KDB PUB 996369 Modules

Laboratory Division
Office of Engineering and Technology
Jim Szeliga

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Module Certification is Challenging

✓ Over the years, modules changed from a self-contained- plugin peripheral or a daughter board to today's advanced solder-in (SoC/SIP) component. Host integrators require sound RF engineering knowledge.

✓ However, nothing in the rules forces filing or record retention of the RF engineering, except for the RF exposure policy, which increases complexity.

✓ Back then, "regulatory founders" viewed host integrators as RF knowledgeable, responsible, and familiar with FCC regulations. However, times have changed.

✓ There are cases of improper use, especially in violation of RF exposure rules, that resulted in products being denied entry into the US—for example, the importation of products using a mobile module in portable body-worn hosts. Custom Inspectors' raised awareness.

Presentation Main Topics

1. Modules with no shield: Limited Modules require PAG item "MODLIM" and host requires a C2/3PC.

2. Licensed modules are permitted by KDB policy and use 15.212 rules as policy for compliance. The policy for licensed CMRS client modules require the antenna to follow 15.212 (15.203/15.204) — mainly for RF exposure.

3. Clarify the requirements for different host environments.

    1. Presented as Host Environment "Compliance Boundaries".

    2. What to do when a module is not certified for that same host environment (crossing "Compliance Boundaries").

    3. The following provide guidance on the applicable procedure, for details one need to refer to KDB Publication 447498

Modules with No Shield:
Host Requires C2/3 Permissive Change

✓ A Module with no shield is considered a "Limited Module" and requires a MODLIM PAG for certification.

✓ The Grantee's Integration Instructions must provide a test plan (required by rule 47 CFR 15.212(b)) to demonstrate continued compliance when the module is integrated into a host.

✓ The Grantee's Integration Instructions and the Grant Notes must state that a C2/3PC is required for adding each host-specific condition to the original grant.

✓ A "specific host" refers to as being of the same series, or as similar models having the same form factor, physical size, and component layout construction.

✓ The test plan can be based on a "worst-case scenario" to allow for test reduction and should follow the general guidelines as stated in 996369 D01 Appendix C.

✓ Note: A host integrator can file a change in ID to become the Grantee for previously certified modules and then file a Permissive Change for each host.

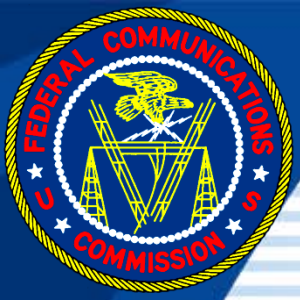# Modules with No Shield: C2/3 Permissive Change Test Plan

Test Plan shall include:

- ✓ Confirm fundamental compliance:
- ✓ For each band under a specific rule parts.
- ✓ Modulation mode(s).
- ✓ Band edge compliance.
- ✓ OOB radiated testing.
- ✓ Confirm no parasitic emissions i.e., compliance emissions due to ingress. (parasitic oscillations, radiation of stray signals within host, etc.)
- ✓ C63.10 and C63.26 can be used as guidance
- ✓ If the Grantee does not want to define a C2/3PC test plan with test reduction, they must state in the integration instructions that full testing is required for a C2/3PC filing.

Licensed Modules for Client Devices

- ✓ A licensed client module is a transmitter that operates under the control of a master in a master/client network and can not initiate a transmission unless enabled by a master.

- ✓ The Grantee must define in the integration instructions so that a host device must follow §§ 15.203, 15.204(b), and 15.204(c), as required by §15.212(a)(1)(iv).

- ✓ A module antenna can be: (1) integrated in the module, (2) provided with the module or (3) specified in detail in the integration instructions.

- ✓ The specifications for the antenna shall include bandwidth, impedance, form factor, frequency, directivity and gain, and polarization in the Integration Instructions,

- ✓ The Integration Instructions must always require that the host product include the antenna provided or specified that demonstrated RFX compliance and comply with §§ 15.203, 15.204(b), and 15.204(c), as required by §15.212(a)(1)(iv).

Licensed Modules for Non-Client Devices

✓ Any <u>non-client</u> device that can initiate a transmission without an enabling signal must comply with policies and the applicable rules for that device.

✓ Antenna requirements can vary:

- Typically, in a CMRS Network: 22, 24, 27, 90, 96 base stations, antennas are not required

- However, for Citizens Band CBD modules require host Class A or B to use the Maximum EIRP on the 731 power fields.

Module Compliance Boundaries: References

➢ **996369 D04 guidance** is recommended for mitigating the risk of incurring in non-compliant conditions.

- ✓ A product with a module is subject to the same general operation conditions in §§ 15.5 and 15.29 as any authorized product.

- ✓ If the device, upon the Commission's or its representative's finding, were to cause harmful interference, the product must stop operating and not resume until the interference has been corrected (with obvious negative impact for the module manufacturer and/or host integrator).

➢ **996369 D02 Q&A New (clarification) Question 12 and question 13**
- ✓ **Question 12** continues (with new clarification) to allow host RFX evaluation for a mobile multiple source Host using single source granted modules.
- ✓ **Question 13** new clarification.
  - ▪ Q13a. Host is classified as *§2.1093-portable* single source device using a single source mobile module,
  - ▪ Q13b. Host is classified as *§2.1091-mobile* multiple source, device
  - ▪ Q13c. Host is classified as *§2.1093-portable* multiple source device
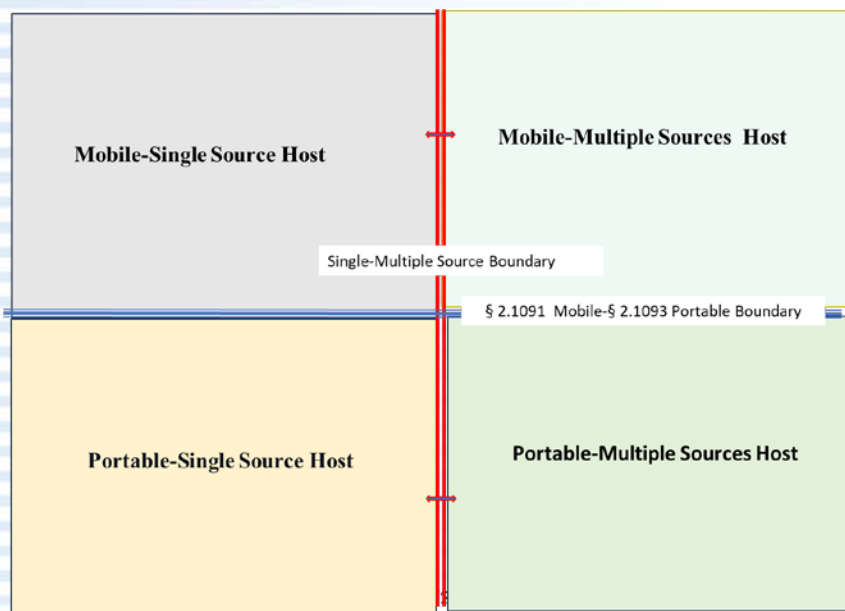
Module Compliance Boundaries: Introduction

➤ **Horizontal Boundary Between**:
  - § 2.1091 Mobile Host
  - § 2.1093 Portable Host

➤**Vertical Boundary Between**
  - **Single Source Host (§ 1.1307(b)(3)(i)) single or multiple transmitters not transmitting simultaneously.**
  - **Multiple RF Sources Host(§ 1.1307(b)(3)(ii).**

Mobile-Single Source Host

Mobile-Multiple Sources Host

Single-Multiple Source Boundary

§ 2.1091 Mobile-§ 2.1093 Portable Boundary

Portable-Single Source Host

Portable-Multiple Sources Host

Compliance Within ''Boundaries''

Mobile-Single Source Host

- 996369 D04 Module Integration Guide test recommended as a risk assessment.
- Rules §§ 15.5 and 15.29 apply as any authorized product.
- A Mobile Module may also be granted requiring a greater then 20 cm distance.

Mobile-Multiple Sources Host

- All transmitters are granted together: i.e., new 996369 D02 Q12 not applicable since EMC & RFX assessment is contained in the filing.
- Module can be mobile (20 cm separation) or granted as a mobile + at a greater distance
- 996369 D04 still recommended.

Single-Multiple Source Boundary

§ 2.1091 Mobile-§ 2.1093 Portable Boundary

Portable-Single Source Host

- Module can be SAR exempt @ a defined distance or
- SAR tested for a specific host.
- 996369 D04 still recommended

Portable-Multiple Sources Host

- Modules can be SAR exempt @ limited distance or
- SAR tested for a specific host.
- 996369 D04 still recommended

Mobile Modules: Crossing Compliance Boundaries

Module Grant			Host			
			Mobile Single Source	Mobile Multi Source	**Portable Single Source**	Portable Multi Source
Mobile	Single Source	20 cm	[0]	[0] [2]	[0][4]	
		>20 cm	[0][1]	[0][1] [2]		
	Multiple Source	20 cm	[0][3]	[0][2]		
		>20 cm	[0][1]	[0][1] [2]		

[0] 996369 D04 recommended.

[1] C2/3PC is required if host distance environment is less than module grant.

[2] 996369 D02 Q12 evaluation for simultaneous transmission.

[3] Host is using only one of the modules granted.

[4] A C2/3PC required. Any mobile module used in a potable host requires C2/3PC.

Portable Modules: Crossing Compliance Boundaries

Module Grant			Host			
			Mobile Single Source	Mobile Multi Source	Portable Single Source	Portable Multi Source
Portable	Single Source	SAR Exempt	[0]	[0] [2]	[0][4]	[0][3][5]
		SAR	[0]	[0] [2]	[0][5]	[0][3][5]
	Multiple Source	SAR Exempt	[0][3]	[0] [2]	[0][3][4]	[0][5][6]
		SAR [4]	[0][3]	[0] [2]	[0][3][5]	[0][5][6]

[0] 996369 D04 recommended.

[2] 996369 D02 Q12 evaluation for simultaneous transmission applies.

[3] Using only one transmitter module.

[4] A C2/3PC for specific host if distance is less than what was granted,

[5] A C2/3PC If used with new specific host.

[6] C2/3PC required when used with different transmitters

Summary - Mobile Host

➢ **Mobile Single Source Host**

   ❖ Module with 996369 D04 recommended.

   ✓ A C2/3PC is required when the modules granted RFX conditions are a greater distance than the host's distance between the RF source and a nearby person.

✓ **Mobile Multiple Source Host**

   ❖ For EMC Q12 allows Host integrator to do an evaluation with no filing requirements.

   ✓ A C2/3PC is required when one of the modules or transmitters granted RFX conditions is at a greater distance than the host's distance between the RF source and a nearby person.

Summary - Portable Host

➢ **Portable Module, Single-Source Host.**

  ❖ The module can be used in a host if the module is granted for that host environment, i.e., the host environment supports a use distance greater than the module's RFX-granted distance.

  ✓ A C2/3PC is required when the module's granted RFX conditions (distance between the RF source and a nearby person) are less conservative than for the host.

➢ **Portable Module, Multiple-Source Host.**

  ❖ Module(s) can be used for simultaneous transmissions in a host if the host ensures more conservative RFX conditions than those in the modules' grants. Also, multiple modules may be granted together for a specific host.

  ✓ For all other conditions, a C2/3PC is required. See 996369 D02 Q13