

## **OPERATIONAL DESCRIPTION**

**APPLICANT:**

Sociedad importadora italiana Itda.

**Manufacturer:**

SHENZHEN SMART INDUSTRIAL CO., LTD

**FCC ID:**

X77HKM750

**Instruction Book:**

Users Manual

**Frequency Range**

GSM

Transmit Frequency Band:	824.2-848.8 MHz
Receive Frequency Band:	849.2-893.8 MHz
Transmit Frequency Band:	1850.2-1909.8 MHz
Receive Frequency Band:	1930.2-1989.8 MHz

**Specific Operating Power Range:**

Power Class 1;

Power Control Level 0	+30dBm +2.0dB/-2.0dB
Power Control Level 1	+28dBm +3.0dB/-3.0dB
Power Control Level 2	+26dBm +3.0dB/-3.0dB
Power Control Level 3	+24dBm +3.0dB/-3.0dB
Power Control Level 4	+22dBm +3.0dB/-3.0dB
Power Control Level 5	+20dBm +3.0dB/-3.0dB
Power Control Level 6	+18dBm +3.0dB/-3.0dB
Power Control Level 7	+16dBm +3.0dB/-3.0dB
Power Control Level 8	+14dBm +3.0dB/-3.0dB
Power Control Level 9	+12dBm +4.0dB/-4.0dB
Power Control Level 10	+10dBm +4.0dB/-4.0dB
Power Control Level 11	+8dBm +4.0dB/-4.0dB
Power Control Level 12	+6dBm +4.0dB/-4.0dB
Power Control Level 13	+4dBm +4.0dB/-4.0dB
Power Control Level 14	+2dBm +5.0dB/-5.0dB
Power Control Level 15	+0dBm +5.0dB/-5.0dB

Note; Effective radiation efficiency is -3.7dB

**DC Voltage and Current into the Final Amplifier Module:**

Supply Voltage = 3.6Vdc

Supply Current = ~0.8Amp.

**Tune-up Procedure:**

Tune-up Procedure

**Equipment Identification:**

Equipment's Identification label and its intended Location are as shown in EXHIBIT Type "ID Label / Location Information" (FCC ID Nameplate), and in EXHIBIT Type "Internal Photo"(Photograph of inside)

**Photographs:**

A complete set of the Photographs showing External and Internal Views of Circuit Details and Construction are provided by from EXHIBIT Type "External Photos" and "Internal Photos".

**Accessories:**



**Figure 1.2: Terminal Components (Accessories)**

### Technical Descriptions

TX synthesizer uses an Offset-PLL circuit. The Offset-PLL circuit consists of PLL-IC and TX\_VCO and loop filter. Reference frequency of the above synthesizers is 26MHz and generated by VCTCXO. Control signal is sent from Baseband section and keeps frequency stability.

TX IQ signal is input from Baseband section to MT6225, The Bluetooth signal is input form MT6601 and FM signal is input form MT6188C section to MT6225.

TX IQ signal is applied to the quadrature up-converter, and the up-converter LO signal is generated from the transceiver VCO within MT6139B. This up-converter translates the GMSK-modulated signal to an intermediate frequency (IF) that forms one input to a frequency/phase detector circuit. This IF signal is the reference input to an Offset-PLL circuit. The feedback path of this Offset-PLL circuit includes a down-conversion from the RF output frequency range to the IF range. The two inputs to this down-conversion mixer are formed the TX\_VCO output and the LO generation circuits. The mixer output is the offset feedback signal that forms the variable input to a frequency/phase detector circuit. The detector compares its variable input to its reference input and generates an error signal that is low-pass filtered by the loop filter and applied to TX\_VCO to force the RF frequency in the direction that minimizes errors.

The TX\_VCO output passes PA, Antenna SW, Coaxial connector with switch and emitted from embedded antenna.

### Digital Modulation:

Analog speech produced by a microphone is encoded to digital PCM samples using a CODEC. The PCM samples are passed to a Vocoder for AMR (Advanced Multi Rate) encoding, to compress the speech samples. The encoding rate is determined by the Vocoder which formats the speech samples as data packets. A new data packet with data rate information is read by the microprocessor every 20 ms. The speech CODEC becomes AMR, FR(Full Rate), EFR(Enhanced FR) and HR(Half Rate). The microprocessor then sends the data packet to the transmit subsystem, and passed DAC to covert analog signal. I/Q base band signal is filtered and is inputted into RTR6250 containing quadrature phase modulator.

### The Data Required (EXHIBIT “Test Report”):

- (2.1046) RF power output
- (2.1047) Modulation characteristics
- (2.1049) Occupied bandwidth
- (2.1051) Spurious emission at antenna terminals
- (2.1053) Field strength of spurious radiation
- (2.1055) Frequency stability
- (2.1057) Frequency spectrum to be investigated

### Bluetooth Part:

The RDA5868E is a single-chip solution integrating radio, baseband, and microcontroller.

The data rate is at 3Mbps. The non-removable antenna is an embedded internal antenna.

The radio system uses 2.4GHz (frequency range is 2402 - 2480MHz) ,which consists of 79 channels and the channel spacing is 1MHz. The crystal frequency is 26MHz.

The sample is powered by DC3.7V battery. Its modulation is FHSS, and its antenna is internal type.