

# FCC RF EXPOSURE REPORT

**FCC ID: VOB-P3430**

**Project No.** : 1903C230  
**Equipment** : SHIELD Android TV Game Console  
**Model Name** : P3430  
**Series Model** : N/A  
**Applicant** : NVIDIA Corporation  
**Address** : 2788 San Tomas Expressway Santa Clara, CA  
95051, United States  
  
**According** : FCC Guidelines for Human Exposure IEEE  
C95.1 & FCC Part 2.1091

## **B T L I N C .**

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Certificate #5123.02

## REPORT ISSUED HISTORY

| Report Version | Description     | Issued Date   |
|----------------|-----------------|---------------|
| R00            | Original Issue. | Jun. 21, 2019 |

## 1. GENERAL SUMMARY

Equipment : SHIELD Android TV Game Console  
Brand Name : NVIDIA  
Test Model : P3430  
Series Model : N/A  
Applicant : NVIDIA Corporation  
Manufacturer : NVIDIA Corporation  
Address : 2788 San Tomas Expressway Santa Clara, CA 95051, United States  
Date of Test : May 06, 2019 ~ Jun. 12, 2019  
Test Sample : Engineering Sample  
Standards : FCC Title 47 Part 2.1091, OET Bulletin 65 Supplement C

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-6-1903C230) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

## 2. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi^2} = \frac{EIRP}{4\pi^2}$$

where:

S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Table for Filed Antenna

**For BT/LE:**

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1    | N/A   | N/A        | Internal     | N/A       | 1.68       |

**For 2.4G:**

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1    | N/A   | N/A        | Internal     | N/A       | 1.68       |
| 2    | N/A   | N/A        | Internal     | N/A       | 1.60       |

Note:

- (1) This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$  dBi, that is Directional gain =  $10\log[(10^{1.68/20} + 10^{1.60/20})^2 / 2]$  dBi = 4.65.
- (2) Both Ant. 1 and Ant. 2 had been tested and the test data of Ant. 2 were the worst case. b/g mode has only one antenna transmits, n mode can transmit two antennas at the same time.

### For 5G:

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Note   |
|------|-------|------------|--------------|-----------|------------|--------|
| 1    | N/A   | N/A        | Internal     | N/A       | 4.11       | UNII-1 |
| 2    | N/A   | N/A        | Internal     | N/A       | 4.21       | UNII-1 |

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Note    |
|------|-------|------------|--------------|-----------|------------|---------|
| 1    | N/A   | N/A        | Internal     | N/A       | 4.38       | UNII-2A |
| 2    | N/A   | N/A        | Internal     | N/A       | 4.05       | UNII-2A |

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Note    |
|------|-------|------------|--------------|-----------|------------|---------|
| 1    | N/A   | N/A        | Internal     | N/A       | 4.07       | UNII-2C |
| 2    | N/A   | N/A        | Internal     | N/A       | 3.66       | UNII-2C |

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Note   |
|------|-------|------------|--------------|-----------|------------|--------|
| 1    | N/A   | N/A        | Internal     | N/A       | 4.38       | UNII-3 |
| 2    | N/A   | N/A        | Internal     | N/A       | 3.00       | UNII-3 |

Note:

(1) This EUT supports MIMO 2X2, any transmit signals are correlated with each other,

So Directional gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$  dBi, then,

1) For UNII-1, Directional gain =  $10\log[(10^{4.11/20} + 10^{4.21/20})^2 / 2]$  dBi = 7.17 dBi.

So, the output power limit is  $24 - 7.17 + 6 = 22.83$ , the power density limit is  $11 - 7.17 + 6 = 9.83$ .

2) For UNII-2A, Directional gain =  $10\log[(10^{4.38/20} + 10^{4.05/20})^2 / 2]$  dBi = 7.23 dBi.

So, the output power limit is  $24 - 7.23 + 6 = 22.77$ , the power density limit is  $11 - 7.23 + 6 = 9.77$ .

3) For UNII-2C, Directional gain =  $10\log[(10^{4.07/20} + 10^{3.66/20})^2 / 2]$  dBi = 6.88 dBi.

So, the output power limit is  $24 - 6.88 + 6 = 23.12$ , the power density limit is  $11 - 6.88 + 6 = 10.12$ .

4) For UNII-3, Directional gain =  $10\log[(10^{4.38/20} + 10^{3.00/20})^2 / 2]$  dBi = 6.73 dBi.

So, the output power limit is  $30 - 6.73 + 6 = 29.27$ , the power density limit is  $30 - 6.73 + 6 = 29.27$ .

(2) Both Ant. 1 and Ant. 2 had been tested and the test data of Ant. 1 were the worst case. a mode has only one antenna transmits, n/ac mode can transmit two antennas at the same time.

### 3. TEST RESULTS

For BT:

| Antenna Gain (dBi) | Antenna Gain (numeric) | Max. Peak Output Power (dBm) | Max. Peak Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|--------------------|------------------------|------------------------------|-----------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 1.68               | 1.4723                 | 10.44                        | 11.0662                     | 0.00324                                 | 1                                                | Complies    |

For LE:

| Antenna Gain (dBi) | Antenna Gain (numeric) | Max. Peak Output Power (dBm) | Max. Peak Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|--------------------|------------------------|------------------------------|-----------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 1.68               | 1.4723                 | 7.39                         | 5.4828                      | 0.00161                                 | 1                                                | Complies    |

For 2.4GHz:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 4.65                   | 2.9174                     | 28.02                   | 633.8697               | 0.36809                                 | 1                                                | Complies    |

For 5GHz:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|------------------------|----------------------------|-------------------------|------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 6.73                   | 4.7098                     | 23.61                   | 229.6149               | 0.21525                                 | 1                                                | Complies    |

**For the max simultaneous transmission MPE:**

| Power Density (S) (mW/cm <sup>2</sup> ) | Power Density (S) (mW/cm <sup>2</sup> ) | Power Density (S) (mW/cm <sup>2</sup> ) | Total   | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|-----------------------------------------|-----------------------------------------|-----------------------------------------|---------|--------------------------------------------------|-------------|
| BT                                      | 2.4GHz                                  | 5GHz                                    |         |                                                  |             |
| 0.00324                                 | 0.36809                                 |                                         | 0.37133 | 1                                                | Complies    |
| 0.00324                                 |                                         | 0.21525                                 | 0.21849 | 1                                                | Complies    |

Note: The calculated distance is 20 cm.

**End of Test Report**