Appendix B

Source Based Time Averaging and Operational Declarations

Scott Health and Safety, the manufacturer of the EUT is requesting a mathematical adjustment of the measured RF power, at the frequency of operation, based on source based time averaging characteristics of the EUT.

The request is for a reduction in the measured RF power, based on 0.8 % transmitter duty factor out of any 100 ms window of measurement. The supporting evidence is presented below as the declared theory of operation from the manufacturer, along with two measurements of the transmit packet envelope and repetition cycles as captured on an oscilloscope.

Theory of Operation

The transceiver operates on a single channel at 2425.0 MHz with a nominal conducted output power of +20 dBm and is stabilized by means of an internal voltage regulator.

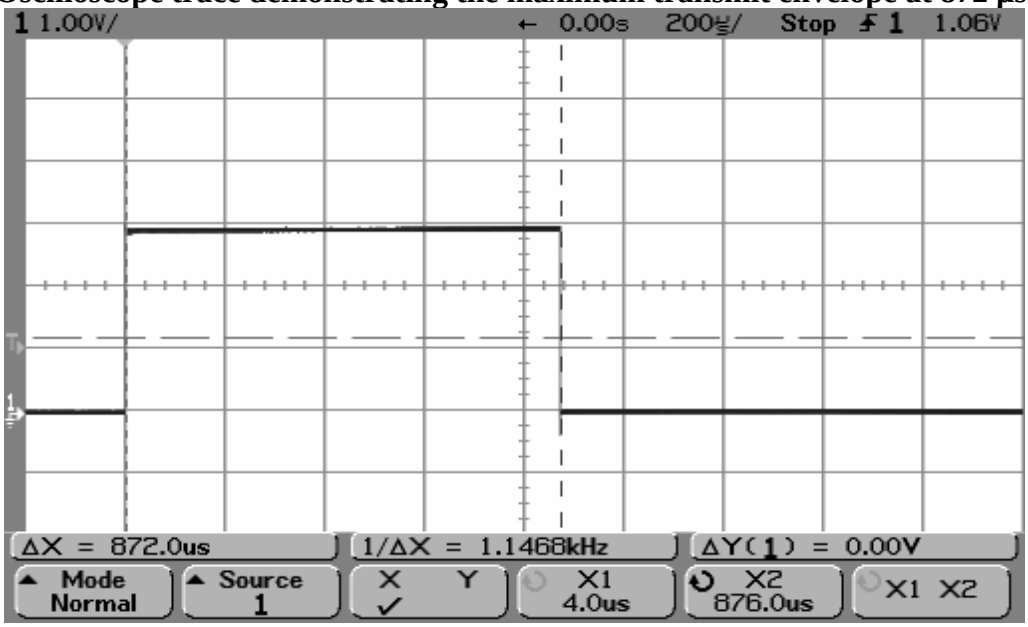
The device operates in a packet mode only. No continuous RF carrier is possible. Each packet is 872 µS long and is repeated at a rate of 4 times per second. The average time between packets is ¼ second but they will dither in time. The shortest repetition between two adjacent packets is 173 mS. Digital data is sent using O-QPSK modulation at a bit rate of 2 MCPS with a payload bit rate of 250 MBPS.

Output frequency is controlled to within 20 ppm by a 16.00 MHz crystal on the radio transceiver chip. The RF oscillator is entirely contained within the radio chip. No external inductor is used.

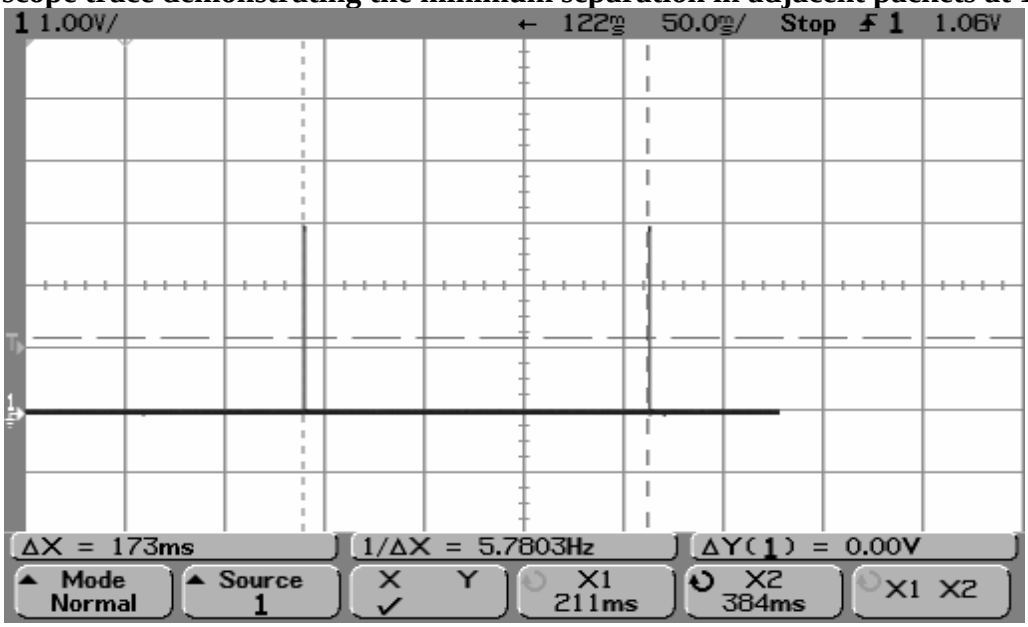
The antenna is a printed circuit board Planar Inverted F (PIFA) with a nominal gain of -2 dBi and a peak gain of -1.9 dBi along a single axis.

The minimum separation distance of the EUT from the user will be greater than 2.5 cm, in all cases, based on the dimensions of the enclosure, as well as the typical usage where the EUT will be used and worn outside of protective fire-fighting clothing and gear.

Oscilloscope trace demonstrating the maximum transmit envelope at 872 µs.



Oscilloscope trace demonstrating the minimum separation in adjacent packets at 173 ms.



Exposure category	low threshold	high threshold
general population	$(60/f_{GHz})$ mW, $d < 2.5$ cm $(120/f_{GHz})$ mW, $d \geq 2.5$ cm	$(900/f_{GHz})$ mW, $d < 20$ cm
occupational	$(375/f_{GHz})$ mW, $d < 2.5$ cm $(900/f_{GHz})$ mW, $d \geq 2.5$ cm	$(2250/f_{GHz})$ mW, $d < 20$ cm

Transmit packet on time:	0.87	(mS)
Packet repetition time:	173.00	(mS)
Maximum peak output power at antenna input terminal:	19.9	(dBm)
Antenna gain(typical):	-1.9	(dBi)
Antenna gain(typical):	0.65	(numeric)
Maximum peak output power at antenna output:	18.03	(dBm)
Maximum peak output power at antenna output:	63.53	(mW)
Use-based time-averaged power, conducted:	**0.32**	(mW)
Maximum peak radiated output:	113.30	(dBuV/m @ 3m)
Maximum peak radiated output:	18.10	(dBm)
Maximum peak radiated output:	64.57	(mW)
Use-based time-averaged power, radiated:	**0.33**	(mW)
Low threshold for d<2.5 cm at 2.425 GHz:	**24.74**	(mW)
Low threshold for d>2.5 cm at 2.425 GHz:	**49.48**	(mW)

In both cases, computed and measured, the output power is below the low threshold for all separation distances greater than and less than 2.5 cm.

Photo of the EUT with the enclosure, demonstrating the minimum separation of 2.5 cm from the human body.