

SAR EXCLUSION REPORT

Applicant Name:

JVC KENWOOD CORPORATION

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Test Report No.: HCT-SR-1807-FC003-R1

Test Site: HCT CO., LTD.

FCC ID:

K44431500

Equipment Type:

UHF DIGITAL TRANSCEIVER

Application Type

Certification

FCC Rule Part(s):

47CFR §2.1093

FCC Model Name:

**NX-5300-K2, NX-5300-K3, NX-5300-F2, NX-5300-F3,
TK-5330-F2, TK-5330-F3, VP5330-F2, VP5330-F3, VP6330-F2,
VP6330-F3**

Device Wireless specification overview		
Band & Mode	Operating Mode	Tx Frequency
Bluetooth 4.0 LE	Data	2 402 – 2 480 MHz
Maximum Output Power : 2.5 mW		

This device has been excluded from SAR measurements based on FCC FDB KDB 447498 D01 v06.

Reviewed By



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1. SAR Test Exclusions Applied

Calculation Result:

Tx frequency range: 2 402 MHz ~ 2 480 MHz

Min. test separation distance: 5 mm

Maximum Output Power: 2.5 mW

The Highest RF channel frequency: 2 480 MHz

1.1 Bluetooth for FCC

Per FCC KDB 447498 D01v06, The SAR exclusion threshold for distance < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel(mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 3.0 \text{ for 1-g SAR}$$

Mode	Frequency [MHz]	Maximum Allowed Power [mW]	Separation Distance [mm]	≤ 3.0 for 1g SAR
Bluetooth 4.0 LE	2 480	2.5	5	0.800

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Bluetooth SAR was not required $[(2.5/5)*\sqrt{2.480}] = 0.8 < 3.0$.

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06 IV.C.1iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6W/kg. When standalone SAR is not required to be measured per FCC KDB 447498 D01v06 4.3.22, the following equation must be used to estimate the standalone 1-g SAR and 10g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel mW})}{\text{Min Separation Distance}}$$

Estimated 1-g SAR

Mode	Frequency [MHz]	Maximum Allowed Power [mW]	Separation Distance (Body) [mm]	Estimated 1g SAR (Body) [W/kg]
Bluetooth 4.0 LE	2 480	2.5	5	0.105

Note:

Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. The Estimated SAR results were determined according to FCC KDB447498 D01v06.

2. Simultaneous SAR Analysis

2.1 Simultaneous Transmission Summation for Body-Worn

Simultaneous Transmission Summation Scenario with Bluetooth for FCC				
Exposure condition	Band	VHF SAR	Bluetooth SAR	Σ 1-g SAR
		(W/kg)	(W/kg)	(W/kg)
Body-worn	Body-worn Belt clip	5.0	0.105	5.105

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498 D01v06. Estimated SAR results were used for SAR summation for body-worn back side at 5 mm to determine simultaneous transmission SAR test exclusion.

The simultaneous transmission summation is applied only for body-worn case according to user condition. Bluetooth transmission is using for Bluetooth headset when DUT is on the body-worn case.

2.2 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013.

3. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/IEEE C95.1- 2005.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.