Data Sheet LACR

MOTOTRBO™ R7Ex

ATEX portable two-way radios

MOTOTRBO R7Ex ATEX and INMETRO 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/ INMETRO 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, INMETRO and maritime regulations certified
- Disinfectant and decontamination substance resistant housing[5]
- Rugged to MIL-STD 810

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Specifications

GENERAL SPECIFICATIONS				
	R7Ex (GAS GROUP IIA)		R7Ex (GAS GROUP IIC)	
	FULL KEYPAD (FKP) MODEL	NON-KEYPAD (NKP) MODEL	FULL KEYPAD (FKP) MODEL	NON-KEYPAD (NKP) MODEL
Frequency	350 - 470 MHz		400 - 470 MHz	
RF power output	4 W / 1 W		2 W[6] / 1 W	
Channel spacing	12.5 kHz, 20 kHz, 25 kHz			
Channel capacity	1000	64	1000	64
Zone capacity	250	4	250	4
Display	1.7" (132 x 90 px) colour display with 5 lines of text	n/a	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 38 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	 419 g 441 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: 5 years manufacturing defects/wear and tear hardware repair, technical support and software updates

Optional: 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[8]									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	NKP	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	NKP	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	4	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**

These models are available in Motorola Solutions LACR region only. Availability varies and is subject to individual country law and regulations.
All specifications shown are typical unless otherwise stated and are subject to change without notice.

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