

**NUMERICAL INDEX — DIVISION 409  
TE, TJ, TL, AND TM MICROWAVE RADIO**

**1. GENERAL**

- 1.01** This section provides an index of System-issued sections in Division 409.
- 1.02** This section reverted to Issue 1 in April 1975. Prior to that date there had been 99 issues of the section.
- 1.03** A bullet (●) indicates an item that has been added or changed since the previous issue of the index.
- 1.04** A square (□) indicates a canceled item. Information relating to the cancellation, if necessary, will be shown in a note following the item. Canceled items and related notes will be deleted upon reissue of the index.
- 1.05** A heart (♥) indicates a new or reissued item which, because of its limited need, will not be distributed on standing order except through coded distribution. Additional copies may be obtained by placing regular (one-time) orders.
- 1.06** A spade (♠) indicates an item not on microfiche. This index indicates the latest issue for hard-copy BSPs. In some cases, the microfiche BSP will reflect the next higher issue as a result of the reduced distribution interval.
- 1.07** "Add" is the abbreviation for Addendum.

**2. LAYERS**

**2.01** This division is arranged in layers as follows:

- 409-0 Indexes and Equipment Test Lists
  - 1 TE Microwave Radio
  - 2 TJ or TJ/TM-1 Microwave Radio
  - 3 TL-1 Microwave Radio
  - 4 TL-2 and TM-1 Microwave Radio
  - 5 TM-2/TM-2A Microwave Radio
  - 6 Ancillary Equipment
  - 7 Overall System

**3. INDEX**

Section Number	Issue	Subject
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**409-0 INDEXES AND EQUIPMENT TEST LISTS**

- ♠ 409-000-000 30 Numerical Index — Division 409 — TE, TJ, TL, and TM Microwave Radio
- 409-001-011 9 ETL — TE, TJ, TL, and TM Microwave Radio

**409-1 TE MICROWAVE RADIO**

**409-100 Overall System**

- 409-100-100 3 Description
- 409-100-500 3 Tests
- 409-100-501 1 Modification for NTSC Color

**409-110 TE-T1 Transmitter**

- 409-110-100 4 Description
- 409-110-500 4 Tests

Section Number	Issue	Subject
409-110-501	1	Modification for Remote and Local Control and Use of Improved Klystron
409-110-502	1	Modification for NTSC Color

**409-120 TE-R1 Receiver**

409-120-100	4	Description
409-120-500	4	Tests
409-120-501	2	Modification for Improved Operation and Maintenance
409-120-502	1	Modification for NTSC Color

**409-130 TE-T2 Transmitter**

409-130-100	2	Description
409-130-500	2	Tests
409-130-501	1	Modification for NTSC Color

**409-140 TE-R2 Receiver**

409-140-100	2	Description
409-140-500	2	Tests
409-140-501	1	Modification for Improved Operation and Maintenance
409-140-502	1	Modification for NTSC Color

**409-150 TE-A1 Amplifier**

409-150-100	1	Description
409-150-500	1	Tests

**409-2 TJ OR TJ/TM-1 MICROWAVE RADIO**

**409-200 TJ Microwave Radio**

**Description**

409-200-100	3	General
409-200-101	4	Overall System
409-200-102	3	Transmitter-Receiver Bay
409-200-103	2	Power Supply
409-200-104	4	Transmitter
409-200-105	4	Receiver
409-200-106	2	D1 Auxiliary Bay
409-200-107	1	D2 Auxiliary Bay

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

**SECTION 409-000-000**

Section Number	Issue	Subject
<b>General Tests</b>		
409-200-500	5	General Test Information
409-200-501	2	Tools
409-200-502	5	TR Bay — Power Supply Tests and Voltage Checks
409-200-503	3	Auxiliary Bay — Power Supply Tests and Voltage Checks
409-200-504	2	Waveguide Components Losses

**409-201 TJ/TM-1 Microwave Radio**

**Description**

409-201-100	1	General
409-201-101	1	Overall System

**General Tests**

409-201-503	2	Auxiliary Bay — Power Supply Tests and Voltage Checks
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**409-210 TJ Transmitter Tests**

409-210-501	4	Frequency and Power Output
409-210-502	2	Deviation
409-210-503	4	Linearity
409-210-504	3	Baseband Amplifier Response
Add 409-210-505	1	
409-210-505	3	Component Replacement

**409-220 TJ Receiver Tests**

409-220-501	4	RF to IF Tests
Add 409-220-502	1	
409-220-502	4	Baseband Amplifier Power Output, Frequency Response, Noise Quieting, and Squelch Adjustments
409-220-503	3	Linearity
409-220-504	3	1A Modulator or J99296AA List 3, 4 Modulator Pre-amplifier
409-220-505	4	Component Replacement
409-220-506	3	Noise Figure Measurements
409-220-507	1	IF Unit Impedance Matching

**409-230 TJ Auxiliary Bay Tests**

409-230-500	2	General
409-230-501	2	Diversity Switch and Transmission Unit

**409-231 TJ/TM-1 Auxiliary Bay**

409-231-501	1	Diversity Switch and Transmission Unit
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Section Number	Issue	Subject
<b>409-240 TJ — Systems Tests — Light Loading</b>		

409-240-500	4	General
409-240-501	3	Initial Line-up Test Sequence
Add 409-240-502	1	
409-240-502	2	Received Signal Level
409-240-503	3	Transmitter Deviation
409-240-504	2	Receiver Gain
409-240-505	3	Net Loss Measurements
409-240-506	4	Telephone With Diversity — Comparator Tests
409-240-507	4	Signaling and Pilot Tone Levels
409-240-508	2	Pilot Monitor Tests and Adjustments

**409-241 TJ/TM-1 — Systems Tests — Heavy Loading**

409-241-500	2	General
Add 409-241-501	1	
409-241-501	2	Initial Line-Up Test Sequence and Periodic Test Intervals
409-241-502	3	Received Signal Level
Add 409-241-503	1	
409-241-503	2	Transmitter-Receiver Link Deviation
Add 409-241-504	1	
409-241-504	1	Transmitter-Receiver — Link Linearity Test
409-241-505	2	Net Loss Measurements
409-241-506	2	Comparator Tests and Adjustments
409-241-507	2	Signaling and Pilot Tone Levels
409-241-508	2	Pilot Monitor Tests and Adjustments
409-241-509	2	Noise Loading Measurements

**409-242 TJ Microwave Radio — Systems Tests — Heavy Loading**

409-242-500	1	General
409-242-501	1	Initial Line-Up Test Sequence
409-242-502	1	Received Signal Level, IF, and Squelch Tests
Add 409-242-503	1	
409-242-503	1	Transmitter-Receiver Link Deviation
409-242-504	2	Transmitter-Receiver — Link Linearity Test
409-242-505	1	Net Loss Measurements
409-242-506	2	Comparator Tests
409-242-507	1	Signaling and Pilot Tone Levels
409-242-508	1	Pilot Monitor Tests and Adjustments
409-242-509	2	Noise Loading Measurements

Section Number	Issue	Subject	Section Number	Issue	Subject
<b>409-3 TL-1 MICROWAVE RADIO</b>			409-306-501	2	Baseband Amplifier Gain Adjustment
<b>409-300 Description</b>			409-306-502	2	AFC Alignment and In-Service Checks
	409-300-100	3 General	409-306-503	2	Received Signal Level
	409-300-101	3 Overall System	409-306-504	2	Squelch Circuit Alignment
	409-300-102	4 Transmitter-Receiver Bay	Add 409-306-505	1	
Add	409-300-103	1	409-306-505	2	Miscellaneous Out-Of-Service Checks
	409-300-103	1 Transmitter	409-306-506	3	Component and Subassembly Replacement
	409-300-104	2 Receiver	<b>409-308 Power Supply Tests</b>		
	409-300-105	1 Power Supply	409-308-500	1	General
	409-300-106	1 Diversity Switch	409-308-501	2	Voltage Checks
	409-300-107	1 Order Wire and Alarm	409-308-502	1	Component and Sub-Assembly Replacement
<b>409-301 Operation</b>			<b>409-310 Order Wire and Alarm Tests</b>		
	409-301-300	1 Operation-Order Wire and Alarm	409-310-500	1	General
<b>409-302 General Information</b>			409-310-501	1	Alarm Circuit Checks
	409-302-330	2 Periodic Test Intervals	409-310-502	1	Level and Frequency Adjustments
	409-302-500	2 General Maintenance	409-310-503	1	Encoder
	409-302-501	3 Transmitter-Receiver Bay — Checks and Trouble Location	<b>409-312 Diversity Switch Tests</b>		
	409-302-502	1 Cabinet Equipment — Miscellaneous Items	409-312-500	1	General
<b>409-303 System Tests</b>			409-312-501	2	Performance Checks, Alignment, and Unit Replacement
	409-303-500	2 General	<b>409-4 TL-2 AND TM-1 MICROWAVE RADIO</b>		
	409-303-501	1 Transmission Measurement	<b>409-400 Description</b>		
	409-303-502	1 Idle Noise	409-400-100	3	General
	409-303-503	1 600-Circuit Noise Loading Tests for Message Systems	409-400-101	2	TL-2 Overall System
	409-303-504	1 Envelope Delay and Linearity Tests	409-400-102	4	TL-2 Transmitter-Receiver Arrangements
<b>409-304 Transmitter Tests</b>			409-400-103	3	Transmitter
	409-304-500	1 General	409-400-104	4	Receiver
	409-304-501	2 Frequency and Linearity	409-400-111	2	TM-1 Overall System
	409-304-502	1 Deviation	409-400-112	3	TM-1 Transmitter-Receiver Arrangement
	409-304-503	1 Baseband Amplifier	409-400-113	3	TM-1 Transmitter
Add	409-304-504	1	409-400-114	3	Receiver
	409-304-504	3 Component and Subassembly Replacement	409-400-121	1	Power Supply
<b>409-305 Transmitter-Receiver Equipment Tests</b>			409-400-122	2	Power Supply — Chargers and Battery
	409-305-500	1 Component and Subassembly Replacement	409-400-123	2	J99296L Bistable Diversity Switch — J99302M Revertive Diversity Switch
<b>409-306 Receiver Tests</b>			409-400-124	2	Order Wire and Alarm
	409-306-500	2 General	409-400-125	2	Television Transmission Systems Equipped With J99296AC, AD, AE, and AH Video Panels

**SECTION 409-000-000**

Section Number	Issue	Subject
409-400-126	1	Television Transmission — J99296AJ and AK Video Panels
♥ 409-400-127	1	Hot Standby Transmitter Switch Control Panel — J99302BL
409-400-140	1	TM-A1 Power Amplifier
409-400-141	2	TM-A1 TWT Power Supply
409-400-145	1	TL-A2 Power Amplifier
409-400-146	1	TL-A2 Power Supply
409-400-150	1	TM-B1 Power Amplifier
409-400-151	1	TM-B1 Power Supply

**409-401 Operation**

409-401-300 1 Order Wire and Alarm

**409-402 General Maintenance Tests**

Add 409-402-500	1	
409-402-500	4	General
409-402-501	3	Removing and Restoring Service
409-402-502	5	Transmitter-Receiver Bay — Checks and Trouble Location
409-402-503	5	Building and Housing Equipment
409-402-504	2	TM-A1 Power Amplifier

**409-403 System Tests**

Add 409-403-500	1	
409-403-500	4	General
409-403-501	4	Message Transmission
409-403-502	2	Television Transmission — Systems Equipped With J99296AC, AD, AE and AH Video Panels
409-403-503	1	Television Transmission — Systems Equipped With J99296AJ and J99296AK Video Panels
409-403-504	2	Idle Noise
409-403-505	1	600 Circuit Noise-Loading Tests for Message Systems
409-403-506	1	Envelope Delay and Linearity

Add 409-403-507	2	
409-403-507	1	1200-Circuit Noise Loading Tests for Message Systems

**409-404 Transmitter Tests**

Add 409-404-501	1	
409-404-501	3	Frequency and Linearity
409-404-502	3	Deviation
Add 409-404-503	1	
409-404-503	3	Baseband Amplifier

Section Number	Issue	Subject
409-404-504	4	Component and Subassembly Replacement
409-404-505	3	Power Output
Add 409-404-506	1	
409-404-506	1	TM-B1 Power Amplifier — Tuneup and Replacement Procedures
409-404-507	2	TL-A2 Power Amplifier — Tuneup and Replacement Procedures

**409-405 TM-A1 Power Amplifier**

409-405-501 2 Component and Subassembly Replacement

**409-406 Receiver Tests**

409-406-500	2	General
409-406-501	2	Baseband Amplifier Gain Adjustment
409-406-502	3	AFC Alignment and In-Service Checks
409-406-503	4	Received Signal Level
409-406-504	4	Squelch Sensitivity
409-406-505	5	Miscellaneous Out-of-Service Checks
409-406-506	3	Component and Subassembly Replacement

**409-408 Power Supply Tests**

409-408-501	3	Regulator, Inverter, and Rectifier
409-408-503	2	Subassembly Replacement
409-408-505	2	TM-A1 Power Supply

**409-410 Order-Wire and Alarm Tests**

409-410-501	3	Alarm Circuit Checks
409-410-502	1	Level and Frequency Adjustments
409-410-503	3	Encoder
409-410-504	3	Transmitter Alarm Initiator

**409-412 Diversity Switch Tests**

• 409-412-501	5	Diversity Switch Tests, Alignment, and Unit Replacement
♥ 409-412-502	1	Hot Standby Transmitter Switch Control Panel J99302BL — Tests, Alignment, and Subassembly Replacement

**409-420 TL-2 Portable Microwave**

**Description**

409-420-100	1	General
409-420-101	1	Over-all System
409-420-102	1	Order Wire and Alarm
409-420-103	1	Television Transmission — J99296BF-1 Video Unit

Section Number	Issue	Subject	Section Number	Issue	Subject
<b>Installation</b>			409-506-502	3	Received Signal Power
409-420-200	1	Installation and Operation	409-506-503	3	IF Amplifier and FM Receiver
<b>Tests</b>			409-506-504	3	Component and Subassembly Replacement
Add 409-420-500	1		<b>409-508 Power Supply Tests</b>		
409-420-500	1	General	409-508-501	3	91A Power Unit and -19 Volt Regulator (ED-3C400-30)
<b>409-5 TM-2/TM-2A MICROWAVE RADIO</b>			409-508-502	3	Component and Subassembly Replacement
<b>409-500 Description</b>			<b>409-512 Hot Standby Switch</b>		
409-500-100	3	General	409-512-501	1	Receiver Tests, Alignment, and Subassembly Replacement
409-500-101	3	Overall System	409-512-502	1	Transmitter — Control Panel — Tests, Alignment, and Subassembly Replacement
409-500-102	3	Transmitter-Receiver Arrangement	<b>409-6 ANCILLARY EQUIPMENT</b>		
409-500-103	2	Transmitter-Receiver Panel — Description	<b>Description</b>		
409-500-121	2	91A and 91B Power Units	409-600-100	1	Description
509-500-122	1	220A Power Unit	409-600-101	1	Baseband Access Panel
<b>409-502 General Maintenance Tests</b>			409-600-102	1	Basic Radio Order Wire
409-502-500	3	General	409-600-103	1	Radio and Common Alarms
409-502-501	4	Removing and Restoring Service	409-600-104	1	2600-Hz Supply Circuit
409-502-502	3	Transmitter-Receiver Panel — Checks and Trouble Location	409-600-105	1	Baseband Monitor, Switch, and Control for HF Pilot
409-502-503	1	Transmitter — Receiver Panel — Back-To-Back Testing Methods	409-600-106	1	Order Wire and Alarm Multiplex
<b>409-503 System Tests</b>			409-600-107	2	Power Supply — Chargers and Battery
409-503-500	2	General	409-600-108	1	Short Haul Radio — 1A-Radio Digital System Transmission
409-503-501	1	Message Transmission	<b>Tests</b>		
409-503-502	1	Television Transmission	409-600-500	1	General Maintenance
409-503-503	1	Idle Noise	409-600-501	1	Baseband Access Panel
Add 409-503-504	2		409-600-502	1	Basic Radio Order Wire
409-503-504	1	1200-Circuit Noise Loading Tests for Message Systems	409-600-503	1	Radio and Common Alarms
409-503-505	1	Envelope Delay and Linearity	409-600-504	1	2600-Hz Supply Circuit
<b>409-504 Transmitter Tests</b>			409-600-505	1	Monitor, Alarm, and Switch Control Units for HF Pilot — Alignment and Subassembly Replacement
409-504-500	2	General	409-600-506	1	Equipment Tests — Order Wire and Alarm Multiplex
409-504-501	3	Local Oscillator	409-600-507	2	Installation and Maintenance — Power Supply — Chargers and Battery
409-504-502	5	FM Transmitter Modulator and Microwave Amplifier	409-600-508	2	Short Haul Radio — Equipment Tests — 1A-Radio Digital System Transmission
409-504-503	3	Component and Subassembly Replacement			
<b>409-506 Receiver Tests</b>					
409-506-500	3	General			
409-506-501	3	Local Oscillator			

**SECTION 409-000-000**

<b>Section Number</b>	<b>Issue</b>	<b>Subject</b>
<b>409-7 OVERALL SYSTEM</b>		
409-700-100	1	Description
409-700-500	1	General Test Information
409-701-500	1	In-Service Testing
409-701-501	1	Short Haul Radio — In-Service Testing — Channel Net Gain and Baseband Response
409-702-500	1	Short Haul Radio — Out-of-Service System Tests — General Test Information
409-702-501	1	Out-of-Service System Tests — Envelope Delay and Linearity

<b>Section Number</b>	<b>Issue</b>	<b>Subject</b>
409-702-502	1	Short Haul Radio — Out-of-Service System Tests — Channel Net Gain and Baseband Response
409-702-503	1	Short Haul Radio — Out-of-Service System Tests — Thermal Noise and Spurious Tones
409-702-504	1	Short Haul Radio — System Tests — Noise Loading
409-702-505	1	Short Haul Radio — System Tests — Differential Phase and Gain