Date January 11, 2024

FCC ID: O8PGSB

RF EXPOSURE SAR ANALYSIS REPORT

The device covered by this report is a small (FCC ID: O8PGSB) capsule (PillCam Genius SB Capsule) designed to be ingested by a human in order to provide photos of the intestinal tract or a specific portion of that tract. It is activated when removed from the packaging and is ingested quickly (typically within a few seconds). The overall size is approximately the same as a large pill one might purchase or have prescribed from a pharmacy. Once ingested as the capsule travels through the intestinal tract it would be expected to always be within 5 mm or less from the body tissue as it travels.

The Pillcam is normally set up in a torso simulator with tissue material characteristics for body tissue at 435 MHz with Pillcam support arrangement as shown in the emissions test data report. However, for purposes of RF Exposure compliance to determine worst case conducted power, the unit was operated in a continuous transmission mode set up in a Semi-Anechoic Chamber without the use of a simulator filled with tissue material. Both low data rate and high data rate transmission formats were measured and the highest level recorded. Radiated field strength measurements were made at 1 meters. In this arrangement, the Pillcam was manipulated horizontally and vertically and the measurement antenna height varied in order to find the maximum level of radiated field strength.

Given Imaging has determined from the recorded worst-case data that the above Pillcam device is compliant with the power limit required for eligibility for application of a SAR test exclusion due to its very low power that is well below the qualifying level of ≤ 1 milliwatt. Based on FCC policy for devices internal to the human body, provided in Paragraph 4.2.4 of KDB 447498 D01 General RF Exposure Guidance v07, Given Imaging wishes to apply, based on their analysis of the Pillcam, an exclusion from SAR measurement or numerical simulation.

As discussed above the field strength data was taken in a manner to provide worst case levels for field strength from which we are able to address conducted power based on the calculation for Far-Field region.
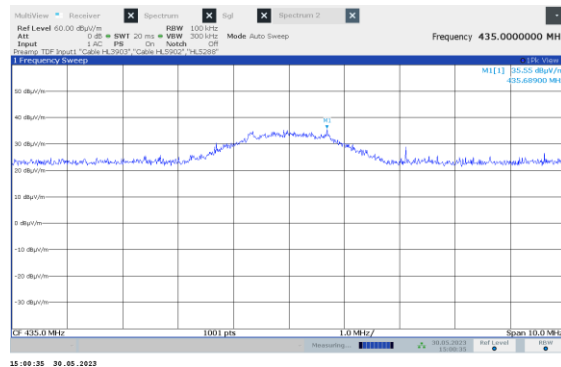
Far-Field Region:
Power estimate via the far-field was described by the following equation:

$$P = 4\pi r^2 \frac{E^2}{Z_o}, where\ Z = 120\pi$$

Table 1 and Table 2 below shows the data from the SAR Exclusion Exhibit report specified above.

Table 1 Power calculation for Far-Field region for HFR 5.5 bps inside the Phantom (torso simulation)

f.MHz	d, m	λ, m	λ/2π, m	E, dBµV/m	E, V/m	Z_H, Ω	Far-field formula	
							P, W	P, mW
435	1	0.68965	0.11	35.55	0.00006	376.99	0.000000	0.000000

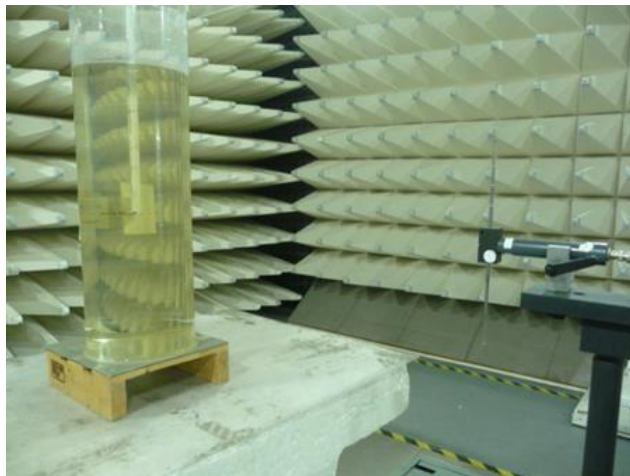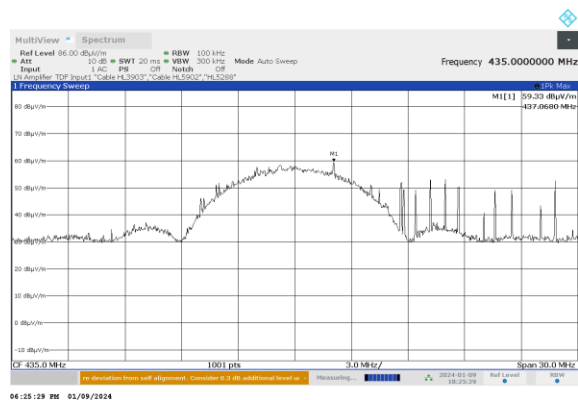**Test setup photo for measuring radiated output power with torso simulator**

Table 2 Power calculation for Far-Field region for HFR 5.5 bps outside the Phantom (torso simulation)

				E,			Far-field formula	
f.MHz	d, m	λ, m	λ/2π, m	dBμV/m	E, V/m	Z_H, Ω	P, W	P, mW
435	1	0.68965	0.11	59.33	0.00092	376.99	0.00000	0.00003

Test setup photo for measuring radiated output power without torso simulator

Based on the above the product compliance with the 1 milliwatt and can be exempted from the SAR measurement or numerical simulation.

Sincerely,
Mrs. S. Peysahov Sheynin, certification specialist,
EMC & Radio