

## 6.2 SORTED MODEL (PART) NUMBERS

The various model/part numbers of Canopy products are categorically listed in [Table 22](#).

**Table 22: Canopy model numbers (part numbers) for AES and DES encryption modules**

Range	Integrated Antenna				Connectorized for Antenna			
	Canopy		Advantage		Canopy		Advantage	
	DES	AES	DES	AES	DES	AES	DES	AES
900 MHz			9000AP 9000APF 9000SM 9000SMF	9001AP 9001APF 9001SM 9001SMF			9000APC 9000SMC	9001APC 9001SMC
2.4 GHz	2400AP 2400APWL 2400SM 2400SMWL 2460SM 2400SMLP 2400BH 2400BH20 2400BHRF 2400BHRF20 2400BHWL 2400BHWL20 2400BHWLRF 2400BHWLRF20	2401AP 2401APWL 2401SM 2401SMWL 2401BH 2401BH20 2401BHRF 2401BHRF20 2401BHWL 2401BHWL20 2401BHWLRF 2401BHWLRF20	2450AP 2450APWL 2450SM 2450SMWL	2451AP 2451APWL 2451SM 2451SMWL				
5.1 GHz	5202AP 5202SM 5202BH 5212BH20 5212BHRF20		5252AP 5252SM					
5.2 GHz	5200AP 5200APHZ 5200SM 5260SM 5200SMHZ 5200BH 5210BHRF 5210BHRF20	5201AP 5201SM 5201BH 5211BH20 5211BHRF 5211BHRF20	5250AP 5250APHZ 5250SM 5250SMHZ	5251AP 5251SM				
5.4 GHz FSK	5400AP 5400SM 5460SM 5400BH 5400BH20 5400BHRF 5400BHRF20	5401AP 5401SM 5401BH 5401BH20 5401BHRF 5401BHRF20	5450AP 5450SM	5451AP 5451SM	5400APC 5400SMC 5400BHC 5400BHC20	5401APC 5401SMC 5401BHC 5401BHC20	5450APC 5450SMC	5451APC 5451SMC
5.4 GHz OFDM	5440AP 5440SM				5440APC			

Range	Integrated Antenna				Connectorized for Antenna			
	Canopy		Advantage		Canopy		Advantage	
	DES	AES	DES	AES	DES	AES	DES	AES
5.7 GHz	5700AP 5700APHZ 5700SM 5760SM 5700SMMHZ 5700BH 5700BH20 5700BHRF 5700BHRF20	5701AP 5701SM 5701BH 5701BH20 5701BHRF 5701BHRF20	5750AP 5750APHZ 5750SM 5750SMMHZ	5751AP 5751SM	5700APC 5700SMC 5700BHC 5700BHC20	5701APC 5701SMC 5701BHC 5701BHC20	5750APC 5750SMC	5751APC 5751SMC
5.7 GHz "G" Series	5700APG 5700APHZG 5703APG 5700SMG 5760SMG 5700SMHZG 5703SMG 5700BHG 5700BH20G	5701APG 5701SMG 5701BHG 5701BH20G	5750APG 5750APHZG 5750SMG 5750SMMHZG	5751APG 5751SMG	5700APC 5700SMCG 5700BHC 5700BHC20G	5701APCG 5701SMCG 5701BHC 5701BHC20G	5750APCG 5750SMCG	5751APCG 5751SMCG
	5900APBB 5900SMBB		5950APBB 5950SMBB					

### 6.3 INTERPRETING ELECTRONIC SERIAL NUMBER (ESN)

Canopy module labels contain a product serial number that could be significant in your dealings with Motorola or your supply chain. This is the electronic serial number (ESN), also known as the Media Access Control (MAC) address, of the module. This hexadecimal number identifies the module in

- communications between modules.
- the data that modules store about each other (for example, in the **Registered To** field).
- the data that the BAM software applies to manage authentication and bandwidth.
- Prizm auto discovery of SMs through the AP (or BHS through the BHM).
- software upgrades performed by the Canopy Network Updater Tool (CNUT).
- information that CNUT passes to external tools.

### 6.4 FINDING THE MODEL (PART) NUMBER AND ESN

The labels and locations of Canopy module model (part) numbers and ESNs are shown in [Table 23](#).

**Table 23: Labels and locations of model (part) numbers and ESNs**

Numeric String	Label and Location	
	Older Modules	Newer Modules

## 15 AVOIDING HAZARDS

Use simple precautions to protect staff and equipment. Hazards include exposure to RF waves, lightning strikes, and power surges. This section specifically recommends actions to abate these hazards.

### 15.1 PREVENTING OVEREXPOSURE TO RF ENERGY

To protect from overexposure to RF energy, install Canopy radios so as to provide and maintain the minimum separation distances from all persons shown in [Table 39](#).

**Table 39: Exposure separation distances**

Module Type	Minimum Separation Distance from Persons
Canopy module, FSK or OFDM	20 cm (approx 8 in)
Canopy module with Reflector Dish	1.5 m (approx 60 in or 5 ft)
Canopy Module with LENS	0.5 m (approx 20 in)
Antenna of connectorized 5.7 GHz AP	30 cm (approx 12 in)
Antenna of connectorized or integrated 900 MHz module	60 cm (24 in)
Indoor 900 MHz SM	10 cm (4 in)

At these and greater separation distances, the power density from the RF field is below generally accepted limits for the general population.



**NOTE:**

These are conservative distances that include compliance margins. In the case of the reflector, the distance is even more conservative because the equation used models the reflector as a point source and ignores its physical dimensions.

#### 15.1.1 Details of Calculations for Separation Distances and Power Compliance Margins

Limits and guidelines for RF exposure come from:

- US FCC limits for the general population. See the FCC web site at <http://www.fcc.gov>, and the policies, guidelines, and requirements in Part 1 of Title 47 of the Code of Federal Regulations, as well as the guidelines and suggestions for evaluating compliance in FCC OET Bulletin 65.
- Health Canada limits for the general population. See the Health Canada web site at <http://www.hc-sc.gc.ca/rpb> and Safety Code 6.
- ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines for the general public. See the ICNIRP web site at <http://www.icnirp.de/> and Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields.

The applicable power density exposure limits from the documents referenced above are

- 6 W/m<sup>2</sup> for RF energy in the 900-MHz frequency band in the US and Canada.
- 10 W/m<sup>2</sup> for RF energy in the 2.4-, 5.2-, 5.4-, and 5.7-GHz frequency bands.

Peak power density in the far field of a radio frequency point source is calculated as follows:

$$S = \frac{P \cdot G}{4 \pi d^2}$$

where

S = power density in W/m<sup>2</sup>

P = RMS transmit power capability of the radio, in W

G = total Tx gain as a factor, converted from dB

d = distance from point source, in m

Rearranging terms to solve for distance yields

$$d = \sqrt{\frac{P \cdot G}{4 \pi S}}$$

### Calculated Distances and Power Compliance Margins

Table 40 shows calculated minimum separation distances *d*, recommended distances and resulting power compliance margins for each frequency band and antenna combination.

**Table 40: Calculated distances and power compliance margins**

Band Range	Antenna	Variable			<i>d</i> (calculated)	Recommended Separation Distance	Power Compliance Margin
		P	G	S			
900 MHz	external	0.4 W (26 dBm)	10.0 (10 dB)	6 W/m <sup>2</sup>	23 cm	60 cm (24 in)	7
	integrated	0.25 W (24 dBm)	15.8 (12 dB)	6 W/m <sup>2</sup>	23 cm	60 cm (24 in)	7
	indoor, integrated	Simulation model used to estimate Specific Absorption Rate (SAR) levels			10 cm (4 in)		2
2.4 GHz	integrated	0.34 W (25 dBm)	6.3 (8 dB)	10 W/m <sup>2</sup>	13 cm	20 cm (8 in)	2.3
	integrated plus reflector	0.34 W (25 dBm)	79.4 (19 dB)	10 W/m <sup>2</sup>	46 cm	1.5 m (5 ft)	10
5.2 GHz	integrated	0.2 W (23 dBm)	5.0 (7 dB)	10 W/m <sup>2</sup>	9 cm	20 cm (8 in)	5
	integrated plus reflector	0.0032 W (5 dBm)	316 (25 dB)	10 W/m <sup>2</sup>	9 cm	1.5 m (5 ft)	279
	integrated	0.025 W	40	10	9 cm	50 cm	31

Band Range	Antenna	Variable			d (calculated)	Recommended Separation Distance	Power Compliance Margin
		P	G	S			
	plus LENS	(14 dBm)	(16 dB)	W/m <sup>2</sup>		(12 in)	
5.4 GHz	integrated	0.2 W (23 dBm)	5.0 (7 dB)	10 W/m <sup>2</sup>	9 cm	20 cm (8 in)	5
	integrated plus reflector	0.0032 W (5 dBm)	316 (25 dB)	10 W/m <sup>2</sup>	9 cm	1.5 m (5 ft)	279
	integrated plus LENS	0.020 W (13 dBm)	50 (17 dB)	10 W/m <sup>2</sup>	9 cm	50 cm (12 in)	31
5.4 GHz OFDM	integrated	0.01 W (10 dBm)	50 (17 dB)	10 W/m <sup>2</sup>	6 cm	20 cm (8 in)	10
5.7 GHz	integrated	0.2 W (23 dBm)	5.0 (7 dB)	10 W/m <sup>2</sup>	9 cm	20 cm (8 in)	5
	integrated plus reflector	0.2 W (23 dBm)	316 (25 dB)	10 W/m <sup>2</sup>	71 cm	1.5 m (5 ft)	4.5
	Integrated plus LENS	0.2 W (23 dBm)	50 (17 dB)	10 W/m <sup>2</sup>	28 cm	50 cm (12 in)	3.13
5.7 GHz "G" Series	integrated	0.4 W (26 dBm)	5.0 (7 dB)	10 W/m <sup>2</sup>	13 cm	20 cm (8 in)	2.5
	integrated plus reflector	0.4 W (26 dBm)	316 (25 dB)	10 W/m <sup>2</sup>	100 cm	1.5 m (5 ft)	2.24
	integrated plus LENS	0.4 W (26 dBm)	50 (17 dB)	10 W/m <sup>2</sup>	40 cm	50 cm (12 in)	1.57
	enhanced	0.4 W (26 dBm)	10 (10 dB)	10 W/m <sup>2</sup>	18 cm	20 cm (8 in)	1.26
5.9 GHz	integrated	0.2 W (23 dBm)	5.0 (7 dB)	10 W/m <sup>2</sup>	9 cm	20 cm (8 in)	5

## 15.2 GROUNDING CANOPY EQUIPMENT

Effective lightning protection diverts lightning current safely to ground, Protective Earth (PE)  $\downarrow$ . It neither attracts nor prevents lightning strikes.

### WARNING!



Lightning damage is *not* covered under the Canopy warranty. The recommendations in Canopy guides give the installer the knowledge to protect the installation from the harmful effects of ESD and lightning. These recommendation must be thoroughly and correctly performed. However, complete protection is neither implied or possible.

## 36 LEGAL AND REGULATORY NOTICES

### 36.1 IMPORTANT NOTE ON MODIFICATIONS

Intentional or unintentional changes or modifications to the equipment must not be made unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

### 36.2 NATIONAL AND REGIONAL REGULATORY NOTICES

#### 36.2.1 U.S. Federal Communication Commission (FCC) Notification

This device complies with Part 15 of the US FCC Rules and Regulations. 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 equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the US 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 these instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to correct the interference by one or more of the following measures:

- Increase the separation between the affected equipment and the unit;
- Connect the affected equipment to a power outlet on a different circuit from that which the receiver is connected to;
- Consult the dealer and/or experienced radio/TV technician for help.

FCC IDs and the specific configurations covered are listed in Table 70.

**Table 70: US FCC IDs and Industry Canada Certification Numbers and Covered Configurations**

FCC ID	Industry Canada Cert Number	Frequencies	Module Families	Antenna, Lens, or Reflector	Maximum Allowed Transmitter Output Power
ABZ89FC5809	109W-9000	8 MHz channels, centered on 906-924 MHz in 1 MHz increments (within the 902-928 MHz ISM band)	900 SM, AP	12 dBi Canopy integrated antenna	24 dBm (250 mW)
				10 dBi Maxrad Model # Z1681, flat panel	26 dBm (400 mW)
				10 dBi Mars Model # MA-IS91-T2, flat panel	26 dBm (400 mW)
				10 dBi MTI Model #MT-2630003/N, flat panel	26 dBm (400 mW)
			900 Indoor SM	8 dBi integrated adj pol antenna	26 dBm (400 mW)

FCC ID	Industry Canada Cert Number	Frequencies	Module Families	Antenna, Lens, or Reflector	Maximum Allowed Transmitter Output Power
ABZ89FC5808	109W-2400	20 MHz channels, centered on 2415-2457.5 MHz in 2.5 MHz increments (within the 2400-2483.5 MHz ISM band)	2400 BH, SM, AP	8 dBi internal	28 dBm (630 mW)
			2400 BH, SM	8 dBi internal + 11 dB reflector	25 dBm (340 mW)
ABZ89FC3789	109W-5200	20 MHz channels, centered on 5275-5325 MHz in 5 MHz increments (within the 5250-5350 MHz U-NII band)	5200 BH, SM, AP	7 dBi internal	23 dBm (200 mW)
			5200 BH SM, AP, only P10 Modules	7 dBi internal + 18 dB reflector	5 dBm (3.2 mW)
				7 dBi internal + 9 dB lens	14 dBm (25 mW)
ABZ89FC5807	109W-5210	20 MHz channels, centered on 5275-5325 MHz in 5 MHz increments (within the 5250-5350 MHz U-NII band)	5210 BH	7 dBi internal + 18 dB reflector	5 dBm (3.2 mW)
ABZ89FT7623	none	20 MHz channels, centered on 5495-5705 MHz in 5 MHz increments (within the 5470-5725 MHz U-NII band)	5400 BH, SM, AP	7 dBi internal	23 dBm (200 mW)
				7 dBi internal + 18 dB reflector	5 dBm (3.2 mW)
				7 dBi internal + 9 dB lens	14 dBm (25 mW)
none	109W-5400	20 MHz channels, centered on 5495-5575 and 5675-5705 MHz in 5 MHz increments (within the 5470-5725 MHz U-NII band with 5600-5650 MHz excluded)	5400 BH, SM, AP	7 dBi internal	23 dBm (200 mW)
				7 dBi internal + 18 dB reflector	5 dBm (3.2 mW)
				7 dBi internal + 9 dB lens	14 dBm (25 mW)
ABZ89FC5804	109W-5700	20 MHz channels, centered on 5735-5840 MHz in 5 MHz increments (within the 5725-5850 MHz ISM band)	5700 BH, SM, AP	7 dBi internal	23 dBm (200 mW)
			5700 BH, SM	7 dBi internal + 18 dB reflector	23 dBm (200 mW)
				7 dBi internal + 10 dB lens	23 dBm (200 mW)
			5700 AP	7 dBi internal + 10 dB lens	19 dBm (80 mW)

FCC ID	Industry Canada Cert Number	Frequencies	Module Families	Antenna, Lens, or Reflector	Maximum Allowed Transmitter Output Power
ABZ89FT7630	109W-5700G	20 MHz channels, centered on 5735-5840 MHz in 5 MHz increments (within the 5725-5850 MHz ISM band)	5700 BHG, SMG, APG	7 dBi internal	26 dBm (400 mW)
			5700 BHG, SMG	7 dBi internal + 18 dB reflector	26 dBm (400 mW)
			5700 APG	7 dBi internal + 10 dB lens	26 dBm (400 mW)
			5700 APCG	7 dBi internal + 10 dB lens	19 dBm (80 mW)
			5703 SMG, APG	Mars Model # MA-WC50-5X vertically polarized antenna with 17 dBi gain	19 dBm (80 mW)
			5703 SMG, APG	10 dBi internal	26 dBm (400 mW)
ABZ89FT7629	none	10 MHz channels, centered on 5476-5719 in 0.5 MHz increments (within the 5470-5725 MHz U-NII band)	5440 AP	17 dBi connectorized antenna (60° x 5° 3 dB beam width)	10 dBm (10 mW)
			5440 SM	17 dBi integrated antenna (18° x 18° 3 dB beam width)	10 dBm (10 mW)

### 36.2.2 Industry Canada (IC) Notification

This device complies with RSS-210 of Industry Canada. 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.

Users should be cautioned to take note that in Canada high power radars are allocated as primary users (meaning they have priority) of 5250 – 5350 MHz and 5650 – 5850 MHz and these radars could cause interference and/or damage to license-exempt local area networks (LELAN).

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to RSS-210 of Industry Canada. 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 these instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to correct the interference by one or more of the following measures:

- Increase the separation between the affected equipment and the unit;
- Connect the affected equipment to a power outlet on a different circuit from that which the receiver is connected to;
- Consult the dealer and/or experienced radio/TV technician for help.

To reduce potential radio interference to other users, the antenna type and its gain should be chosen so its Equivalent Isotropic Radiated Power (EIRP) is not more than that permitted for successful communication.

Industry Canada Certification Numbers and the specific configurations covered are listed in [Table 70](#).

This device has been designed to operate with the antennas listed in [Table 70](#) and having a maximum gain as shown in [Table 70](#). Antennas not included or having a gain greater than as shown in [Table 70](#) are strictly prohibited from use with this device. Required antenna impedance is 50 ohms.

### 36.2.3 Regulatory Requirements for CEPT Member States (<http://www.cept.org>)

When operated in accordance with the instructions for use, Motorola Canopy Wireless equipment operating in the 2.4 and 5.4 GHz bands is compliant with CEPT Recommendation 70-03 Annex 3 for Wideband Data Transmission and HIPERLANs. For compliant operation in the 2.4 GHz band, the transmit power (EIRP) from the built-in patch antenna and any associated reflector dish shall be no more than 100mW (20dBm). For compliant operation in the 5.4 GHz band, the transmit power (EIRP) from the built-in patch antenna and any associated reflector dish shall be no more than 1 W (30 dBm).

The following countries have completely implemented CEPT Recommendation 70-03 Annex 3A (2.4 GHz band):

- EU & EFTA countries: Austria, Belgium, Denmark, Spain, Finland, Germany, Greece, Iceland, Italy, Ireland, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Switzerland, Sweden, UK
- New EU member states: Czech Republic, Cyprus, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovenia, Slovakia
- Other non-EU & EFTA countries: Bulgaria, Bosnia and Herzegovina, Turkey

The following countries have a limited implementation of CEPT Recommendation 70-03 Annex 3A:

- France - Outdoor operation at 100mW is only permitted in the frequency band 2400 to 2454 MHz;
  - Any outdoor operation in the band 2454 to 2483.5MHz shall not exceed 10mW (10dBm);
  - Indoor operation at 100mW (20dBm) is permitted across the band 2400 to 2483.5 MHz
- French Overseas Territories:
  - Guadeloupe, Martinique, St Pierre et Miquelon, Mayotte – 100mW indoor & outdoor is allowed
  - Réunion and Guyana – 100mW indoor, no operation outdoor in the band 2400 to 2420MHz
- Italy - If used outside own premises, general authorization required
- Luxembourg - General authorization required for public service