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Re:	FCC ID OGQ-BASE2010	731 Confirmation #:	EA94192
		Correspondence #:	9868
	FCC ID OGQ-MOBILE2020	731 Confirmation #:	EA94191
		Correspondence #:	9867

The system was set using the guidelines set forth by Section 90.217(b), which limits the emissions at +/- 25kHz to –30dBc.
The necessary bandwidth, audio frequency response and modulation limiting characteristics were met by performing the following modifications:

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- Added R41A, 47K series resistor into Background Music input to reduce input signal amplitude (refer to Base-Mixers & Control Logic Schematic)
- Changed R37 from 5.1K to 1K to decrease local mic gain (refer to Base-Mixers & Control Logic Schematic)
- Added C74A, .01uF // capacitor w/R74 to decrease 2nd harmonic of 18.75KHz tone (refer to Base-Mixers & Control Logic Schematic)
- Changed R66 from 47K to 39K to increase sub-carrier deviation (refer to Base-Mixers & Control Logic Schematic)
- Change U11 power supply from +6V to +5V to limit audio signal amplitude evenly (refer to Base-Mixers & Control Logic Schematic)
- Changed C32T from .022uF to .047uF to modify transmitted audio frequency pre-emphasis characteristics to be within limit (refer to Base Transmitter Schematic)
- Added C15AT, .03uF capacitor from R49T wiper to ground to further decrease pre-emphasis (refer to Base Transmitter Schematic)
- Changed C14T from .1uF to .02uF to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R14T from 3.3K to 6.2K to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R16T from 1K to 10K to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R21T from 10K to 100K to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R17T from 1K to 10K to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R41T from 220 to 2.2K to modify transmitted audio frequency response (refer to Base Transmitter Schematic)
- Changed R49T from a 50K pot to a 20K pot to reduce sensitivity of audio deviation adjustment (refer to Base Transmitter Schematic)
- Changed R170 from 47K to 100K to increase gain of received audio signal to compensate for a decreased audio signal amplitude (refer to Base Receiver Schematic)
- Changed C151 from 560pF to 180pF to modify frequency response of received audio signal (refer to Base Receiver Schematic)
- Changed C140 from .01uF to .001uF to modify frequency response of received audio signal (refer to Base Receiver Schematic)
- Changed R155 from 3.3K to 1.5K to increase received audio signal amplitude (refer to Base Receiver Schematic)

- Reduced 40KHz tone level from –20dBc to –32dBc by adjusting R72, 50K potentiometer for squelch tone level adj
- With input of .75Vp-p @400Hz sine wave into BG music input, adjust R35, 50K potentiometer for mic gain adj, to produce a transmitter output FM deviation of +/- 2.55KHz
- With input of .75Vp-p @400Hz sine wave into mic input , adjust R49T (20K audio deviation potentiometer) and adjust R42 (50K system gain potentiometer) to produce a transmitter output FM deviation of +/- 7.0KHz

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- Changed R31 from 2.2K to 6.2K to modify transmitted audio frequency response (refer to Remote Transmitter Schematic)
- Changed C14 from .1uF to .01uF to modify transmitted audio frequency response (refer to Remote Transmitter Schematic)
- Changed C15A from .022uF to .03uF to modify transmitted audio frequency pre-emphasis characteristics to be within limit (refer to Remote Transmitter Schematic)
- Added C190, .01uF capacitor from receiver modulation to ground to modify transmitted audio frequency pre-emphasis characteristics to be within limit (refer to Remote Transmitter Schematic)
- Changed R103 from 27K to 82K to increase received audio signal amplitude (refer to Remote Receiver Schematic)
- Changed C48 from .001uF to 220pF to modify frequency response of received audio signal (refer to Remote Receiver Schematic)
- Reduced squelch tone level from –20dBc to –32dBc by adjusting R12, 50K potentiometer for squelch tone level adjust
- With input of .75Vp-p @400Hz sine wave into mic input, adjust R98A, 50K potentiometer for audio deviation adj, to produce a transmitter output FM deviation of +/- 8.75KHz

PRODUCTION TEST PROCEDURE

BASE

Resistances: Vin to GND = 800 to 1200 ohms _____
+6V to GND = 200 to 250 ohms _____
+5V to GND = 2000 to 3000 ohms _____
+2.5V to GND = 3000 + ohms _____

Power: total current drain with "Vin" = 9V _____mA
"+5V" _____ VDC
"+2.5V" _____ VDC
"+6V" _____ VDC

TRANSMITTER:

RF

1. Connect the transmitter output to a frequency counter, apply power and adjust C6T (which sets the frequency of the 6.4 Mhz PLL reference oscillator) for the precise transmitted frequency (see the pre-assigned label on the unit). The transmitted frequency must be within +/-.001%. _____

2. Vary the slug in L2T to set the control voltage (TP14) to: 1.8 to 3.2 VDC. _____

3. Measure the switched 6 volts (SW+6V) @ Q3T drain to verify it is within .1V of "+6V"._____

4. Connect the transmitter output to a spectrum analyzer (SA) and/or a power meter and peak the output by varying C30. The output should be +14 to +16 dBm (output power switch open or to High). Check that there are no harmonics or spurious emissions greater than -30dBc. _____

5. Turn the power on and off 3 to 4 times and verify that the PLL locks up within 3 seconds. The RF output must be stable upon lock up. _____

6. Set the power switch to "Low" (short the two pins of the PL connector) and verify the RF output drops approx. 3 dBm

SUBCARRIER/SQUELCH TONE

1. Verify that the squelch tone is the correct frequency (40 KHz) - measure at pin 4 of U17. Adjust to 40KHz +/- 200Hz with R69 _____

2. Adjust R72 for a sub-carrier audio/squelch tone amplitude of -32dBc as indicated on the spectrum analyzer _____

1. Set R41 to minimum resistance, Background music input resistance. Apply .75v peak to peak, 400 Hz to the Background Music in (J8) and set the transmitter output FM deviation to +/- 2.55 KHz (spectrum analyzer or deviation meter) with R49T. Slowly increase the frequency from 400 Hz to 20Khz (or use a sweep generator) and verify that the deviation does not exceed + and – 25 KHz at a level above -30dBc. _____

2. Repeat 2 above while also increasing the input voltage from .75v to 4v peak to peak. The same limits apply. Set R41 to maximum resistance. _____

3. Verify there is approx. 5 VDC at the microphone input (pin 3 of the headset connector J3). _____

4. Apply .75v peak to peak, 400 Hz to the Microphone input and set the transmitter output FM deviation to +/- 7.0 KHz (spectrum analyzer or deviation meter) with the mic. Gain control, R35. Slowly increase the frequency from 400 Hz to 20KHz (or use a sweep generator) and verify that the deviation does not exceed + and - 25 KHz at a level above -30dBc. _____

5. Repeat 2 above while also increasing the input voltage from .75v to 4v peak to peak. The same limits apply. _____

RECEIVERS (Total of 6 Receivers – repeat for each):

RF

1. Using a high impedance, low capacitance probe and frequency counter, verify that the local oscillator frequency (listed on a production control document) is correct at the emitter of Q2T _____

2. Vary L2T to produce a control voltage of 1.8 to 3.2 VDC at TP6 _____

3. Apply the correct receive signal (-50dBm at a freq. from prod. control with squelch tone modulation at a level of -32dBc). See the frequency chart on the Remote Transmitter for a list of crystal controlled squelch tones. Or, table 1 on the Base Rcvr schematic can be used.. Adjust C125 and L8 for the best (least noisy) squelch tone at U25, pin2. Monitor the RSSI voltage (TP1) while tuning to ensure that the RSSI is also within 95% of its peak. The "channel active" LED must be "on". _____

4. With the above setup, reduce the RF level until the receiver squelches, that is, the voltage at U25-5 goes high. The RF level from the generator should be less than -93dBm (receiver sensitivity). The "channel active" LED must extinguish when U25-5 goes high. _____

5. Apply a high quality music signal to the FM mod. input of the RF source and verify (with headphones) the quality and loudness of the receiver's audio. Adjust the level of the music for best results. _____

6. AGC – record the AGC voltage at the Q12 side of R148 at RF input levels of – 30, -50 and –70 dBc>

_____

CONTROL TONE GENERATION/AUDIO QUALITY:

1. Control tones are transmitted to the remotes when the mode switch (for any channel) is set to "PHONE" Or "AUX". The receiving remote then receives audio from the phone or Base mic. via the frequency modulated 40KHz squelch tone, and its received audio at the Base is routed to the phone connection or Base headphone. Both a fixed and a momentary duration tone are sent. Verify the correct tone frequency and amplitude at the outputs of U9 and U10. Then switch each channel in turn and verify with a SA that the tones appear at the RF output at a level of approx. –32dBc.

_____

2. Switch each channel in turn to "AUX" and verify the audio quality using test remotes. _____

3. Connect a PBX phone (or simulated or single line non PBX) to the phone jack and verify each channel's
audio quality when in the "phone" mode.

_____

End of Base tests.

PRODUCTION TEST PROCEDURE

REMOTE

Resistances: +6V to GND = 200 to 250 ohms _____
+5V to GND = 2000 to 3000 ohms _____
+2.5V to GND = 3000 + ohms _____

Power: total current drain with "+6V" = 6.3V _____mA
"+5V" _____ VDC
"+2.5V" _____ VDC

TRANSMITTER:

RF

1. Connect the transmitter output to a frequency counter, apply power and adjust C7 (which sets the frequency of the 6.4 Mhz PLL reference oscillator) for the precise transmitted frequency (see the pre-assigned label on the unit). The transmitted frequency must be within +/-.001%. _____

2. Vary the slug in L3 to set the control voltage (TP14) to: 1.8 to 3.2 VDC. _____

3. Measure the switched 6 volts (SW+6V) @ Q3 drain to verify it is within .1V of "+6V"._____

4. Connect the transmitter output to a spectrum analyzer and/or a power meter and peak the output by varying C30. The output should be +14 to +16 dBm (output power switch open or to High). Check that there are no harmonics or spurious emissions greater than -30dBc. _____

5. Turn the power on and off 3 to 4 times and verify that the PLL locks up within 3 seconds. The RF output must be stable upon lock up. _____

6. Set the power switch to "Low" (short the two pins of the PL connector) and verify the RF output drops approx. 3 dBm

SQUELCH TONE

1. Verify that the squelch tone is the correct frequency (see schematic for frequencies) - measure at the junction of R83 and L9. _____

2. Adjust R12 for a squelch tone amplitude of -32dBc as indicated on the spectrum analyzer _____

LO BATTERY

1. Gradually reduce the supply voltage until a pulse output appears at U5B pin 7. Measure the supply voltage, which should be 5.85 to 5.93 volts. Set the headphone volume to approx. 1/4 up and verify the pulses appear at U7A, pin 5. Use a 'scope or headphones. _____

1. Verify there is approx. 5 VDC at the microphone input (pin 6 of the headset connector). _____

2. Apply .75v peak to peak, 400 Hz to the mic. in (above) and set the transmitter output FM deviation to +/- 5.0 KHz (spect. an. or deviation meter). Ensure that the rear panel mic. level control is max. (fully clockwise). Slowly increase the frequency from 400 Hz to 20Khz (or use a sweep generator) and verify that the deviation does not exceed + and - 25 KHz at a level above -30dBc.

_____

3. Repeat 2 above while also increasing the input voltage from .75v to 1.5v peak to peak. The same limits apply. _____

RECEIVER:

RF

1. Using a high impedance, low capacitance probe and frequency counter, verify that the local oscillator frequency (listed on a production control document) is correct at the emitter of Q2 (TP10). _____

2. Vary L6 to produce a control voltage of 1.8 to 3.2 VDC at TP8 _____

3. Apply the correct receive signal (-50dBm at a freq. from prod. control with 40khz modulation at a level of -32dBc) and adjustC58 and L7 for the best (least noisy) 40khz tone at U17, pin2. Monitor the RSSI voltage (TP6) while tuning to ensure that the RSSI is also within 95% of its peak. _____

4. With the above setup, reduce the RF level until the receiver squelches, that is, the voltage at JS1-4 goes high. The RF level from the generator should be less than -93dBm (receiver sensitivity). _____

AUDIO

1. Set the RF source to the correct frequency and a level of -50dBm and connect to the receiver input. Apply the correct fixed and momentary control tones (see the remote receiver schematic) to the generator's FM modulation input. Adjust the tone amplitude for an RF level of -32dBc. When the tones are applied, the receiver should switch to the AUX (sub-carrier) mode - TP9 will go high and stay. Remove the fixed tone and verify that TP9 goes low.

2. Apply a high quality music signal to the RF source and verify (with headphones) the quality and loudness of the receiver's audio in both the COM and AUX modes (apply the tones, as in 1 for AUX).

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End of Remote tests.