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In response to your comments regarding the applications for FCC ID SK6XS37008 please find our responses below:

1) The operational description provided is strictly for the model with 16 transmitters. To clarify this application, is an operational description available for only the model with 8 transmitters to define this application more clearly?

> One is not available at this time – I have prepared an explanation letter to cover the differences. If more is required please advise.

2) The device appears to be able to have 802.11 b/g capability for 4 transmitters, but it appears to be stated in many locations in the application that only 3 802.11b/g will be used at a time. What limits this to 3? Note that the users manual page 98 suggests that 4 can operate at the same time while Page 6 of the report states
Aggregate power is the sum of the output powers from the maximum number of individual transceivers that can operate in the band specified without two trx using overlapping channels. There are only 3 non-overlapping channels available in the band.
It would seem if each device is directional in nature that all four could be used and that 3 non-overlapping channels may not be a correct assumption. Additionally, if device are directional, it would seem that it would be possible to transmit the same channel from 2 different radios. Please comment as this may affect assumptions made to sum power (sum across band vs, sum of worse case channels) and MPE calculations.

> It is possible for all four 802.11abg transceivers to be operational in the 2.4 GHz band simultaneously. The report, aggregated power and form 731 have all been updated.

3) MPE appears to take into consideration 4 802.11 b/g TX's occurring at the same time, even though other information states only 3 will be used at a time. Please review given 2) above.

> It is possible for all four 802.11abg transceivers to be operational in the 2.4 GHz band simultaneously. The MPE is correct in this assumption.

4) Please clearly define the maximum number of Transmitters that can be used each band given information above in 2) and 3). Note it may be helpful to add a column to the MPE to denote maximum number of channels for each sub band as well to keep understanding of worse case selections to a minimum. (i.e., can all 5 channels be used at the same time in the 5725 – 5850 band?). In addition, could a user not only operate on all 5 channels, but use the same channel more than once in different directions. Additionally, how is this controlled? The GUI interface appears to allow any selection of channels for each radio.

It is possible for all four 802.11abg transceivers to be operational in the 2.4GHz band simultaneously. The MPE is correct in this assumption.

The MPE calculation has a table on the second page that shows the number of channels available in each band. I have added more comments to try and explain the rationale behind the worst-case mode.

To clarify further:

11 channels in the 2412 – 2462 MHz range
4 channels in the 5150 – 5250 MHz band
4 channels in the 5250 – 5350 MHz band
5 channels in the 5725 – 5850 MHz band

5) Page 38 of 113 of the test report, please explain how the power is summed assuming all 5 channels in the band are being used (note 2). For instance, why can't all 3 directional antennas be for the highest power channel? 3 x 1.675 W + 2 x 0.375 W? Additionally, I can not recreate the maximum summed power listed, even trying to follow the note 2. Also, the power assumes 5 channels, while worse case MPE appears to suggest only 4 can be used (3 directional, 1 additional). Please clarify these inconsistencies.

Firstly, Xirrus are removing the high gain external antenna from this application as the use of such a high gain antenna would require them to lock out the use of the external antenna with any of the other 5 GHz bands. The test data, MPE calculations and report have been updated to remove the references to the high gain Maxrad antenna.

The test data has been revised to show a corrected aggregated power over all five channels. The aggregated power assumes all five channels at the highest output power (19.7dBm, 0.094W) to give a total of 26.7dBm, or 0.471 Watts.

The maximum eirp for each radio is with the internal 6dBi antenna (the external antenna has a high gain of 3dBd, 5.2dBi), which gives a total eirp of 32.7dBm, or 1.875 Watts.

6) The interface on page 53 of the users manual suggests that selection of channels may not be mutually exclusive given so many transmitters are enabled on the same channel. If channels are not mutually exclusive, then shouldn't summing of powers should be based on worse case channel per band multiplied by the maximum number of channels in that band that can be utilized. See additional comments above.

The system incorporates lockout of a channel once selected, thereby ensuring a channel can only be selected once. It also locks out the ability the ability to have devices operating on overlapping channels:

- the 2400 – 2483.5 MHz band has 11 channels, separated by 5 MHz with a signal bandwidth of between 12 MHz and 17MHz, so there are a maximum of 4 non-overlapping channels in this band – channels 1,4, 7 and 10 or 11).
- all other bands have a channel spacing of 20MHz, wider than the 17MHz signal bandwidth.

The operational description also references about use of non-overlapping channels. The GUI showing channel lockout has also been uploaded.

7) Is there detailed specifications/information on the two 5 GHz external antennas being approved? The FCC desires this information to be included with the application.

The antenna gain information for the 5 GHz antennas was uploaded. It will be revised to remove the high gain antenna.

8) Questions regarding power on page 43 of 113;

a) Given information above, what limits the TX to only 4 channels in each band (both 5150- 5250)?

See response to (6).

b) Why is the power in the second table for aggregation of power different than power measured in the first table? It appears that a power reduction in the software settings was necessary? Which will be in final production units? Note that data on following pages matches the 2 table but the information on the 731 form appears to match first table.

A reduction was necessary, and this new value will be in the final production units. The form 731 was revised an uploaded, but I will send it again.

c) How does a) and b) affect MPE information reported?

It does not.

d) It appears that even a single channel for either band is in excess of this limit if the external 12.5 dBi gain antenna is used. However information on page 11 of the report suggests that only the 5725 – 5825 MHz band uses the external antenna. Please explain how this is controlled to meet 15.15.

See response to (5) which removes the high gain antenna from the application.

e) In your discussions with Joe D., was there any concern regarding aggregation of spectral density as well. It would appear that this may be over the limits if aggregation was necessary for the 2 lower UNII bands.

It was not discussed, but I assumed that both power and PSD would be aggregated. However, as the device only uses non-overlapping channels the PSD would not need to be summed for each radio since the power density per MHz would only be affected if the channels overlapped.

9) Please explain the reference to antenna gain of 1.45 on page 53 of 113. Should this be 6 dBi?

Correct, changed and incorporated into the revised report.

10) Please explain why the data on pages 54 and 55 of 113 appear significantly higher in the plots than the tables.

Plots show peak values, the table shows average values. The OFDM modulation has a peak : average ratio of ~10dB.

11) To get the true correction factors on page 80 and 81 (which are used on page 83 and 85), different settings should likely have been used. Settings appear to be mixed/matched. Call to discuss.

The correction factor has been changed to show the marker delta measured in 1MHz between in-band peak and out-of-band spurious at the band edge. As the spurious is at the band edge and the signals is a broadband signal an additional correction was applied to account for the delta between 1MHz and 100KHz, measured at the band edge.

12) Please explain how the ferrites will be implemented on the Ethernet cables. The FCC expects that these should be permanently molded and the cable provided. Alternatively if installed with the system the FCC would generally only allow this to be professionally installed and the installers must be properly instructed on how to install. The FCC has generally not allowed end users to install these as the burden of compliance must not be given to the user.

The aim is to re-spin the digital circuit board to avoid using the ferrites. If this is not done before the first release of the product Xirrus will provide the cables with the ferrite pre-installed on the signal interface cables.

13) FYI….It is uncertain why Radiated uses a limit of -33 dBm/MHz, when the limit of –27 dBm/MHz is already and EIRP limit on pages 59 – 61 of the report. It is assumed that this is in error, but given it is more restrictive will not affect the final results negatively. Note that -33 dBm is acceptable for antenna conducted for the assumption of a 6 dBi gain antenna.

Data amended and included in the revised report.

14) FYI…..The updated user's manual mentions a model with only 4 transmitters. Please note that this does not appear to covered by either application.

Noted.

The following files have been uploaded in support of the above:

- 5GHz external antenna spec.pdf
- R58645 rev 3.pdf
- MPE Calculation - 8 TRx REV 3.pdf
- ATCB-Form-731 (UNII) rev 2.doc
- ATCB-Form-731 (DTS) rev 2.doc
- Channel lock out GUI.JPG

Regards,

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