

RF Exposure Exhibit
FCC ID: 2AL2U-ET2000150
Model: ET20001.50 and ET20001.51
etectRx, Inc.
107 SW 140th Terrace Suite 1
Newberry FL 32669

General Information:

Applicant: etectRx, Inc.

Environment: General Population/ Uncontrolled Exposure

Exposure Conditions: Ingested

Technical Information:

Minimum Test Separation Distance: Ingested device

Operating Frequency Range: 299 to 315 MHz

Antenna Type: Linear Omnidirectional. The antenna is an electrically short loop optimized to transmit immersed in high dielectric material.

Antenna Gain: <-11.5 dBi (Peak) (far field)

Maximum Transmitter Conducted Power: 10.5 dBm (11.2 mW) Peak (includes manufacturing variation or "tune-up" tolerance).

Maximum (peak) Transmitter EIRP: -0.3 dBm (0.93 mW)

Modulation type: low duty factor on – off keying

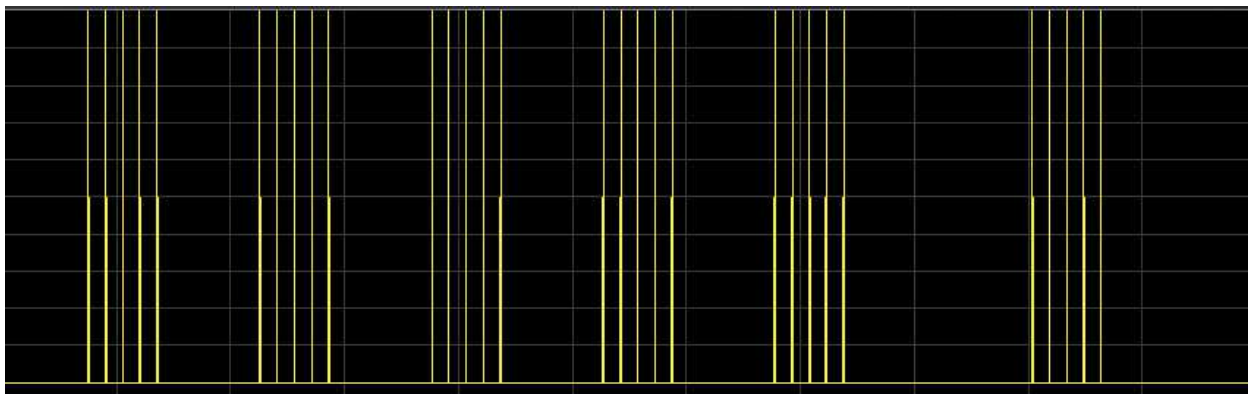
Justification for SAR Test Exclusion:

Standalone SAR Test Exclusion:

Our system consists of a commercial drug capsule with sensor, the ID-Tag, rolled up inside. An electrochemical reaction by gastric juices in contact with the metallic electrodes powers the tag. This yields about 1.5 VDC with an expected mean current consumption of 90 μ A. The life of the tag in the body will be about 20 minutes. The integrated circuit that generates the RF energy contains voltage regulators and this keeps the RF output power constant till the cell is exhausted. The peak RF output power is 10.5 dBm. This peak output power value includes any manufacturing variation.

The modulation consists 15 slots of on – off keyed pulses with the following pulse format and timing:

BIT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
VAL	0	1	0	1	0	1	0	1	0	1	0	0	1	0	0



Slots 0, 10, 11, 13, and 14 are always 0.

A binary "0" consists of no pulses.

Using a maximum payload packet yields a duty cycle of 200 μ s on-time in 100500 μ s total for a 0.2% 'on' time overall.

Limits:

Using the SAR exclusion thresholds in KDB 447498 Section 4.2.4.

“When the aggregate of the maximum power available at the antenna port and radiating structures of an implanted transmitter, under all operating circumstances, is ≤ 1.0 mW, SAR test exclusion may be applied.”

The exemption limit for routine evaluation is 1 mW average power. The output power limit for a medical implant device is defined as the higher of the conducted or EIRP to determine whether the device is exempt from SAR evaluation.

Conducted Power

The duty cycle correction factor as described in the previous section was used in the calculation of the average conducted power.

Duty cycle $(200 \mu\text{s} / 100500 \mu\text{s}) = 0.002$

The Tag has no antenna connector. To get the conducted RF output power the Tag's RF IC was placed in a test fixture and the RF conducted power was measured. This was upward adjusted to include manufacturing tolerance.

$11.2 \text{ mW} * 0.002 = 0.02 \text{ mW}$ Average Power Conducted
 0.02 mW is $< 1 \text{ mW}$

Radiated Power

Taking the average conducted power and now adding in the antenna gain (loss).

The antenna gain was calculated and verified by measurement to be -11.5 dBi in the far field.

The average radiated power therefore is -16.5 dBm (0.02 mW) + $(- 11.5 \text{ dBi}) = -28 \text{ dBm}$
 -28 dBm is $< 0 \text{ dBm}$ (1 mW)

Conclusion:

The average conducted power and the average radiated power are below the 1mW limit described in KDB 447498 Section 4.2.4. and further SAR testing is not required