

4 FCC part 15 Subpart E

4.1 Wavence unlicensed radio

The 2ASK5-WAVUBTS58/25881-WAVUBTS58 (UBT-S) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and ISSED requirements) allow immediate turn-up. After the license is received, the unlicensed UBT-S radio can be easily converted to the 6 GHz licensed band.

The 2ASK5-WAVUBTT58/25881-WAVUBTT58 (UBT-T) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and ISSED requirements) allow immediate turn-up. After the license is received, the unlicensed UBT-T radio can be easily converted to the 6 GHz licensed band.

The 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/25881-WAVUBTT58 unlicensed radios operate in the 5725-5850 U-NII-3 band in accordance with FCC Part 15.407 and ISSED RSS-247. These unlicensed radios, although operating in the same band as other spread spectrum radio, operates using narrower bandwidths than spread spectrum, allowing higher power at the tuned frequency. This design will provide greater immunity to interference from other unlicensed radios.

4.2 FCC Class B and ISSED ICES-003 compliance statement

The 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/25881-WAVUBTT58 unlicensed radios have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and ISSED ICES-003.

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.

4.3 FCC Class B and ISED ICES-003 requirements

**WARNING!**

Regulatory compliance warning: Physical changes or modifications to the 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/25881-WAVUBTT58 (unlicensed) radio are strictly prohibited.

Avertissement pour conformité réglementaire: changements physiques ou modifications sur les radios 2ASK5-WAVUBTS58/25881-WAVUBTS58, et 2ASK5-WAVUBTT58/25881-WAVUBTT58 (sans licence) sont strictement interdit.

**CAUTION!**

Changes or modifications not expressly approved by Nokia could void the authority to operate the 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/25881-WAVUBTT58 (unlicensed) radio.

**CAUTION!**

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 2ASK5-WAVUBTS58, and 2ASK5-WAVUBTT58 (unlicensed) radio requires strict adherence for continued part 15 of the FCC Rules compliance.

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 25881-WAVUBTS58, and 25881-WAVUBTT58 (unlicensed) radio requires strict adherence for continued ISED RSS-247 and ISED ICES-003 compliance

These devices comply with part 15 of the FCC Rules: 2ASK5-WAVUBTS58, and 25881-WAVUBTT58. These devices comply with ISED RSS-247 and ISED ICES-003: 25881-WAVUBTS58, and 25881-WAVUBTT58. Operation is subject to the following three conditions: (1) These devices may not cause harmful interference. (2) These devices must accept any interference received, including interference that may cause undesired operation. (3) These devices must be professionally installed.

Cet appareil radio est conforme À ISED RSS-247 et ISED ICES-003 (25881-WAVUBTS58, et 25881-WAVUBTT58). Son fonctionnement respecte les trois conditions suivantes: 1) cette radio ne cause pas d'interférences néfastes, 2) cette radio peut recevoir des interférences, ainsi que des interférences qui peuvent causer des opérations non désirées, et 3) cette radio doit être installée par des Professionnels.

9 UBT-S and UBT-T 5.8GHz (unlicensed) radios

The 2ASK5-WAVUBTS58/25881-WAVUBTS58 (UBT-S) and 2ASK5-WAVUBTT58/25881-WAVUBTT58 (UBT-T) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and ISSED requirements) allow immediate turn-up. After the license is received, the 2ASK5-WAVUBTS58, and 2ASK5-WAVUBTT58 radios can be easily converted to the 6 GHz licensed band.

The 2ASK5-WAVUBTS58/25881-WAVUBTS58 and 2ASK5-WAVUBTT58/25881-WAVUBTT58 unlicensed radios operate in the 5725-5850 U-NII-3 band in accordance with FCC Part 15.407 and ISSED RSS-247. This unlicensed radio, although operating in the same band as a spread spectrum radio, operates using narrower bandwidths than spread spectrum.

FCC class B and ISSED ICES-003 compliance statement

The 2ASK5-WAVUBTS58 and 2ASK5-WAVUBTT58 unlicensed radios have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. The 25881-WAVUBTS58, and 25881-WAVUBTT58 unlicensed radios have been tested and found to comply with the limits for a Class B digital device, pursuant to ISSED ICES-003.

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.

FCC class B requirements



CAUTION!

Changes or modifications not expressly approved by Nokia could void the authority to operate the 2ASK5-WAVUBTS58/25881-WAVUBTS58 and 2ASK5-WAVUBTT58/25881-WAVUBTT58 unlicensed radio.

**CAUTION!**

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 2ASK5-WAVUBTS58 and 2ASK5-WAVUBTT58 (unlicensed) radio requires strict adherence for continued part 15 of the FCC Rules compliance.

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 25881-WAVUBTS58, and 25881-WAVUBTT58 (unlicensed) radio requires strict adherence for continued ISSED RSS-247 and ICES-003 compliance.

The 2ASK5-WAVUBTS58 and 25881-WAVUBTT58 devices comply with part 15 of the FCC Rules. The 25881-WAVUBTS58 and 25881-WAVUBTT58 devices comply with ISSED RSS-247 and ICES-003. These devices contain license-exempt transmitter(s)/receiver(s). Operation is subject to the following three conditions:

1. These devices may not cause harmful interference.
2. These devices must accept any interference, including interference that may cause undesired operation of the device.
3. These devices must be professionally installed.

Les appareils 2ASK5-WAVUBTS58 et 2ASK5-WAVUBTT58 sont conformes à la clause 15 du règlement FCC. Les appareils 25881-WAVUBTS58 et 25881-WAVUBTT58 sont conformes à la clause qu'à la RSS-247 et ICES-003 exempte de licence de l'ISSED ISSED.

Ces appareils contiennent des émetteurs/récepteurs exempts de licence. L'exploitation est autorisée aux conditions suivantes:

1. Les appareils ne doivent pas produire d'interférences nuisibles.
2. Les appareils doivent accepter toute interférence radioélectrique subie, même si l'interférence est susceptible d'en compromettre le fonctionnement.
3. Ces appareils doivent être installés par des professionnels.

12.12 Radio profiles

For information about radio profiles, see the following documents:

- Wavence UBT-S UBT-T Technical Specification
- Wavence UBT-m Technical Specification
- Wavence Engineering Specifications.

For the full list of Wavence documentation, see *Wavence List of Documents*.

Related descriptions

[UBT radio](#) on page 78

12.13 Unlicensed radio for UBT-S and UBT-T in the ANSI Market



CAUTION!

Changes or modifications not expressly approved by Nokia could void the authority to operate the 2ASK5-WAVUBTS58/25881-WAVUBTS58 and 2ASK5-WAVUBTT58/25881-WAVUBTT58 (unlicensed) radio.



CAUTION!

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 2ASK5-WAVUBTS58 and 2ASK5-WAVUBTT58 (unlicensed) radio requires strict adherence for continued part 15 of the FCC Rules compliance.

Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the 25881-WAVUBTS58, and 25881-WAVUBTT58 (unlicensed) radio requires strict adherence for continued ISSED RSS-247 and ICES-003 compliance.

The 2ASK5-WAVUBTS58/25881-WAVUBTS58 (UBT-S) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and ISSED requirements) allow immediate Turn-Up. After the license is received, the unlicensed UBT-S radio can be easily converted to the 6 GHz licensed band.

The 2ASK5-WAVUBTT58/25881-WAVUBTT58 (UBT-T) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and ISSED requirements) allow immediate Turn-Up. After the license is received, the unlicensed UBT-T radio can be easily converted to the 6 GHz licensed band.

Table 12 Unlicensed radio

Transceiver	FCC ID	ISED ID
UBT-S	2ASK5-WAVUBTS58	25881-WAVUBTS58
UBT-T	2ASK5-WAVUBTT58	25881-WAVUBTT58

See the Wavence Equipping Options drawing, found in Wavence Engineering Support Documentation for unlicensed radio configurations and equipping options.

The UBT-S and UBT-T unlicensed radios operate in the 5725-5850 U-NII-3 band in accordance with FCC Part 15.407 and ISSED RSS-247. These unlicensed radios, although operating in the same band as a spread spectrum radio, operates using narrower bandwidths than spread spectrum. Advantages, disadvantages, and antenna recommendations for the unlicensed radio follow:

Advantages:

- Fast installation and Turn-Up
- Between 14.2 — 283 Mb/s (full duplex) user configurable data payload capacity consisting of a combination of E1/DS1, DS3, STM-1/OC-3, and/or Ethernet traffic
- Field convertible to 6 GHz licensed band (UBT-S/UBT-T)
- Flexible capacity upgrades in service.
- Common network management with licensed radios.
- Common spares and training with licensed radios
- Adaptive Modulation - automatic interference countermeasures
- XPIC support -reuse of the same frequency on other polarization
- Carrier Aggregation support with other frequency bands to provide additional capacity and protection mechanisms

Disadvantages:

- Interference from other 5725-5850 U-NII-3 band transmissions are possible
- Operating restrictions
- Performance could deteriorate due to interference as the frequency band becomes congested.

Antenna Recommendations:

- Frequency 5.8 GHz
- Size and Type, see [Table 13: 5.8 GHz unlicensed antenna options](#)
- Gain and 3 dB Beamwidth, see [Table 13: 5.8 GHz unlicensed antenna options](#)
- The required antenna impedance is 50 ohms.

Antennas not included in [Table 13: 5.8 GHz unlicensed antenna options](#) are strictly prohibited for use with these devices.

This radio transmitter 25881-WAVUBTS58 and 25881-WAVUBTT58 has been approved by ISSED 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.

Le présent émetteur radio 25881-WAVUBTS58 et 25881-WAVUBTT58 a été approuvé par ISSED 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.

Table 13 5.8 GHz unlicensed antenna options

UBT-S/UBT-T
1 ft flat panel – 23 dBi/9°
2 ft flat panel – 28 dBi/3.5°
2 ft parabolic – 29 dBi/6°
3 ft parabolic – 32 dBi/3°
4 ft parabolic – 35 dBi/3°
6 ft parabolic – 38 dBi/3°

These antennas can only be used in a fixed point-to-point configuration.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotopically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

**DANGER!**

The antennas used for this transmitter must be installed to provide a separation distance of at least 12 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

**DANGER!**

Les antennes utilisées pour cet émetteur doivent être installées de manière à offrir une distance de séparation d'au moins 12 mètres entre toutes les personnes et ne doivent pas être situées ou fonctionner conjointement avec une autre antenne ou un autre émetteur.

**DANGER!**

Danger of public exposure to long term RF radiated energy. When using a 1 ft flat panel antenna with a 1-watt (+30 dBm) output power, the antenna must be located in an area that does not allow the general population access to within 12 meters (5.8 GHz) of the antenna.

Frequency Plan:

- For UBT-S and UBT-T frequency plan for the 5.725 and 5.850 GHz unlicensed band, see [Figure 49: Frequency plan UBT-S and UBT-T: 5.725 to 5.850 GHz unlicensed band \(FCC Part 15 and ISSED RSS-247\)](#).

Output Power: A requirement of operating in the unlicensed band is to limit transmit output power to not more than +30.0 dBm at the antenna port. It is the responsibility of the user to transmit not more than +30.0 dBm.

Figure 49 Frequency plan UBT-S and UBT-T: 5.725 to 5.850 GHz unlicensed band (FCC Part 15 and ISSED RSS-247)

5725	5787.5												5850 MHz
G1	G3	G5	B1	B3	B5		G1'	G3'	G5'	B1'	B3'	B5'	10 MHz
	G2	G4		B2	B4		G2'	G4'		B2'	B4'		10 MHz
G3			B3				G3'			B3'			30 MHz

Transmit Channel	Frequency (MHz)	Receive Channel	Frequency (MHz)
G1	5731	G1"	5794
G2	5736	G2"	5799
G3	5741	G3"	5804
G4	5746	G4"	5809
G5	5751	G5"	5814
B1	5761	B1"	5824
B2	5766	B2"	5829
B3	5771	B3"	5834
B4	5776	B4"	5839
B5	5781	B5"	5844



1. The drawing above shows the 10 MHz channels used by the 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/25881-WAVUBTT58 radio. Gray channels are designated "G". Blue channels are designated "B". Transmit and receive channels have a 63 MHz separation.
2. RF filters are centered on channels G3, B3, G3", and B3".
3. The flexibility of the 2ASK5-WAVUBTS58/25881-WAVUBTS58, and 2ASK5-WAVUBTT58/ 25881-WAVUBTT58 allows any radio to grow to 283 Mb/s without a hardware upgrade.