RF EXPOSURE EVALUATION

1. PRODUCT INFORMATION

FCC ID	2BAGC-AURA-ESM231
Product Description	aura
Model Name	aura-esm231
Frequency Band (Operating)	☐WLAN: 2.412GHz ~ 2.462GHz ☐WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐WLAN: 5.745GHz ~ 5825GHz ☒Bluetooth: 2.402GHz ~ 2.480GHz ☐Others (NFC:13.56MHz)
Device Category	☒Portable (<20cm separation) ☐Mobile (>20cm separation) ☐Others:
Antenna Diversity	☒Single antenna ☐Multiple antennas
Max. Output Power	BR EDR: 5.584dBm (Max) BLE 1Mbps: 4.593dBm (Max) BLE 2Mbps: 4.183dBm (Max)
Antenna Designation	PCB Antenna
Antenna Gain	0.407dBi
Minimum Assessment Distance	35mm
Evaluation Applied	☒MPE Evaluation ☐SAR Evaluation
Evaluation Result	Pass

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2. PORTABLE DEVICE EVALUATION METHOD AND LIMIT

Following FCC KDB 447498 D01 “General SAR test exclusion guidance” The corresponding SAR Exclusion Threshold condition, listed below:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [if(GHz)] s 3.0 for 1-g SAR and ñ 7.5 for 10-g extremity SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz.
   - Power and distance are rounded to the nearest mW and mm before calculation.
   - The result is rounded to one decimal place for comparison The test exclusions are applicable only when the minimum test separation distance is ≤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.

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50mm) (f(MHz)/150)] mW, at 100MHz to 1500 MHz;
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)-10] mW at > 1500 MHz and ≤6 GHz;

3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion.
   a) The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm.
   b) The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by 1/2 for test separation distances ñ 50 mm.
   c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

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3. MOBILE DEVICE EVALUATION METHOD AND LIMIT

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE

Frequency Range (MHz)	E-field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (Minutes)
0.3 -- 1.34	614	1.63	(100)*	30
1.34 -- 30	824/f	2.19/f	($180/f^2$)*	30
30 -- 300	27.5	0.073	0.2	30
300 -- 1500	--	--	f/1500	30
1500 -- 100,000	--	--	1.0	30

*Note:

1. f= Frequency in MHz * Plane-wave Equivalent Power Density
2. The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters. See 47 CFR §§2.1091 and 2.1093 on source-based time-averaging requirement for mobile and portable transmitters.

$S=PG/4\pi R^2$

Where:

S=power density

P=power input to 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

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4. MEASUREMENT RESULT

Test Mode	Channel Frequency (MHz)	Max Output power (dBm)	Max Output power (mW)	Calculati on Value (Note 1)	Threshold Value
GFSK 1Mbps					
BT_BLE	2402	4.534	2.841	0.881	3.0
BT_BLE	2440	4.488	2.811	0.877	3.0
BT_BLE	2480	4.593	2.879	0.904	3.0
GFSK 2Mbps					
BT_BLE	2402	4.118	2.581	0.800	3.0
BT_BLE	2440	4.082	2.560	0.798	3.0
BT_BLE	2480	4.183	2.620	0.822	3.0
8DPSK					
BT_EDR	2402	5.555	3.593	1.114	3.0
BT_EDR	2441	5.530	3.573	1.115	3.0
BT_EDR	2480	5.584	3.617	1.136	3.0

Note 1: Calculation Value =[(max. power of channel, mW)/(min. test separation distance, mm)] ·[√f(GHz)].
Fox example: 3.617/5*√2.480=1.136 ≤ 3.0

According to KDB447498 D01 V06, threshold at which no SAR required is ≤3.0 for 1-g SAR, separation distance is 5mm, and no simultaneous SAR measurement is required.

5. CONCLUSION

Since Source-base time average power is below SAR test exclusion power thresholds, the SAR evaluation is not required.

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