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1. Radio Frequency Exposure

RESULT: **Pass**

Test standard : FCC Part 2: Section 2.1091
RSS-102 Issue 5
KDB 447498 D01 General RF Exposure Guidance v06

1.1 Product Technical Information

The EUT is a Digital media receiver which supports Bluetooth, Bluetooth BLE and 2.4GHz/5GHz Wi-Fi protocols, refer below for detail information.

Technical Specification	Value
Product Name	Digital media receiver
Model	B7W64E
FCC ID	2ALXK-2767
IC	25980-2767
HVIN	B7W64E
Frequency Bands	2400-2483.5MHz 5150-5350MHz 5470-5725MHz 5725-5850MHz
Operating Frequency/Channels/Protocol	Bluetooth: 2402-2480MHz, 79CHs Bluetooth BLE: 2402-2480MHz, 40CHs 2.4GHz Wi-Fi: 2412-2472MHz, 13CHs, 802.11b/g/n20 5GHz Wi-Fi: 5180-5320MHz, 14CHs, 802.11 a/n20/n40/ac20/ac40/ac80 5500-5700MHz, 21CHs, 802.11 a/n20/n40/ac20/ac40/ac80 5745-5825MHz, 8CHs, 802.11 a/n20/n40/ac20/ac40/ac80
Type of Product	Client Device without Radar Detection
TX Power Control (TPC)	Not Supported
Modulation	DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16QAM, 64QAM) GFSK, pi/4-DQPSK, 8-DPSK
Antenna Number	Bluetooth: 1 2.4GHz Wi-Fi: 1 5GHz Wi-Fi: 1
Antenna Type	Integral antenna
Antenna Gain	Bluetooth: 2.0dBi max. 2.4GHz Wi-Fi: 3.0dBi max. 5GHz Wi-Fi: 6.0dBi max.
Operation Voltage	Powered by AC/DC adapter

1.2 Product Classification

This device defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

1.3 Radio Frequency Exposure Limit

For FCC:

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)
300-1,500	--	--	f/1500
1,500-100,000	--	--	1.0

For IC:

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
$0.003\text{-}10^{21}$	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142f^{0.3417}$	$0.008335f^{0.3417}$	$0.02619f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

1.4 Radio Frequency Exposure Calculation Formula

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

where: S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW)
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 (appropriate units, e.g., cm)

or:

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

where: EIRP = equivalent (or effective) isotropically radiated power

1.5 Calculation Result

1.5.1 Stand-alone transmission MPE

Mode	*Measured RF Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm²)	FCC Limit (mW/cm²)	IC Limit (mW/cm²)
Bluetooth	12.11	2	20	0.0048	1.0	5.35
2.4G Wi-Fi	21.87	3	20	0.0131	1.0	5.37
5G Wi-Fi	17.93	6	20	0.0214	1.0	9.05

Note:
1. *Bluetooth RF Output Power: Refer to 60391936 001 Appendix B&C
2. *2.4GHz Band RF Output Power: Refer 60391936 002 Appendix B
3. *5GHz Bands RF Output Power: Refer 60391936 003 Appendix B

1.5.2 Simultaneous transmission MPE

Per KDB 447498 D01 v06, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0.

Simultaneous transmission Scenarios

No.	Simultaneous transmission Scenarios
1	Bluetooth + 2.4GHz Wi-Fi
2	Bluetooth + 5GHz Wi-Fi

1) For Bluetooth + 2.4GHz Wi-Fi:

The MPE ratio for Bluetooth can be calculated as follow:
=The power density at 20cm distance/MPE limit
=0.0048 mW/cm²/1 mW/cm²
=0.0048

The MPE ratio for 2.4GHz WiFi can be calculated as follow:
=The power density at 20cm distance/MPE limit
=0.0131 mW/cm²/1 mW/cm²
=0.0131

The sum of the MPE ratios for all simultaneous transmitting antennas:
=0.0048+0.0131
= 0.0179<1.0

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0, simultaneous transmission MPE test exclusion will be applied.

2) For Bluetooth + 5GHz Wi-Fi:

The MPE ratio for Bluetooth can be calculated as follow:
=The power density at 20cm distance/MPE limit
=0.0048 mW/cm²/1 mW/cm²
=0.0048

The MPE ratio for 5GHz WiFi can be calculated as follow:
=The power density at 20cm distance/MPE limit
=0.0214 mW/cm²/1 mW/cm²
=0.0214

The sum of the MPE ratios for all simultaneous transmitting antennas:
=0.0048+0.0214
= 0.0262<1.0

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0, simultaneous transmission MPE test exclusion will be applied.

1.5.3 Conclusion

Therefore the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.