emissions	15.205 (d)/15.209	Complied	2.6
Tx AC Power Line Spurious Emissions	15.207	Complied	2.7

### FCC Part 15.31 (e)

This EUT provides stable voltage (DC 1.2 V) constantly to the wireless transmitter regardless of input voltage. Therefore, the equipment complied with the requirement.

### FCC Part 15.203 Antenna requirement

The antenna is not removable from EUT.

Therefore, the equipment complied with the antenna requirement.

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## 1.6 Setup of equipment under test (EUT)

### 1.6.1 Test configuration of EUT

#### Equipment(s) under test

No.	Item	Manufacture	Model No.	Serial No.
A1	Bluetooth device evaluation board	SENSYST CO., LTD.	SAPPHIRE-680FSG	A060002
A2	Bluetooth device evaluation board	SENSYST CO., LTD.	SAPPHIRE-681FSG	A070002

#### Support Equipment(s)

No.	Item	Manufacture	Model No.	Serial No.
B	Laptop Computer	Sony	PCG-5V1N	2750936311082 5
C	AC Adaptor	Sony	VGP-AC16V11	1479948220241 264

#### Connected cable(s)

No.	Item	Identification (Manu.etc.)	Cable Shielded	Ferrite Core	Length [m]
1	USB	-	Shielded	Yes	0.5
2	USB Extend	Use for radiated test setup	Shielded	None	2.0
3	DC	-	Unshielded	None	1.8
4	AC	-	Unshielded	None	0.9

### 1.6.2 Operating condition

Operating Mode	Power Setting	Remarks
Continuous Tx, LE, 1 Mbps	8	-
Continuous Tx, LE, 2 Mbps	8	-

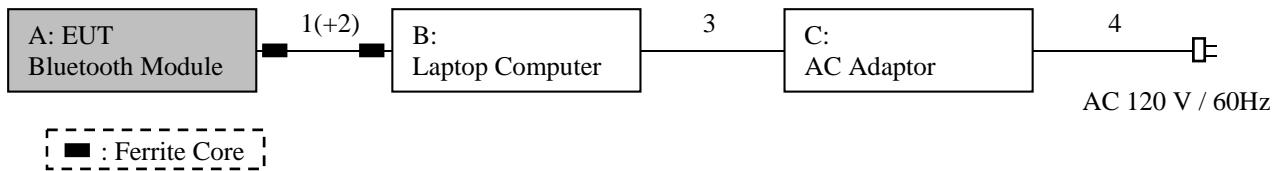
Tested Frequency [MHz]	Remarks
2402	-
2440	-
2480	-

Software for RF test	Version	Remarks
HCITester_100.exe	1.00	-

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### 1.6.3 Setup diagram of tested system



### 1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

### 1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

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