FCC Certification of Low Power Wireless Devices

April 13, 2015

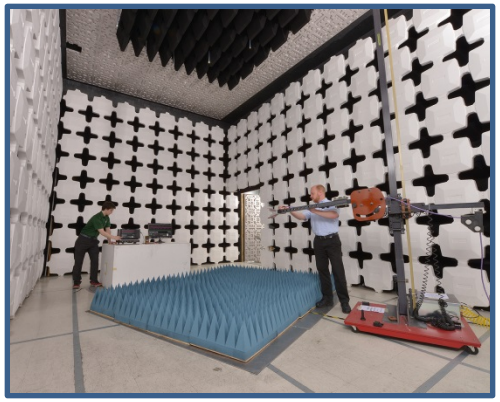
Steve Laya
Elite Electronic Engineering, Inc.

Elite Overview

Services EMC Since 1954, ENV Since 1973
Downers Grove Facility 45,000 Square Feet

- EMC Testing
- Environmental Stress Testing
- Wireless Certification
- Electrical Safety Services
- EMC Design Consulting & Training
- Regulatory Consulting & Training

Automotive
Military
FCC/ CE Mark
Commercial Aviation
Medical
Power Industry
Marine



EMC Testing

ENV Stress Testing

Agenda

1. FCC Rule Parts- General
2. Part 15.231, 15.249, 15.247
3. Equipment Authorization
4. Informational Sites
5. Typical Costs & Timing
6. Questions

FCC Regulations- What do they cover?

Cellular Phone
Land Mobile Radio
Microwave Communication
Radio & TV Broadcast
Maritime, EPIRB,
Aviation Comms, Navigation

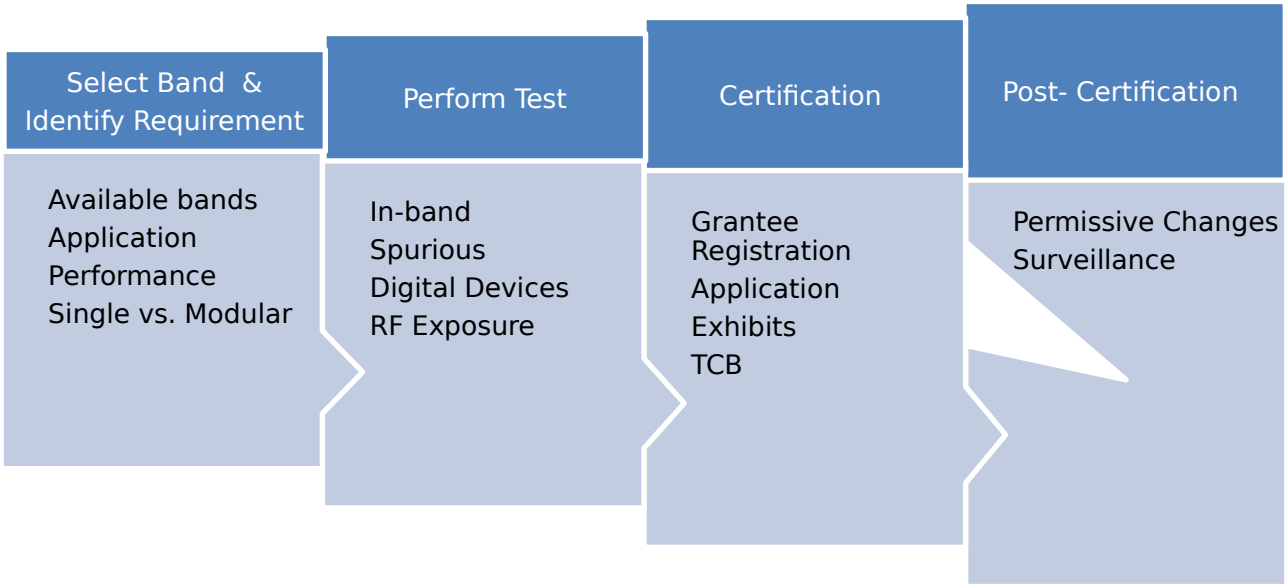
Generally
Greater than 1W
Licensed Services

FCC Part 15C Regulations

Remote Control
RFID
Cordless Phones
WiFi
Bluetooth
Zigbee

Typically less than 1watt
Unlicensed

FCC Certification Overview



FCC Rule Parts

Code of Federal Regulations

http://www.gpo.gov e-CFR

50 Titles

- 29 CFR (OSHA workplace safety rules)
- 40 CFR (tail pipe emissions and pollutants)
- 47 CFR Telecommunications

FCC Rule Parts

47 CFR Telecommunications

- Part 2- General Rules
  - Equipment Authorization Procedures
  - Certification Processes
  - Verification
  - Declaration of Conformity
  - SAR/MPE requirements
- Part 15- Low Power Devices
  - Subpart A General Requirements
  - Subpart B Unintentional Radiators
  - Subpart C Intentional Radiators
  - Subpart E UNII

Part 15 Rules

Subpart A—General

15.1 Scope of this part.
15.3 Definitions.
15.5 General conditions of operation.
15.9 Prohibition against eavesdropping.
15.11 Cross reference.
15.13 Incidental radiators.
15.15 General technical requirements.
15.17 Susceptibility to interference.
15.19 Labelling requirements.
15.21 Information to user.
15.23 Home-built devices.
15.25 Kits.
15.27 Special accessories.
15.29 Inspection by the Commission.
15.31 Measurement standards.
15.32 Test procedures for CPU boards and computer power supplies.
15.33 Frequency range of radiated measurements.
15.35 Measurement detector functions and bandwidths.
15.37 Transition provisions for compliance with the rules.
15.38 Incorporation by reference.

This device complies with part 15 of the FCC Rules. 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

Xmit Range	Test Frequencies
1MHz <	Center
1-10MHz	Low & High
>10MHz	Low, Mid, High

Highest Freq	Upper Msmt, MHz
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th Harm or 40 GHz

Transmitters 10th harmonic

Part 15 Rules

Subpart B—Unintentional Radiators

15.101 Equipment authorization of unintentional radiators.
15.102 CPU boards and power supplies used in personal computers.
15.103 Exempted devices.
15.105 Information to the user.
15.107 Conducted limits.
15.109 Radiated emission limits.
15.111 Antenna power conduction limits for receivers.
15.113 Power line carrier systems.
15.115 TV interface devices, including cable system terminal devices.
15.117 TV broadcast receivers.
15.118 Cable ready consumer electronics equipment.
15.120 Program blocking technology requirements for television receivers.
15.121 Scanning receivers and frequency converters used with scanning receivers.
15.123 Labeling of digital cable ready products.

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Part 15 Rules

Type of device Part 15B	15B Equipment authorization
TV broadcast receiver	Verification.
FM broadcast receiver	Verification.
CB receiver	DoC
Superregenerative receiver	DoC
Scanning receiver	Certification.
Rada	ation.
All ot	
TV in	
Cable	ation of Conformity.
Stand	tion.
Class	
CPU	
Class	
Class	tion.
Other	tion.
Class A digital devices, peripherals & external switching power supplies	Verification.
Access Broadband over Power Line (Access BPL)	Certification.
All other devices	Verification.

Verification (FCC listed site)
DoC (Accredited Test Lab)

- Measure Conducted & Radiated Emissions
- Have results on file
- Label Accordingly
- Information for users

Unintentional Radiators- digital devices and receivers

Intentional Radiators- Always Certification

Part 15 Rules

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Exempt if,
(a) used exclusively in autos, truck, planes.
(b) used exclusively in public utility or industrial plant.
(c) industrial, commercial, or medical test equipment.
(d) appliances, e.g., microwave oven, dishwasher, clothes dryer
(e) Specialized medical digital devices
(f) Power consumption not exceeding 6 nW.
(h) battery powered and less than 1.705 MHz

Part 15 Rules

15.105 Information to the user.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

Part 15 Rules

Subpart B—Unintentional Radiators

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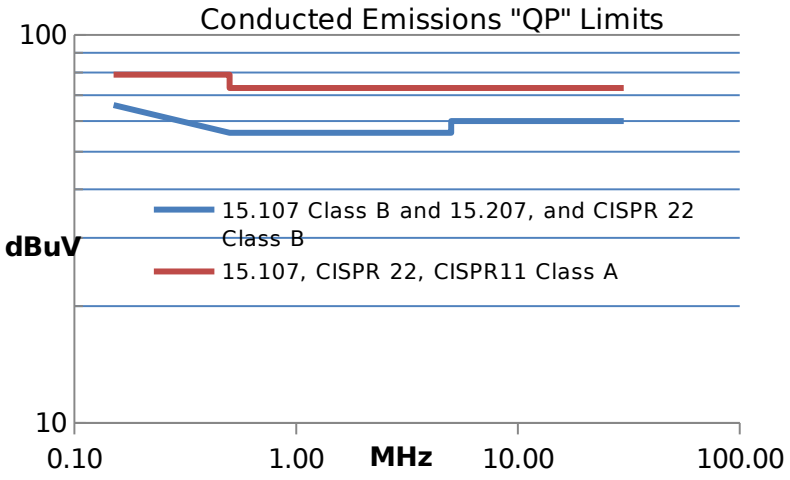
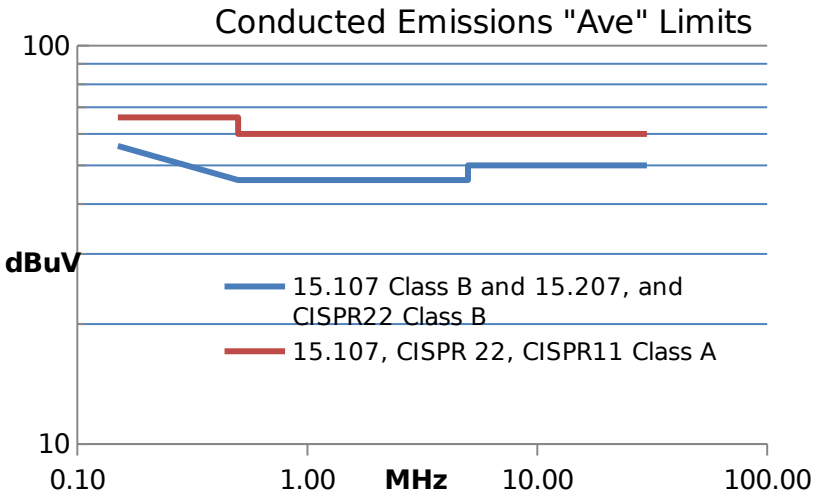




Part 15 Rules

Restricted Bands-- No Fundamental and Spurious Emissions per 15.209			
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

Part 15 Rules

Subpart C—Intentional Radiators

15.212 Modular transmitters.

Single Modular (Any user, any host)
Limited Modular (Specific host)

1) Shielding
2) Buffered I/O
3) Regulated power
4) Antenna requirements
5) Tested stand alone
6) Labeled
7) Instructions
8) RF Exposure

Radiated Emission Limits, Additional Provisions

15.215 Additional provisions to the general radiated emission limitations.
15.217 Operation in the band 160-190 kHz.
15.219 Operation in the band 510-1705 kHz.
15.221 Operation in the band 525-1705 kHz.
15.223 Operation in the band 1.705-10 MHz.
15.225 Operation within the band 13.110-14.010 MHz.
15.227 Operation within the band 26.96-27.28 MHz.
15.229 Operation within the band 40.66-40.70 MHz.
15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.
15.233 Operation within 43.71-44.49 MHz, 46.60-46.98 MHz, 48.75-49.51 MHz & 49.66-50.0 MHz.
15.235 Operation within the band 49.82-49.90 MHz.
15.237 Operation in the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz.
15.239 Operation in the band 88-108 MHz.
15.240 Operation in the band 433.5-434.5 MHz.
15.241 Operation in the band 174-216 MHz.
15.242 Operation in the bands 174-216 MHz and 470-668 MHz.
15.243 Operation in the band 890-940 MHz.
15.245 Operation 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz.
15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
15.249 Operation within 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.
15.250 Operation of wideband systems within the band 5925-7250 MHz.
15.251 Operation within 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz.
15.252 Operation of wideband vehicular radar systems within 16.2-17.7 GHz and 23.12-29.0 GHz.
15.253 Operation within the bands 46.7-46.9 GHz and 76.0-77.0 GHz.
15.255 Operation within the band 57-64 GHz.
15.256 Operation of level probing radars within 5.925-7.250 GHz, 24.05-29.00 GHz, and 75-85 GHz.
15.257 Operation within the band 92-95 GHz.

Radiated Emission Limits, Additional Provisions

15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

15.247 Operation within 902-928MHz, 2400-2483.5MHz, and 5725-5850 MHz.
15.249 Operation within 902-928MHz, 2400-2483.5MHz, 5725-5875MHZ, & 24.0-24.25GHz.

15.231 Remote Control Applications

Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

Intermittent Control Signals 15.231(a)-(d)

- Control or command signals, alarm systems, door openers, remote switches.
- No voice, video, or RC toys. No data (unless sent with control signal)
- Transmission must cease within 5 seconds
- No regular predetermined transmissions (except safety system polling)
- Radio control purposes only during emergencies

Periodic Transmission 15.231(e)

- No restrictions on type of operation
- Transmission must cease within 1 second
- Silent period at least 30x transmission period or 10sec.

[Field Strength approx 2x greater for Intermittent Control Signals vs. Periodic Transmission]

15.231(c) emissions BW less than 0.25% of Center Frequency, (70-900MHz)

15.249 Narrowband Transmitters in ISM Bands

902-928MHz
2400-2483.5MHz
5725-5875MHZ
24.0-24.25GHz

Fundamental Field Strength 50mV/m at 3meters

$$\frac{PG}{4\pi D^2} \equiv \frac{E^2}{120\pi} \Rightarrow P = 0.3E^2$$

P= EIRP (Watts)
E= V/m at 3meters

$P = 0.75mW = 1.25dbm$

No direct limitations on voice, data, or periodic/intermittent use

15.231(b) 12,500uV/m
15.231(e) 5,000uV/m
15.209 200uV/m

15.247 Wideband Transmitters in ISM Bands

902-928MHz
2400-2483.5MHz
5725-5875MHZ

Up to 1Watt (30dBm) conducted
(4W EIRP, with antenna gain)

No direct limitations on voice, data, or periodic/intermittent use

FHSS or Digital Modulation to spread energy

15.249 Narrowband Transmitters in ISM Bands

902-928MHz
2400-2483.5MHz
5725-5875MHZ
24.0-24.25GHz

- Fundamental Field Strength & Harmonics 15.249(a)
  - Measure Duty Cycle
  - Measure Fundamental & Harmonics with Peak Detector 15.249(e)
  - Report Average value using Peak + duty cycle
  - Band Edge Compliance 15.249(d)
- AC Mains Conducted Emissions 15.207
- Radiated Spurious Emissions 15.209

15.247 Wideband Transmitters in ISM Bands

902-928MHz
2400-2483.5MHz
5725-5875MHZ

Frequency Hopping
Bluetooth (Basic Rate, EDR)

20dB Channel Bandwidth
<500kHz 900MHz,
<1MHz 2.4/5GHz
Number of Hopping Channels
Channel separation
Time of Occupancy
Hop Randomness
Equal Use of Channels

Transmit power
Band edge compliance
Radiated Spurious Emissions
Conducted AC Mains Emissions

Digitally Modulated
802.11 WiFi
802.15.4 Zigbee,
Bluetooth (BLE)

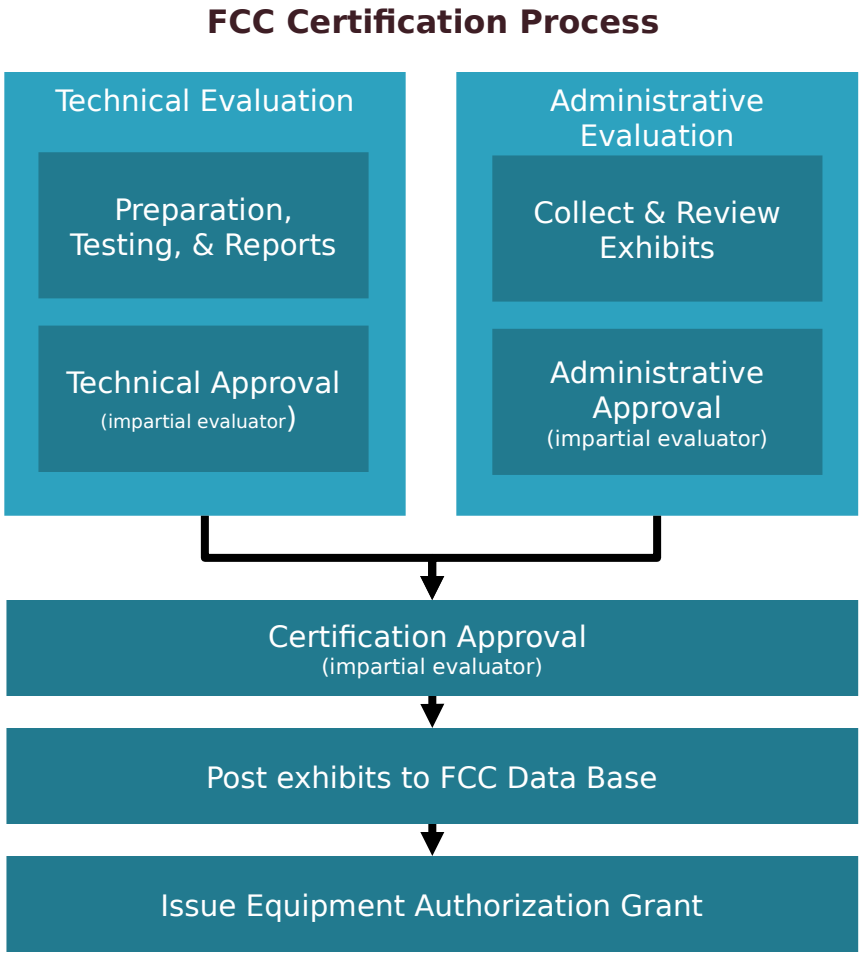
6dB Bandwidth >500kHz
Power Spectral Density 8dBm/3kHz

Transmit power
Band edge compliance
Radiated Spurious Emissions
Conducted AC Mains Emissions

Equipment Authorization

Initial Steps

1. FRN Number
2. Grantee Code
3. FCC ID



Federal Communications Commission [US] https://apps.fcc.gov/coresWeb/publicHome.do

Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

C Registration

> FCC Registration

< FCC Site Map

C Registration

ou wish to conduct business with the FCC, you must first register through the FCC's **CO**mmission **RE**gistration **S**ystem (CORES). Upon stration, you will be assigned a **F**CC **R**egistration **N**umber (FRN). This number will be used to uniquely identify you in all transactions with FCC.

vs releases related to the FCC Registration Number.

Select one of the following:

REGISTER	UPDATE	SEARCH
→ **Register and receive your FRN**	→ **Update your registration information**	→ **Search for public FRN information**
● REGISTER	● UPDATE	● SEARCH
	Forgot Password?	

Customer Service

Frequently Asked Questions	Forms Requiring an FRN	Privacy Statement	FCC Home Page

FRN Help Line: 877-480-3201 (Mon.-Fri. 8 a.m.-6 p.m. ET)

The FRN Help desk has a dedicated staff of customer service representatives standing by to answer your questions or concerns. You can also email the FRN Help desk with your questions and concerns.

Home Page

g Options

ee Registration

y Grantee Information

731 Application

lete Unfinished Form 731

Attachments

it Correspondence

ter New Test Firm

w Test Firm/Add Exhibits

Firm Accrediting Body

n to 159 Form

Modify Grant Deferral

ge Short-Term dential Date

rts

ng Application Status

rization Search

ee Search

ng Grantee Search

Firms

Firm Accrediting Bodies

ment Class/Rule Part List

Equipment Authorization System Grantee Registration

Upon completion of this filing, you will receive a five-character Grantee Code to be used when completing the FCC Form 731, Application for Equipment Authorization (there will be no digits zero and/or one in the Code). Please retain this Code for future reference. After successful completion of the Grantee Registration you will be presented with the Fee Remittance Advice, FCC Form 159. The Form 159 may be submitted electronically (at least 128-bit encryption is required) or in paper form, along with payment to: Federal Communications Commission, Equipment Approval Services, P. O. Box 358315, Pittsburgh, PA 15251-5315

Grantee's FCC Registration Number(FRN): *

Grantee's Complete, Legal Business Name: *

Grantee's Mailing Address (* **Either line one or P.O. Box is required):**

Line 1: *

Line 2:

P.O. Box:

City: *

State:

Country: *

Zip/Postal Code:

Equipment Authorization

Certification

1. **FRN FCC Registration Number (FCC.gov/CORES)**
2. **Grantee Code**
3. **Exhibits**

- Application
- Agent & Anti-Drug Letter
- Confidentiality Agreement
- Certification Agreement (TCB)
- Description of Labels
- Schematic, Technical Description, Block Diagram
- Internal & External Photographs
- Operating & Users Manual

EXAMPLE OF FCC/IC CONFIDENTIALITY LETTER
(PLACE ON APPLICANT LETTERHEAD)

Date: _____

Subject: Confidentiality Request for: _____(Insert FCC ID and/or IC ID)_____

Pursuant to FCC 47 CRF 0.457(d) and 0.459 and IC RSP-100, Section 10, the applicant requests that a part of the subject FCC application be held confidential.

Type of Confidentiality Requested		Exhibit
☐ Short Term	☐ Permanent	Block Diagrams
☐ Short Term		External Photos
☐ Short Term	☐ Permanent*[1]	Internal Photos
☐ Short Term	☐ Permanent	Operation Description/Theory of Operation
☐ Short Term	☐ Permanent	Parts List & Placement/BOM
☐ Short Term	☐ Permanent	Tune-Up Procedure
☐ Short Term	☐ Permanent	Schematics
☐ Short Term		Test Setup Photos
☐ Short Term	☐ Permanent*	User's Manual

*Note: _____(Insert Explanation as Necessary)_____

_____(Insert Company Name)_____ has spent substantial effort in developing this product and it is one of the first of its kind in industry. Having the subject information easily available to "competition" would negate the advantage they have achieved by developing this product. Not protecting the details of the design will result in financial hardship.

Permanent Confidentiality:

ermanently withheld from
on not customarily released to

DSC Part 15.231Transmitter
DSR Part 15.231 Security Transmitter

DSS Part 15C Spread Spectrum Xmitter
DTS Part 15C Digital Transmission System

d from public view for a
f the Grant of Equipment
ive information prior to
y are responsible to notify ELITE ELECTRONIC ENGINEERING, INC. in the event information regarding the product or the product is made available to the public. ELITE ELECTRONIC ENGINEERING, INC. will then release the documents listed above for public disclosure pursuant to FCC Public Notice DA 04-1705.

NOTE for Industry Canada Applications:
The applicant understands that until such time that IC distinguishes between Short Term and Permanent Confidentiality, either type of marked exhibit above will simply be marked Confidential when submitted to IC.

Sincerely,

By: _____ _____
(Signature/Title[2]) (Print name)

[1] - The asterisked items (*) require further justification before permanent confidentiality will be allowed. These also currently require review by the FCC under their Permit-But-Ask policy before the grant is issued and can delay completion of an application. Further justification should be added to the note above. One such example for a potted device would be: "The EUT is FULLY potted using a non-removable epoxy based material. Removal of potting material causes irreparable damage to internal circuitry. See photographs exhibits that outline the device before and after potting."

[2] - Must be signed by applicant contact given for applicant on the FCC site, or by the authorized agent if an appropriate authorized agent letter has been provided. Letters should be placed on appropriate letterhead.

uipment Certification Application Form

n I (continued): Contact/ General Information

dle Initial: ☐ Last Name: ☐

Zip/Postal Code: ☐

Fax: No.: ☐

o FCC:

equest for SHORT-TERM confidentiality for any
n this application pursuant to FCC DA 04-1705

SHORT-TERM request:
☐ Yes ☐ No

equest for PERMANENT confidentiality for any
n this application pursuant to 47 CFR 0.459 of

PERMANENT request:
☐ Yes ☐ No

of grant of this application pursuant 47 CFR 0.457(d)(1)(ii)? ☐ Yes ☐ No
y be issued (MM/DD/YYYY format): ☐

tion

ed radio authorization? ☐ Yes ☐ No
ot. immediately regarding TCB certification eligibility.

: ☐

eted: (NOTE: This text will appear below the equipment class on the grant)

ntly authorized equipment:

Grant Date (MM/DD/YYYY): ☐

odificatio presently authorized equipment.

a composite device subject to an additional equipment authorization?

part of a system that operates with, or is marketed with, another device that requires

swered "Yes", complete the following question:

er the FCC ID listed below
FCC ID listed below
d under the FCC ID below

Test Firm Information

Name of the Test Firm and contact person on file with the FCC, if different from applicant or

FCC Registered Test Site Number: *Required for Part 15 and 18 applications.*

Firm Name:

First Name: Last Name:

Address Line 1:

Address Line 2:

P.O. Box:

City:

State: Country (if foreign address): Zip/Postal Code:

Telephone: Ext: Fax: No.:

E-mail:

Modular Approval

* Is this application for modular approval? ☐ Yes ☐ No

If "Yes", please contact our Cert. Dept. immediately regarding TCB certification eligibility.

If "Yes", please submit a cover letter addressing the modular approval requirements of DA 0

Section II: Equipment Specifications

Equipment Specifications:

Frequency range In MHz Lower	Upper	Rated RF Power Output In Watts	Frequency Tolerance	Emission designator (See 47 CFR § 2.201 and § 2.202)	Microprocessor Model Number

Section III: Certification

Read each certification carefully before answering and signing this application

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312 (a) (1)), AND/OR FORFEITURE (U.S. TITLE 47, SECTION 503).

SECTION 5301 (ANTI-DRUG ABUSE) CERTIFICATION:

The applicant must certify that neither the applicant nor any party to the application is subject to a denial of Federal Benefits, that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act pf 1988, 21 U.S.C. § 862 because of conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the definition of "party" for these purposes.

*Does the applicant or authorized agent so certify?

☐ Yes ☐ No

Applicant / Agent Certification

I certify that I am authorized to sign this application. All of the statements herein and the exhibits attached hereto are true and correct to the best of my knowledge and belief. In accepting a Grant of Equipment Authorization issued by the TCB, under the authority of the FCC, as a result of the representations made in this application, the applicant is responsible for (1) labeling the equipment with the exact FCC ID specified in this application, (2) compliance statement labeling pursuant to the applicable rules, and (3) compliance of the equipment with the applicable technical rules. If the applicant is not the actual manufacturer of the equipment, appropriate arrangements have been made with the manufacturer to ensure that production units of this equipment will continue to comply with the FCC's technical requirements.

Authorizing an agent to sign this application is done solely at the applicant's discretion; however, the applicant remains responsible for all statements in this application.

If an agent has signed this application on behalf of the applicant, a written letter of authorization which includes information to enable the agent to respond to the above Section 5301 (Anti-Drug Abuse) Certification statement has been provided by the applicant. It is understood that the letter of authorization must be submitted to the FCC upon request, and that the FCC reserves the right to contact the applicant directly at any time.

*Signature of Authorized Applicant:

Title of Authorized Signature:

Complete items below if Agent signs the application

Firm Name:

First Name: Middle Name: Last Name:

Address Line 1:

Address Line 2:

P.O. Box:

City:

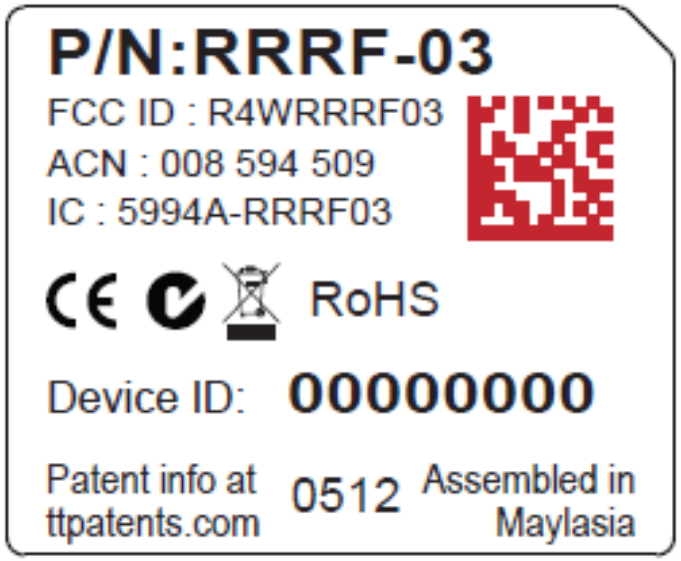
State: Country: Zip/Postal Code:

Telephone: Ext: Fax: No.:

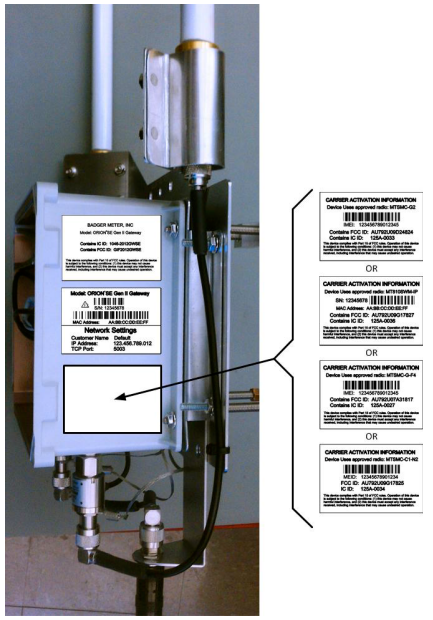
E-mail:

NOTE: An asterisk '*' preceding a field indicates it must be completed.

FCC Label

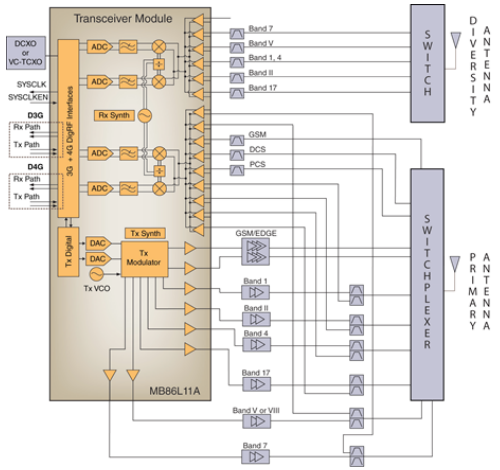


- “FCC ID” must precede number
- 6point font or larger
- Must be permanent
- Identify attachment process
- Must be visible to customer at time of purchase
- Cannot be on a removable part
- Provide label exhibit
- Provide location on transmitter exhibit



Exhibits

Theory of Operation
Schematics
Parts List
Block Diagram
External Photos
Internal Photos
Operators Manual



TECHNICAL DESCRIPTION (theory of operation)

Radio Characteristics

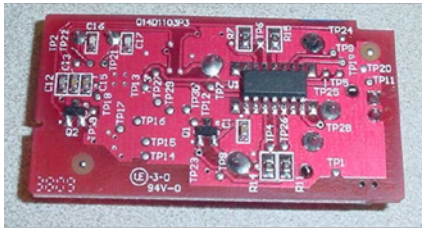
Radio module name and type
Output Power (conducted)
Lowest/highest Frequency
Number of Channels
Channel Bandwidth
Channel Spacing
Transmitter duty cycle
Actuation (manual/auto)
Hop dwell time & Pseudo-Random table
Modulation types
Data rates
Frequency deviation
Grounding systems

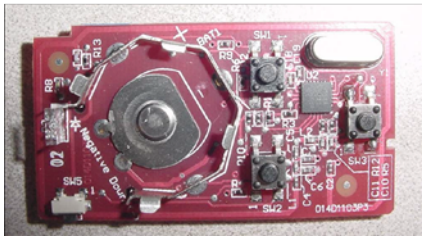
Antenna System

Antenna type
Gain
Connector type
Mounting location from transmitter
Antenna cable length and loss
Spacing distance from operator

Receivers

Receiver type, i.e super-het
High/Low Freq
Local Oscillator Frequency
Sensitivity
Number of Channels

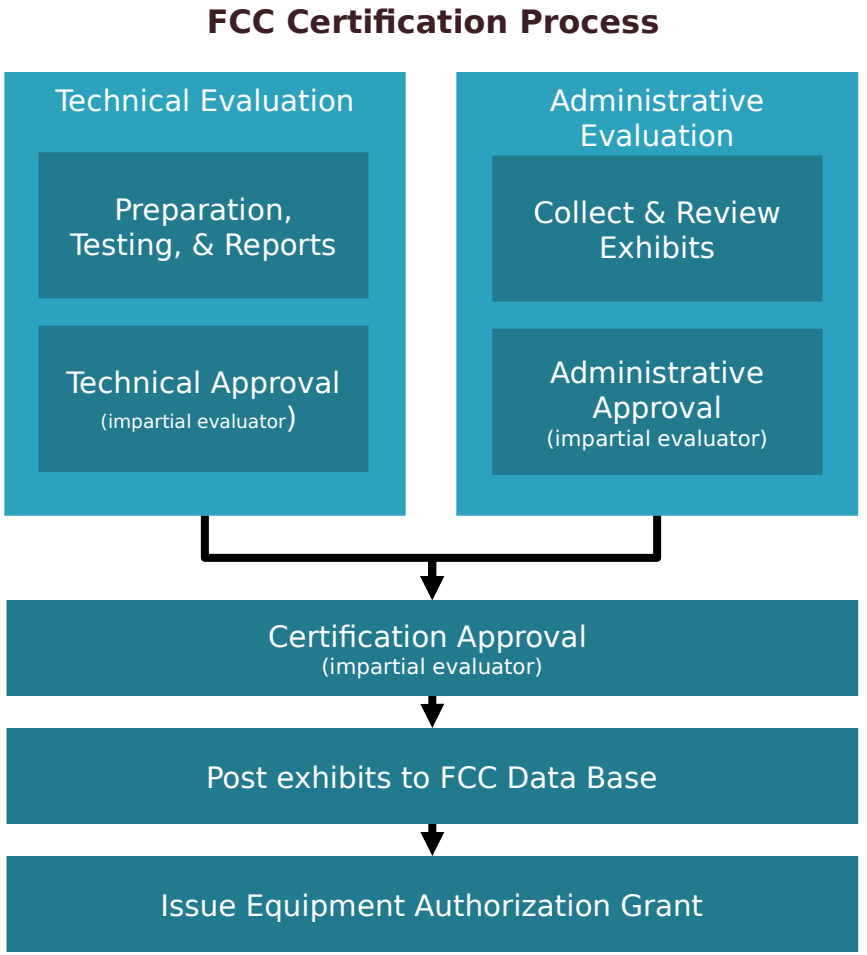




Equipment Authorization

Final Steps

1. Submit all exhibits
2. Respond to findings
3. Receive Grant
4. Begin Marketing



Post Certification

1 Changes to a certified device

- New Certification
  - Change frequency, power, modulation schemes
- Class II permissive change
  - Add an antenna type
  - Requires filing
- Class 1 permissive change
  - Minor changes to non-transmitter parameters
  - Testing, but no filing.

2 Surveillance

g Options
tee Registration
fy Grantee Information
731 Application
plete Unfinished Form 731
Attachments
nit Correspondence
ster New Test Firm
ew Test Firm/Add Exhibits
Firm Accrediting Body
rn to 159 Form
Modify Grant Deferral
ge Short-Term
idential Date

orts
ling Application Status
orization Search
tee Search
ling Grantee Search
Search
Firms
Firm Accrediting Bodies
oment Class/Rule Part List

ellaneous

Equipment Authorization Search

Application Information:

Grantee Code: (First three or five characters of FCCID)

Product Code: Exact Match (Remaining characters of FCCID)

Applicant Name:

Final Action Date Range (mm/dd/yyyy): to

Grant Comments:

Application Purpose:

Software Defined Radios:

FCC Approved Applications Only

TCB Approved Applications Only:

Composite Applications Only:

Grant Note: & & View Grant Note Descriptions

Test Firm

Application Status: All Granted Statuses

Equipment Information:

Equipment Class:

Frequency Range in MHz: to Exact Match

Necessary Bandwidth:

Emission Designator:

Frequency Tolerance to Exact Match

Power Output (in Watts) to Exact Match

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification

Issued Under the Authority of the

Federal Communications Commission

By:

Elite Electronic Engineering, Inc.
1516 Centre Circle
Downers Grove, IL 60515

Date of Grant: 01/15/2013

Application Dated: 01/15/2013

Motorola Solutions, Inc.
1301 East Algonquin Road
Schaumburg, IL 60196

Attention: Ken Weiss , Senior Staff Engineer

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: ABZ99FT7016
Name of Grantee: Motorola Solutions, Inc.
Equipment Class: Part 15 Spread Spectrum Transmitter
Notes: Part 15 Transmitter

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	15C	2400.0 - 2483.5	0.001		

Home Page

Options

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r Guidance Publications

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Laboratory Division cations (Expired)

Publication Moderation y

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communications fication Bodies (TCB)

Office of Engineering and Technology Laboratory Division Knowledge Database (KDB)

Welcome to the OET Laboratory Division Knowledge Database (KDB). The FCC Office of Engineering and Technology (OET) publishes equipment authorization procedures and measurement guidance in the form of FCC Public Notices and Knowledge Database (KDB) publications. The staff guidance provided in the KDB is intended to assist the public in following Commission requirements and does not constitute rules. Accordingly, the guidance is not binding on the Commission and will not prevent the Commission from making a different decision in any matter that comes to its attention for resolution.

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KDB Publication Number Search: Search for a specific publication by entering the publication number:

Publication Number: Run Publication # Search

Didn't find a conclusive answer? Submit an Inquiry

Publications:

Recent KDB Publications:

Publication Number	Question	Answer
628591	What equipment cannot be certified by a Telecommunications Certification Body?	The attached document 628591 D01 TCB Exclusion List v16 identifies equipment that are excluded from being certified by a TCB. At t the present time, the TCBs are allowed to certify the items previously included on the TCB Exclusion List under the Permit-b...

Range of Pricing for Services

Every Product is Unique

- Conformity services are priced after review of product and requirements.

But…. Typical range of prices are

Digital Device per 15.107 & 15.109

- 1 day test and report $2,700

15.231(e) Remote Control Periodic Transmitter

- 1.5 days test and report $ 4,000
- TCB Certification $1,250, IC Certification $1,000

15.247 2.4GHz Frequency Hopping Spread Spectrum (BT)

- 3-4 day test and report $8,000
- TCB Certification $1,250, IC Certification $1,000

15.247 2.4GHz DTS (802.11b/g)

- 4-5 day test and report $9,000
- TCB Certification $1,250, IC Certification $1,000

A Word About Canada, Europe & Global

- Canada- requirements mirror FCC, but a se cation is required.

- Europe- Manufacturers self declaration, tests are different than FCC & Canada

Global- Every country has a spectrum management agency

...Not all countries accept foreign test reports

Applicable FCC Rule Parts??

§15.201 Equipment authorization requirement.

((b) Except as otherwise exempted in paragraph (c) of this section and in §15.23 of this part, all intentional radiators operating under the provisions of this part shall be certificated by the Commission pursuant to the procedures in subpart J of part 2 of this chapter prior to marketing.

§15.3 Definitions (p) Kit.

Any number of electronic parts, usually provided with a schematic diagram or printed circuit board, which, when assembled in accordance with instructions, results in a device subject to the regulations in this part, even if additional parts of any type are required to complete assembly.

§15.23 Home-built devices.

(a) Equipment authorization is not required for devices that are not marketed, are not constructed from a kit, and are built in quantities of five or less for personal use.

(b) It is recognized that the individual builder of home-built equipment may not possess the means to perform the measurements for determining compliance with the regulations. In this case, the builder is expected to employ good engineering practices to meet the specified technical standards to the greatest extent practicable. The provisions of §15.5 apply to this equipment

FCC Certification of Wireless Devices

Final Points & Questions

- Requirements may not always be clear
- Rules can seem complicated
- The first one is a pain, but they get easier each time

- Any Questions??