

RF Exposure Evaluation

FCC ID: 2ATTT-CUBE2

1. Client Information

Applicant	:	Digital Signage Hamburg GmbH
Address	:	Reinbeker Weg 62B, 21029 Hamburg, Germany
Manufacturer	:	Digital Signage Hamburg GmbH
Address	:	Reinbeker Weg 62B, 21029 Hamburg, Germany

2. General Description of EUT

EUT Name	:	Android Box
Models No.	:	Cube2,Cube3,Cube4,Cube5,Cube6,Cube7,Cube8,Cub9,Cube10
Model Difference	:	All these models are identical in the same PCB layout and electrical circuit, the only difference is appearance of the color and model name for commercial.
Product Description	:	Operation Frequency: 2.4G: 802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth 4.0(BLE): 2402MHz~2480MHz 5G: U-NII-1: 5180MHz~5240MHz U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5700MHz U-NII-3: 5745MHz~5825MHz
		Modulation Type: 802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM, 64QAM) 802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM) BLE: GFSK
Power Supply	:	AC Adapter(FJ-SW1261201000DN): Input: AC 100-240V, 50/60Hz, 0.4A Max Output: DC 12V, 1000mA
Connecting I/O Port(S)	:	Please refer to the User's Manual

Note: More test information about the EUT please refer the RF Test Report.

MPE Calculations for WIFI

1. Antenna Gain:

Reverse SMA Ant:	Model	Frequency Range	Frequency Range
	N/A	2400~2483.5MHz	5150~5850MHz
		3dBi	3dBi

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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

4. Test Result:

2.4G WIFI&BLE

Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]	Limit of Power Density (mW/ cm ²) (S)
BLE	3.86	4±1	5	3.0	20	0.0013	1
802.11B	15.79	15±1	16	3.0	20	0.0158	1
802.11G	14.07	14±1	15	3.0	20	0.0126	1
802.11N(HT20)	13.84	14±1	15	3.0	20	0.0126	1
802.11N(HT40)	12.10	12±1	13	3.0	20	0.0079	1

5G WIFI U-NII-1

Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) Numeric [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11a	16.57	16±1	17	3.0	20	0.0199
802.11n(HT20)	16.30	16±1	17	3.0	20	0.0199
802.11n(HT40)	15.49	15±1	16	3.0	20	0.0158
802.11ac(VHT20)	16.61	16±1	17	3.0	20	0.0199
802.11ac(VHT40)	15.89	16±1	17	3.0	20	0.0199
802.11ac(VHT80)	14.00	14±1	15	3.0	20	0.0126

5G WIFI U-NII-2A

Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) Numeric [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11a	15.81	15±1	16	3.0	20	0.0158
802.11ac(VHT20)	15.41	15±1	16	3.0	20	0.0158
802.11ac(VHT40)	15.33	15±1	16	3.0	20	0.0158
802.11ac(VHT80)	15.40	15±1	16	3.0	20	0.0158
802.11n(HT20)	15.99	15±1	16	3.0	20	0.0158
802.11n(HT40)	15.22	15±1	16	3.0	20	0.0158

5G WIFI U-NII-2C

Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) Numeric [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11a	16.09	16±1	17	3.0	20	0.0199
802.11ac(VHT20)	16.55	16±1	17	3.0	20	0.0199
802.11ac(VHT40)	14.33	15±1	16	3.0	20	0.0158
802.11ac(VHT80)	16.63	16±1	17	3.0	20	0.0199
802.11n(HT20)	13.55	13±1	14	3.0	20	0.0100
802.11n(HT40)	12.68	12±1	13	3.0	20	0.0079

5G WIFI U-NII-3

Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) Numeric [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11a	14.61	14±1	15	3.0	20	0.0126
802.11ac(VHT20)	15.73	15±1	16	3.0	20	0.0158
802.11ac(VHT40)	14.02	14±1	15	3.0	20	0.0126
802.11ac(VHT80)	14.09	14±1	15	3.0	20	0.0126
802.11n(HT20)	14.37	14±1	15	3.0	20	0.0126
802.11n(HT40)	12.58	12±1	13	3.0	20	0.0079

The worst RF Exposure Evaluation

Worst Calculation Value			Total Calculation Value	Threshold Value
2.4WiFi Mode	5GWiFi Mode	Bluetooth Mode		
0.0158	0.0199	0.0013	0.037	1.0

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For BT:2402~2480 MHz

For WIFI:2412~2462 MHz

U-NII-1:5180MHz~5240MHz

U-NII-2A:5260MHz~5320MHz

U-NII-2C:5500MHz~5700MHz

U-NII-3:5745MHz~5825MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as $0.037 \text{ mW} / \text{cm}^2 < \text{limit } 1 \text{ mW} / \text{cm}^2$. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

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