

# TP9500 DMR Portable Radios

## Specifications Manual

MPG-00003 - Issue 04 - April 2023

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# Preface

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## Scope of Manual

The contents of this document applies to the TP9500 portable radio. This manual provides general, performance, and physical specifications.

## Alerts

Please follow exactly any instruction that appears in the text as an 'alert'. An alert provides necessary safety information as well as instructions about the proper use of the product. This manual uses the following types of alert:



**Warning** This alert is used when there is a hazardous situation, which, if not avoided, could result in death or serious injury.



This icon is used to draw attention to information that may improve users understanding of the equipment or procedure.

## Associated Documentation

The following associated documentation for this product is available on the Tait support website.

The characters **xx** represent the issue number of the documentation.

Title	Code
TP9500 User's Guide	MPG-00001-xx
Battery Charging Guide	MPD-00002-xx
Safety and Compliance Information	MTA-00011-xx

## Acronyms

Acronym	Definition
ESD	Electrostatic discharge

# Publication Record

Issue	Publication Date	Description
4	April 2023	Added WiFi data. Updated formatting. Updated battery specifications footnote with WiFi.
3	June 2021	High Capacity Battery updates. Multiple minor updates.
2	August 2020	Added correct character symbol to transmitter and receiver specs Added Language Support section and available colors Added plug pack information to Charger Specifications section
1	December 2019	First release

# 1 Introduction

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This manual lists some of the regulatory requirements and industry standards that the TP9500 series of portable radios satisfy, and explains how the radio specifications were derived. Separate chapters compare the performance of the receiver and of the transmitter, with requirements specified by the European Telecommunications Standards Institute (ETSI), and the Telecommunications Industry Association (TIA). "General Specifications" on page 19 provides general radio, battery, and charger specifications.



The TP9500 specifications in this manual are typical performance figures and are intended only to provide guidance. They are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.



For known issues and limitations that may cause a radio to perform outside the specifications listed here, see the software release notes for the TP9500. Software release notes are found on the Tait support website, <http://support.taitradio.com>.

## Regulatory Requirements and Industry Standards

### Regulatory Requirements

TP9500 radios meet and exceed the following **regulatory requirements** (where applicable):

- CFR 47<sup>1</sup>
- AS4295-2004
- EN 300 086-11
- EN 300 113-11
- EN 300 219-11
- EN 301 489-11
- 62368-11
- RSS-119

TP9500 radios also meet and exceed **industry standards** that include:

- Relevant sections of TIA-603-E (Land Mobile FM or PM Communications Equipment Measurement and Performance Standards)
- MIL-STD 810 G (Environmental Engineering Considerations and Laboratory Tests, see also "Environmental" on page 22.

TIA standards are adopted by TIA in accordance with the American National Standards Institute (ANSI) patent policy.

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<sup>1</sup>A regulatory requirement issued by ETSI. ETSI requirements do not apply to radios operating in the 700/800/900MHz frequency bands.

For applicable Ingress Protection (IP) ratings and military standards, as well as details of the applicable ESD standard, see "Environmental" on page 22.

## Quality Assurance

Tait is an ISO9001: 2000 and ISO14001: 2004 certified supplier.

## Vocoder

TP9500 radios use AMBE+2™ voice coding technology.

## Performance Figures

TP9500 specifications were derived by measuring **typical performance** and then averaging that measurement across multiple points in each RF band.

In contrast, all figures quoted as regulatory requirements are **guaranteed minimum performance** figures for equipment operated at standard room temperature, +71.6°F to +82.4°F (+22°C to +28°C) and standard test voltage (7.5VDC).

Performance figures quoted as 'typical' are generally better than performance figures quoted as 'guaranteed minimum'.

## Definition of Narrow Bandwidth and Wide Bandwidth

The terms 'narrow bandwidth' (NB) and 'wide bandwidth' (WB) are used as follows:

Term	Abbreviation	Channel spacing	Modulation 100% deviation
Narrow bandwidth	NB	12.5kHz/15kHz	±2.5kHz
Wide bandwidth	WB	25kHz/30kHz	±5.0kHz



# Frequency Bands

Tait uses a unique alphanumeric code to represent each frequency band. These codes are used throughout this manual. The frequency codes currently used with the TP9500 series of radios are as follows:



HK and H7 band radios are approved for operation on the Australia and New Zealand Citizens Band frequencies (476.425 to 477.4125MHz). Citizens Band performance limits apply to radios used in these bands.

Frequency code	Frequency band
B1	136MHz to 174MHz
HK	378MHz to 470MHz
H7	450MHz to 520MHz
K5	757MHz to 870MHz (Tx) 757MHz to 776MHz (Rx) 850MHz to 870MHz (Rx)

## Australia and New Zealand Citizens Band

AS/NZS 4365 deals with the use of frequencies in the 476.425 to 477.4125MHz band. Products capable of operating in this band have been approved for operation in the UHF Citizens Band Radio Service which is licensed in Australia by the ACMA Radio communications (Citizens Band Radio Stations) Class Licence and in New Zealand by the MBIE General User Radio Licence for Citizens Band Radio. Operation is subject to conditions contained within those licences.

Repeaters operate by receiving a transmission on one channel and re-transmitting it on another. Operators are required to avoid using local repeater input channels, which will be in the range of 31 to 38 (and 71 to 78 when authorized), unless it is intended to use the repeater facility, and to avoid using local repeater output channels, which will be in the range 1 to 8 (and 41 to 48 when authorized), at any time. Operators must always listen in on a channel (or observe a channel-busy indicator) to ensure it is not already being used before transmitting.

No voice transmissions are permitted on data channels 22 and 23. Equipment meeting this standard will inhibit voice operation on channels 22 and 23.

Operators must be aware of the consequences of narrowband (2.5kHz deviation) transmissions being received on older wideband equipment, and wideband (5.0kHz deviation) transmissions being received on newer narrowband equipment. They should also be aware of the possibility of interference due to older equipment being operated on channels adjacent to new narrowband channels. The list of currently authorized channels can be obtained from the ACMA website in Australia and the MBIE website in New Zealand.

In Australia:

- Except in an emergency, a CB transmitter must not be operated on UHF channels 5 and 35.
- Channel 11 is the customary calling channel for establishing communications.
- Channel 40 is the customary road vehicle channel.

# FCC Narrowbanding Regulations

The following information applies to all radios, not just to those sold in countries where FCC regulations apply.

From 1 January 2013, it is an FCC requirement that land mobile radio systems must not operate channels with a bandwidth greater than 12.5kHz in the 150–174MHz and 421–470MHz frequency bands. From this date all radios will be supplied with firmware that requires a software feature license to operate a medium or wide bandwidth channel in these frequency bands.

The 20/25kHz Unrestricted Wideband feature license is available to any customer who is not subject to the relevant FCC regulations, or who has an FCC waiver. Note that this feature license is also required to operate a medium or wide bandwidth channel on the spot frequencies which are exempt from the FCC requirement:

- 152.0075, 157.450, 152.480, 157.740 and 158.460MHz in the 150–174MHz frequency band
- 462.750, 462.775, 462.800, 462.825, 462.850, 462.875, 462.900, 462.925, and 465MHz in the 421–470MHz frequency band.

To obtain the feature license, or for more information about it, contact your regional Tait office.

## 2 Receiver Specifications

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This chapter compares the performance of the receiver in a TP9500 radio with receiver requirements specified by ETSI and TIA.

Where an ANSI/TIA or ETSI EN 300 113 test method was used to measure TP9500 performance, this is indicated in parentheses. Where the ETSI test method EN 300 086-1 was used, no test method is named. Please also see the footnotes for the tables.



The TP9500 specifications in this manual are typical performance figures that are only intended to provide guidance. The specifications are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.



For important information about how radio performance figures were derived, see "Introduction" on page 7.

# Analog Receiver Specifications

Parameter	Compliance limit	Measured performance		
	All bands <sup>a</sup>	B1	HK, H7	K5
Adjacent channel selectivity				
NB channel <sup>b</sup>	> 60dB	65dB		n/a
WB channel	> 70dB	74dB		
Adjacent channel selectivity (TIA/EIA603 one-tone test method)				
NB channel	> 50dB	65dB		63dB
WB channel	> 60dB	74dB		72dB
Audio distortion at rated audio (TIA-603-E)				
	< 5%	1%		
Audio response (TIA-603-E)				
	+1dB, -3dB	+0.5dB, -2.5dB		
Blocking				
	> 84dB	> 110dB	> 100dB	n/a
Frequency stability (TIA-603-E)				
	±2.5ppm	±0.5ppm		
Intermodulation rejection				
NB channel	> 65dB	66dB	68dB	n/a
WB channel	> 65dB	67dB	69dB	
Intermodulation rejection (TIA-603-E)				
NB channel	> 70dB	75dB	77dB	75dB
WB channel	> 70dB	75dB	77dB	75dB

<sup>a</sup>See "Frequency Bands" on page 9.

<sup>b</sup>See "Definition of Narrow Bandwidth and Wide Bandwidth" on page 8

Parameter	Compliance limit	Measured performance		
	All bands <sup>a</sup>	B1	HK, H7	K5
Rated audio (TIA-603-E)				
		0.5W into external 16Ω load		
Internal speaker rating				
		3W		
Hum and noise (TIA-603-E)				
NB channel	34dB	40dB		
WB channel	40dB	45dB		
Sensitivity				
NB channel	< -107dB	-116dBm	-118dBm	n/a
WB channel	< -107dB	-118dBm	-120dBm	
Sensitivity <sup>b</sup> (TIA-603-E)				
NB channel	< -116dBm (0.35μV)	-120dBm (0.22μV)		
WB channel	< -116dBm (0.35μV)			
Spurious response rejection (TIA-603-E)				
NB channel	> 70dB	80dB	76dB	70dB <sup>c</sup>
WB channel	> 70dB	80dB	76dB	70dB <sup>c</sup>



Sensitivity, distortion, and signal-to-noise figures are for standard operating conditions that include audio de-emphasis.

<sup>a</sup>See "Frequency Bands" on page 9.

<sup>b</sup>12dB SINAD.

<sup>c</sup>1/2-IF spurious response degrades at the edges of the band.

# Digital Receiver Specifications

Parameter	Compliance limit	Measured performance		
	All bands <sup>a</sup>	B1	HK, H7	K5
Sensitivity (EN 300 113)				
	< -110dBm	-119dBm	-120dBm	
Selectivity (EN 300 113)				
	60dB	62dB		60dB
Intermodulation rejection (EN 300 113)				
	65dB	65dB	67dB	70dB
Spurious response rejection (EN 300 113)				
	> 70dB	76dB	71dB	70dB
Co-channel rejection (EN 300 113)				
	-12dB	-9dB	-8.5dB	-9dB
Blocking (EN 300 113)				
	> 84dB	> 105dB	> 95dB	> 100dB

<sup>a</sup>See "Frequency Bands" on page 9.

### 3 Transmitter Specifications

This chapter compares the performance of the transmitter in a TP9500 radio with transmitter requirements specified by ETSI and TIA.

Where an ANSI/TIA or ETSI EN 300 113 test method was used to measure TP9500 performance, this is indicated in parentheses. Where the ETSI test method EN 300 086-1 was used, no test method is named. Please see also the footnotes to the tables.

This equipment is compatible with the emissions listed in the following table.



Some emission designators may not apply in all regions. Not all models support all emission designators. Contact your regional Tait office for details.



The TP9500 specifications in this manual are typical performance figures that are only intended to provide guidance. They are subject to change without notice and shall not form part of any contract. To establish whether the radio meets the regulatory requirements that apply to you, please contact your regional Tait office.

Emission Designator	Common Name	Modulation Scheme	Operating Modes
11K0F3E	analog voice	analog FM	NB voice
16K0F3E	analog voice	analog FM	WB voice
6K60F2D	FFSK data	FFSK	NB data - 1200 bps
7K80F2D	FFSK data	FFSK	NB data - 2400 bps
9K60F2D	FFSK data	FFSK	WB data - 1200 bps
10K8F2D	FFSK data	FFSK	WB data - 2400 bps
7K60FXD	2-slot DMR	4FSK	data/control channel
7K60FXW	2-slot DMR	4FSK	digital voice/data/-control channel
7K60F7DDT	2-slot DMR	4FSK	digital voice
7K60F7EDT	2-slot DMR	4FSK	digital data
7K60F7DDN	2-slot DMR	4FSK	digital voice
7K60F7EDN	2-slot DMR	4FSK	digital data

For important information about how radio performance figures were derived, see "Introduction" on page 7.

# Analog Transmitter Specifications

Parameter	Compliance limit	Measured performance		
	All bands	B1	HK, H7	K5
Audio distortion at 1kHz with 60% modulation <sup>a</sup>				
	< 2%	0.6%		
Audio response				
	+1dB, -3dB	+0.5dB, -2.5dB		+0.5dB, -1.5dB
Conducted emissions				
< 1GHz	< -36dBm	-38dBm	-45dBm	n/a <sup>b</sup>
> 1GHz	< -30dBm	-40dBm	-41dBm	
Conducted emissions (TIA-603-E)				
	> 57dBc	75dBc		73dBc
FM hum and noise (TIA-603-E)				
NB channel <sup>c</sup>	> 34dB	47dB	49dB	44dB
WB channel	> 40dB	48dB	53dB	50dB
Adjacent channel power (TIA-603-E)				
NB channel	60dBc	65dBc	65dBc	65dBc
WB channel	70dBc	74dBc	77dBc	73dBc
Adjacent channel power (EN 300 086)				
NB channel	60dBc	66dBc	70dBc	72dBc
WB channel	60dBc	74dBc	75dBc	74dBc

<sup>a</sup>EN 300 086-1 and TIA-603-E test methods.

<sup>b</sup>Not applicable.

<sup>c</sup>See "Definition of Narrow Bandwidth and Wide Bandwidth" on page 8.



Parameter				
	All bands	B1	HK, H7	K5
Wideband noise [all values dBc/Hz]				
100kHz offset		-130	-134	-132
1MHz offset		-145	-139	-138
1.5MHz offset	n/a	-149	n/a	n/a
4MHz offset	(Tait in-house test only)	n/a	-140	n/a
12MHz offset		n/a	n/a	-141
10MHz offset		-154	-142	n/a
45MHz offset		n/a	n/a	-149
Modulation limiting				
NB channel	±2.5kHz	±2.2kHz		
WB channel	±5.0kHz	±4.4kHz		
Radiated emissions				
<1GHz	< -36dBm	< -46dBm		n/a
>1GHz	< -30dBm	< -40dBm		
Radiated emissions (TIA-603-E)				
	57dBc	> 90dBc		> 84dBc
RF power output				
High		5W	4W	3W
Medium		3W	2.5W	2.5W
Low		2W	2W	2W
Very low		1W	1W	1W

# Digital Transmitter Specifications

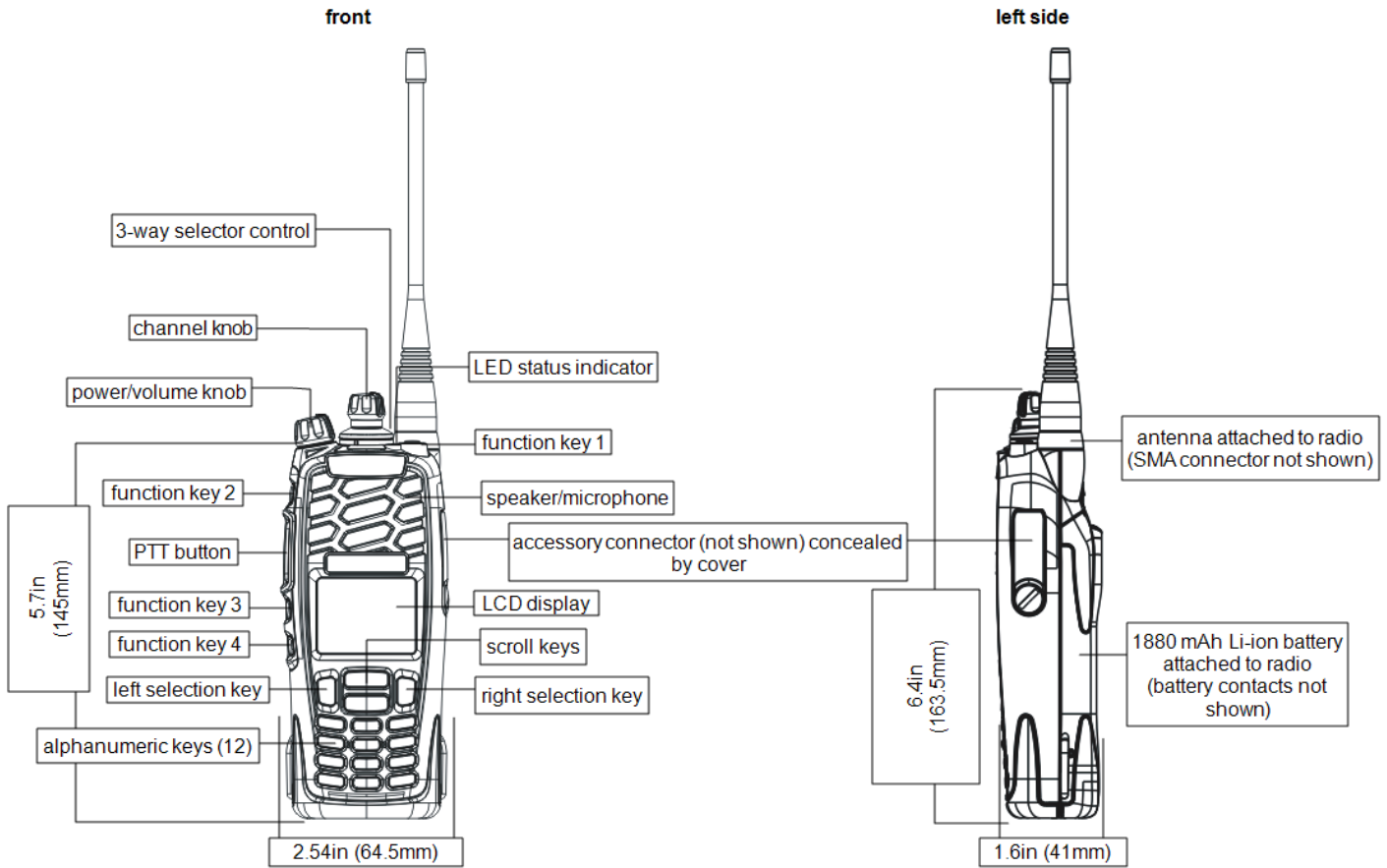
Parameter	Compliance limit	Measured performance		
	All bands <sup>a</sup>	B1	HK, H7	K5
Adjacent channel power ratio (EN 300 113)				
	60dBc	62dBc		
Transient adjacent channel power ratio (EN 300 113)				
	50dBc	57dBc	59dBc	50dBc

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<sup>a</sup>See "Frequency Bands" on page 9.

# 4 General Specifications

This chapter provides general specifications for the TP9500 portable radios, and the batteries and chargers used with them.



# Radio Specifications

This section lists general radio specifications.

- For radio compliance specifications, see "Introduction" on page 7
- For receiver performance specifications, see "Receiver Specifications" on page 11
- For transmitter performance specifications, see "Transmitter Specifications" on page 15

## User Interface

For the location of the keys, see "General Specifications" on the previous page.

<b>Connectors</b>	
Accessory connector	Standard interface for compatible accessories, on the right side of the front panel (see "Accessory Connector" on the next page "Accessory Connector" on the next page
Battery contacts	Two self-cleaning swipe contacts on the rear panel
Antenna connector	Stainless steel SMA connector
Display	240x180 pixel, high contrast color LCD screen
Function keys	Four programmable keys: three silicone rubber keys on the left of the front panel and a colored key, sometimes called the 'emergency key', on top
Keypad	Two scroll keys, an enter/menu key, and a clear/back key; 12 alpha-numeric in some models
<b>Knobs</b>	
3-way selector	Plastic knob
Channel knob	Textured rubber knob
Volume knob	

## Radio Size, Weight and Finish



The height of the radio is measured from the bottom of the device to the base of the channel knob assembly.

	Radio with 1880mAh battery	Radio with 2400mAh battery	Radio with 3300mAh battery
Size (WxHxD)	2.5in x 5.7in x 1.6in (65mm x 145mm x 41mm)	2.5in x 5.7in x 1.77in (65mm x 145mm x 45mm)	2.4 in x 5.4 in x 1.77 in (61 mm x 137 mm x 45 mm)
Weight <sup>b</sup>	11.8oz (335g)	13oz (370g)	14.22 (403 g)
Finish, body	Two-shot molded construction, easy grip, with toughened rubber armor corners		
Colors	Black, red, orange, yellow, hi-vis green		

## Accessory Connector

The accessory connector has nine contacts. These are described in the following table:

	Pin	Signal name	Description
	1	ACC TXD	Asynchronous serial port. Data direction is from the radio to the PC.
	2	ACC SPKR–	External speaker negative output. Balanced load configuration. (Differential drive with ACC SPKR+.)
	3	ACC GPIO1b	General purpose input/output. Function and direction depends on the radio model.
	4	ACC PWR	Power output. Switched and current-limited supply from the radio to the accessory. Supply is switched off when the radio is powered off.
	5	GND	Ground
	6	ACC PTT	External PTT or button input. Analog signal allows multiplexed buttons in external devices such as speaker-microphones. Two levels are defined for button presses, which creates three inputs

<sup>a</sup>Height measured to base of channel knob.

<sup>b</sup>Includes antenna TPA-AN-001 (136-225MHz). For battery dimensions see "Battery Specifications" on page 27.

	Pin	Signal name	Description
			to the system on the single wire.
	7	ACC SPKR+	External speaker positive output. Balanced load configuration. (Differential drive with ACC SPKR–.)
	8	ACC MIC	Accessory (auxiliary) microphone input. Electret microphone biasing is provided inside the radio. Dynamic microphones are not supported.
	9	ACC RXD	Asynchronous serial port. Data direction is from the computer to the radio.

## Environmental

Frequency stability temperature	–22°F to +140°F (–30°C to +60°C)		
Operating temperature	–4°F to +140°F (–20°C to +60°C)		
Ingress protection rating	IP65 and IP68		
Electro Static Discharge	International Electrotechnical Commission (IEC) 61000-4-2		
Military standard (MIL-STD)	MIL-STD-810G <sup>a</sup>		
		<b>Method</b>	<b>Procedure</b>
	Low pressure	500.5	2
	High temperature	501.5	1 and 2
	Low temperature	502.5	1 and 2
	Temperature shock	503.5	1
	Solar radiation	505.5	1
	Rain	506.5	1 and 3
	Humidity	507.5	2
	Salt fog	509.5	1

<sup>a</sup>MIL-STD-810G supersedes MIL-STD-810C, D, E, and F.

	Dust	510.5	1 and 2
	Immersion	512.5	1
	Vibration	514.6	1
	Shock	516.6	1, 4, 5 and 6

## Frequencies and Channels

	B1	HK, H7	K5
Frequency increments			
	2.5kHz, 5kHz, 6.25kHz		
Channel spacing			
NB channel	12.5kHz/15kHz		
WB channel	25kHz/30kHz		
Frequency range (MHz), see "Frequency Bands" on page 1			
Frequency stability, see <a href="#">"Receiver Specifications" on page 11</a>			
IF bandwidth			
NB channel	9kHz		
WB channel	15kHz		
RF power output			
High	5W	4W	3W
Medium	3W	2.5W	2.5W
Low	2W	2W	2W
Very low	1W	1W	1W

## Number of Networks, Zones, Channels and Groups

### Conventional Mode

	TP9500
Conventional networks	26
Zones	100
Channels (simplex or semi-duplex)	1500

	TP9500
Scan/vote groups	300
Channels per group	50

### Trunked Mode

	TP9500
Trunked networks	4 (shared between MPT and DMR)
Zone and workgroups	1000 zones, 1000 work functions per zone, organised in a matrix structure
Talk groups	512

### Location Services

TTFF <sup>a</sup> cold start	<60 seconds <sup>b</sup>
TTFF hot start	<10 seconds
Location accuracy	<33 feet (<10 metres)
Mode of operation	non-assisted GPS (autonomous)

### WiFi Specification

Protocol	802.11b, 802.11g, and 802.11n
Frequency	2.4GHz only

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<sup>a</sup>Time To First Fix.

<sup>b</sup>These values are for long-term tracking (95th percentile values >5 satellites visible at a nominal –130dBm signal strength).



## Operational Features

	Analog operation	DMR digital operation
Channels: simplex or semi duplex repeater talkaround option	✓ ✓	DMR Tier 2 ✗
Trunking	MPT 1327	DMR Tier 3
Voting/scanning	✓	✓
Predefined status messaging	✓	✓
GPS	Internal (send and receive position reports), GPS display	Internal (send and receive position reports), GPS display
2-tone signaling format	Decode only	✗
5-tone Selcall	✓	✗
CTCSS signaling format	✓	✗
DCS signaling format	✓	✗
DTMF signaling format	Encode only	✗
MDC1200 signaling format	✓	✗
Security/Encryption	Voice inversion scrambler (standard)	DES (optional) ARC4 (optional - Tier 2 and 3 only)
Emergency:		
Lone Worker inactivity detection	✓	✓
Man down (an additional Lone Worker feature)	✓	✓

## Current Consumption



Current consumption was tested using conventional radios equipped with the latest radio hardware. All measurements were made in the middle frequencies of each band. Battery voltage was 7.5V, and radios transmitted into a 50Ω load.

	B1	HK, H7	K5
Current consumption			
Receiver squelched	100mA	105mA	110mA
Receiver (rated audio)	215mA	225mA	225mA
Transmitter current			
Very low power	1A	1A	1A
Low power	1.3A	1.3A	1.3A
Medium power	1.5A	1.4A	1.4A
High power	1.9A	1.8A	1.5A

## Language Support

The TP9500 series of portable radios support the following languages:

- English
- French
- Spanish
- Portuguese
- German
- Czech
- Polish
- Bulgarian
- Russian

# Battery Specifications

Observe all safety precautions that relate to the handling of Li-ion batteries.



**LI-ION BATTERY.** This radio uses a Lithium-ion battery. If the battery is damaged or handled in an unsafe manner, it can cause personal injury and/or damage to property. See the Li-ion Battery Safety Information document for more information (MPC-00006-xx). This is available on the Tait Support website.



**LI-ION BATTERY.** Do not allow anything to obstruct the vent hole in the battery. If the battery vent is obstructed, the battery may explode, causing personal injury and/or damage to property. Ensure no customized label attached to the battery or radio will obstruct the battery vent hole.

## Battery Size, Weight and Finish

	<b>1880 mAh 'Slimline' T03-00011-Axxx</b>	<b>2400mAh 'Performance' T03-00011-Cxxx</b>	<b>3300mAh 'High Capacity' T03-00011-Exxx</b>
Size (WxHxD)	2.4in x 4.7in x 0.7in (61mm x 118mm x 17mm)	2.4in x 4.7in x 0.8in (61mm x 118mm x 21mm)	
Weight	4.4oz (125g)	5.4oz (155g)	6.6 oz (188g)
Finish	Two-shot molded construction, with toughened rubber armor corners		

## Expected Shift Life

The following table shows the expected shift life for a fully charged, healthy Li-ion battery when the radio is used in analog mode, and when the radio is used in DMR digital mode.



Expected shift life figures are based on rated audio volume and will vary based on volume setting. In the table below, the figures are calculated based on a rated speaker output level of 0.5W.

**Notice** To maximize battery life and performance, and to charge batteries correctly, follow the instructions in the Battery Charging Guide (**MPD-00002-xx**) supplied with the charger.

	<b>1880mAh<sup>a</sup></b> <b>'Slimline'</b> <b>T03-00011-Axxx</b>	<b>2400mAh<sup>a</sup></b> <b>'Performance'</b> <b>T03-00011-Cxxx</b>	<b>3300mAh<sup>a</sup></b> <b>'High Capacity'</b> <b>T03-00011-Exxx</b>
Analog mode			
Duty cycle 5 / 5 / 90 <sup>b</sup>	12 hours	15 hours	21 hours
Duty cycle 5 / 35 / 60 <sup>c</sup>	10 hours	12 hours	17 hours
DMR TDMA operation			
Duty cycle 5 / 5 / 90	16 hours	20 hours	27 hours
Duty cycle 5 / 35 / 60	12 hours	15 hours	21 hours

## Temperature Range for Charging and Operating

	<b>1880mAh</b> <b>'Slimline'</b> <b>T03-00011-Axxx</b>	<b>2400mAh</b> <b>'Performance'</b> <b>T03-00011-Cxxx</b>	<b>3300mAh</b> <b>'High Capacity'</b> <b>T03-00011-Exxx</b>
Operating temperature range	+14°F to +140°F (-10°C to +60°C)	-4°F to +140°F (-20°C to +60°C)	-4°F to +140°F (-20°C to +60°C)
Charging temperature range	+41°F to +104°F (+5°C to +40°C)		


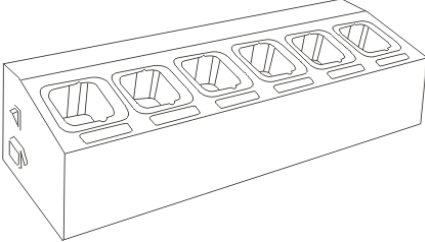
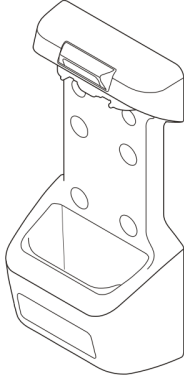
<sup>a</sup>Figures assume a new rated cell capacity. Shift life numbers represent the radio functioning under the following conditions: correct antenna being used and backlighting is off. WiFi, Bluetooth, and GPS are off. Ambient temperature of 68°F (20°C)

<sup>b</sup>5% transmitting, 5% receiving, 90% standby.

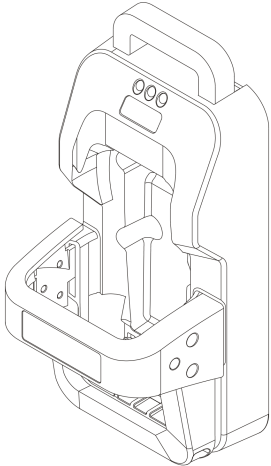
<sup>c</sup>5% transmitting, 35% receiving, 60% standby.

# Battery Charger Specifications

Use only the following chargers to charge a TP9500 Li-ion battery:

Part number range	Designation	Part
T03-00012-xxxx	Desktop charger	
T03-00013-xxxx	6-way charger	
T03-00014-Axxx	Battery-only vehicle charger <sup>a</sup>	

<sup>a</sup>See the installation instructions (402-00078-xx) for more information.

Part number range	Designation	Part
T03-00014-Bxxx	Vehicle charger <sup>a</sup>	

**Notice** To maximize battery life and performance, and to charge batteries correctly, follow the instructions provided in the Battery Charging Guide (**MPD-00002-xx**) supplied with the charger.

**Notice** If the radio is attached to the battery while the battery is being charged, the radio must be switched off. If the radio transmits while in the charger, interference from the charger may interfere with other radio users.

### Charge Temperature

A Li-ion battery will only charge correctly when the temperature of the battery and the charger is between +41°F (+5°C) and +104°F (+40°C).

### Battery Charge Times

	1880mAh 'Slimline' T03-00011-Axxx	2400mAh 'Performance' T03-00011-Cxxx	3300mAh 'High Capacity' T03-00011-Exxx
Typical time to full charge	1.5 hours to 2 hours	2 hours to 2.5 hours	2.5 hours to 3 hours
Maximum time to full charge	2.5 hours	3 hours	4 hours

<sup>a</sup>See the installation instructions (**402-00105-xx**) for more information.

## Charger Specifications

	Desktop charger (T03-00012-xxxx)	6-way charger (T03-00013-xxxx)	Vehicle chargers (T03-00014-Axxx/Bxxx)
Input rating	12V, 2A	100VAC to 250VAC, 50/60Hz, 2.5A	13.8V, 2A
Input range	11.4VDC to 18VDC	85VAC to 264VAC; 120VDC to 370VDC	11.4VDC to 18VDC
Output rating		10VDC, 2.5A	
Charger output (CCCV) <sup>1</sup>	2A, 8.4V		

## LED Indicators

The chargers display a **red** LED when the battery is charging, a **green** LED when the battery is fully charged, and an **amber** LED if there is a problem.

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<sup>1</sup>CCCV = Constant Current Constant Voltage