

FCC RF Exposure Evaluation

1. Product Information

FCC ID	2ASR7-YT43I
Product name	43 inch IR Android Touch Tablet
Model Number	YT43I, YT15P, YT21P, YT27P, YT43P, YT49I, YT49P, YT55I, YT55P, YT65I, YT65P, YT75I, YT75P, YT86I, YT86P, YT98I, YT98P
Model Declaration	PCB board, structure and internal of these model(s) are the same, Only model's name, shell colors, side of frame and shell materials are different for these models.
Power supply	Input Voltage: AC 100-240V 50/60Hz 2.0A
Bluetooth Modulation Type	GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.1 (BT Classics)
2.4G WLAN Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)
Antenna Type	External Antenna for Bluetooth V4.1 External Antenna for 2.4G WLAN
Antenna Gain	2.0 dBi (maximum) for Bluetooth V4.1 2.0 dBi (maximum) for 2.4G WLAN
Hardware version	VS-RK3399
Software version	android7.1
Bluetooth Operation frequency	2402MHz-2480MHz
2.4G WLAN Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Portable Equipment

2. Evaluation Method and Limit

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.²² The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc."

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [f (\text{GHz})] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where:}$$

- 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
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

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 according to 5) in section 4.1 is applied to determine SAR test exclusion.

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- a) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$, for test separation distances ≤ 50 mm; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.
- b) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm.

This SAR estimation formula has been considered in conjunction with the SAR Test Exclusion Thresholds to result in substantially conservative SAR values of ≤ 0.4 W/kg. When SAR is estimated, the peak SAR location is assumed to be at the feed-point or geometric center of the antenna, whichever provides a smaller antenna separation distance, and this location must be clearly identified in test reports. The estimated SAR is used only to determine simultaneous transmission SAR test exclusion; it should not be reported as the standalone SAR. When SAR is estimated, it must be applied to determine the sum of 1-g SAR test exclusion. When SAR to peak location separation ratio test exclusion is applied, the highest reported SAR for simultaneous transmission can be an estimated standalone SAR if the estimated SAR is the highest among the simultaneously transmitting antennas (see also KDB Publication 690783 D01). For situations where the estimated SAR is overly conservative for certain conditions, the test lab may choose to perform standalone SAR measurements, then use the measured SAR to determine simultaneous transmission SAR test exclusion. Estimated SAR values at selected frequencies, distances, and power levels are illustrated in Appendix D.

When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter modules in host devices that operate in the mixed mobile and portable host platform exposure conditions. The grantee is responsible for documenting this according to Class I permissive change requirements. Antennas that qualify for standalone SAR test exclusion must apply the estimated standalone SAR to determine simultaneous transmission test exclusion.

- a) The $[\sum \text{ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / } 1.6 \text{ W/kg}] + [\sum \text{ of MPE ratios}] \leq 1.0$.
- b) The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04 , and the $[\sum \text{ of MPE ratios}] \leq 1.0$.

According to KDB 616217 D04 SAR for laptop and tablets v01r02 Section 4.2 Laptop host platform test requirements, When the modular approach is applied, transmitters and modules must be tested initially without using a representative host for incorporation in the display and/or keyboard of qualified laptop computers for standalone use according to the following minimum test separation distance and antenna installation requirements. The separation distance required for incorporation in qualified hosts is described in KDB Publication 447498 D01; item e) of 4.1 and item a) of 5.2.2 etc

- a) ≤ 25 mm between the antenna and user for incorporation in laptop display screens
- b) ≤ 5 mm between the antenna and user; only when incorporation in the keyboard compartment is required by the hosts, for bottom surface and edge exposure conditions
- c) the antennas used by the host must have been tested for equipment approval or qualify for SAR test exclusion
- d) the antenna polarization, physical orientation, rotation and installation configurations used by the host must have been tested for compliance for the required display and/or keyboard installation conditions and test separation distance(s) or qualify for SAR test exclusion
- e) When the SAR Test Exclusion Threshold in KDB Publication 447498 D01 applies, a minimum test separation distance of 25 mm is required to determine test exclusion for the display,

and 5 mm for the keyboard compartment.

3. Refer Evaluation Method

[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 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC KDB publication 616217 D04 SAR for laptop and tablets v01r02](#): SAR Evaluation Considerations for Laptop, Notebook, and Tablet Computers.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1093](#): Radiofrequency radiation exposure evaluation: portable devices

4. Conducted Power Results

4.1 Test Setup Block Diagram



4.2 Test Equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	R&S	NRVS	100444	2019-06-15
2	Power Sensor	R&S	NRV-Z32	10057	2019-06-15

Remark: all calibration period of equipment list is one year.

4.3 Test Procedure

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram Test Setup;
- b. Setup EUT work at duty cycle more than 98%;
- c. Read power sensor values in RMS detector;

5. Antenna Information

YT43I can only use antennas certificated as follows provided by manufacturer;

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
Antenna 0	External Antenna	2402 MHz – 2480 MHz	2.0dBi
Antenna 1	External Antenna	2412 MHz – 2462 MHz	2.0dBi

6. Conducted Power

[BT Classics]

Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
GFSK	0	2402	2.03
	39	2441	2.21
	78	2480	2.52
$\pi/4$ DQPSK	0	2402	0.77
	39	2441	1.01
	78	2480	1.29
8DPSK	0	2402	0.89
	39	2441	1.34
	78	2480	1.55

[2.4GWLAN]

Test Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
IEEE 802.11b	1	2412	9.12
	6	2437	9.49
	11	2462	9.35
IEEE 802.11g	1	2412	8.79
	6	2437	8.91
	11	2462	9.03
IEEE 802.11n HT20	1	2412	8.77
	6	2437	9.15
	11	2462	8.52

7. Manufacturing Tolerance

[BT Classics]

GFSK (Average)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	2.0	2.0	2.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
$\pi/4$ -DQPSK (Average)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	1.0	1.0	1.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
8DPSK (Average)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	1.0	1.0	1.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[2.4GWLAN]

IEEE 802.11b (Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.5	8.5	8.5
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11g (Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.5	8.5	8.5
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8.5	8.5	8.5
Tolerance $\pm$ (dB)	1.0	1.0	1.0

8. Evaluation Results

8.1

Standalone SAR Evaluation

[Antenna 0]

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
GFSK	2.50	5	3.00	1.9953	0.6 < 3.0	Yes
$\pi/4$ DQPSK	2.50	5	2.00	1.5849	0.5 < 3.0	Yes
8DPSK	2.50	5	2.00	1.5849	0.5 < 3.0	Yes

[Antenna 1]

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
IEEE 802.11b	2.50	5	9.50	8.9125	2.8 < 3.0	Yes
IEEE 802.11g	2.50	5	9.50	8.9125	2.8 < 3.0	Yes
IEEE 802.11n HT20	2.50	5	9.50	8.9125	2.8 < 3.0	Yes

Remark:

(1). RF output power including tune up tolerance;

(2). When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 of KDB 447498 is applied to determine SAR test exclusion.

8.2

Simultaneous Transmission SAR Exclusion

The sample support BT modular and 2.4G WLAN modular, BT and 2.4G WLAN share difference antenna, need consider simultaneous transmission;

8.2.1 Estimated Standalone SAR

[Antenna 0]

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		Estimated SAR Values (W/kg)
			dBm	mW	
GFSK	2.50	5	3.00	1.9953	0.0841
$\pi/4$ DQPSK	2.50	5	2.00	1.5849	0.0668
8DPSK	2.50	5	2.00	1.5849	0.0668

[Antenna 1]

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		Estimated SAR Values (W/kg)
			dBm	mW	
IEEE 802.11b	2.50	5	9.50	8.9125	0.3758
IEEE 802.11g	2.50	5	9.50	8.9125	0.3758
IEEE 802.11n HT20	2.50	5	9.50	8.9125	0.3758

Remark:

(1). RF output power including tune up tolerance;

(2). When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 of KDB 447498 is applied to determine SAR test exclusion.

8.2.2 Estimated Simultaneous SAR

Maximum Simultaneous transmission SAR Ratio for BT and WLAN;

SAR Ratio _{BT}	SAR Ratio _{wlan}	Σ SAR ratios	Limit	Results
< 0.1	< 0.3	< 0.4	1.0	PASS

Remark:

(1). RF output power including tune up tolerance;

(2). When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 of KDB 447498 is applied to determine SAR test exclusion.

9. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure of mobile device.

-----THE END OF REPORT-----