

SKO.WB276P.1 A23205

IEEE 802.11b/g/n/a/ac/ax 2T2R PCIE WiFi Module Integrated BT 2.1+EDR/4.2/5.3

SKO.WB276P.1 module is based on AMPAK AP6276P solution.

AP6276P is a highly integrated module which features a low power 2x2 11a/b/g/n/ac/ax dual-band Wi-Fi subsystem and a Bluetooth v5.3 subsystem, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective throughput from an extended distance.

AP6276P data rate up to 1200Mbps with PCIE3.0. Optimized RF architecture and baseband algorithms provide superb performance and low power consumption. Intelligent MAC design deploys a high efficient offload engine, and hardware data processing accelerators which fully offloads Wi-Fi task of the host processor, AP6276P is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance. This documentation describes the engineering requirements specification.

The Test for electrical specification was performed under the following condition unless otherwise specified:

Ambient condition Temperature :0-40°C

Power supply voltages: 3.3V+/-0.3 input power at the Module;

NOTICE:

- ◆ please keep this product and accessories attached to the places which children can't touch;
- ◆ do not splash water or other liquid onto this product, otherwise it may cause damage;
- ◆ do not put this product near the heat source or direct sunlight, otherwise it may cause deformation or malfunction;
- ◆ please keep this product away from flammable or naked flame;
- ◆ please do not repair this product by yourself. Only qualified personnel can be repaired.

FCC Statement

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.

This equipment 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247, DTS and DSS) and CFR 47 FCC Part 15 E (NII). It is applicable to the modular transmitter

2.3

This radio transmitter QCI-SKOWB276P1 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The concrete contents to check are the following three points.

- 1) Antenna type is a Dipole with no more than 3.83 dBi gain at 2.4 GHz, 5.52 dBi gain at 5GHz and 5.84 dBi at 6GHz.
 - 2) Should be installed so that the end user cannot modify the antenna
 - 3) Feed line should be designed in 50ohm
- Fine-tuning of return loss etc. can be performed using a matching network.
The antenna shall not be accessible for modification or change by the end user.

2.4

The module complies with FCC Part 15.247 / Part 15.407 and apply for Single module approval.

2.5

Trace antenna designs: Not applicable— the antenna is integrated into the module and cannot be modified.

2.6

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7

Antenna type and antenna gain:

BLE/BT:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.28

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.83

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.57

2.4G wifi:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.28
2	2412-2462	Dipole Antenna	3.28

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.83

2	2412-2462	Dipole Antenna	3.83
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Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.57
2	2412-2462	Dipole Antenna	3.57

5G:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	5.52
2	5150-5825	Dipole Antenna	5.52

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	4.65
2	5150-5825	Dipole Antenna	4.65

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	3.61
2	5150-5825	Dipole Antenna	3.61

Wifi 6E:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	2.65 (Minimum) 4.46 (Maximum)
2	5925-6525	Dipole Antenna	2.65 (Minimum) 4.46 (Maximum)

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	4.01 (Minimum) 5.84 (Maximum)
2	5925-6525	Dipole Antenna	4.01 (Minimum) 5.84 (Maximum)

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	2.69 (Minimum) 3.99 (Maximum)
2	5925-6525	Dipole Antenna	2.69 (Minimum) 3.99 (Maximum)

2.8

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as “Contains FCC ID: QCI-SKOWB276P1”; any similar wording that expresses the same meaning may be used.

2.9

Testing of the host product with all the transmitters installed – referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested individually.

If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to

confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10

Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 and 15.209 & 15.207, part 15 E 15.407,15B class B requirement, only if the test result comply with FCC part 15C: 15.247 and 15.209 & 15.207, part 15 E 15.407,15B class B requirement. Then the host can be sold legally.

The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

2.11

The host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. For more information, please refer to the in KDB 996369 D03 OEM Manual and KDB 996369 D04 Module integration Guide.

FCC Wi-Fi 6E statement

FCC regulations restrict the operation of this device to indoor use only.

This module is for client devices only. When installed in a client device use is prohibited for control of or communications with unmanned aircraft systems. In addition of this module is installed in a fixed client device, it is also prohibited on oil platforms, cars, trains, boats, and aircraft, except that indoor access points are permitted to operate in the 5.925–6.425 GHz bands in large aircraft while flying above 10,000 feet.

This module cannot be installed in a weatherized enclosure and cannot operate from battery but only power sources.

Hosts device may not be battery powered and must be connected to a power source and this module does not contain power sourced by battery.

Canada Statement

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 4302A-SKOWB276P1" any similar wording that expresses the same meaning may be used.

L'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot « IC: 4302A-SKOWB276P1 » ou d'une formulation similaire exprimant le même sens, comme suit

- 1、 the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- 2、 for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
- 3、 for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate; and

1、 les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

2、 le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;

3、 le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 RF, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

IC Wi-Fi 6E Statement:

Devices shall not be used for control of or communications with unmanned aircraft systems. Low-power indoor access points and indoor subordinate devices shall bear statements acknowledging both of the following restrictions in the user manual and, where feasible, in a conspicuous location on the device:

Operation shall be limited to indoor use only.

Operation on oil platforms, automobiles, trains, maritime vessels and aircraft shall be prohibited except for on large aircraft flying above 3,048 m (10,000 ft).

L'équipement ne doit pas être utilisé pour le contrôle ou la communication des systèmes d'aéronefs sans pilote.

Les points d'accès intérieurs de faible puissance et les accessoires intérieurs doivent indiquer les restrictions suivantes dans le manuel de l'utilisateur et, si possible, à un endroit bien en vue de l'appareil:

Le fonctionnement doit être limité à un usage intérieur.

Il est interdit de travailler sur les plates - formes pétrolières, les voitures, les trains, les navires maritimes et les aéronefs, à l'exception des gros aéronefs de plus de 3 048 mètres (10 000 pieds)

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

This radio transmitter [IC: 4302A-SKOWB276P1] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The concrete contents to check are the following three points.

- 1) Must use an antenna such as Dipole Antenna with a gain not exceeding 3.83 dBi for BT/BLE/2.4G WIFI, 5.52 dBi for 5G WIFI, 5.84 dBi for 6G WIFI;
- 2) Should be installed so that the end user cannot modify the antenna;
- 3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.

Le présent émetteur radio [IC: 4302A-SKOWB276P1] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Le contenu concret à vérifier sont les trois points suivants.

- 1) Les antennes telles que les antennes dipole doivent être utilisées avec un gain ne dépassant pas 3.83 DBI pour BT / ble / 2.4G wifi, 5.52 DBI pour 5G wifi et 5.84 DBI pour 6g wifi;
- 2) doivent être installés de façon que l'utilisateur final ne peut pas modifier l'antenne
- 3) La ligne d'alimentation doit être conçue en 50ohm

Le réglage précis de la perte de rendement, etc. peut être effectué en utilisant un réseau correspondant..

Antenna type and antenna gain:

BLE/BT:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.28

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.83

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2402-2480	Dipole Antenna	3.57

2.4G wifi:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.28
2	2412-2462	Dipole Antenna	3.28

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.83
2	2412-2462	Dipole Antenna	3.83

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	3.57
2	2412-2462	Dipole Antenna	3.57

5G:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	5.52
2	5150-5825	Dipole Antenna	5.52

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	4.65
2	5150-5825	Dipole Antenna	4.65

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5150-5825	Dipole Antenna	3.61
2	5150-5825	Dipole Antenna	3.61

Wifi 6E:

Antenna Type 1			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	4.46
2	5925-6525	Dipole Antenna	4.46

Antenna Type 2			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	5.84
2	5925-6525	Dipole Antenna	5.84

Antenna Type 3			
Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5925-6525	Dipole Antenna	3.99
2	5925-6525	Dipole Antenna	3.99

Notice to OEM integrator

Must use the device only in host devices that meet the FCC/ISED RF exposure category of mobile, which means the device is installed and used at distances of at least 20cm from persons.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The end user manual shall include FCC Part 15 /ISED RSS GEN compliance statements related to the transmitter as show in this manual(FCC/Canada statement).

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B, ICES 003.

Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

The use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual.

Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

Must have on the host device a label showing Contains FCC ID: QCI-SKOWB276P1or IC: 4302A-SKOWB276P1

Both FCC ID and IC ID are not to be placed on the host at the same time and only hosts going into the US can use the FCC ID and only hosts going into Canada can use the IC ID.

Installer should put it in the manual:

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems

l'hôte doit utiliser l'instrument uniquement dans des dispositifs qui répondent à la fcc / (catégorie d'exposition rf mobile, ce qui signifie le dispositif est installé et utilisé à une distance d'au moins 20 cm de personnes.

le manuel de l'utilisateur final doit inclure la partie 15 / (fac rss gen déclarations de conformité relatives à l'émetteur que de montrer dans ce manuel.

le fabricant est responsable de la conformité de l'hôte, le système d'accueil avec le module installé avec toutes les autres exigences applicables du système comme la partie 15 b, ices - 003.

accueillir le fabricant est fortement recommandé de confirmer la conformité avec les exigences de la fcc / (émetteur lorsque le module est installé dans l'hôte.

le dispositif d'accueil doivent avoir une étiquette indiquant contient FCC ID: QCI-SKOWB276P1, IC: 4302A-SKOWB276P1

Les personnes chargées de l'installation devraient figurer dans le manuel:

Les dispositifs fonctionnant dans la bande de 5 150 à 5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Doit avoir sur l'appareil hôte une étiquette indiquant Contient l'ID FCC QCI-SKOWB276P1 ou IC : 4302A-SKOWB276P1 L'ID FCC et l'ID IC ne doivent pas être placés sur l'hôte en même temps et seuls les hôtes se rendant aux États-Unis peuvent utiliser l'ID FCC et seuls les hôtes se rendant au Canada peuvent utiliser l'ID IC.

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

-應避免影響附近雷達系統之操作

-高增益指向性天線只得應用於固定式點對點系統

內含發射器模組:  CC XX xx YY yy Z zW