

# TEST REPORT

**Application No.:** HKEM2202000202AT  
**Applicant:** Nacon (HK) Limited  
**Address of Applicant:** Unit 1505, 148 Electric Road, North Point, Hong Kong  
**Equipment Under Test (EUT):**  
**EUT Name:** PS4 Wireless Controller  
**Model No.:** BB4487  
**FCC ID:** 2AVPR-4487CBT  
**IC:** 25872-4487CBT  
**HVIN:** 4487CBT  
**Standard(s) :** 47 CFR Part 1.1307, Part 1.1310  
KDB447498D01 General RF Exposure Guidance v06  
RSS-102 Issue 5  
**Date of Receipt:** 2022-02-20  
**Date of Test:** 2022-02-20 to 2022-02-28  
**Date of Issue:** 2022-03-01

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.




**Law Man Kit**  
EMC Manager

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2022-03-01		Original

<b>Authorized for issue by:</b>			
			
		<hr/> <b>Panny Leung</b> /Project Engineer	Date: 2022-03-01
			
		<hr/> <b>Law Man Kit</b> /Reviewer	Date: 2022-03-01

## 2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
RF Exposure	47 CFR Part 1.1307, Part 1.1310	CFR 47 Part 1.1310	CFR 47 Part 1.1310	Pass

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
RF Exposure	RSS-102 Issue 5	RSS-102 Section 2.5.1	RSS-102 Issue 5	Pass

### Declaration of EUT Family Grouping:

None.

### Abbreviation:

- Tx: In this whole report Tx (or tx) means Transmitter.
- Rx: In this whole report Rx (or rx) means Receiver.
- RF: In this whole report RF means Radiated Frequency.
- CH: In this whole report CH means channel.
- Volt: In this whole report Volt means Voltage.
- Temp: In this whole report Temp means Temperature.
- Humid: In this whole report Humid means humidity.
- Press: In this whole report Press means Pressure.
- N/A: In this whole report not application.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	USB 5.0VDC  OR  Lithium-Ion Battery Model: YMD633745 Rated capacity: 1200mAh, 4.44Wh Voltage: 3.7VDC
Test voltage:	AC 120V or DC 3.7V
Cable:	100cm Mirco-USB Cable
Antenna Gain:	2.64 dBi
Antenna Type:	PIFA
Bluetooth Version:	4.2
Channel Spacing:	1MHz
Modulation Type:	GFSK, $\pi/4$ DQPSK
Number of Channels:	79
Operation Frequency:	2402MHz to 2480MHz
Series number:	A1
Hardware Version:	V2.7
Software Version:	V1.25

### 4.2 Description of Support Units

The EUT has been tested with corresponding accessories as below:

Supplied by client

Description	Manufacturer	Version	SN/Certificate NO
Eclipse test software	Eclipse contributors	Mars.1 Release (4.5.1)	20150924-1200

Supplied by SGS:

Description	Manufacturer	Model No.	SN/Certificate NO
NoteBook (EMC4)	Dell	P75F	N/A



### 4.3 Modulation configure

<b>RF software:</b>	FCC_Assist.exe			
<b>Modulation</b>	<b>Packet</b>	<b>Packet Type</b>	<b>Packet Size</b>	<b>Power</b>
GFSK	DH1	Pn9	Default	2
	DH3	Pn9	Default	2
	DH5	Pn9	Default	2
$\pi/4$ DQPSK	2DH1	Pn9	Default	2
	2DH3	Pn9	Default	2
	2DH5	Pn9	Default	2
Remark: 1. default value was set in test software as maximum output power setting.				

#### 4.4 Measurement Uncertainty

RF

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power (30MHz-40GHz)	1.5dB
5	RF power density	1.5dB
6	Conducted Spurious emissions	1.5dB
7	RF Radiated power & Radiated Spurious emission test	4.4dB (30MHz-1GHz)
		4.7dB (1GHz-6GHz)
		4.7dB (6GHz-18GHz)
		5.7dB (18GHz-40GHz)
8	Temperature test	$\pm 1^\circ\text{C}$
9	Humidity test	$\pm 3\%$
10	Supply voltages	$\pm 1.5\%$
11	Time	$\pm 3\%$

Remark:

The  $U_{\text{lab}}$  (lab Uncertainty) is less than  $U_{\text{CISPR}}$  (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

According to decision rule based on Clause 4.2 of CISPR 16-4-2, the EUT complied with the standards specified above.

#### 4.5 Test Location

All tests were performed at:

SGS Hong Kong Limited  
Unit 2 and 3, G/F, Block A, Po Lung Centre,  
11 Wang Chiu Road, Kowloon Bay, Kowloon, Hong Kong  
Tel: +852 2305 2570 Fax: +852 2756 4480

No tests were sub-contracted.

#### 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **HOKLAS (Lab Code: 009)**

SGS Hong Kong Limited has been accepted by HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a HOKLAS Accredited Laboratory, this laboratory meets the requirements of ISO/IEC 17025:2017 and it has been accredited for performing specific test as listed in the scope of accreditation within the test category of Electrical and Electronic Products.

• **IAS Accreditation (Lab Code: TL-817)**

SGS Hong Kong Limited has met the requirements of AC89, IAS Accreditation Criteria for Testing Laboratories, and has demonstrated compliance with ISO/IEC Standard 17025:2017, General requirements for the competence of testing and calibration laboratories. This organization is accredited to provide the services specified in the scope of accreditation maintained on the IAS website ([www.iasonline.org](http://www.iasonline.org)).

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

• **FCC Recognized Accredited Test Firm(CAB Registration No.: 514599)**

SGS Hong Kong Limited has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: HK0015, Test Firm Registration Number: 514599.

• **Industry Canada (Site Registration No.: 26103; CAB Identifier No.: HK0015)**

SGS Hong Kong Limited has been recognized by Department of Innovation, Science and Economic Development (ISED) Canada as a wireless testing laboratory. The acceptance letter from the ISED is maintained in our files. CAB Identifier No: HK0015, Site Registration Number: 26103.

#### 4.7 Deviation from Standards

None

#### 4.8 Abnormalities from Standard Conditions

None

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## 5 Equipment List

<b>Conducted Peak Output Power</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
SMBV100A VECTOR SIGNAL GENERATOR	Rohde & Schwarz	SMBV100A	E234	2021/08/16	2022/08/15
FSV40 SIGNAL ANALYZER 40GHz	Rohde & Schwarz	FSV40	E235	2021/08/16	2022/08/15
OSP	Rohde & Schwarz	OSP-B157W8	E242	2021/08/16	2022/08/15
Cable	Rohde & Schwarz	J12J103539-00-2	E239	2021/07/15	2022/07/14
WMS32 Test software	Rohde & Schwarz	N/A	Version 11	N/A	N/A

<b>General used equipment</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
Digital temperature & humidity data logger	SATO	SK-L200TH II	E232	2021/08/16	2022/08/15
Electronic Digital Thermometer with Hygrometer	nil	2074/2075	E159	2021/08/16	2022/08/15
Barometer with digital thermometer	SATO	7612-00	E218	2021/03/29	2022/03/28
Conditional Chamber	Zhong Zhi Testing Instruments	CZ-E-608D	E216	2021/08/17	2022/08/16

## 6 Radio Spectrum Technical Requirement

### 6.1 RF Exposure

#### 6.1.1 Test Requirement:

CFR 47 Part 2.1093

Limit:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion

#### 6.1.2 Conclusion

According to the formula. calculate the test exclusion thresholds:

BT:

$$\text{General RF Exposure} = (6.761\text{mW} / 5\text{ mm}) \times \sqrt{2.402\text{ GHz}} = \frac{(1)}{2.096}$$

SAR requirement:

$$S = 3.0 \quad (2)$$

$(1) < (2)$

So the SAR report is not required.

Remark: 6.761 mW is the worst conducted output power from report HKEM220200020202

### 6.1.3 Test Requirement:

RSS-102

Limit:

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2 of RSS-102 Issue 5, March 2015. If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance.

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

<b>Table 1: SAR evaluation — Exemption limits for routine evaluation based on frequency and separation distance</b>					
Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10-gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

### 6.1.4 Conclusion

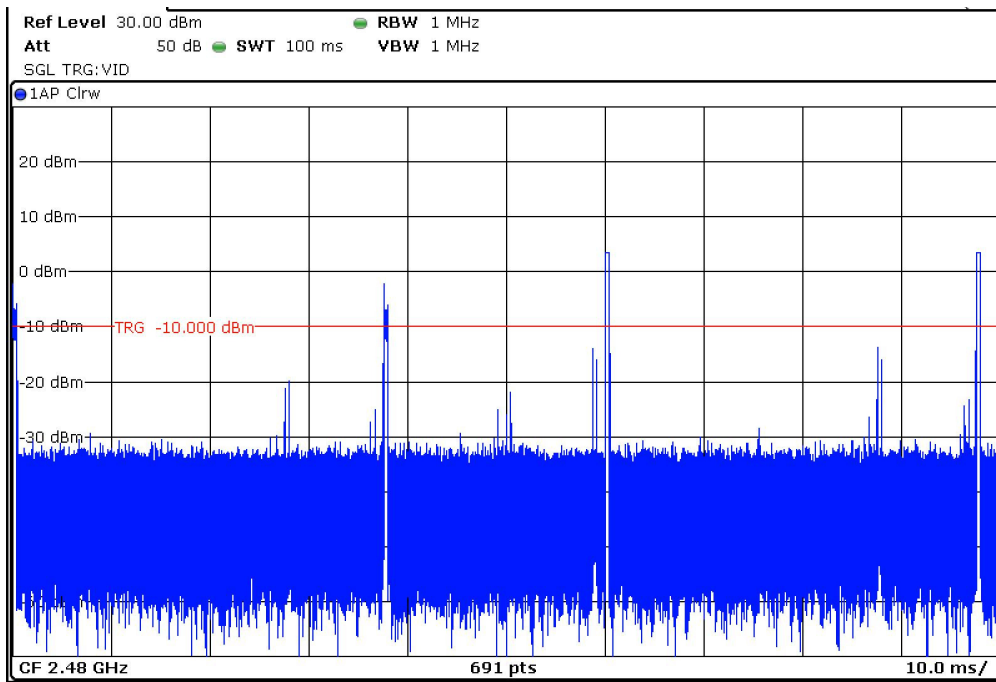
Correction factor for average power:

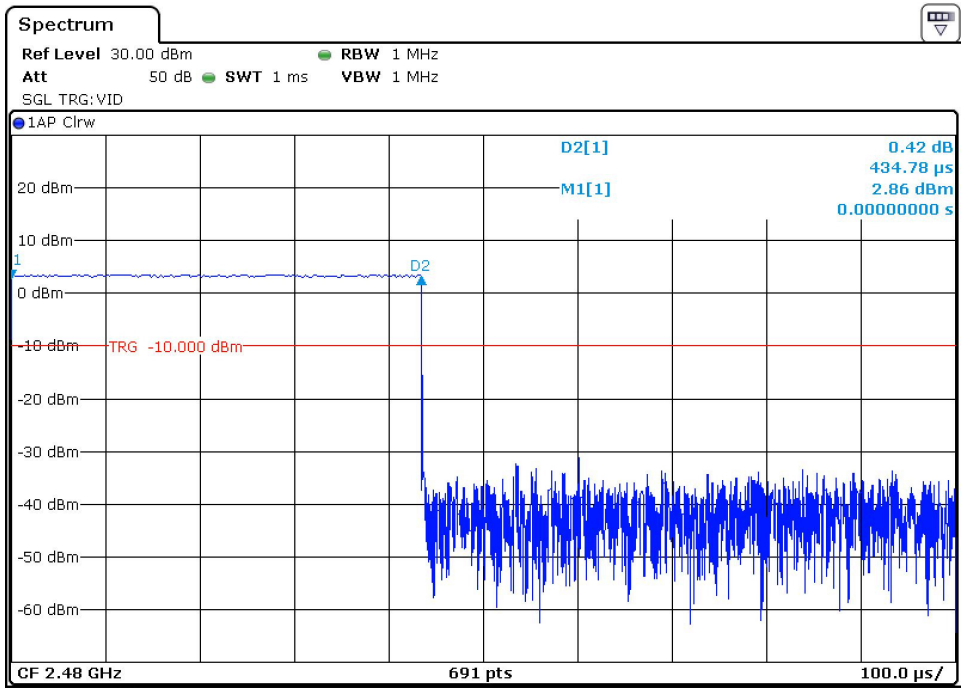
$$\text{On time} = 0.435 \times 4 = 1.74 \text{ms}$$

$$\text{Worst-case duty cycle within 100ms} = 1.74 / 100 = 0.0174$$

$$\text{Average factor} = 20 \log 0.0174 = -35.2 \text{dB}$$

$$\text{E.I.R.P} = 8.3 + 2.64 - 35.2 = -24.3 \text{dBm}$$





By using linear interpolation to determine the limit for the worse separation distance of ≤ 5 mm at 2402 MHz:

$$\text{Limit} = 4 + (2450 - 2402) \times ((7-4) / (2450 - 1900)) = 4.26 \text{ mW}$$

The maximum average e.i.r.p. was 0.004 mW.



## **7 Photographs**

### **7.1 EUT Constructional Details (EUT Photos)**

Refer to the appendices setup, external and internal photos.

- End of the Report -

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