



MOTOROLA SOLUTIONS

Material or Methods Specification

NO. **AN000459A01**

TITLE:

ANTENNA, MOBILE, BT-WIFI, MAGNETIC MOUNT

REVISION DATE: **16-May-2024**

ECN: **EC245173**

ISSUE: **A**

PAGE: **1 OF 13**

ISSUE ORIGINATOR

DETAILS OF CHANGE

DATE

ISSUE	ORIGINATOR	DETAILS OF CHANGE	DATE
A	Ng Chin Wun Tan Chu Hau	Released to Production	16-May-2024

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1. SCOPE

This document contains general Motorola requirements, qualification requirements, and those specific electrical and mechanical requirements for a BT-WiFi Magnetic Mount Mobile Antenna, for TETRA Subscriber.

CAUTION: This specification must not be distributed to parties outside of Motorola without first having a signed Non-Disclosure Agreement.

2. DESCRIPTION AND APPLICATION

Mobile Antenna, BT-WiFi, consists of:

- Radome Antenna,
- paired with a Magnet Mount Socket.
- Connector: SMA MALE

Mounting methods,

- Magnetic suction, on flat ferromagnetic mounting surface

3. KITS & PART NUMBERS

3.1. Standard kits

Motorola P/N	Vendor P/N	Description
AN000459A01	L000687-01	ANTENNA, MOBILE, BT-WIFI, MAGNETIC MOUNT

4. APPLICABLE DOCUMENTS

Document Number	Document Description
12G13933A01	MOTOROLA RECEIVING BAR CODE SPECIFICATION
12I3933U11	COSMETIC SPECIFICATION FOR MSI PRODUCT
12M80967A78-EMS	MOTOROLA SUPPLIER MATERIAL QUALITY CONTROL
12S10601A-EMS	PACKAGING REQUIREMENTS FOR INBOUND SHIPMENTS TO MOTOROLA
12G02897W18	MOTOROLA CONTROLLED AND REPORTABLE MATERIALS DISCLOSURE
1209195A94	PPAP REQUIREMENTS FOR PIECE PART AND ASSEMBLY QUALIFICATIONS
12M05049A01	MOTOROLA REQUIREMENTS FOR PARTS FABRICATED USING DATABASE



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5. REQUIREMENTS

5.1. General Requirements

- 5.1.1. Operating Temperature Range: -30°C to +70°C
- 5.1.2. Storage Temperature Range: -40°C to +85°C
- 5.1.3. Parts shall be clean and free of all foreign matter.
- 5.1.4. Product Appearance: Per 1213933U11. Class A
- 5.1.5. Critical characteristics: per 12M80967A78
 - 5.1.5.1. [] denotes process control characteristic with no Cpk requirement
 - 5.1.5.2. [X] denotes process control characteristic with Cp > 2.0 & Cpk > 1.5 requirement.
 - 5.1.5.3. A "reference" dimension is used for information purposes only, with tolerance excluding, e.g. (.xxx).
 - 5.1.5.4. Motorola reserves the right to add process control or critical dimensions at any time if manufacturer failed to demonstrate process stability and requirements stated in this document.
- 5.1.6. Dimensions: Measure all mechanical dimensions specified. Measurement must meet all specification requirements including packaging dimensions.
- 5.1.7. No changes shall be allowed on production materials, processes or manufacturing locations, regardless of whether the such changes affect the characteristic specified without prior explicit written approval by Motorola's development and purchasing departments.
- 5.1.8. Controlled and reportable materials disclosure: part must comply with 12G02897W18. Appendix C. Section 2.

5.2. Electrical and RF Requirements

5.2.1. Electrical Requirements

ELECTRICAL SPECIFICATIONS		
Operating Frequency (MHz)	2400-2500	4900-5850
Peak Gain Max (dBi)	5.5	7.2
Avg. Gain (dBi)	-1.1	-2.2
Efficiency Avg (%)	77	61
Elevation Beamwidth at Half -Power	47°	61°
Azimuth Beamwidth at Half-Power	Omnidirectional	
VSWR - Max	2:1 (with 6 ft. of ATX195)	
Nominal Impedance (Ohms)	50	
Max Power - Ambient 25°C (W)	100	
Polarization	Vertical	



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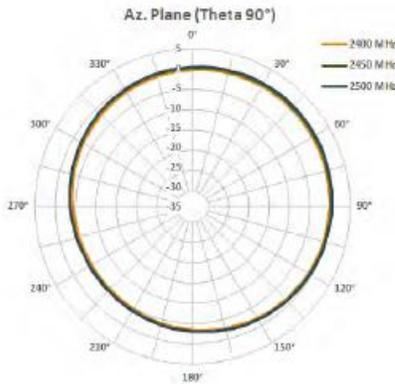
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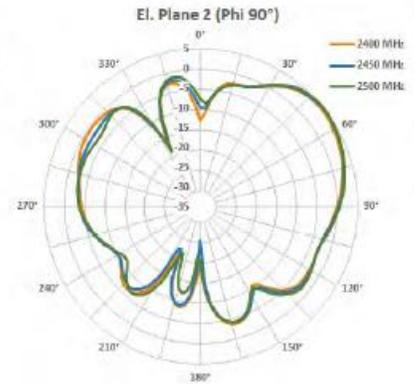
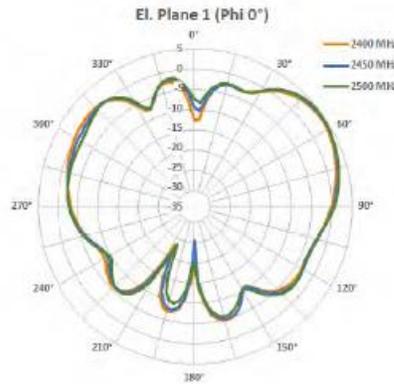
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RADIATION PATTERN - 2.4 GHZ BAND

Azimuth Plane

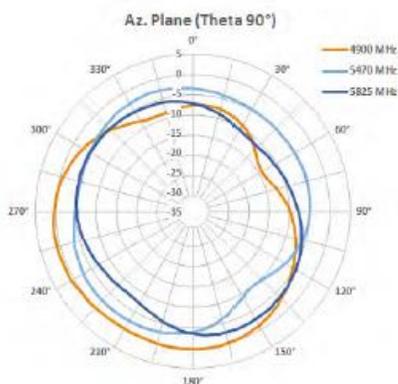


Elevation Plane

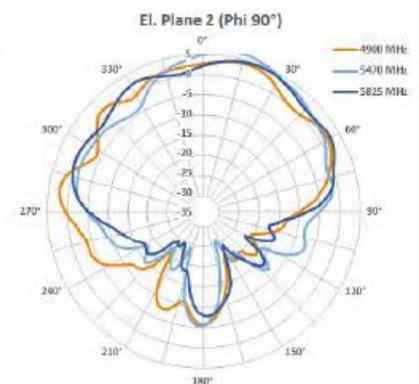
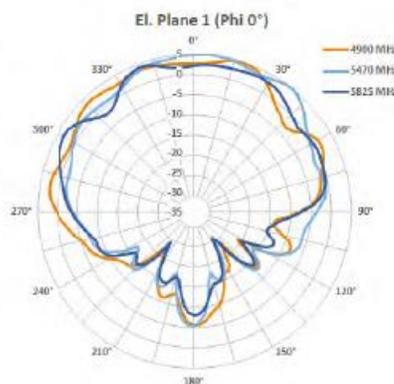


RADIATION PATTERN - 5 GHZ BAND

Azimuth Plane



Elevation Plane



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5.3. Mechanical And Test Requirements

5.3.1. Mechanical Requirement (Phantom Antenna)

MECHANICAL SPECIFICATIONS	
Dimensions - diameter x height - mm (inches)	36.5 x 58.4 (1.44 x 2.3)
Weight - kg (lbs.)	0.113 (0.25)
Cable Type	None
Connector	NMO or Permanent Mount w/ N Female Connector

ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature - °C (°F)	-40 to +85°C (-40 to +185°F)
Material Substance Compliance	RoHS Compliant
Ingress Protection	IP67

5.3.2. Mechanical Requirement (Magnetic Mount)

MECHANICAL SPECIFICATIONS	
Mount Type	Magnetic base, NMO mount
Installation	Metallic/magnet mountable surface
Cable Type	LMR195 equivalent, LSZH
Cable Length - mm (ft.)	3660 (144)
Connector	SMA Male, Installed
Pull Strength - kg (lbs.)	36.3 (80)
Operating Temperature, °C	-30 to +80



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5.3.3. Mechanical Drawing

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PACKAGING NOTE:

- PHANTOM ANTENNA & MAGNETIC MOUNT PACK INDIVIDUALLY BEFORE PACK INTO CARTON
- WEEE LEAFLET WILL PACK TOGETHER INTO CARTON

REVISIONS

REV	DESCRIPTION	DATE	DWN	APVD
4	ADD WIND OPERATIONAL & WIND SURVIVAL	17NOV23	LC TAN	LL TEOP
A	RELEASE & ADD UNIT CARTON LABEL	28FEB24	LC TAN	LL TEOP
A1	UPDATE UNIT CARTON LABEL POSITION AS CUSTOMER REQUEST	13MAR2024	LC TAN	LL TEOP
A2	ADD IP67 & Made in MY TO ANTENNA LABEL	08MAY2024	LC TAN	LL TEOP
A3	CHANGE WINDMOUNT LABEL TYPE TO DWR195 EQUIVALENT LSZH JACKET MATERIAL	10MAY2024	LC TAN	LL TEOP

PARAMETER PERFORMANCE

TCPN	L000687-01
ALIAS NUMBER	AKIT-TRAB24-49003-MT1
MOTOROLA P/N	AN000459A01
PHANTOM ANTENNA (*)	TRAB24-49003
MAGNETIC MOUNT	L000996-01
TERMINATION	SMA,MALE CONNECTOR
CABLE TYPE	LMR195 EQUIVALENT,LSZH
TOTAL CABLE LENGTH,Lc,MM	3660 ± 36
RoHS COMPLIANCE	YES
OPERATING TEMPERATURE , °C	-30 TO +80
WIND OPERATIONAL, MPH	174
WIND SURVIVAL,MPH	226

NOTE (*): MODEL# FOR REFERENCE ONLY.

AN000459A01 REV A IP67 Made in MY

TE Connectivity Solutions
Mühlenstrasse 26
8200 Schaffhausen
Switzerland

TE Connectivity UK
Faraday Road
Swindon
SN3 9HH
YYWW

LOGO HEIGHT MIN. 7MM

UK CAC EAC ENE

LOGO HEIGHT MIN. 5MM

ANTENNA LABEL

ROHS LABEL

THIS DRAWING IS A CONTROLLED DOCUMENT.

REV	DATE	BY	CHK	APPV	NAME
IPV	23AUG23				
LC TAN	23AUG23				
DK	23AUG23				
MT NG					
APV	23AUG23				
LL TEOP					

STE TE Connectivity

KIT,TRAB24-49003, G8SMI

SIZE	CAGE CODE	DRAWING NO	RESTRICTED TO
A3	00779	C=L000687-01	MDT

RESTRICTED CUSTOMER SCALE 1:2 SHEET 1 OF 2 REV A3

DIMENSIONS	TOLERANCES UNLESS OTHERWISE SPECIFIED
MM	0 PLC ±0.5
	1 PLC ±0.25
	2 PLC ±0.13
	3 PLC ±
	4 PLC ±
ANGLES	±30°
MATERIAL	FRESH

5.3.4. Manufacturer's Specification / Drawing

C-L000687-01_A3.PDF

ENG_DS_ANT-DS-TRA
24-4900_SERIES_0619

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5.4. Mechanical Test Requirements :

Antenna Assemblies design is subjected to the tests as follows to ensure robustness before ship acceptance, due to an off the shelf design. Motorola reserves the right to add process control or critical dimensions at any time if manufacturer failed to demonstrate process stability and requirements stated in this document.

All shipped antenna assemblies must maintain the ability to withstand the operating and storage temperature as mentioned in Section 5.1.

5.4.1. Environmental Test

5.4.1.1. All Units Must Pre condition to Thermal Shock prior to the performance test.

TEST	Thermal Shock (Manufacturer's Specification)
Procedure	-25°C to +70°C, 1 hour soak, 5°/min minimum ramp, 5 Cycles, ramp up from ambient at beginning of cycle.
Criteria	No degradation that affects the VSWR, form, fit and function of the product.

5.4.1.2.

TEST	Temperature Cycling (Storage) (Manufacturer's Specification)
Procedure	-40°C to 85°C, 2 hour soak, 2°/min ramp, 15 Cycles, ramp up from ambient at beginning of cycle.
Criteria	No degradation that affects the VSWR, form, fit and function of the product.

5.4.1.3.

TEST	High Humidity (Endurance) (Manufacturer's Specification) MIL-STD-810G, 507.5, Procedure II, Aggravated Humidity
Procedure	95%±4% relative humidity, 24 hour cycle, 5 cycles. ***1 Cycle: Ramp up from ambient temperature (23°C) to 60°C in 2 hr period. Remain at 60°C for 6 hours. Ramp down to 30°C in a 8 hour time period. Remain at 30°C for 8 hours. 24 hours total***
Criteria	No degradation that affects the VSWR, form, fit and function of the product.



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5.4.2. Mechanical Design Tests :

5.4.2.1.

TEST	Water Ingress (Manufacturer's Specification) <i>Extended IPx7 per IEC 60529</i>
<i>Procedure</i>	<i>Pre-Condition: Thermal Shock per 5.4.1.1 IPx7, submerge 1 meter deep, 30 minute duration.</i>
<i>Criteria</i>	<i>No degradation that affects the VSWR, form, fit and function of the product. No water entry in main antenna cavity.</i>

5.4.2.2.

TEST	Dust Ingress (Manufacturer's Specification)
<i>Procedure</i>	<i>IP6x, Category 1, per IEC 60529</i>
<i>Criteria</i>	<i>No degradation that affects the VSWR, form, fit and function of the product. No water entry in main antenna cavity.</i>

5.4.2.3.

TEST	Wind Operational (Manufacturer's Specification)
<i>Procedure</i>	<i>Simulated Wind Speed 174MPH Physical loading of front, rear, and one side surface, 1 minutes, based on flat plate load Calculation</i>
<i>Criteria</i>	<i>No physical movement of the mounting should be allowed. No degradation that affects the VSWR, form, fit and function of the product.</i>

5.4.2.4.

TEST	Wind Survival (Manufacturer's Specification)
<i>Procedure</i>	<i>Simulated Wind Speed 226MPH Physical loading of front, rear, and one side surface, 15 seconds, based on flat plate load Calculation</i>
<i>Criteria</i>	<i>No physical movement of the mounting should be allowed. No degradation that affects the VSWR, form, fit and function of the product.</i>

5.4.2.5.

TEST	Magnet Pull force; lbs (Kg) (Manufacturer's Specification)
<i>Procedure</i>	<i>Min. 80lbs</i>
<i>Criteria</i>	<i>No degradation that affects the VSWR, form, fit and function of the product after the pull. Must withstand min pull force requirement for the side and vertical pull.</i>

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6. **LABELING**

Antenna shall be packaged in individual carton and labeled per shown below:



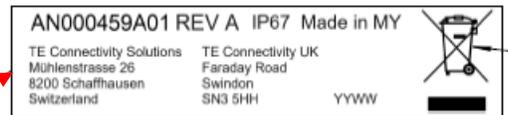
Label on unit carton packaging



unit carton packaging (exterior)



unit carton packaging (interior)



Product Detail's Label

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7. PACKAGING & SHIPMENT

7.1. Packaging Requirements:

- 7.1.1. Components must be sealed prior to shipment so as to prevent contamination and damage while en-route to Motorola. Damaged containers will be documented by Motorola Receiving and follow up action with the carrier or supplier will occur when appropriate.
- 7.1.2. Any data should be correlated to the material received and be enclosed with the parts inside the packing container. When multiple packing containers are shipped as one lot, the container with the data should be marked "DATA IN THIS CONTAINER".
- 7.1.3. Packaged containers shall comply with 12G13933A01 Bar-coding Label requirements as well as the shipping containers per Motorola Standard 12S10601A.
- 7.1.4. The Master carton containing the individual packaged units is also to be labeled with Motorola Kit Number AN000459A01. Date Code and Barcode as specified in 12M05041A30.
- 7.1.5. Motorola part number, date code and quantity per carton and pack shall be bar-coded marked according to the Motorola standard 1213933A01 on each carton and pack. The parts are packed 1 unit per box. Total of 20 units will be packed per master box.



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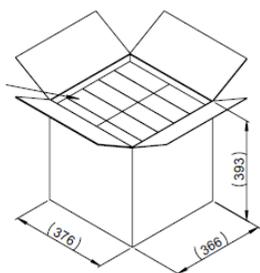
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7.1.6. Packaging Configuration

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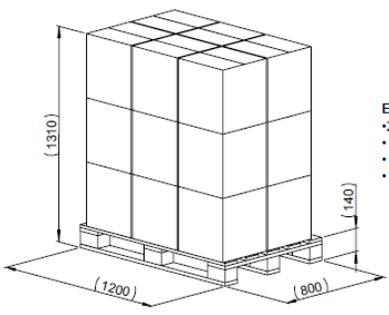
MASTER CARTON PACKAGING

- TOTAL 20PCS ANTENNA PER MASTER CARTON



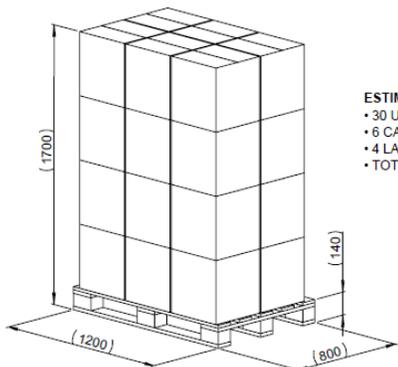
ESTIMATED FOR AIR SHIPMENT

- 20 UNITS ANTENNA PER MASTER CARTON
- 6 CARTONS PER LAYER
- 3 LAYERS PER PALLET
- TOTAL ANTENNA PER PALLET : 360 UNITS

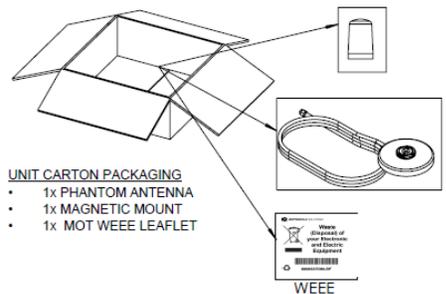


ESTIMATED FOR OCEAN SHIPMENT

- 30 UNITS ANTENNA PER MASTER CARTON
- 6 CARTONS PER LAYER
- 4 LAYERS PER PALLET
- TOTAL ANTENNA PER PALLET : 480 UNITS

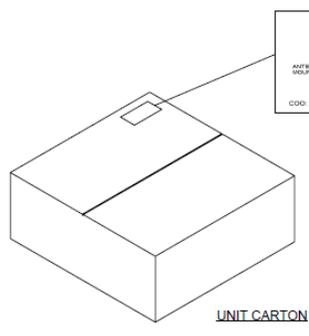


REVISIONS



UNIT CARTON PACKAGING

- 1x PHANTOM ANTENNA
- 1x MAGNETIC MOUNT
- 1x MOT WEEE LEAFLET



UNIT CARTON LABEL

AN000459A01

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LGR: MADDYY QTY: 6

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THIS DRAWING IS A CONTROLLED DOCUMENT.		IPV	23AUG23		TE Connectivity
		LC TAN	23AUG23		
		WT NG	23AUG23		
		APVD	LL TEDH	KIT, TRAB24-49003, G8SMI	
DIMENSIONS		TOLERANCES UNLESS OTHERWISE SPECIFIED		PRODUCT SPEC	
		0 PLC	±.5	APPLICATION SPEC	
		1 PLC	±.25	WEIGHT	
		2 PLC	±.13	RESTRICTED TO	
		3 PLC	±.1	MOT	
		4 PLC	±.05	RESTRICTED CUSTOMER	
MATERIAL		FINISH		SCALE: 1:20	
				SHEET 2 OF 2	
				REV A3	

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8. WARRANTY

The supplier shall comply with the warranty as specified on the Motorola Purchase Order. The warranty period will commence upon the date of receipt of the parts to Motorola. In the event that the warranty is not specified on the purchase order, the warranty period shall be one year from the date of delivery.

9. QUALITY PROVISIONS

9.1. Specification Acceptance :

For all initial specification details and revisions to this specification, the supplier must complete and return a signed PAF form back to Motorola.

9.2. Changes :

No major changes (affecting reliability or performance) shall be allowed on production material, process, or manufacturing locations, regardless of whether such changes affect characteristics specified, without prior explicit written approvals by the Motorola Development Engineering, Quality Department, and Purchasing Departments.

10. QUALIFICATION

10.1. Qualification by Similarity :

If the product has been previously qualified or approved by a Motorola facility, qualification may be exempt from specific tests listed below. Motorola may, at its discretion, exempt tests by the following criteria.

- <1> In the case of 100% commonality, Motorola may choose to exempt any or all qualification tests on the basis of product similarity.
- <2> In case of high commonality, Motorola may choose to perform only those tests which are affected by parts or specs unique to the Motorola design.
- <3> Motorola may, test the product using Motorola facility, to justify the product performance conformity if the manufacturer's test document is not satisfactory.
- <4> Motorola may, regardless of commonality or re-use, require the supplier to perform and submit data for all tests specified below.

10.2. Qualification by Supplier :

If the supplier is developing the product, it is the supplier's responsibility to provide Component Engineering proof of compliance to all specifications listed in this document. This should include description of how the test was done, results and pertinent data, along with tested samples.

10.3. Qualification Requirements :

- 10.3.1. Production samples used for qualification testing should be randomly chosen.
- 10.3.2. The environmental test equipment and the types of test fixturing used for the component qualification are left to the discretion of the supplier.

10.4. Qualification Tests (Test Definition Boxes) :

- 10.4.1. Throughout this document, all applicable tests are described or referenced in "Test Definition Boxes". This eliminates documentation redundancy and provides an easy method for reference and tracking of all tests performed. It also keeps a common test format which specifically defines the procedure and criteria for all tests run.
- 10.4.2. The tests defined in these boxes encompass all testable parameters for this product. Motorola reserve the right request for a third party test report to justify the product performance conformity if the manufacturer's test document is not satisfactory.