Data Sheet

MXM600

Frontline safety, today and tomorrow

The MXM600 takes on the challenges of the front line, keeping your teams safe while they deal with the safety of others. It has been designed to provide reliable in-vehicle TETRA coverage for voice and data communications, as well as extend the coverage of TETRA portable radios via its gateway and repeater capability.

Clarity of voice communication is critical in order to get vital messages across. Noise suppression technology, trained through Artificial Intelligence (AI) machine-learning, is integrated in the MXM600 to suppress background noise and improve clarity of calls — so users can hear and be heard, even in noisy conditions.

We designed the MXM600 to be easy to install and automated some of the configuration work needed when setting up a mobile radio. The MXM600 is highly flexible when it comes to installation options: it can support two control heads from one transceiver, and also has the ability to control two transceivers from one control head. Whether you are looking to install the radio in a car, fire engine, van, ambulance, train, boat or on a motorcycle — there are installation options for you.

The MXM600 is a mobile radio that gives your frontline users the confidence to support their community. Ready to respond to sudden changes in the field and future changes in technology, it helps equip your front line to efficiently and effectively get the job done.

Key attributes

- Loud and clear audio with AI-trained noise suppression technology
- Supports GPS, Beidou, Galileo and GLONASS
- Bluetooth® 5.3 with up to 90 m range
- Hardware ready for High Definition (HD) voice
- Wideband 350 - 470 MHz or 806 - 870 MHz
- Wi-Fi 2.4 GHz and 5 GHz
- Automatic control head detection
- Automatic control head software updates
- Wi-Fi Over-The-Air Programming and firmware updates
- Compatible with all MTM5000 audio accessories and control heads
- Variety of transceiver models to support different needs
- Choice of 3 remote control heads
- Deeper radio interaction via M-Radio Control app on a Bluetooth-paired Android smartphone or tablet

MOTOROLA SOLUTIONS

GENERAL SPECIFICATIONS

DIMENSIONS (H, D, W) AND WEIGHT

Single remote (transceiver and expansion head)	45 x 172 x 186 mm, 1355 g
Dual remote (transceiver and expansion head)	45 x 172 x 194 mm, 1415 g
Databox (transceiver and expansion head)	45 x 172 x 192 mm, 1450 g
Dash/desk mount (transceiver and control head)	60 x 188 x 200 mm, 1530 g
Dash/desk mount transceiver	45 x 172 x 167 mm
Dash/desk mount control head	60 x 188 x 31 mm
IP54 Remote Ethernet control head (IP54 RECH)	60 x 188 x 39 mm, 332 g
IP67 Remote Ethernet control head (IP67 RECH)	60 x 188 x 39 mm, 338 g
Telephone style control head (TSCH) (excluding cable)	220 x 65 x 75 mm, 450 g

[1] Based on 15.6W external speaker

ELECTRICAL

Electrical voltage range	10.8 to 15.6 V DC
Electrical current consumption	• At 10W: Idle 0.5 A, Rx[1] 1.1 A, Tx 1.1 A Peak consumption is 3.5 A for Tx 1.1A for Rx with 15.6W speaker • At 3W: Idle 0.5 A, Rx[1] 1.1 A, Tx 0.75 A Peak consumption is 1.45 A for Rx[1] • Tx-Multi Slot PD (6 slots) at 10 W: 2.4 A (3.6 A peak) • Dash/desk control head adds 0.16 A • IP67 or IP54 RECH adds 0.3 A • TSCH adds 0.3 A • USB host adds 0.25 A • Wi-Fi adds 0.13 A • Bluetooth adds 0.04 A

AUDIO

Audio output power at maximum volume (depending on external speaker selected)	External: 7.5 W / 13 W / 15 W
Noise suppression	AI-trained noise suppression (high and low suppression options)
Acoustic feedback (howling) suppression	AI-trained noise suppression also suppresses acoustic feedback (howling)
Echo cancelling	AI-trained noise suppression also provides echo cancelling capability

CONNECTORS AND PORTS

Common across the back of all models of transceiver	• 26-pin connector • Power connector • GNSS antenna connector • Combined Bluetooth and Wi-Fi antenna connector • TETRA antenna connector • TETRA SIM card slot
Single remote model	1 x RJ50 control head connector
Dual remote model	• 2 x RJ50 control head connector • RJ50 External SIM / RJ45 Ethernet connector • RS232 (9-pin SubD)
Databox model	• 1 x RJ50 control head connector • RS232 (9-pin SubD) • 25-pin SubD front connector
Dash/desk mount model	GCAI MMP
IP54 RECH and IP67 RECH	• 25-pin SubD rear connector • GCAI MMP
TSCH	• 10-pin accessory connector • Micro USB port

CONNECTORS AND PORTS FUNCTIONALITY

RS232	Enables PC applications to run simultaneously: Packet Data, AT Commands and SDS
GCAI MMP	Motorola Solutions rugged accessory connector for connection of accessories and programming
USB via 26-pin connector accessory	• USB 2.0 supports rapid programming and Peripheral Equipment Interface (PEI) (that enables PC applications to run simultaneously: Packet Data, AT Commands and SDS) • USB On-The-Go (host and secondary) capability for PEI applications • USB 1.1 support (host mode) to manage USB secondary devices (e.g. SIM card reader)
General Purpose Input / Output (GPIO)	• 4 digital GPIOs (2 on rear 25-pin connector of IP54 RECH and IP67 RECH, 2 on rear 26-pin connector of transceiver) • 1 analogue GPIO (4 levels on rear 25-pin connector of IP54 RECH and IP67 RECH)

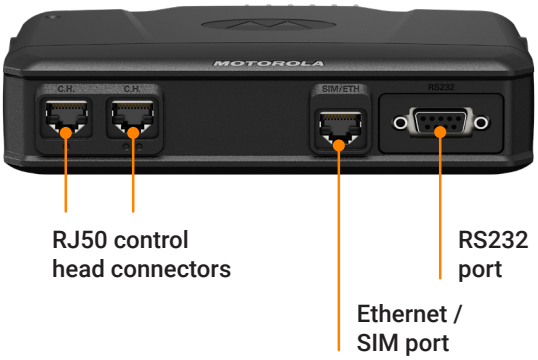
TETRA transceiver

Slot for TETRA SIM card

Trunnion mounting point

Single remote

Dual remote



Dash/desk mount

Databox

TETRA SERVICES

RF

Frequency bands	350 - 470 MHz or 806 - 870 MHz
Transmitter RF power	10 W (class 2) and 3 W (class 3)
Adaptive RF power control	Yes: starting at 15 dBm; finishing at 40 dBm
Receiver class	A and B
Receiver static sensitivity (ETSI 300-392-2)	350 - 470 MHz: -116 dBm minimum, -118 dBm typical 806 - 870 MHz: -114 dBm minimum, -116 dBm typical
Receiver dynamic sensitivity (ETSI 300-392-2)	350 - 470 MHz: -107 dBm minimum, -109 dBm typical 806 - 870 MHz: -105 dBm minimum, -107 dBm typical

VOICE

Full duplex	TMO: private, PABX, PSTN, MS-ISDN, emergency
Half duplex	TMO: private, group, emergency
	DMO: private, group, emergency
Emergency call (user customisable)	Tactical: emergency group call to attached talkgroup
	Non-tactical: emergency group call to dedicated talkgroup
	Individual: emergency call to pre-defined party (half/full duplex)
	Hot mic: configurable timers for automatic open mic (talk without PTT)
	Smart emergency: TMO to DMO and DMO to TMO automatic switching options
	Location: location (GNSS) is sent with emergency
	Target address: sent to individual or group address (selected or dedicated)
	Alarm (status message): Emergency Status (or other predefined status)
DGNA	Up to 10,000 groups
Other voice functions	Phonebook: 1000 persons, 6 numbers per each, 2000 maximum entry
	• Scanning: 40 lists of 20 talkgroups, monitoring 20 groups at the same time (selected talkgroup and passive monitoring) • Announcement talkgroup: 1 primary talkgroup that can monitor other talkgroups

DATA

Short Data	Status: • 400 entries, send via One-Touch Button (OTB) or via menu • TMO and DMO
	SDS: • Concatenation up to 1000 characters • TMO and DMO
	Target address: sent to individual or group address (selected or dedicated)
	SDS messages can be sent and received during a voice call
	Call out (simple, full, E2EE)
Packet Data	Multi-slot Packet Data: data transmission with up to 4 slots supporting up to 28.8 kbit/s in total
PEI (Peripheral Equipment Interface)	• TNP1: Simultaneous operation of Packet Data and Short Data Services over a common Peripheral Equipment Interface (PEI) • AT Commands: full set of ETSI and Enhanced AT Commands • AT multiplexer: 4 virtual physical port (simultaneous PD, SDS, AT Commands and Air Tracer Sessions)
WAP	WAP 1.2.x and WAP 2.0 compatibility for UDP/IP stack

TETRA SERVICES (CONTINUED)

DMO / TMO GATEWAY SERVICES

DMO / TMO gateway mode	Group voice calls from DMO to TMO
	Group voice calls from TMO to DMO
	Emergency group call from DMO to TMO
	Emergency group call from TMO to DMO
	Call pre-emption (in either direction)
	SDS messaging through the gateway from DMO to TMO or TMO to DMO
	Configurable routing of SDS messages to console or PEI
	Point to point calls and SDS messages whilst operating as a gateway

DMO REPEATER SERVICES

DMO repeater mode	Repeats DMO voice calls on selected talkgroup
	Repeats SDS and Status messaging on selected talkgroup
	ETSI type 1A DMO repeater for channel efficient operation
	Transmission of Repeater Presence Signal
	Priority call, Emergency call (Preemptive Priority call)
	End-to-End Encryption (E2EE) DMO traffic
	Monitoring of and participation in calls whilst in Repeater mode
	Configurable repeater power levels

CONNECTIVITY

WI-FI

IEEE standards supported	802.11 a, b, g, n, ac
Wi-Fi bands	2.4 GHz and 5 GHz
Authentication and encryption	• WPA • WPA2 • WPA2 Enterprise (EAP-TLS)
Security	TLS 1.2 (OTAP application)

BLUETOOTH

Bluetooth versions supported	Bluetooth 5.3, 5.2, 5.1, 5.0, 4.2, 4.1, 4.0, and 2.1 + EDR
Bluetooth range	Bluetooth power: Class 1 Line of sight range is up to 90 m (accessory dependent)
Bluetooth security	• With Secure Connections (used in security mode 4, level 4 as recommended by NIST[2]) • Supports Advanced Encryption Standard (AES) algorithm, with 128 bit key length • Also uses an algorithm for Bluetooth key generation and key authentication
Bluetooth audio profiles	• Headset Profile (HSP) • Serial Port Profile (SPP) • Generic Access Profile (GAP) • Generic Attributes Profile (GATT)

[2] https://csrc.nist.gov/publications/detail/sp/800-121/rev-2/final

SECURITY

Air Interface Encryption Authentication	Infrastructure initiated and made mutual by terminal
Air Interface Encryption algorithm options	• TEA1 • TEA2 • TEA3 (Hardware ready for TEA5, TEA6, TEA7 and dual encryption)
Air Interface Encryption Protocols - security classes	• Class 1 (Clear) • Class 2 (SCK) • Class 3 (DCK/CCK, OTAR-CCK, OTAR-SCK) • Class 3G (GCK, OTAR-GCK)
End-to-End Encryption (E2EE) options	• AES128 or AES256 for voice and short data with OTAK supported through an optional Hardware Security Module (HSM) • Encrypted SDS messaging to the Short Data Router (SDR) via the Short Data Encryption Gateway (SDEG)
	• Internal TETRA SIM card: via integrated card slot • External SIM card reader connected through a rear accessory connector or a Dual Remote Transciever's RJ50 SIM port
Wi-Fi security	Built-in firewall: • Secures inbound IP traffic, by restricting it to the channel initiated by MXM600. • No open TCP/UDP sockets
User access control	PIN/PUK code access
	• PIN/PUK code access • Radio User Assignment (RUA) / Radio User Identity (RUI) authentication restricts radio users to pre-installed service profile capabilities. • Setup for forwarding of calls and SDS from permanent radio to the currently assigned radio. • Users can be reached (called, sent SDS) at their permanent radio number (P-ISSI) even if they are logged on to a different radio. • RUA/RUI are not supported when E2EE is enabled.
Other security features	Temporary disable (stun)
	Permanent disable (either ETSI standard or customer restorable)
	Packet data user authentication

LOCATION SERVICES

SATELLITE / OUTDOOR NAVIGATION SERVICE

Constellations supported	GPS plus one of: Galileo, GLONASS, and BDS (BeiDou), Satellite-Based Augmentation Systems (SBAS) including QZSS		
Antenna	External antenna, supports active antenna (5 V, 25 mA supply)		
Simultaneous satellites	12		
GNSS acquisition sensitivity	GPS:	-145 dBm (guaranteed);	-146 dBm (typical)
GNSS tracking sensitivity	GPS:	-163 dBm (guaranteed);	-164 dBm (typical)
	BDS (BeiDou):	-155 dBm (guaranteed);	-156 dBm (typical)
	GLONASS:	-157 dBm (guaranteed);	-160 dBm (typical)
	Galileo:	-155 dBm (guaranteed);	-157 dBm (typical)
Horizontal accuracy, 2D	1.0m (95% probable, -130 dBm, >15 SVs Galileo and GPS)		
Protocols	• ETSI LIP (Short and Long) • Motorola Solutions LRRP		
TTFF cold start	<60 sec (95% probable at -130 dBm)		
TTFF hot start	<10 sec (95% probable at -130 dBm)		

USER INTERFACES

Display	• IP54 RECH and IP67 RECH: 2.8" (43.2 x 57.6 mm), VGA - 640 x 480 pixel, 65K colours • TSCH: 2.0" (30.6 x 40.8 mm) TFT colour transflective display, 240 x 320 black pixels on white background, 65K colours
	Variable backlight, user configurable
	Font size: standard and zoom mode (90 pixels, 4.5 mm high) characters
	Multiple display languages, user selectable
	Time display
	Configurable screen saver: GIF image / text
	TSCH has rotating display: • When off-hook, portrait orientation • When on-hook, fixed portrait, clockwise rotation, counter clockwise rotation • When 2 x TSCHs, both have portrait orientation
Status LED	Tri-colour status LED on control heads and transceiver
Tones	Configurable notification tones
Controls	• Rotary, talkgroup (when pressed) and volume change dual function with lock option • 4-way navigation key, menu and soft keys • Emergency button with backlight • User configurable shortcuts to menus and common features using "One-Touch-Button" (OTB) feature
Keypad	• International keypad options[3] • Back-lit character keypad with keypad lock option • 3 programmable function keys (plus 12 programmable alphanumeric keys)
Text entry	Predictive keypad text entry
Menu	• Customisable menu • Menu shortcuts
Talkgroup management	User friendly, flexible, fast and efficient interface
Talkgroups	• Dual layer folder structure (folder/subfolder) • TMO folders: up to 500, TMO talkgroups: up to 10000 • DMO folders: up to 128, DMO talkgroups: up to 2000 • 4000 TMO Entries (up to 2048 entries in one folder)
Favourite talkgroup folders	Up to 3 folders (128 groups each, 384 groups in total)
Scan lists	40 lists of up to 20 groups
Country/Network code list	100

Contacts management	Rapid search to find the contact easily
Contacts	• Up to 1000 contacts • Up to 6 numbers per contact, maximum of 2000 numbers in total
Dialling methods	One-Touch Buttons (OTB), from the favourite folders, from the address book, from the recent calls list, direct dialling, from the embedded numbers in Short Data Service messages, speed dialling, talkgroup dialling by index
Call alert	Short alert tone (configurable) for group incoming calls
Ring tones	Configurable via CPS / iTM
Message manager	Distinct folders for each message type for flexible message management
Text message list	• 100 short and 20 long messages (up to 1000 characters) for outbox • 100 short and 10 long messages (up to 1000 characters) for inbox
Status list	400 predefined messages assignable to One-Touch Buttons (OTB)
Covert mode	Yes
Dual control head	Configuration options: • 1 IP54 RECH and 1 TSCH • 1 IP54 RECH and 1 IP67 RECH • 1 IP67 RECH and 1 TSCH • 2 x IP54 RECH • 2 x IP67 RECH • 2 x TSCH
	Both displays are active with the following configurations: • 2 x IP54 RECH • 2 x IP67 RECH • 2 x TSCH • 1 x IP54 RECH and 1 x IP67 RECH
	Single display is active with either of these configurations: • IP54 RECH and TSCH • IP67 RECH and TSCH
Multi radio control	• A single IP54 RECH or IP67 RECH or TSCH controls 2 transceivers • Display follows PTT
Third party control head	• Third party developed control head solution (physical or virtual) with the MXM600 transceiver • Motorola Solutions Remote Display Control (RDC) protocol is used for the solution (through Application Developer Program) • Optional use with IP54 RECH or IP67 RECH or TSCH in the dual control head configuration
Automated control head detection[4]	Yes
Auto control head software update[4]	Yes

[3] For the availability of specific language keypads please contact your local Motorola Solutions representative.

[4] Requires both the transceiver and control head to have at least MR2024.1.

DEVICE MANAGEMENT SOLUTIONS

Customer Programming Software (CPS)	Requires CPS version 8.2 or newer
Integrated Terminal Management (iTM)	Requires iTM version 8.2 or newer
Over-The-Air Updates (via iTM)	• Supports Over-The-Air-Programming (OTAP) for configuration (codeplug) and Over-The-Air Updates (OTA Updates) for firmware via Wi-Fi.
Wired Updates (via CPS or iTM)	• Supports programming for configuration (codeplug) and updating radio firmware • Via a transceiver's 26-pin rear connector • Via a control head GCAI MMP connector

RECOMMENDED SERVICES

Services for TETRA radios	Visit motorolasolutions.com/mxm600 for more information

ENVIRONMENTAL SPECIFICATIONS

Operating temperature[5]	-30 to +70 °C
Storage temperature	-40 to +85 °C
Humidity (condensation and high), temperature change, low and high temperature	ETSI 300 019-1-5 class 5.2
Shock (bumps and shock), drop (free fall, drop and topple) and vibration (random and sine)	ETSI 300 019-1-5 class 5M3
Dust and water Ingress Protection	• IP54 for all transceiver models (even with cables connected) • IP54 for IP54 RECH • IP55 for TSCH • IP67 for IP67 RECH

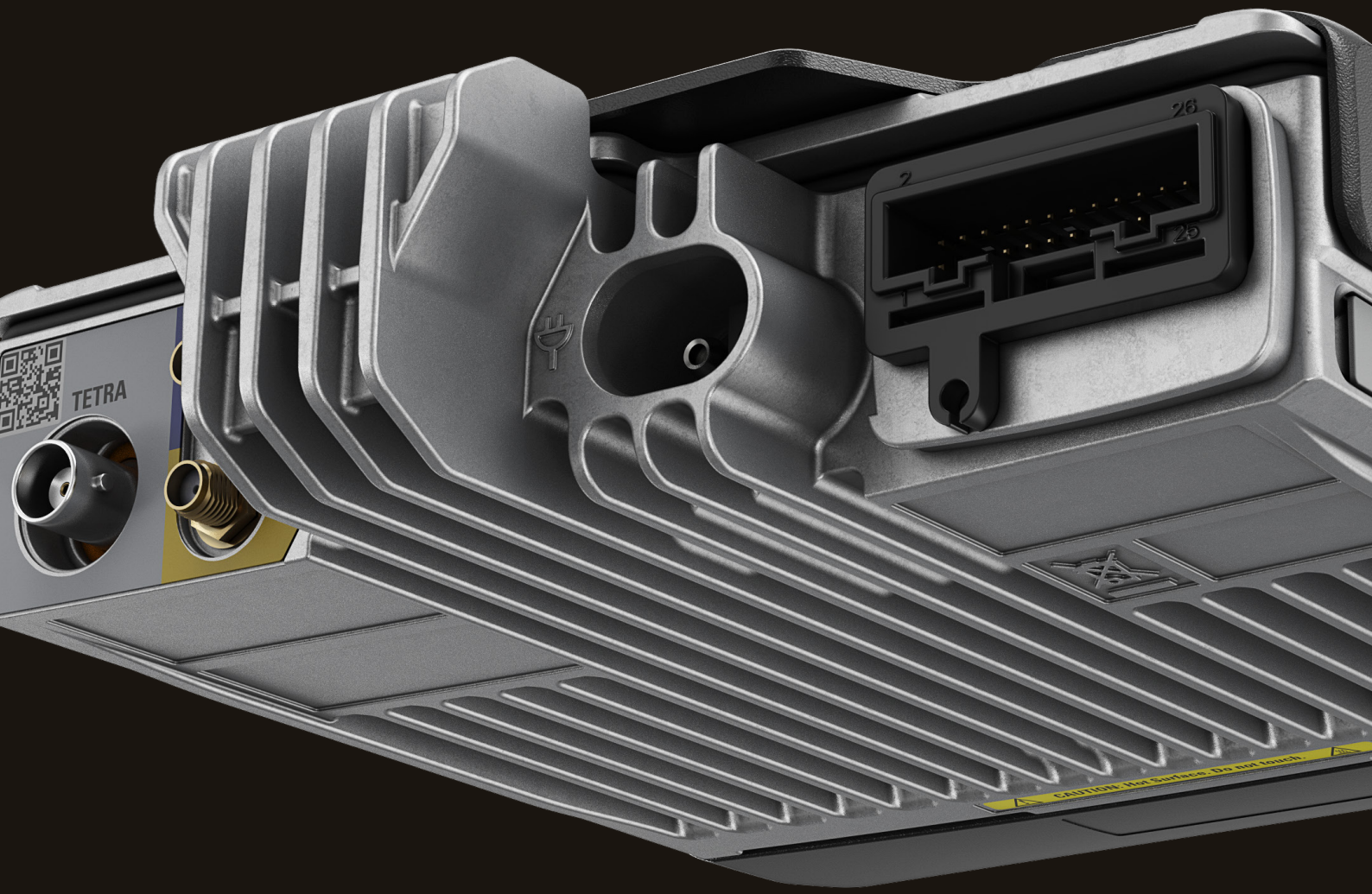
REGULATORY COMPLIANCE

Radio RED	2014/53/EU directive
Environmental	EN 50155 (IEC 60571 ED. 3.0)
Automotive	E-mark, ECE Regulation No.10 for Electrical/Electronic-Subassembly
Rail Certification EMC	EN 50121-3-2 (IEC 62236-3-2 Ed.2.0)

US MILITARY STANDARD MATRIX

	MIL-STD 810 C		MIL-STD 810 D		MIL-STD 810 E		MIL-STD 810 F		MIL-STD 810 G		MIL-STD 810 H	
Applicable MIL-STD	**Method**	**Proc/Cat**	**Method**	**Proc/Cat**	**Method**	**Proc/Cat**	**Method**	**Proc/Cat**	**Method**	**Proc/Cat**	**Method**	**Proc/Cat**
Low pressure	500.1	I	500.2	II	500.3	II	500.4	II	500.6	II	500.6	II
High temperature	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 temperature	502.1	I	502.2	I, II	502.3	I, II	502.4	I, II	502.6	I, II	502.7	I, II
Temperature shock	503.1	I	503.2	A1/C3	503.3	A1/C3	503.4	I	503.6	I-C	503.7	I-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	Yes	507.6	II/ Aggravated	507.6	II/ Aggravated
Salt fog	509.1	I	509.2	I	509.3	I	509.4	Yes	509.6	Yes	509.7	Yes
Blowing dust and 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,III, V	516.3	I, V, VI	516.4	I, V, VI	516.5	I, V, VI	516.7	I, V, VI	516.8	I, V, VI

[5] Full performance from -30 to +60 °C. Performance may be limited when operating at extreme temperatures.



To learn more, visit: **motorolasolutions.com/MXM600**

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