7. Description of circuits suppressing spurious and harmonic emissions

7.1. Block schemes of generating signals on reception/transmission (TX / RX) for two operational modes FH and DSS are given in Fig. 6.1 (A) and (B) correspondingly. In these schemes one can see main elements providing suppression of spurious and harmonic emissions. The suppression of unwanted emissions is achieved by making the correct choice of frequency plan for the transmitter (receiver), using necessary devices for filtering both on the intermediate frequency and in the output frequency band, as well as modem design.

7.2. The suppression of harmonic components of the output signal is provided by the following due measures:

- Selecting optimal operation modes for transistors of the output stage for both 10 and 50 mW output power;
- Using AGC circuit in the final amplifier;
- Using low-pass frequency filter LPF1 (LPF2).

LPF1 has the following parameters:

- Nominal Fo 915MHz;
- Bandwidth BW 26 MHz;
- Insertion Loss in band BW 0.35 dB typ;
- Attenuation in band 2x(Fo +/- BW) 37dB typ;
- Attenuation in band 3x(Fo +/- BW) 27 dB typ.

7.3. Two similar filters BPF2 and BPF3 connected in series with the path of generating receiver's output signal provide necessary suppression of off-band spurious signals. This SAW filter has the following parameters:

- Insertion Loss in band 902-928 MHz 3dB typ;
- Absolute Attenuation in band DC – 800 MHz 27dB typ;
- Absolute Attenuation in band 800 – 880 MHz 30dB typ;
- Absolute Attenuation in band 950 – 1080 MHz 40dB typ;
- Attenuation Absolute in band 1080 –1500 MHz 35dB typ;
- Attenuation Absolute in band 1500 –2000 MHz 24dB typ.

7.4. The filter BPF4 at FH (DSS) operational mode implements separation of desired signal on the intermediate frequency 270(280)MHz and suppression of spurious emissions after generating (modulating**)** this signal. For FH operational mode SAW filter BPF4 has the following characteristics:

- Nominal Fo 270MHz;
- 3 dB Bandwidth BW 0.18 MHz;
- Relative Attenuation in band from Fo +/- 0.4 to Fo +/- 0.6 MHz 30dB typ;
- Relative Attenuation in band from Fo +/- 0.6 to Fo +/- 1.0 MHz 40dB typ;
- Relative Attenuation in band from Fo +/- 1.0 to Fo +/- 30.0 MHz 50dB typ.

7.5. At DSS operational mode SAW filter BPF4 has main parameters as follows:

- Center Frequency 280 MHz;
- 3 dB Lower Frequency from 269.5 to 271.5 MHz;
- 3 dB Upper Frequency from 288.5 to 290.9 MHz;
- 40 dB Lower Frequency from 250 to 265.9 MHz;
- 40 dB Upper Frequency from 307.8 to 310 MHz;
- Passband Ripple in band 271.5 – 288.5 MHz 0.29 dB typ.

7.6. Band-pass filter BPF6 with the central frequency of 10.7 MHz, which operates in FH mode, provides suppression of spurious signals when tuning out carrier frequency selectivity is greater than +/-150 kHz. BPF4 has main parameters as follows:

- Center Frequency 10.7 MHz;
- 3 dB Bandwidth 110 +/- 30 êHz;
- 20 dB Bandwidth 350 êHz max.