Customer declared Output powers

Technology	Power Output (dBm)	Power Output (W)
Z-Wave*	-2.43	0.001
Wi-Fi**	23.8	0.240
ZigBee**	26.8	0.479

* Power from RF130710C16 Max peak radiated output power
** Output power + 6dBi Gain antenna

Section 4.3 General SAR test reduction and exclusion guidance

For Standalone SAR exclusion consideration, when SAR Exclusion Threshold requirement in KDB 447498 is satisfied, standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.

In the frequency range below 100 MHz to 6 GHz and test separation distance of 50mm, the SAR Test Exclusion Threshold will be determined as follows

SAR Exclusion Threshold (SARET)

SAR Exclusion Threshold = Step 1 + Step 2

Step 1

$$NT = [(MP/TSD^{A}) * \sqrt{f_{GHz}}]$$

NT = Numeric Threshold (3.0 for 1-g SAR and 7.5 for 10-g SAR)
MP = Max Power of channel (mW) (inc tune up)
TSD^{A} = Min Test separation Distance or 50mm (whichever is lower) = 50

We can transpose this formula to allow us to find the maximum power of a channel allowed and compare this to the measured maximum power.

$$= [(NT \times TSD^{A}) / \sqrt{f_{GHz}}]$$

For Distances Greater than 50 mm Step 2 applies

Step 2

For Frequencies from 100 MHz to < 1500 MHz

$$(TSD^{B} – 50mm) * (f_{MHz} / 150)\}$$

For Frequencies > 1500 MHz and ≤ 6 GHz

$$(TSD^{B} – 50mm) * 10\}$$

Where:
TSD^{B} = Min Test separation Distance (mm) = 200

Z-Wave Operating Frequency 916 MHz

SARET = [(3.0 x 50) / √0.916] + {(200 – 50) * (916/150)}
SARET = [150 / 0.957] + {150 * 6.11}
SARET = 156.74 + 916.5
SARET = 1.073 W

Wi-Fi Operating Frequency 2.462 GHz

SARET = [(3.0 x 50) / √2.462] + {(200 – 50) * 10}
SARET = [150 / 1.569] + {150 * 10}
SARET = 95.60 + 1500
SARET = 1.596 W

ZigBee Operating Frequency 2.435 GHz

SARET = [(3.0 x 50) / √2.435] + {(200 – 50) * 10}
SARET = [150 / 1.560] + {150 * 10}
SARET = 96.13 + 1500
SARET = 1.596 W

Section 7.2 Transmitters used in mobile device exposure conditions for simultaneous transmission operations

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0, according to calculated/estimated, numerically modelled, or measured field strengths or power density. The MPE ratio of each antenna is determined at the minimum *test separation distance* required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to the MPE limit at the test frequency. Worst case figures are recorded for each radio for simultaneous operation.

Band	EIRP (W)	Duty Cycle (%)	Time Averaged EIRP (W)	SAR Exclusion Threshold (W)	Ratio
Z-Wave*	0.001	100.00	0.001	1.073	0.001
Wi-Fi**	0.240	100.00	0.240	1.596	0.150
ZigBee**	0.479	100.00	0.479	1.596	0.300
Sum of Ratios of simultaneously operating radios					0.5
Ratio Limit					**< 1.0**