

## RA-53 LMA Module Integration Manual

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RA-53 Module is intended only for use in proprietary Kyosho Mini-z products.

These integration instructions are internal, manufacturing documents.

The RA-53 is installed on the host (toy vehicle) to check its characteristics, and then sold as a unit with the vehicle still attached.

The RA-53 is sold exclusively to partners for assembly, and after assembly, it is sold to consumers. Consumers are not allowed to assemble it themselves.

### FCC Part 15.212(a)(1) Modular Transmitter Requirements:

- (i) The module does not have its own shielding. The end-product host must be additionally tested to ensure continued RF compliance when this module is implemented. This testing must include spurious radiated emissions testing. See the host testing guidance in this integration manual.
- (ii) The module's data inputs are buffered internal to the RFIC on the module.
- (iii) The module contains its own power supply regulation, separate from the host.
- (iv) The antenna for the module is permanent and etched into the module PCB. The antenna design cannot be changed without a Class II permissive change application for this module.
- (v) The module has been tested in a stand-alone configuration, independent of any host device.
- (vi) The module is labeled with its FCC ID and IC number granted by the FCC andISED after authorization. These identification numbers must appear on a permanent label on the host device. See the labeling instructions in this integration manual.
- (vii) The module complies with FCC Part 15C, Intentional Radiator requirements. § 15.247 describes operation requirements for the module transmit frequency range of 2407.5 -2467.5 MHz
- (viii) The module meets Portable exclusion levels.

#### Module Integration Instructions:

The RA-53 module is an intentional radiator and is therefore governed by the FCC rules 47 CFR Part 15, Subpart C. As a Radio for controlling the MINI-Z transmitting(T-FHSS) in the frequency range 2407.5 -2467.5 MHz, § 15.247 applies. The module is only to be used by the Grantee in their proprietary MINI-Z without any modifications to the radio circuitry or copper wire antenna.

The RA-53 Grant of Authorization is issued as a Limited Modular Approval because the module does not have its own RF shield. As such, deployment of the module in a host device requires a Class II Permissive Change filing for the module. The host product must also be evaluated for RF exposure.

A copper wire antenna is integral to this radio module. This antenna cannot be modified in any way without a Class II Permissive Change filing for the module.

Changes or modifications to the module not expressly approved by Kyosho could void the user's authority to operate the device.

#### Host Device Testing Guidance:

Because of the Limited Modular Approval of the RA-53 due to the lack of a shield, extra care must be exercised when evaluating all end-product hosts incorporating this module. In particular, the host device must be evaluated using the following test plan to demonstrate compliance with the following:

FCC Rule Part:15.247
Approval FCC ID: AZPRA53
Modulation Modes: T-FHSS
Maximum power: -3.28dBm
Highest Occupied Bandwidth: 0.86368MHz

Based on this test data from the module filing, confirm and then select the worst-case channel in the host for each band under each specific rule part and verify that each specific fundamental frequency remains in full compliance with the respective rule part (i.e. 15.247).

The host device must be investigated with the RA-53 module in modulation mode (T-FHSS 384kbps) to demonstrate full compliance with the specific rule part. The permissive change test data shall complement the test data from the original module filing with regard to the worst-case modulation.

With the RA-53 module set to hop between low-, mid-, and high-channels, record the radiated

emissions band edge measurements for both the widest and narrowest BW available to ensure the host device is compliant.

Per Part 15.31(m), one frequency near the low-end, one frequency near the middle, and one frequency near the high-end of the frequency range of the module must be evaluated in the host device. The worst-case channel may be confirmed through an approved investigation. The widest BW, highest aggregate power conditions shall be investigated. Only the data for worst-case condition among the modes needs to be included in the permissive change report if the overall testing strategy is explained and justified. For the LMA RA-53, since it has no shield, testing of radiated spurious emissions shall cover the 10th harmonic of the fundamental, per the requirements in Part 15.247, to confirm no additional parasitic non-compliant emissions exist.

In all cases, a test of each worst-case modulation is required for channels over the frequency range defined in Part 15.33(a).

Lastly, confirm and demonstrate with the host radiated testing that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.). This can be based on ANSI C63.10 and C63.26. Complete FCC Part 15, Subpart B testing as necessary.

If the host device contains additional intentional radiator devices, modular or otherwise, all transmitter devices must be operated simultaneous to ensure that the transmitters can be co located. The host device is otherwise operated in a typical user mode. The antenna used for this transmitter must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

This modular transmitter is ONLY authorized for the specific FCC and ISSED intentional radiator rules listed in the grants of authorization. The host device must be evaluated for RF compliance to any other FCC and ISSED rules that apply to the host device and not covered by the modular transmitter grant. At a minimum, the host device must be evaluated for compliance to 47 CFR Part 15, Subpart B with the module installed. All new host configurations require a Class II Permissive Change filing to the LMA authorization of this module.

Refer to the FCC KDB 996369 D04 Module Integration Guide for additional guidance.

When RA-53 module install the specific host because it's not have shield case so the host need to test below testing requirements to ensure compliance and file a Class II permissive change.

15.207	Conducted Emission	Yes
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	Yes
15.247(a)(1)	20dB Bandwidth	Yes
15.247(a)(1)	Carrier Frequency Separation	No
15.247(a)(1)(iii)	Time of Occupancy	No
15.247(a)(1)(iii)	Number of Hopping Channels	No
15.247(b)(1)	Maximum Peak Output Power	Yes
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	No
<p>15.203 Antenna requirement</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>This device uses the permanently attached antenna and information A copper wire antenna is integral to this radio module. This antenna cannot be modified in any way without a Class II Permissive Change filing for the module.</p>		

Host Device Labeling Instructions:

The host device employing the RA-53 module shall be permanently marked with a label stating, "Contains FCC ID: AZPRA53" and "Contains IC: 2914D-RA53". If the host device employs additional certified modules, the FCC ID and IC number for each additional module can be appended to each statement. The two statements can be combined so that only one "Contains" is used, but the other text is required. E-labeling of the host device is also allowed. Check current agency regulations for e-labeling.

Host devices that comply with the RF requirements must follow the Labeling requirements in §15.19 of 47 CFR Part 15 and bear the following compliance statement in a conspicuous location on the device if space allows. If there isn't enough space to accommodate this compliance statement in at least 4 point size, the statement must be included in the user manual and on the packaging of the host device.

"This device complies with part 15 of the FCC Rules and Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."