Qualcomm Atheros Modular Certification

Instructions to OEM Integrators for AR5BMD22 in portable hosts(Antenna to body distance > 2.5cm)

FCC ID: PPD-AR5BMD22

IC: 4104A-AR5BMD22

June 26 2012


ATHEROS®

Notice

The information in this document has been carefully reviewed and is believed to be accurate. Nonetheless, this document is subject to change without notice, and Atheros Communications, Inc. (Atheros) assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the contained information, or to notify a person or organization of any updates. Atheros reserves the right to make changes, at any time, in order to improve reliability, function or design and to attempt to supply the best product possible. Atheros does not represent that products described herein are free from patent infringement or from any other third party right.

Revision History

Revision	Revision Description of Changes
June 26 2012	Initial release

Introduction

This document describes mandatory steps required by the OEM integrator when designing and manufacturing any host PC system utilizing this Atheros radio module.
Also refer to the Atheros Regulatory Compliance Guide available on the Atheros customer support site and from the Atheros customer support contact person.
This document lists the mandatory responsibilities and actions of the OEM integrator.
Failure to comply with all requirements and conditions in this document may result in non-compliance of the host PC with FCC rules and invalidate the Atheros FCC certification for the module.
This guide applies to this Client modules that act under control of an Access Point.

Max. average WLAN output power at antenna terminal

Single TX mode:

Mode	802.11b			802.11g		
Data Rate	1M			6M		
Channel	1	6	11	1	6	11
Frequency	2412	2437	2462	2412	2437	2462
Avg. Power (ANT 1)	18.00	19.20	18.50	15.00	19.00	12.70

Mode	802.11a			
Data Rate	6M			
Channel	36	40	44	48
Frequency	5180	5200	5220	5240
Avg. Power (ANT 1)	14.60	14.80	14.73	14.60

Mode	802.11a			
Data Rate	6M			
Channel	52	56	60	64
Frequency	5260	5280	5300	5320
Avg. Power (ANT 1)	17.20	17.16	17.20	17.20

Mode	802.11a							
Data Rate	6M							
Channel	100	104	108	112	116	132	136	140
Frequency	5500	5520	5540	5560	5580	5660	5680	5700
Avg. Power (ANT 1)	14.80	15.36	15.33	15.34	15.83	15.36	15.38	14.00

Mode	802.11a				
Data Rate	6M				
Channel	149	153	157	161	165
Frequency	5745	5765	5785	5805	5825
Avg. Power (ANT 1)	16.20	16.15	16.20	16.12	16.20

Dual TX mode:

Mode	802.11b			802.11g		
Data Rate	1M			6M		
Channel	1	6	11	1	6	11
Frequency	2412	2437	2462	2412	2437	2462
Avg. Power (ANT 0+1)	19.00	19.20	18.90	14.50	19.10	13.90
Mode	802.11n HT20			802.11n HT40		
Data Rate	MCS0			MCS0		
Channel	1	6	11	3	6	9
Frequency	2412	2437	2462	2422	2437	2452
Avg. Power (ANT 0+1)	13.70	19.10	12.60	13.70	16.50	13.40

Mode	802.11a			
Data Rate	6M			
Channel	36	40	44	48
Frequency	5180	5200	5220	5240
Avg. Power (ANT 0+1)	13.90	14.00	14.3	14.50

Mode	802.11a							
Data Rate	6M							
Channel	52	56	60	64				
Frequency	5260	5280	5300	5320				
Avg. Power (ANT 0+1)	17.10	17	17.10	17.00				
Mode	802.11a							
Data Rate	6M							
Channel	100	104	108	112	116	132	136	140
Frequency	5500	5520	5540	5560	5580	5660	5680	5700
Avg. Power (ANT 0+1)	15.70	17.00	16.9	16.8	17.10	17.20	17.14	13.90
Mode	802.11a							
Data Rate	6M							
Channel	149	153	157	161	165			
Frequency	5745	5765	5785	5805	5825			
Avg. Power (ANT 0+1)	16.20	16.10	16.20	16.11	16.10			

Mode	802.11n HT20							
Data Rate	MCS0							
Channel	36	40	44	48				
Frequency	5180	5200	5220	5240				
Avg. Power (ANT 0+1)	14.00	14.30	14.6	15.00				
Mode	802.11n HT20							
Data Rate	MCS0							
Channel	52	56	60	64				
Frequency	5260	5280	5300	5320				
Avg. Power (ANT 0+1)	16.20	16.21	16.20	16.30				
Mode	802.11n HT20							
Data Rate	MCS0							
Channel	100	104	108	112	116	132	136	140
Frequency	5500	5520	5540	5560	5580	5660	5680	5700
Avg. Power (ANT 0+1)	15.80	15.9	15.7	15.8	16.20	16.20	16.00	14.20

Mode	802.11n HT20				
Data Rate	MCS0				
Channel	149	153	157	161	165
Frequency	5745	5765	5785	5805	5825
Avg. Power (ANT 0+1)	15.10	15	15.20	15.14	15.20

Mode	802.11n HT40	
Data Rate	MCS0	
Channel	38	46
Frequency	5190	5230
Avg. Power (ANT 0+1)	14.30	16.30
Mode	802.11n HT40	
Data Rate	MCS0	
Channel	54	62
Frequency	5270	5310
Avg. Power (ANT 0+1)	16.20	13.20

Mode	802.11n HT40	
Data Rate	MCS0	
Channel	102	134
Frequency	5510	5670
Avg. Power (ANT 0+1)	10.00	16.30
Mode	802.11n HT40	
Data Rate	MCS0	
Channel	151	159
Frequency	5755	5795
Avg. Power (ANT 0+1)	15.20	15.20

Allowed Antennas to be used with the Radio Module

The Integrator must request from Atheros sales or regulatory contact person the current list of allowable antennas for use with the specific radio module. This information is not available on the public FCC database but will be provided by Atheros. Atheros will provide a table of antenna type(s) models, cable lengths, and peak gain in each band.

Generally, the list will include Omni-directional Inverted-F (PIFA) and stamped metal/film antennas for use inside laptops. In some cases, dipole antenna types may be included in the available list. Peak gain including cable losses are quoted in the table provided by Atheros.

Use of any of the antennas in the list (identical or equivalent antenna with lower gain, dimensions and cable lengths) is acceptable in the host device, without any further FCC testing or submission.

However, use of an antenna that is higher gain than those on the list or is a Different Type, requires additional testing and submission to the FCC. Therefore, antennas with higher gain or different type than specified by Atheros may not be used with the Atheros module until new testing and reporting is completed.

You must contact the Atheros Regulatory Group to report any higher gain or new antenna type to be used with the module.

Antenna Placement

802.11A/B/G/N + BT COMBO CARD has been certified by FCC as single module approval with the following restrictions:

- The most conservative antenna-to-user separation distance shall be greater than 4.6mm to end user or near-by person. 4.6mm physical separation distance is measured by positioning the display section of notebook/Netbook/Laptop computers perpendicular to the keyboard section. Measure the distance from the nearest point of antenna to the bottom of host.
- Consult with Atheros to determine the allowable rotational orientations for vertical and horizontal antenna installation in applicable host devices.
- When antenna is installed in the typical notebook/Netbook/laptop computer platform, the antenna cable shall be positioned away from antenna elements to conform to configuration tested for compliance.
- When the antennas are installed in the display section of notebook/Netbook/Laptop computer platform, the display section shall not have metallic components and material that can influence or change the operating and exposure characteristics of the antennas.

If any one of condition listed above can not comply, please consult with Atheros regulatory contact person to determine the applicable equipment authorization procedure before marketing the host device.

Simultaneous transmission of Radio Module with Other Integrated or Plug-In Radios

Based upon FCC Knowledge Database publication number 616217 D03 (Supplement) https://fjallfoss.fcc.gov/kdb/GetAttachment.html?id=30257, when there are multiple radios installed in a host device, RF exposure transmitting assessment shall be performed to determine the necessary application and test requirements. Certain criteria can be used in determine the requirement for simultaneous SAR evaluation and whether Class I or Class II permissive change may apply. A brief summary of the procedures is provided below. OEM integrators must consult the actual FCC KDB 616217 Supplement document for details:

- Identify all possible combinations of simultaneous transmission configurations for all transmitters and antennas installed in the display screen and keyboard of the intended host computer configurations and provide the following information:
    - Antenna-to-antenna separation distance
    - Antenna-to-user separation distance
- Transmitters/antennas operating from external card slots and/or connectors of the host computers must be more than 5 cm from any simultaneous transmitting antennas
- If simultaneous transmission radio/module is installed in the host as portable device (< 20 cm to the body of user) , determine the highest 1-g SAR value of each portable radio module for applicable simultaneous transmission operating modes and configurations.
- If simultaneous radio is installed in the host as mobile device (> 20 cm to the body of user) , determine the MPE (power density) according to the highest output power, , antenna gain and antenna-to-user separation distance in each frequency band.
- Determine the antenna to antenna separation distances as required for the conditions below

a) When the [(∑ of the highest measured 1-g SAR for each portable transmitter/antenna included in the simultaneous transmission configuration) / 1.6 W/kg] + ∑ of [(the highest MPE for each mobile transmitter/antenna included in the simultaneous transmission configuration) / (the corresponding MPE limit)] < 1; (where: ∑ excludes antennas that do not require SAR evaluation, the corresponding MPE limits based upon frequency band can be found at table 1 of section 1.1310 of CFR 47: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=788a1f4d7395e22ffa71dc3905fb2f10&rgn=div8&view=text&node=47:1.0.1.1.2.9.193.10&idno=47)

or

b) For antennas included in the simultaneous transmission configuration that require SAR evaluation, when the separation distance between each antenna pair is
i) greater than 5 ·[(SAR1 + SAR2) / 1.6]$^{1.5}$ cm, rounded to the nearest cm, and
ii) the ∑ of [(the highest MPE for each mobile transmitter/antenna included in the simultaneous transmission configuration) / (the corresponding MPE limit)] < 1

By satisfying condition a) or b) as listed above, simultaneous SAR evaluation is not required. Incorporation of this Atheros module in conjunction with other certified transmitters in a qualified host device can be addressed as a Class I permissive change. However, the simultaneous transmission conditions must be fully documented in Class I permissive change report as described in KDB 616217 Supplement..

For each simultaneous transmission configuration which does not meet the conditions described above, submit an inquiry to Atheros Regulatory Group or equivalent responsible party of the radio module to evaluate additional FCC evaluation or application requirements.

Required Information to be documented in the Class I permissive change report

A summary of the information to be included in the Class I permissive change report is listed below. OEM integrators must consult the FCC KDB 616217 Supplement document for details.

1. FCC ID of all transmitters, maximum average conducted output power in each transmission mode and frequency band, operating configurations and exposure conditions approved for the individual transmitters.
2. Applicable antenna locations for all host configurations identified in diagrams, drawings and/or photos, including the range of antenna-to-user and antenna-to-antenna separation distances to support the required test reduction and exclusion analysis or SAR test configurations (The closest distance between each antenna and the user and the closest distance between individual antennas should be used.)
3. The type and physical dimensions of antennas incorporated in the intended host configurations
4. Antenna gain specified by the antenna manufacturer for antennas qualified for mobile exposure conditions
5. Other relevant information and restrictions required by the equipment certifications of individual transmitters, including antenna changes
6. The range of applicable physical, mechanical and electrical variations of host computer configurations supported by the test results in all relevant equipment certification.

Required Host System Labeling

FCCID and Industry Canada ID

The Integrator must affix the Atheros module's FCCID on the module. Also, when the module is not visible when installed in the host system, an additional label must appear on the outside of the host system visible to the user. Industry Canada (IC) labeling is only required on the module.
Example FCC & Canada IDs to appear on module:
FCC ID: PPD-AR5BMD22
IC: 4104A- AR5BMD22
Example wording also to appear somewhere on the outside of the host system visible to the end user:
Contains FCC ID: PPD- AR5BMD22

FCC Logo

The FCC logo shown below must appear on the host system signifying declared compliance of the system with FCC digital emissions rules.

Required User Manual Wording for Host PC System

The FCC requires the following text (or equivalent) included in the user documentation provided to the end user:
Example text which can be used by the Integrator in the end user instructions are:

Compliance Information:

The OEM integrator must incorporate appropriate operating instructions for all the transmitters and antennas installed in the host device with respect to any restrictions required for the individual transmitter certified by the FCC. Additional user instructions for meeting RF exposure requirements are not necessary for this Atheros module when installed in typical laptop/notebook/netbook computers provided the requirements in this document and KDB 616217 Supplement are fully satisfied.

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.
This product does not contain any user serviceable components. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

FCC Part 15 Digital Emissions Compliance
We [System Manufacturer Name, Address, Telephone], declare under our sole responsibility that the product [System Name] 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.
WARNING: 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 the one the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:
The Interference Handbook
This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-00345-4.

Industry Canada requires the following wording to the end user in French and English:

Industry Canada Notice:

This device complies with Canadian RSS-210.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmitting antenna) that is installed outdoors is subject to licensing. The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's web site

www.hc-sc.gc.ca/rpb.

"This Class B digital apparatus complies with Canadian ICES-003"

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada

Avis de Conformité à la Réglementation d'Industrie Canada:

Pour empêcher toute interférence aux services faisant l'objet d'une licence, cet appareil doit être utilisé à l'intérieur seulement et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. L'installateur du présent matériel radio doit s'assurer que l'antenne est située ou pointée de manière à ce que cette dernière n'émette pas de champs radioélectriques supérieurs aux limites specifées par Santé Canada pour le grand public; consulter le Code de sécurité 6, disponible sur le site Web de Santé Canada, à l'adresse suivante: www.hc-sc.gc.ca/rpb.

End of Required User Manual Wording to end user provided by radio/system integrator