

RPV599APlus Adjustment Description

Required Test Equipment

Stabilized Power supply

1. The supply voltage can be changed between 5V and 8V, and the current is 3A or more.
2. The standard voltage is 7.5V.

DC Ammeter

1. Class 1 ammeter (17 ranges and other features).
2. The full scale can be set to either 300mA or 3A.
3. A cable of less internal loss must be used.

Digital Voltmeter

1. Voltage range: FS=18V or so
2. Input resistance: 1MΩ or more

Oscilloscope

1. Measuring range: DC to 30MHz
2. Provides highly accurate measurements for 5 to 25MHz.

Dummy Load

8Ω, 3W or more

RADIO COMMUNICATION TESTER

2955B

Spectrum Analyzer

SG815

Initialization:

The model of RPV599APlus is 8. Frequency range is 148-174MHz.

Notes:

1. Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils)
2. When adjusting receiver unit, do not send signal. Then the standard signal generator can be protected.
3. The output level of standard signal generator is the maximum.

Adjustment specifications:

TC1: Frequency adjustment

TC2: Receive lock voltage adjustment

TC3: Transmit lock voltage adjustment

VR1: CTCSS/CDCSS waveform adjustment

VR2: DEV adjustment

L24:

L26: } B.P.F waveform adjustment

L32: }

TP: B.P.F test point

ANT: Antenna connector

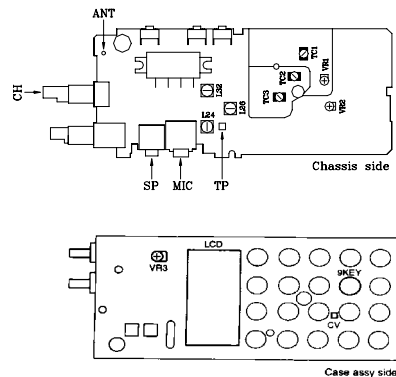
SP: Speaker jack

MIC: Microphone jack

CH: Channel selector

VR3: DTMF/TTS DEV adjustment

9 Key: DTMF9 key terminal



CV: Lock voltage test terminal

Use the jig as the following:

1. Insert the coaxial antenna connector into the jig.
2. Place the unit on the jig and fix it with four screws.
3. Solder the antenna terminal to the terminal of the unit.

Notes:

1. Do not install the Ni-Cd battery when using the jig for adjustment, repair, or checking. If the Ni-Cd battery is installed, the relay terminal (+) may be damaged.
2. Using an external power supply as the radio power.
3. Please refer to the “adjustment mode” in “Radio Modes” to adjust.

RPV599APlus VCO adjustment

Item	Condition	Measurement		Adjustment		Specifications/Remarks
		Test equipment	Terminal	Parts	Method	
1.Setting	Power supply voltage Battery terminal: 7.5V					
2.VCO lock voltage	1) TX HI	Digital voltmeter	CV	TC3	3.8 ±0.1V	
	2) TX LOW	Digital voltmeter	CV		≥0.7V	Check
	3) RX HI	Digital voltmeter	CV	TC2	3.8 ±0.1V	
	4) RX LOW	Digital voltmeter	CV		≥0.8V	Check

RPV 599APlus Receiver adjustment

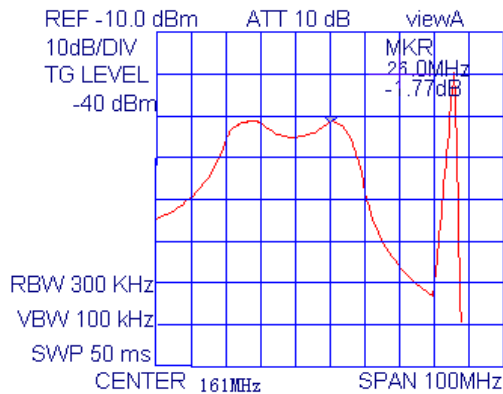


Fig.9

Item	Condition	Measurement		Adjustment		Specifications/Remarks
		Test equipment	Terminal	Parts	Method	
1. Band-pass filter	1) Given frequency 2) Trapezium generator output – 40 dBm. Connect the spectrum analyzer to the T.P terminal.	Trapezium generator Spectrum analyzer	ANT TP	L24 L26 L32	Adjust the frequency so that it becomes the spectrum waveform shown above Fig.(See Fig. 9)	
2. Sensitivity	CH: RX LO CH: RX Center CH: RX HI At each frequency: SSG output: -121dBm MOD: 1KHz DEV:±3KHz	SSG Oscilloscope AF.V.M Distortion meter	ANT SP		Check	SINAD: 12dB or higher
3. Signal-to-Noise	SSG output □ 66dBμV				Check	≥40 dB
4. Distortion	SSG output □ 66dBμV				Check	≤3.5%
5. Squelch	1) Level 9 CH: RX Center SSG output: -117dBm	SSG Oscilloscope AF.V.M Distortion meter	ANT S.P	Channel selector	Level 9 Adjust to close the squelch with the channel selector.	Squelch must be closed.
	2) Level 3 CH: RX Center SSG output: -128dBm				Level 3 Adjust to close the squelch with the channel selector.	Squelch must be closed.
	3) Refer to adjustment mode.					

RPV599A Plus Transmitter adjustment

Item	Condition	Measurement		Adjustment		Specifications/Remarks
		Test equipment	Terminal	Parts	Method	
1. Transmit frequency	1) CH: TX Center PTT: ON	Frequency counter	ANT	TC1	Adjust to ±200 Hz.	Within ±200Hz
2. CTCSS/ CDCSS Balance	1) Refer to adjustment mode. CTCSS is 67Hz.	Modulation analyzer or linear detector Oscilloscope	ANT	VR1	Adjust VR1 to make the frequency deviation of 67Hz consistent with that of 250.3Hz	67Hz CTCSS
	2) Refer to adjustment mode. CTCSS is 250.3Hz. LPF: 300Hz					250.3Hz CTCSS
3. Full Power	1) CH: TX Center Battery terminal: 7.5V PTT: ON	Power meter Ammeter	ANT	Channel selector	Turn the channel selector to increase the value. Verify that it is 5W or higher	5W or higher
	2) Refer to adjustment mode					
4. High Power	1) CH: TX Center Battery terminal: 7.5V PTT: ON	Power meter Ammeter	ANT	Channel selector	Adjust it to 5W ± 0.1W with the channel selector.	5W ± 0.1W 2.0A or lower
	2) Refer to adjustment mode.					
	3) CH: TX HI, Lo Battery terminal: 7.5V PTT: ON				Check	≥4.5W 2.0A or lower

5.Low power	1) CH: TX Center, LO PTT: ON	Power meter Amperometer	ANT	Channel selector	Adjust it to 1.0W \pm 0.1W with the channel selector.	1.0 \pm 0.1W 1.0A or lower	
	2) Refer to adjustment Mode.						
	3) CH: TX HI, Lo PTT: ON					Check	0.5~1.5W
6.Modulation	1) CH: TX HI	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M.	ANT MIC	VR2	Adjust it to \pm 4KHz \pm 100Hz MOD METER L.P.F 15KHz	4.0KHz \pm 100Hz	
	2) Low-frequency oscillator output: 1 KHz 50mV PTT:ON						Check
	3) CH: TX Center Low-frequency oscillator output 20 dBm 1KHz: 10mV						
7. Modulation distortion	Low-frequency oscillator output 1KHz: 10mV				Check	\leq 3.5%	
8. Transmit S/N	CH: TX Center HPF: 300Hz LPF: 3KHz DEMP: 750 μ s	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC		Check	40dB or higher	
9.CTCSS DEV (wideband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.7KHz \pm 50Hz with the channel selector.	0.7KHz \pm 50Hz	
	2) CTCSS: 151.4Hz						
	3) Refer to adjustment mode (wideband). LPF: 300Hz						
10.CDCSS DEV (wideband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.7KHz \pm 50Hz with the channel selector.	0.7KHz \pm 50Hz	
	2) CDCSS: 023						
	3) Refer to adjustment mode (wideband). LPF: 300Hz						
11.CTCSS DEV (narrowband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.4KHz \pm 50Hz with the channel selector.	0.4KHz \pm 50Hz	
	2) CTCSS: 151.4Hz						
	3) Refer to adjustment mode (wideband). LPF: 300Hz						
12. CDCSS DEV (narrowband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.4KHz \pm 50Hz with the channel selector.	0.4KHz \pm 50Hz	
	2) CDCSS: 023						
	3) Refer to adjustment mode (wideband). LPF: 300Hz						

13. DTMF/TTS DEV (wideband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope	ANT	VR3	Adjust it to 3.5KHz±0.5 KHz	3.5KHz ±0.5KHz
	2) use the [9] key: PTT: ON LPF: 15KHz					
14. DTMF/TTS DEV (narrowband)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope	ANT	check	Adjust it to 1.8KHz±0.5 KHz	1.8KHz ±0.5KHz
	2) use the [9] key: PTT: ON LPF: 15KHz					
15. Battery warning	1) Battery terminal: 5.8V			Channel selector	Adjust so that the LED flashes by using the channel selector.	The LED flashes.
	2) Refer to adjustment mode.					
	3) Battery terminal: 6.3V PTT: ON				Verify that the LED glows.	Check

RPU499APlus Adjustment Description

Required Test Equipment

Stabilized Power supply

1. The supply voltage can be changed between 5V and 8V, and the current is 3A or more.
2. The standard voltage is 7.5V.

DC Ammeter

1. Class 1 ammeter (17 ranges and other features).
2. The full scale can be set to either 300mA or 3A.
3. A cable of less internal loss must be used.

Digital Voltmeter

1. Voltage range: FS=18V or so
2. Input resistance: 1MΩ or more

Oscilloscope

1. Measuring range: DC to 30MHz
2. Provides highly accurate measurements for 5 to 25MHz.

Dummy Load

8Ω, 3W or more

Synthetical Test

2955B

Scanner

SG815

Initialization:

The model of RPU499APlus is 11. Frequency range is 450-470MHz.

Notes:

1. Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils)
2. When adjusting receiver unit, do not send signal. Then the standard signal generator can be protected.
3. The output level of standard signal generator is the maximum.

Adjustment specifications:

TC1: Frequency adjustment

TC2: Transmit lock voltage adjustment

TC3: Receive lock voltage adjustment

VR1: CTCSS/CDCSS balance adjustment

VR2: DEV adjustment

L26: } B.P.F waveform adjustment
L33: }

TP: B.P.F test point

ANT: Antenna terminal

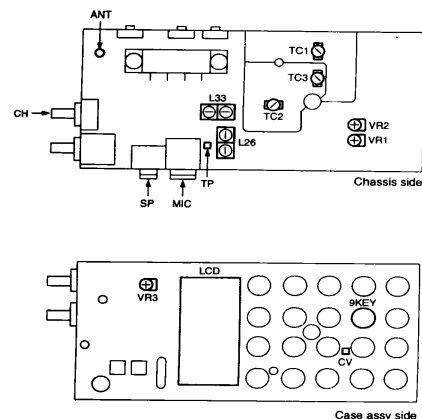
SP: Speaker jack

MIC: Microphone jack

CH: Channel selector

VR3: DTMF/TTS DEV adjustment

9 Key: DTMF9 key terminal



CV: Lock voltage test terminal

Notes:

1. Do not install the Ni-Cd battery when using the jig for adjustment, repair, or checking. If the Ni-Cd battery is installed, the relay terminal (+) may be damaged.
2. Using an external power supply as the radio power. (The relay terminal is “+” and jig (chassis) “-“.)
3. Please refer to the “adjustment mode” in “Radio Modes” to adjust.

RPU499APlus VCO adjustment

Item	Condition	Measurement		Adjustment		Remarks
		Test equipment	Terminal	Parts	Specifications	
1.Setting	Power supply voltage: 7.5V					
2.VCO lock voltage	1) CH: TX HI	Digital voltmeter	CV	TC3	3.5V± 0.3V	
	2) CH: TX LO	Digital voltmeter	CV		≥0.7V	Check
	3) CH: RX HI	Digital voltmeter	CV	TC2	3.5V± 0.3V	
	4) CH: RX LO	Digital voltmeter	CV		≥0.8V	Check

RPU499APlus Receiver adjustment

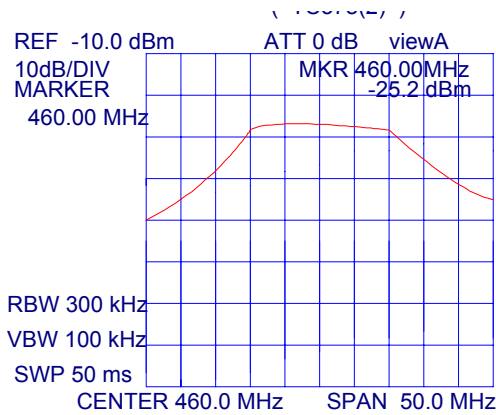


Fig. 10

Item	Condition	Measurement		Adjustment		Remarks
		Test equipment	Terminal	Parts	Specifications	
1. Band-pass filter	1) Given frequency 2) Trapezium generator output – 40 dBm Connect the spectrum analyzer to the T.P terminal.	Trapezium generator Spectrum analyzer	ANT T.P	L26 L33	Adjust according to the spectrum waveform	See the figure above
2.Sensitivity	CH: RX LO CH: RX CENTER CH: RX HI At each frequency: SSG output: -120dBm MOD: 1KHz DEV:±3KHz	SSG Oscilloscope AF.V.M Distortion meter	ANT S.P		Check	SINAD: 12dB or higher
3.S/N	SSG output□66dBμV				Check	≥40 dB
4. Distortion	SSG output□66dBμV				Check	≤5%
5.Squelch	1) Level 9 CH: RX Center SSG output: -119dBm	SSG Oscilloscope AF.V.M Distortion meter	ANT S.P	Channel selector	Level 9 Set with the channel selector. Adjust to close the squelch with the channel selector.	The squelch must be closed.
	2) Level 3 CH: RX Center SSG output: -123dBm				Level 3 Adjust to close the squelch with the channel selector.	The squelch must be closed.
	3) Refer to adjustment mode.					

RPU499APlus Transmitter adjustment

Item	Condition	Measurement		Adjustment		Specifications
		Test equipment	Terminal	Parts	Method	
1. Transmit frequency	CH: TX Center PTT: ON	Frequency counter	ANT	TC1	Adjust to ± 200 Hz.	Within ± 200 Hz
2. CTCSS/ CDCSS Balance	1) Refer to adjustment mode. CTCSS is 67Hz.	Modulation analyzer or linear detector Oscilloscope	ANT	VR1	Adjust VR1 so that the frequency deviation of 67Hz CTCSS is equal to that of 250.3Hz CTCSS and the difference is no more than 50Hz	67Hz CTCSS
	2) Refer to adjustment mode. CTCSS is 250.3Hz. LPT: 300Hz					250.3Hz CTCSS
3. Full Power	1) CH: TX Center Battery terminal: 7.5V PTT: ON 2) Refer to adjustment mode.	Power meter Ammeter	ANT	Channel selector	Adjust it to more than 4W with the channel selector	4W or higher
4. High Power	1) CH: TX Center Battery terminal: 7.5V PTT: ON	Power meter Ammeter	ANT	Channel selector	Adjust it to $4W \pm 0.3W$ with the channel selector.	$4W \pm 0.3W$ 2.0A or lower
	2) Refer to adjustment mode.				Check	$\geq 4W$ 2.0A or lower
	3) CH: TX HI, Lo Battery terminal: 7.5V PTT: ON					
5. Low Power	1) CH: TX Center PTT: ON	Power meter Ammeter	ANT	Channel selector	Adjust it to $1.0W \pm 0.1W$ with the channel selector.	$1.0W \pm 0.1W$ 1.0A or lower
	2) Refer to adjustment mode.				Check	0.5W~1.5W
	3) CH: TX HI, Lo PTT: ON					
6. Modulation (wide)	1) CH: TX HI	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M.	ANT MIC	VR2	Adjust it to 3.9KHz\pm50Hz MOD METER L.P.F 15KHz	4.0KHz \pm 100Hz
	2) Low-frequency oscillator output: 1 KHz 50mV PTT:ON				Check	2.2KHz ~ \pm 3.6KHz
	3) CH: TX Center Low-frequency oscillator output 20 dBm 1KHz: 10mV					
7. Modulation distortion	Low-frequency oscillator output: 1 KHz 10mV				Check	$\leq 5\%$
8. Transmit S/N	CH: TX Center HPF: 300Hz LPF: 3KHz DEMP: 750 μ s	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC		Check	40dB or higher

9.CTCSS DEV (wide)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.75KHz±50Hz with the channel selector.	0.75KHz±50 Hz
	2) CTCSS: 151.4Hz					
	3) Refer to adjustment mode (wide). LPF: 300Hz					
10. CDCSS DEV (wide)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.75KHz±50Hz with the channel selector.	0.75KHz±50 Hz
	2) CDCSS: 023					
	3) Refer to adjustment mode (wide). LPF: 300Hz					
11. CTCSS DEV (narrow)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.4KHz±50Hz with the channel selector.	0.4KHz±50H z
	2) CTCSS: 151.4Hz					
	4) Refer to adjustment mode (narrow). LPF: 300Hz					
12. CDCSS DEV (narrow)	1) CH: TX Center	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF.V.M	ANT MIC	Channel selector	Adjust it to 0.4KHz±50Hz with the channel selector.	0.4KHz±50H z
	2) CDCSS: 023					
	3) Refer to adjustment mode (narrow). LPF: 300Hz					
13. DTMF/TTS DEV (wide)	1) CH: TX Center	Modulation analyzer or linear detector	ANT	VR3	Adjust it to 3.5KHz±0.5KHz	3.5KHz±0.5 KHz
	2) Use [9] key: PTT: ON LPF: 15KHz					
14. DTMF/TTS DEV (narrow)	1) CH: TX Center	Modulation analyzer or linear detector	ANT	Check	Adjust it to 1.8KHz±0.5KHz	1.8KHz±0.5 KHz
	2) Set using the [9] key: PTT: ON LPF: 15KHz					
15.Battery warning	1) Battery terminal: 5.8V			Channel selector	Adjust so that the LED flashes using the channel selector.	The LED flashes.
	2) Refer to adjustment mode.					
	3) Battery terminal: 6.3V PTT: ON				Verify that the LED glows.	Check