RF Exposure evaluation

FCC ID	2BON2-X-A5
Product Name	Smart Camera; Security Camera
Model No.	X-A5
Listed Model(s)	X-Q11, X-A7
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Mobile Device

1. Reference

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

FCC CFR 47 part1 1.1310: Radio frequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radio frequency radiation exposure evaluation: mobile devices

FCC KDB publication 680106 D01 RF Exposure Wireless Charging Apps v04: RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications

2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f2)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500–100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f2)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz, *=Plane-wave equivalent power density

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100kHz.

3. RF Exposure evaluation for WIFI

3.1. Calculation Method

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

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

3.2. Tune up power

Mode	Channel	Peak Output Power (dBm)	Tune up Power (dBm)
IEEE 802.11b	1	7.16	7±1
	6	7.42	7±1
	11	7.23	7±1
IEEE 802.11g	1	8.79	8±1
	6	8.47	8±1
	11	8.71	8±1
IEEE 802.11n_20	1	7.89	8±1
	6	8.03	8±1
	11	7.49	8±1

3.3. Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna is 1.65dBi, the RF power density can be obtained.

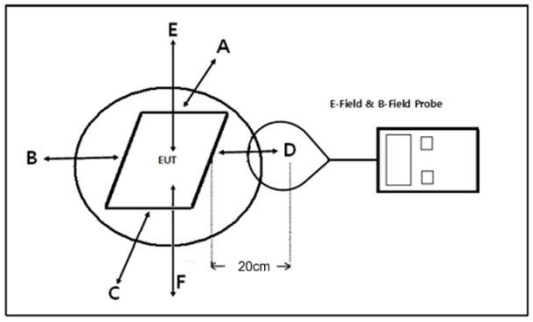
Mode	Maximum output power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
2.4G WIFI	9	1.65	0.00231	1.0000	Pass

Remark:

1. Output power (Peak) including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

4. RF Exposure evaluation for WPT

4.1. Test Setup Diagram



4.2. Test Equipment

Equipment	Manufacturer	Model	Serial no.	Calibrated date	Calibrated Due
Exposure Level Tester	Narda	ELT-400	N-0713	2025-1-07	2026-1-06
B-Field Probe	Narda	ELT-400	M-1154	2025-1-07	2026-1-06

4.3. Support equipment List

Manufacturer	Description	Model	Serial Number
Adapter	Guangdong Sangu Technology Co. ltd	SG-0501000AU	--
phone	Huawei	Mate 30	--

4.4. Measurement Procedure

1) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
2) The measurement probe was placed at test distance (20cm) which is between the edges of the charger and the geometric center of probe.
3) The turn table was rotated 360d degree to search of highest strength.
4) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
5) The EUT were measured according to the dictates of KDB 680106D01v04.

4.5. Equipment Approval Considerations

Requirements of KDB 680106 D01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 110.1kHz - 205kHz
The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.	Yes	The maximum output power of the primary coil is 15W.
A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)	Yes	Client device is placed directly in contact with the transmitter.
Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).	Yes	EUT is a mobile device
The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.	Yes	Fulfil requirements
For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.	Yes	EUT has only one coil

4.6. Result

Test Modes	
Mode 1	AC/DC Adapter + EUT(5W) + phone(Battery Status: <1%)
Mode 2	AC/DC Adapter + EUT(5W) + phone(Battery Status: <50%)
Mode 3	AC/DC Adapter + EUT(5W) + phone(Battery Status: <99%)
Mode 4	AC/DC Adapter + EUT(7.5W) + phone(Battery Status: <1%)
Mode 5	AC/DC Adapter + EUT(7.5W) + phone(Battery Status: <50%)
Mode 6	AC/DC Adapter + EUT(7.5W) + phone(Battery Status: <99%)
Mode 7	AC/DC Adapter + EUT(10W) + phone(Battery Status: <1%)
Mode 8	AC/DC Adapter + EUT(10W) + phone(Battery Status: <50%)
Mode 9	AC/DC Adapter + EUT(10W) + phone(Battery Status: <99%)
Mode 10	AC/DC Adapter + EUT(15W) + phone(Battery Status: <1%)
Mode 11	AC/DC Adapter + EUT(15W) + phone(Battery Status: <50%)
Mode 12	AC/DC Adapter + EUT(15W) + phone(Battery Status: <99%)
Note: All test modes were pre-tested, but we only recorded the worst case in this report.	

H-Field Strength at 20 cm from the edges surrounding the EUT and 20cm from the top surface of the EUT

Test mode	Field Strength	Measurement data / Test Position					50% Limits	Result
		A	B	C	D	E		
10	uT	0.128	0.139	0.143	0.135	0.135	-	-
	H Field Strength (A/m)	0.102	0.111	0.114	0.108	0.108	0.815	Pass
	E Field Strength (V/m)	38.323	41.617	42.814	40.419	40.419	307.0	Pass
11	uT	0.125	0.136	0.141	0.132	0.131	-	-
	H Field Strength (A/m)	0.100	0.109	0.113	0.106	0.105	0.815	Pass
	E Field Strength (V/m)	37.425	40.719	42.216	39.521	39.222	307.0	Pass
12	uT	0.125	0.136	0.141	0.132	0.131	-	-
	H Field Strength (A/m)	0.100	0.109	0.113	0.106	0.105	0.815	Pass
	E Field Strength (V/m)	37.425	40.719	42.216	39.521	39.222	307.0	Pass

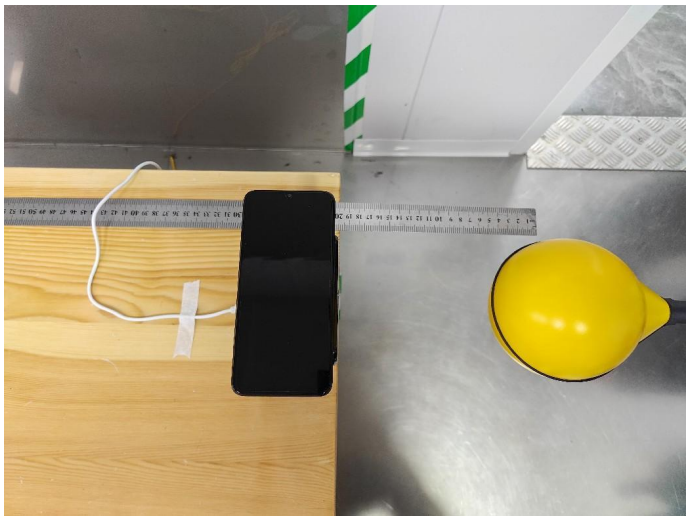
Note:

1A/m=1.25uT, 1V/m=0.00334uT

H-Field Strength at 20 cm from the edges surrounding the EUT and 20cm from the top surface of the EUT

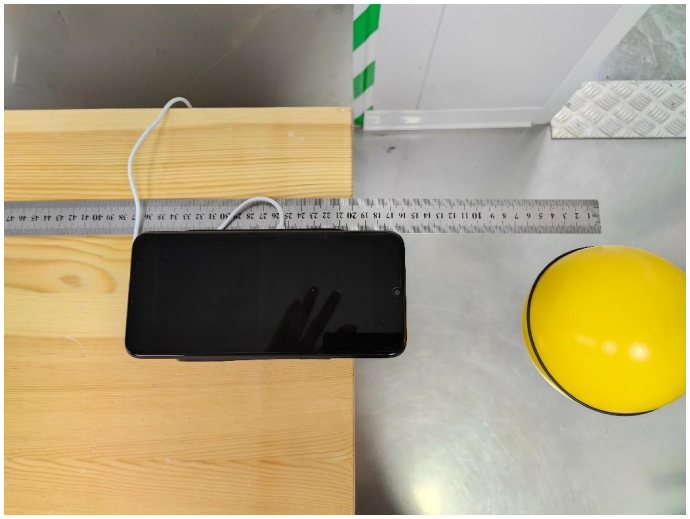
4.7. Test Setup Photos

Test Position A - Exposure photo from side edge surface-Rear (20cm)

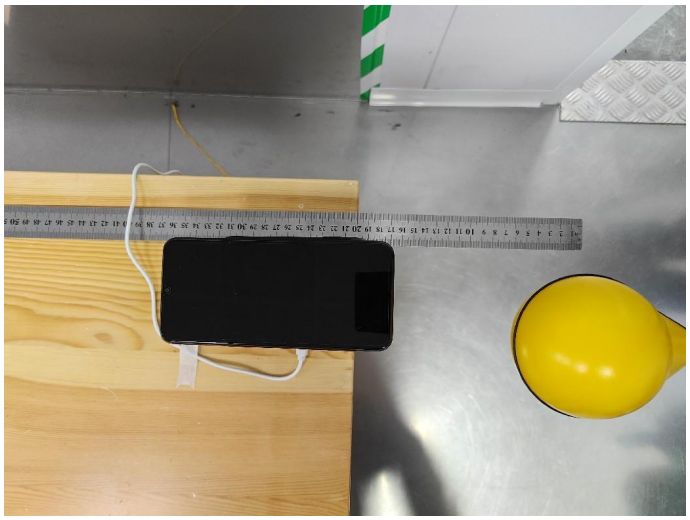


Test Position B - Exposure photo from side edge surface-Left (20cm)

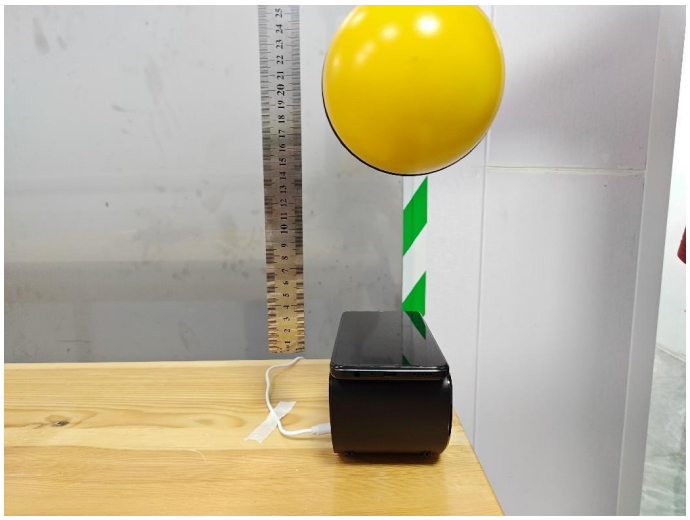
Test Position C - Exposure photo from side edge surface-Front (20cm)



Test Position D - Exposure photo from side edge surface-Right (20cm)



Test Position E- Exposure photo from top surface (20cm)



5. RF Exposure evaluation for simultaneous transmission

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) should be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from §1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a}\frac{P_i}{P_{\text{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\text{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

Type	Power Density (mW/m^2)	Limit (mW/m^2)	Power Density / Limt	Sum	Limit	Result
WIFI	0.00231	1.0000	0.00231	0.141	1.0	Pass
Type	E Field Strength (V/m)	Limit (V/m)	E Field Strength / Limit			
WPT	42.814	307	0.139			

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

------End of report ------