Data Sheet EMEA

MOTOTRBO™ R7Ex

ATEX portable two-way radios

MOTOTRBO R7Ex ATEX and IECEx certified digital portable radios provide high quality communications in potentially explosive environments.

Key features

- UHF and 350 MHz
- Digital and analogue signalling
- 1.7" 132 x 90 px. display[1]
- Wi-Fi 2.4/5.0 GHz[1]
- WPA3 Wi-Fi security protocol compliant[1]
- Bluetooth® Core Version 5.2[1]
- GNSS location tracking
- Modern, intuitive user experience
- Full suite of accessories, tested with the radio to ensure ATEX/IECEx certification for the full solution
- Sleek and ergonomic form factor
- Automatic acoustic feedback suppression
- AI-trained Noise Suppression
- Single microphone noise cancellation (SINC+)
- Intelligent Audio
- IMPRES™ technology
- Programmable loudness up to 108 phons
- Dual click volume knob controls on/off/volume and Volume Boost
- Simple audio configuration
- 6 (FKP)/4 (NKP) programmable buttons[2]
- Up to 19 hours (IIA) or 23.5 hours (IIC) of battery life[3]
- IP68 waterproof up to 2 metres for 2 hours per ATEX/IECEx specifications[4]
- IP66 (concentrated water jet pressure) per ATEX/IECEx specifications[4]
- ATEX, IECEx and maritime regulations certified
- Disinfectant and decontamination substance resistant housing[5]
- Rugged to MIL-STD 810

MOTOROLA SOLUTIONS

Specifications

GENERAL SPECIFICATIONS			
	R7Ex (GAS GROUP IIA) FULL KEYPAD (FKP) MODEL	**R7Ex (GAS GROUP IIC) FULL KEYPAD (FKP) MODEL**	**R7Ex (GAS GROUP IIC) NON-KEYPAD (NKP) MODEL**
Frequency	350 - 470 MHz	400 - 470 MHz	
RF power output	4 W / 1W	2 W[6] / 1 W	
Channel spacing	12.5 kHz, 20 kHz, 25 kHz		
Channel capacity	1000	1000	64
Zone capacity	250	250	4
Display	1.7" (132 x 90 px) colour display with 5 lines of text	1.7" (132 x 90 px) colour display with 5 lines of text	n/a
Power supply (nominal)	7.4 V		
MOTOTRBO R7Ex WITH Li-Ion IP68 2150 mAh BATTERY (PMNN4848)			
Dimensions (h x w x d)	140 x 57 x 40 mm	140 x 57 x 40 mm	140 x 57 x 38 mm
Weight with battery Excluding antenna Including whip antenna[7]	 438 g 460 g	 438 g 460 g	 419 g 441 g
Battery life[3] digital / analogue	19 / 14.5 hours (23 / 20 hours at 1 W)	23.5 / 20.5 hours (24.5 / 22 hours at 1 W)	
HAZLOC CERTIFICATION			
Gas rating	ATEX: II 2G Ex ib IIA T4 Gb IECEx: Ex ib IIA T4 Gb	ATEX: II 2G Ex ib IIC T4 Gb IECEx: Ex ib IIC T4 Gb	
Dust rating	ATEX: II 2D Ex ib IIIC T130°C Db IECEx: Ex ib IIIC T130°C Db		
Mining rating	ATEX: I M2 Ex ib I Mb IECEx: Ex ib I Mb		
Ambient temperature	-30 °C to +60 °C		
ATEX/IECEx Ingress Protection (IP) rating[4]	IP66, IP68 (2 metres for 2 hours)		
MARITIME CERTIFICATION			
Maritime regulation certificates	n/a	Marine Equipment Directive 2014/90/EU MED/5.20 Merchant Shipping (Marine Equipment) Regulations 2016 UK/5.20	

TRANSMITTER SPECIFICATIONS	
FM modulation	12.5 kHz: 11K0F3E 20 / 25 kHz: 16K0F3E
4FSK digital modulation	12.5 kHz data: 7K60F1D & 7K60FXD 12.5 kHz voice: 7K60F1E & 7K60FXE Combination of 12.5 kHz voice and data: 7K60F1W
Digital protocol	ETSI TS 102 361-1, -2, -3,- 4 DMR Tier II and DMR Tier III
Conducted / radiated spurious emissions (ETSI / TIA603E / ANSI C63.26, C63.4)	-36 dBm < 1 GHz -30 dBm > 1 GHz
Adjacent channel power (ETSI / TIA603E)	60 dB @ 12.5 kHz 70 dB @ 20 kHz / 25 kHz
Frequency stability	±0.5 ppm (-30 °C to +60 °C)
Modulation limiting (ETSI / TIA603E)	±2.5 kHz @ 12.5 kHz ±4.0 kHz @ 20 kHz ±5.0 kHz @ 25 kHz

RECEIVER SPECIFICATIONS	
Analogue sensitivity (12dB SINAD)	0.16 µV (typical) / 0.21 µV (maximum)
Digital sensitivity (5% BER)	0.14 µV (typical) / 0.18 µV (maximum)
Conducted / radiated spurious emissions (ETSI / TIA603E)	< -57 dBm for < 1 GHz < -47 dBm for > 1 GHz
Intermodulation (ETSI)	> 65 dB
Intermodulation (TIA603E)	> 70 dB
Adjacent channel selectivity (ETSI / TIA603A)-1T	> 60 dB @ 12.5 kHz > 70 dB @ 20 / 25 kHz
Adjacent channel selectivity (TIA603E)-2T	> 45 dB @ 12.5 kHz > 70 dB @ 20 / 25 kHz
Spurious rejection (ETSI / TIA603E)	> 70 dB
Frequency stability	±0.5 ppm (-30 °C to +60 °C)

Specifications

GNSS SPECIFICATIONS Long-term tracking (95th percentile values >5 satellites visible at nominal -130dBm signal strength)	
Constellation support	GPS, GLONASS, BeiDou, Galileo
Time to first fix, cold start	≤ 35 seconds (dual constellation) ≤ 60 seconds (single constellation)
Time to first fix, hot start	≤ 2 seconds (dual constellation) ≤ 10 seconds (single constellation)
Horizontal accuracy	< 1 metres (dual constellation) < 5 metres (single constellation)

WI-FI SPECIFICATIONS[1]	
Frequency range	2.4 GHz, 5 GHz
Standards supported	Wi-Fi 5 / IEEE 802.11a/b/g/n/ac
Security protocol supported	WPA3, WPA2
Roaming protocol supported	IEEE 802.11k/v/r
Maximum number of SSIDs	128

BLUETOOTH SPECIFICATIONS[1]	
Bluetooth technology	Bluetooth, Bluetooth Classic, Bluetooth LE, Bluetooth Dual Mode
Core version	Qualified against Bluetooth Core 5.2
Range	Class 2, 10 m (33 ft)
Supported profiles	Bluetooth Headset Profile (HSP), Serial Port Profile (SPP), Personal Area Network (PAN), Generic Attributes (GATT), In-door location (Passive Scanning)
Simultaneous connections	1 audio accessory and up to 4 data devices

AUDIO SPECIFICATIONS	
Digital vocoder type	AMBE+2™
Audio response (TIA603E / ANSI C63.26)	+1, -3 dB
Audio output power (rated/max)	0.5 W / 2.5 W
Audio distortion at rated audio	≤1.5 %
Maximum speech loudness by default (ISO532B)	101 phons @ 30 cm
Maximum programmable speech loudness	108 phons @ 30 cm
Hum and noise	-40 dB @ 12.5 kHz -45 dB @ 20 kHz / 25 kHz

ENVIRONMENTAL SPECIFICATIONS	
Operating temperature with battery	IIA models: -25 °C to 60 °C (digital) -20 °C to 60 °C (analogue) IIC models: -30 °C to 60 °C
Storage temperature	-40 °C to 85 °C
Thermal shock	Per MIL-STD-810C/D/E/F/G/H
Humidity	Per MIL-STD-810C/D/E/F/G/H
Electrostatic discharge	IEC 61000-4-2 level 4
Dust and water intrusion IEC60079 & IEC60529[4]	IP66 and IP68 (2 metres for 2 hours)
Salt fog	5 % NaCl for 8 hours at 35 °C, 16 hours standing
Packaging test	Per MIL-STD-810D and E

SERVICE COVERAGE

Included: 2 years manufacturing defects hardware repair, plus 5 years technical support and software updates

Optional: 5 years defects/wear and tear hardware repair and 5 years accidental damage repair

MILITARY STANDARDS (MIL-STD 810)

	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F		MIL-STD 810G		MIL-STD 810H	
	METHOD	PROCEDURE	METHOD	PROCEDURE	METHOD	PROCEDURE	METHOD	PROCEDURE	METHOD	PROCEDURE	METHOD	PROCEDURE
Low pressure	500.1	I	500.2	II	500.3	II	500.4	II	500.6	II	500.6	II
High temp	501.1	I, II	501.2	I/A1, II/A1	501.3	I/A1, II/A1	501.4	I/Hot, II/HoT	501.6	I/A1, II/A1	501.7	I/A1, II/A1
Low temp	502.1	I	502.2	I, II	502.3	I, II	502.4	I, II	502.6	I, II	502.7	I, II
Temp shock	503.1	I	503.2	A1/C3	503.3	A1/C3	503.4	I	503.6	I-C	503.7	1-C
Solar radiation	505.1	II	505.2	I/A1	505.3	I/A1	505.4	I/A1	505.6	I/A1	505.7	I/A1
Rain	506.1	I, II	506.2	I, II	506.3	I, II	506.4	I, III	506.6	I, III	506.6	I, III
Humidity	507.1	II	507.2	II	507.3	II	507.4	-	507.6	II/Aggravated	507.6	II/Aggravated
Salt fog	509.1	I	509.2	I	509.3	I	509.4	-	509.6	-	509.7	-
Blowing dust & sand	510.1	I / -	510.2	I, II	510.3	I, II	510.4	I, II	510.6	I, II	510.7	I, II
Vibration	514.2	VIII/CatF, XI	514.3	I/Cat10, II/ Cat3	514.4	I/Cat10, II/ Cat3	514.5	I/Cat24, II/ Cat5	514.7	I/Cat24, II/ Cat5	514.8	I/Cat24, II/ Cat5
Shock	516.2	I, II	516.3	I, IV	516.4	I, IV	516.5	I, IV	516.7	I, IV	516.8	I, IV
Contamination by fluids[4]									504.2	II	504.3	2.2.6b

Features

R7Ex is available with full keypad (FKP) and non-keypad (NKP) versions.

	R7Ex (gas group IIA)	R7Ex (gas group IIC)	
	FKP	FKP	NKP
GENERAL			
Full keypad	●	●	—
Colour display	●	●	—
Analogue and digital	●	●	●
Voice and data	●	●	●
Canned text messaging	●	●	●
Freeform text messaging	●	●	—
Text to speech	●	●	●
Work order ticketing	●	●	—
Integrated Wi-Fi	●	●	—
Indoor location tracking	●	●	—
Outdoor location tracking (GNSS)	●	●	●
Event-driven location updates	●	●	●
Bluetooth audio	●	●	—
Bluetooth data	●	●	—
Third-party Bluetooth PTT support	○	○	—
Voice announcement	●	●	●
Home channel reminder	●	●	●
Late entry	●	●	●
Priority scan	●	●	●
Date and time	●	●	●
Audio recording/playback	○	○	○
IP66 & IP68[4]	●	●	●
Rugged to MIL-STD 810	●	●	●
AUDIO			
Intelligent Audio in analogue and digital	●	●	●
IMPRES audio	●	●	●
Acoustic feedback suppressor	●	●	●
User-selectable audio profile	●	●	●
Dual click volume knob	●	●	●
Trill enhancement	●	●	●
Microphone distortion control	●	●	●
Received audio levelling	●	●	●
Voice operated transmit (VOX)	●	●	●
AI-trained noise suppression	●	●	●
Single microphone noise cancellation (SINC+)	●	●	●

● Included ○ Optional — Not Included

	R7Ex (gas group IIA)	R7Ex (gas group IIC)	
	FKP	FKP	NKP
SYSTEMS			
Dual Capacity Direct Mode	●	●	●
Conventional	●	●	●
IP Site Connect	●	●	●
Capacity Plus single site	●	●	●
Capacity Plus multi-site	●	●	●
Capacity Max	○	○	○
MANAGEMENT			
CPS 2.0 and Radio Management	●	●	●
Over-the-air programming (via DMR)	●	●	●
Over-the-air software update (via Wi-Fi)	●	●	—
IMPRES energy	●	●	●
IMPRES battery management	○	○	○
Over-the-air battery management	○	○	○
Preventive maintenance	○	○	○
Rental timer	●	●	●
SAFETY			
Emergency button	●	●	●
Fall Alert	●	●	●
Lone worker	●	●	●
Transmit Interrupt	●	●	●
Basic privacy	●	●	●
Enhanced privacy	●	●	●
AES256 encryption	○	○	○
Remote monitor	●	●	●
Digital emergency	●	●	●
Emergency search tone	●	●	●
Radio disable / enable	●	●	●
Secure processor	●	●	●
Digital certificates	●	●	●
Secure Linux operating system	●	●	●
Wrong battery alert	●	●	●
Disinfectant / decontamination resistant[5]	●	●	●
CUSTOMISATION			
Programmable buttons[2]	6	6	4
Day/night screen mode	●	●	—
Label recess	●	●	●
Sensor integration[8]	○	○	—
RFID/NFC tag (requires aftermarket installation)	○	○	○

[1] Full keypad models only.
[2] Including emergency button which can alternatively be programmed for other functions.
[3] Typical battery life, 5/5/90 profile at maximum transmitter power with GNSS, Bluetooth and Wi-Fi disabled. Actual observed runtimes may vary.
[4] R7Ex also meets IP64, IP65 and IP67.
[5] Please refer to the MOTOTRBO R7Ex user manual for a list of approved disinfectants and decontamination substances.
[6] Max 2 W allowed per ATEX/IECEx Standards.
[7] Weight including whip antenna PMAD4139 or PMAE4079.
[8] Interface allowing third-party developers to create sensor solutions using R7Ex.

To learn more, visit **motorolasolutions.com/r7ex**

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