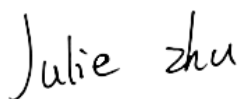


TEST REPORT

Applicant: nFore Technology Co., Ltd.
Address: 5F., No.31, Ln. 258, Ruiguang Rd., Neihu Dist.,
Taipei City 114, Taiwan
Equipment Type: NF3219PQ
Model Name: NF3219PQ (refer section 2.4)
Brand Name: nFore
FCC ID: W3GNF3219PQ
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Mar. 23, 2023
Test Date: Mar. 23, 2023 - Apr. 04, 2023
Date of Issue: Apr. 11, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu**Checked by:** Xiong Lining **Approved by:** Tu Lang
(Testing Director)

Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Apr. 11, 2023</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	Test Laboratory	3
1.2	Test Location	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information	4
2.2	Manufacturer Information	4
2.3	Factory Information	4
2.4	General Description for Equipment under Test (EUT)	4
2.5	Ancillary Equipment	4
2.6	Technical Information	5
3	SUMMARY OF TEST RESULT	6
3.1	Test Standards	6
4	DEVICE CATEGORY AND LEVELS LIMITS	7
5	ASSESSMENT RESULT	9
5.1	Output Power	9
5.2	Tune-up power	9
5.3	RF Exposure Evaluation Result	10
5.4	Collocated Power Calculation	10
5.5	Conclusion	11

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	nFore Technology Co., Ltd.
Address	5F., No.31, Ln. 258, Ruiguang Rd., Neihu Dist., Taipei City 114, Taiwan

2.2 Manufacturer Information

Manufacturer	nFore Technology Co., Ltd.
Address	5F., No.31, Ln. 258, Ruiguang Rd., Neihu Dist., Taipei City 114, Taiwan

2.3 Factory Information

Factory	nFore Technology Co., Ltd.
Address	No.9, Dapumeiyuanqu 9th Rd., Dalin Township, Chiayi County 622, Taiwan

2.4 General Description for Equipment under Test (EUT)

EUT Name	NF3219PQ
Model Name Under Test	NF3219PQ
Series Model Name	NF3219TPQ, NF3219TPQL, NF3219TPQLL
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the customer)
Hardware Version	1.2
Software Version	1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac and 802.11ax U-NII-1/3
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth; WLAN	
Frequency Range	802.11b/g	2412 MHz ~ 2462 MHz
	802.11n(HT20)/ax(HE20)	2412 MHz ~ 2462 MHz
	802.11n(HT40)/ax(HE40)	2422 MHz ~ 2452 MHz
	802.11a	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
	802.11n(HT20/HT40)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
	802.11ac(VHT20/VHT40/VHT80)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
	802.11ax(HE20/HE40/HE80)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
Antenna Type	WLAN	External Antenna
	Bluetooth	External Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Type	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
300		39	65	88	110	129	148	166	184	201	217
450		22	44	67	89	112	135	158	180	203	226
835		9	25	44	66	90	116	145	175	207	240
1900		3	12	26	44	66	92	122	157	195	236
2450		3	10	22	38	59	83	111	143	179	219
3600		2	8	18	32	49	71	96	125	158	195
5800		1	6	14	25	40	58	80	106	136	169

5 ASSESSMENT RESULT

5.1 Output Power

Bluetooth	
Mode	GFSK (BLE 2Mbps)
Conducted Power (dBm)	8.97
Antenna Gain (dBi)	1.91
EIRP (dBm)	10.88
Note: This report listed the worst case conducted power value, please refer to BL-SZ2330997-601~602 report for more details.	

WLAN 2.4G			
Mode	Main Antenna	Aux. Antenna	MIMO
Conducted Power (dBm)	23.24	22.81	22.00
Antenna Gain (dBi)	1.91	1.91	1.91
EIRP (dBm)	25.15	24.72	23.91
Note: This report listed the worst case conducted power value, please refer to BL-SZ2330997-603 report for more details.			

WLAN 5G			
Mode	Main Antenna	Aux. Antenna	MIMO
Conducted Power (dBm)	19.12	19.18	18.04
Antenna Gain (dBi)	4.50	4.50	4.50
EIRP (dBm)	23.62	23.68	22.54
Note: This report listed the worst case conducted power value, please refer to BL-SZ2330997-604 report for more details.			

5.2 Tune-up power

Mode		Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
Bluetooth		[8.00,10.00]	[10.00,12.00]	[7.85,9.85]
WLAN 2.4G	Main Antenna	[22.00,24.00]	[23.50,25.50]	[21.35,23.35]
	Aux. Antenna	[22.00,24.00]	[23.50,25.50]	[21.35,23.35]
	MIMO	[22.00,24.00]	[23.50,25.50]	[21.35,23.35]
WLAN 5G	Main Antenna	[18.00,20.00]	[22.00,24.00]	[19.85,21.85]
	Aux. Antenna	[18.00,20.00]	[22.00,24.00]	[19.85,21.85]
	MIMO	[18.00,20.00]	[22.00,24.00]	[19.85,21.85]
Note1: ERP= EIRP -2.15dB.				
Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.				

5.3 RF Exposure Evaluation Result

Evolution mode		Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
Bluetooth		10.00	10.00	200	3060.00	0.003	Pass
WLAN 2.4G	Main Antenna	24.00	251.19	200	3060.00	0.082	Pass
	Aux. Antenna	24.00	251.19	200	3060.00	0.082	Pass
	MIMO	24.00	251.19	200	3060.00	0.082	Pass
WLAN 5G	Main Antenna	21.85	153.11	200	3060.00	0.050	Pass
	Aux. Antenna	21.85	153.11	200	3060.00	0.050	Pass
	MIMO	21.85	153.11	200	3060.00	0.050	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency (GHz)	Power /Limit	$\Sigma(\text{Power / Limit})$ of Bluetooth + WLAN 2.4G Main Antenna + WLAN 2.4G Aux. Antenna	Verdict
Bluetooth	2.402	0.0030	0.167	Pass
WLAN 2.4G Main Antenna	2.412	0.0820		
WLAN 2.4G Aux. Antenna	2.412	0.0820		
Evolution mode	Frequency (GHz)	Power /Limit	$\Sigma(\text{Power / Limit})$ of Bluetooth + WLAN 5G Main Antenna + WLAN 5G Aux. Antenna	Verdict
Bluetooth	2.402	0.0030	0.103	Pass
WLAN 5G Main Antenna	5.750	0.0500		
WLAN 5G Aux. Antenna	5.750	0.0500		

Note:

1. $\Sigma(\text{Power / Limit})$: This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for Bluetooth + WLAN 2.4G Main Antenna + WLAN 2.4G Aux. Antenna, Bluetooth + WLAN 5G Main Antenna + WLAN 5G Aux. Antenna.
2. Both of the 2.4GHz/5GHz can transmit simultaneously, the formula of calculated the Power is $CP1 / LP1 + CP2 / LP2 + \dots \text{etc.} < 1$
 CP = Calculation power
 LP = Limit of power
3. Both of the 2.4GHz WIFI and 5.8GHz WIFI can't transmit simultaneously at same time.
4. The worst-case situation is 0.167, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
5. The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz, 5150 MHz~ 5250 MHz and 5725 MHz ~ 5850 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
6. More power list please refer to BL-SZ2330997-601~604 report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

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--END OF REPORT--