Chris Harvey

From: Liming Xu
Sent: Monday, October 06, 2003 1:46 PM
To: Chris Harvey
Subject: FW: MPE limit calculation

-----Original Message-----
From: Liming Xu
Sent: Thursday, September 04, 2003 5:20 PM
To: 'kpowell@matricsrfid.com'
Subject: RE: MPE limit calculation

Thanks

> -----Original Message-----
> **From: Kevin Powell [SMTP:kpowell@matricsrfid.com]**
> **Sent:**   Thursday, September 04, 2003 4:58 PM
> **To:** LXu@metlabs.com
> **Subject:**   RE: MPE limit calculation
> **Importance:**   High
>
> OK - as discussed, I have the following information for you -
>
> #1 - depending upon antenna gain, with a 20W (+43dBm) reader output, it
> would be easy to achieve a field power above the FCC limit. Thus, you must
> take into account the appropriate antenna used at different power levels.
> Alternatively, you could base a calculation on the maximum allowed by the
> FCC = 30W ERP. The easiest method to achieve this with equipment delivered
> is to attach the antenna labeled "ARM" and run the reader at the high power
> setting (value 255). Actual measured power with this config is a little
> less than 29W ERP.
>
> #2 - duty cycle. We do not impose waiting, or specific delay within the
> reader firmware, however, systematically we achieve a maximum potential of
> RF on at 37%, details are:
>
> Note - the reader is only active upon a host request.
>
> - Host request is (average) 100 bits (at 230K baud), xmit time .5ms
> - Reader changes from an internal standby mode to fully, stabilized power -
> 3ms time
> - Reader then transmits wake-up @ 1 ms
> - Reader then negotiates a tag, with retry @ 320 bits (15 usec each) = 4.8ms
> - Reader then turns off RF
> - Reader packetizes return data @ .5ms
> - Reader transmits packet @ 200 bits (at 230K baud), xmit time 1ms
> - Host requires to accept, process, and acknowledge packet - typ. 5ms
>
> Thus - Modulated RF "ON" time (roughly 50% duty in itself) is 5.8ms
>   - RF "OFF" minimally will be 10ms
>
> On time of 5.8 over full period of 15.8 = duty cycle of 37% (maximally)

Note - that often PC processing (application) doesn't drive the reader
nearly as fast as quoted above, leaving a much lower duty cycle. Most apps
are actually in the 1-10%, however, since this is not an encoded, guaranteed
delay, I can quote this to you as an absolute maximum. Additionally, the
particular application utilizing this equipment only operates the reader
upon system trigger / input, which averages 1 read every 30 seconds.
Overall this is well below 1% -- but again, the reader itself does not
guarantee the large delay.

Hope it helps - let me know if you need more info.

Thanks,

Kevin J Powell
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Tag the World ...

-----Original Message-----
From: LXu@metlabs.com [mailto:LXu@metlabs.com]
Sent: Thursday, September 04, 2003 3:30 PM
To: kpowell@matrics.com
Subject: MPE limit calculation

Hi Kevin,

Please provide the time-averaging interval and duty cycle of the RF carrier
signal.
So we can calculate the average exposure to comply with the MPE limit.

Regards

Liming