Adjustment for FX-2458 (IC-F21)

ADJUSTMENT					
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point
Preparation Check points		Connect the transceiver by cloning cable (OPC-478) to a PC (IBM compatible) and boot up the cloning software. Be sure to use a tester with more than 50 kohm/V internal resistance when making each test.			
Lock Voltage Adjustment		Set the transceiver to the 400 MHz and set so that the LV voltage is C54 during RX and C68 during TX. Adj. Freq. — 400 MHz RX Side — 1.3V TX Side — 1.3V	1.3V 1.3V	C54 C68	LV
Lock Voltage Check		Set the transceiver to the 430 MHz and check that all is within specification. Adj. Freq. — 430 MHz RX Side — 2.5V~4.0V TX Side — 2.8V~4.3V	2.5V~4.0V 2.8V~4.3V		LV
Frequency Adjustment		Connect a power meter or attenuator to the antenna terminal. Loose coupling the antenna terminal and frequency counter. Set the transceiver to near the TX greatest high band frequency and set the unit to TX. Use adjustment software to adjust the TX frequency to the values below. Set Frequency — Set Freq. ± 500 Hz	±500Hz	Adj.Soft	ANT Con

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Adjustment	No.	Adjustment Condition & Tuning		Value	Ref. No.	CK. Point
TX Output Adjustment		Adjust so that the transceiver power voltage is stable with the voltage from the power terminal at 7.5V during TX. Use adjustment software to adjust the adjustment output to the values below. 	Adj. Freq.	Greatest Low Band Freq.
Hi Power	4.0W
L2 Power	2.0W
L1 Power	1.0W		4.0W 2.0W 1.0W	Adj.Soft	ANT Con
TX Output Check		Check that the in-band TX output is within the specifications below. 	Hi Power	3.0~5.0W
L2 Power	1.2~2.8W
L1 Power	0.5~2.0W		3.0-5.0W 1.2-2.8W 0.5-2.0W		ANT Con
Current Check at TX		Check that the in-band power consumption is within the specifications below. 	Hi Power	Less than 2.5A
L2 Power	Less than 2.0A
L1 Power	Less than 1.5A		Less 2.5A Less 2.0A Less 1.5A		PWR Con
Checking Spurious		Connect a spectrum analyzer to the ANT terminal through an attenuator. Set the attenuation so that the spectrum Analyzer does not distort. Set the transceiver to TX and when at Hi power, check that spurious is less than the value below in the bandwidth. | Spurious	Less than −65dB of the fundamental wave		Less than −65 dB		ANT Con

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Preparation for Checking Modulation Adjustment		When there is no particular set limits, set the modulation analyzer for adjustment and checking as below. 	HPF	OFF
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LPF	20 kHz
De-Emphasis	OFF
Detector	(P ± P)/2	 Connect the modulation analyzer set at the above conditions, through the attenuator to the antenna terminal. Connect an oscilloscope, distortion meter and a level meter to the modulation analyzer's detection output terminal. Connect a millivolt meter or a 600 ohm output impedance CR oscillator to the transceiver's mic terminal.			
Modulation Balance Adjustment		Use the adjustment software to adjust the modulation analyzer's detection output horizontal line so that it becomes a Straight line as below 	Adjust. Freq.	Near Center Frequency
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Deviation Adjustment		Set the CR oscillator to a 1 kHz sine wave, 150mVrms, and input from the external mic terminal. Set the transceiver to TX and use the adjustment software to adjust to the following values. 	Adjust. Freq.	Near Center Frequency
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WIDE	± 4.10 ± 0.05 kHz
NARROW	± 2.10 ± 0.05 kHz		± 4.05 ~ ±4.15kHz ± 2.05 ~ ±2.15kHz	Adj.Soft	ANT Con
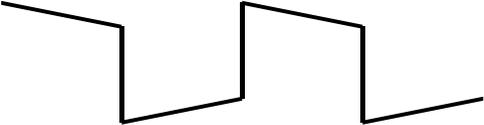
ADJUSTMENT					
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point
Checking Deviation		Check that the deviation in the bandwidth is as the values below. 	WIDE	± 3.60 ~ 4.50 kHz
NARROW	± 1.80 ~ 2.30 kHz		± 3.6 ~ ±4.5kHz ± 1.8 ~ ±2.3kHz		ANT Con
Checking Modulation		Check that the modulation in the bandwidth is as the value below | WIDE/NARROW	7 ~ 20mV rms | WIDE:±3 KHz DEV ; NARROW:±1.5 KHz DEV	7~20mV rms		ANT Con
Checking CTCSS/ DTCS/2/5 TONE/ DTMF DEVIATION		Connect a linear detector via the attenuator to the antenna terminal, then reset so that each signaling type can be output. DTCS CODE 007 CTCSS 88.5 Hz 5 TONE CCIR 11111 DTMF # (Auto Dial Setting) 2 TONE 349.0 Hz Set the linear detector to the following. HPF OFF LPF 20 kHz De-emphasis OFF Level Meter (P/P)/2 Transmit while making sure no input is applied to the mic (or mic terminal), and check that each version in it's bandwidth is as the values below, respectively. 	Wide CTCSS/DTCS	± 0.50~± 0.90kHz
Wide 2/5 TONE/ DTMF	± 2.40~± 3.60kHz
Narrow CTCSS/DTCS	± 0.25~± 0.45kHz
Narrow 2/5 TONE/ DTMF	± 1.20~± 1.80kHz		±0.5-0.9kHz ±2.4-3.6kHz ±.25-.45kHz ±1.2-1.8kHz		ANT Con

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Checking TX S/N		Connect a linear detector via the attenuator to the antenna terminal, and set to the conditions below.
		
		    HPF 50 Hz
		    LPF 20 kHz
		    De-emphasis OFF
		    Level Meter (P/P)/2
		
		Apply a 1 kHz signal from the low frequency oscillator to the mic terminal, and transmit, then adjust the low frequency oscillator output level so that the maximum modulation is 70%.
		Check that the TX S/N in the bandwidth is as the values below.
		
		<table><tr><td>WIDE</td><td>More than 40 dB</td></tr><tr><td>NARROW</td><td>More than 34 dB</td></tr></table>
			Over 40dB
			Over 34dB
					ANT Con

Adjusting RX Sensitivity		When there is no particular set limits, set the RX adjustments and signal generator when checking to the settings below. <table><tr><td>Modulation Freq.</td><td>1kHz</td></tr><tr><td>WIDE</td><td>± 3.5 kHz</td></tr><tr><td>NARROW</td><td>± 1.75 kHz</td></tr></table> Set the signal generator in the following way for narrow channels. <table><tr><td>Adjust Freq.</td><td>Near Greatest Lo band F.</td></tr><tr><td>SG Input level</td><td>+20 dBu</td></tr></table> Connect an 8 ohm non-inductive load and a distortion meter to the external speaker terminal. Adjust BPF (T1) ~ (T4) with the adjustment software, so that the sensitivity is at maximum.		Adj.Soft	RSSI line

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Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point
Checking RX Sensitivity		Check that the signal generator level when the RX frequency bandwidth becomes 12 dB SINAD, is the value below. | RX Sensitivity	Less than -10 dBu | Use the same check method for Wide channels also.	Less-10dB		ANT Con SP Jack
Adjusting the Squelch		set the transceiver to the RX frequency bandwidth's wide band center frequency. Set the signal generator to the settings below. 	Modulation Freq.	1kHz
WIDE	± 3.5 kHz
NARROW	± 1.75 kHz
SG Output Level	-14 dBu	 In this condition, using the adjustment software, raise the squelch D/A value until the squelch closes once, then lower the D/A value again, and adjust until the squelch opening point.		Adj.Soft	ANT Con
Checking Squelch Sensitivity		Check that the squelch opening point value in the RX frequency bandwidth is as below. | Squelch Sensitivity	Less than -10 dBu | Next, reduce the signal generator output and check that the squelch closes in the RX bandwidth.	Less-10dB		ANT Con

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Checking AF Output		Set the signal generator output level to +60 dBu. The transceiver and SG connection is the same as the squelch adjustment above. Adjust the transceiver volume until the distortion meter reads 10%. Check that the AF output value at this point as below. 	AF Output	More than 0.35W
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Checking RX S/N		Set the signal generator output level to +60 dBu. Adjust the AF volume so that the AF output is 50% of the rated value. Check that the RX S/N in the bandwidth is as the values below. 	WIDE	More than 40 dB
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NARROW	More than 34 dB		Over 40dB Over 34dB		ANT Con SP Jack
Checking Howling		Set the signal generator output to +60 dBu as in RX adjustment, and for non modulation. set the internal speaker for operation, and turn the AF volume up to maximum to check that howling does not occur.			ANT Con Int SP
Checking Maximum RX Current		While still in the AF output check status, rotate the volume control clockwise to obtain the maximum AF output. Check that the current consumption at this time is as the value below. 	Max. RX Current	Less than 300 mA
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