

FCC ID: L2V-STX3
IC ID: 3989A-STX3
CT Project: p1320003

From: Chris Harvey

Date: November 11, 2013

Amanda, thank you for the response. We are getting closer but not yet there. The new comments from me are in GREEN.

9. The FCC Modular Approval letter indicates that this device has a unique Antenna Connector, but this appears to have a pin on the PCB for connection to an antenna trace. There is FCC Guidance on Licensed Modules and for Trace Antenna compliance, but due to the US Government shutdown, I cannot determine the KDB numbers.

Spot - The module is not approved for use with an antenna trace under this application. This device is only approved for use with the specified ceramic patch antenna. The pin on the board is to be connected directly to the specified antenna.

Continued Q9. The module does not have an RF connector and relies on an installation to a host that contains a connection to a pin that has a trace to some antenna connector. In order to NOT have an antenna or antenna connector on the module, there MUST be control over installation, and the installation guidance MUST be part of this application review. This cannot be a regular Modular Approval, but must be a Limiter Modular Approval because this item #4 of the Modular Approval cover letter is NOT met.

Modular item #4. "The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a "unique" antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The "professional installation" provision of Section 15.203 may not be applied to modules.

CH 11-11-13

According to the FCC KDB 996369 D01 Module Guide:

Question 11: Can a module be certified where the host device must use a micro-strip trace on the host's printed circuit board to an antenna connector or a trace antenna on the host circuit board?

Answer 11: A modular transmitter may be certified when the connection to the antenna is made through a host's printed board micro-strip trace layout to an external connector, trace antenna or component (chip) antenna on a printed circuit board (herein referenced as "trace design"). This can be extended to include passive parts for antenna attenuation padding, impedance matching or providing test ports. Other components such as amplifiers and active drivers are not considered a trace layout and must be contained on the module.

The Form 731 application shall include detailed engineering reference designs for the trace design in addition to the required OEM instructions (see Comprehensive integration instructions above) for all trace designs approved with the module. In particular the integration instructions shall include the following:

1. Trace layout and dimensions including specific designs for each type:
 - a. Layout of trace design, parts, antenna, connectors and isolation requirements;
 - b. Boundary limits of size, thickness, length, width, shape(s) dielectric constant, and impedance must be clearly described for each type antenna;
 - c. Different antenna length and shapes affect radiated emissions and each design shall be considered a different type; e.g., antenna length in multiple(s) of frequency wavelength and antenna shape (traces in phase) can affect antenna gain and must be considered;
 - d. The above data is to be provided by a Gerber file (or equivalent) for PC layout.
2. Appropriate parts by manufacturer and specifications.



3. Test procedures for design verification.
4. Production test procedures for ensuring compliance.

Only trace designs approved at the time of grant or through permissive change can be used by the OEM. PCB circuit designs have an increased potential for design mishandling and they are susceptible to cross-talk and increased unintentional radiation. The applicant must provide compliance test data for all antenna circuit trace designs being marketed or used. Different antenna length and trace layouts can affect radiated emissions and each design shall be considered a different type.

For demonstrating compliance, when not limited to specific host, a stand-alone reference opens board PCB test board design that is representative of the worst case boundary limits (as constrained by the design rules documented in the integration instructions) for each trace design (type) shall be used.

For SAR consideration, all current test procedures and guidance must be followed as discussed in Section IV on RF Exposure considerations and all the relevant KDB publications and in particular the conditions defined in Section 2 of KDB Publication 447498.

996369 D01 Module Equip Auth Guide v01r04 13

It is recommended that the grantee have an agreement with the Host manufacture to build in accordance with instructions, in order to ensure compliance.

Grant comment: This module can only be used with a host antenna circuit trace layout design in strict compliance with the OEM instructions provided.

(end of KDB reference)

1. Therefore, please provide ALL OF THE information required for this 'Trace Design' as required by the FCC.

CT- Manufacturer has included Gerber files detailing Antenna trace section.

The document set now includes the STX3 reference design package which includes:

1. RF trace layout and dimensions (including complete Gerber and drill files)
 2. Complete reference parts list
 3. Test procedures for design verification (in STX3 Reference Design.pdf)
 4. Production test compliance procedures (in STX3 Reference Design.pdf)
2. Please also confirm that the STX3 Module does NOT meet the definition of a Split Module per the same KDB.

Spot – The Modular Cover Letter item 5 has been modified to include the following:

FCC KDB 996369 D01Module Guide defines a split-modular device as follows:

Split-modular transmitter: a RF transmission system that complies with the requirements for a single-modular transmitter, that is separated into a radio front-end section and a control-element section, and can demonstrate compliance for a range of similar type hosts;

Since the STX3 contains all RF (including power amplifiers) and digital circuitry in a single integrated circuit, this device does NOT meet the requirements as a split-modular device.

3. The 4dBi antenna gain is specified in the RF Exposure calculation exhibit (are you providing an over estimation or EIRP, then state so). Please also provide the antenna specification exhibit of the 3dBi or 4dBi ceramic patch antenna.

CT- Corrected



4. The Revised Modular Cover Letter has an Excerpt from the User's Manual, but this information in this exhibit is different from the information contained in the User's Manual provided. There is no information about the antenna in the manual that was provided. The Modular letter stated that the Peak gain of the spectrum antenna is 3.0, but neglected to indicate any units on that value (dBi?).

CT- All exhibits have been updated to indicate the proper units for the antenna gain as provided by the manufacturer in the product datasheet (including the User's Manual).

Response by: Spot & Alex Macon

Submitted by: Amanda Reed

Date: November 13, 2013