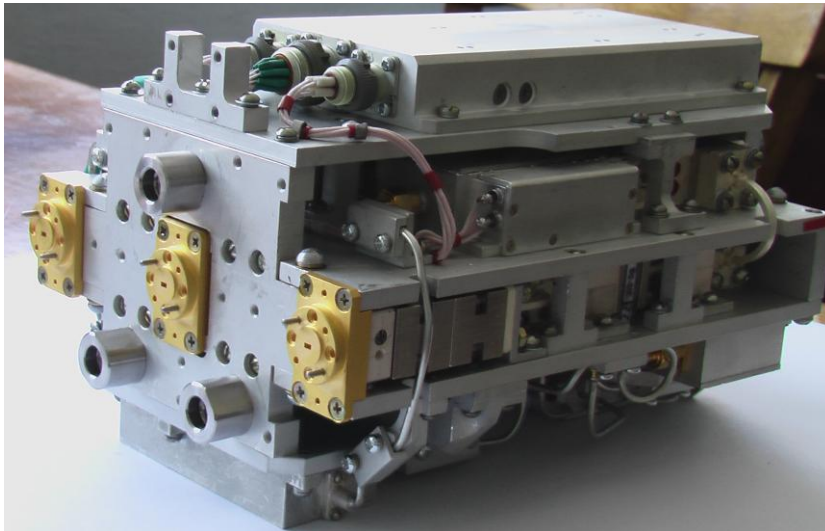




Coherent pulse transceiver in frequency range 94 GHz



APPLICATION

Coherent pulse mode transceiver, **M353002** module, is intended for operation in onboard W-band equipment.

DESCRIPTION

The transceiver has three channels – one transceiving, basic channel, and two auxiliary – receiving channels.

High level of output pulse power more than 25 W, at transceiver output pulse duration 80–100 nsec and peak pulse repetition rate of output signal 30 kHz, is provided with application of pulse power amplifiers on IMPATT-diodes. Output amplifying stage is designed on a bridge circuit.

In transmitter channel there is $0/\pi$ modulator which permits forced changing of transmitted pulse signal phase.

High stability of intermediate frequency and coherent operation of the transceiver are provided with single quartz resonator of 140 MHz.



Receiver-transmitter modules M353002

The receiver is designed on heterodyne scheme and has two outputs. Receiver input signal is divided into two quadrature signals by means of 90-degree bridge.

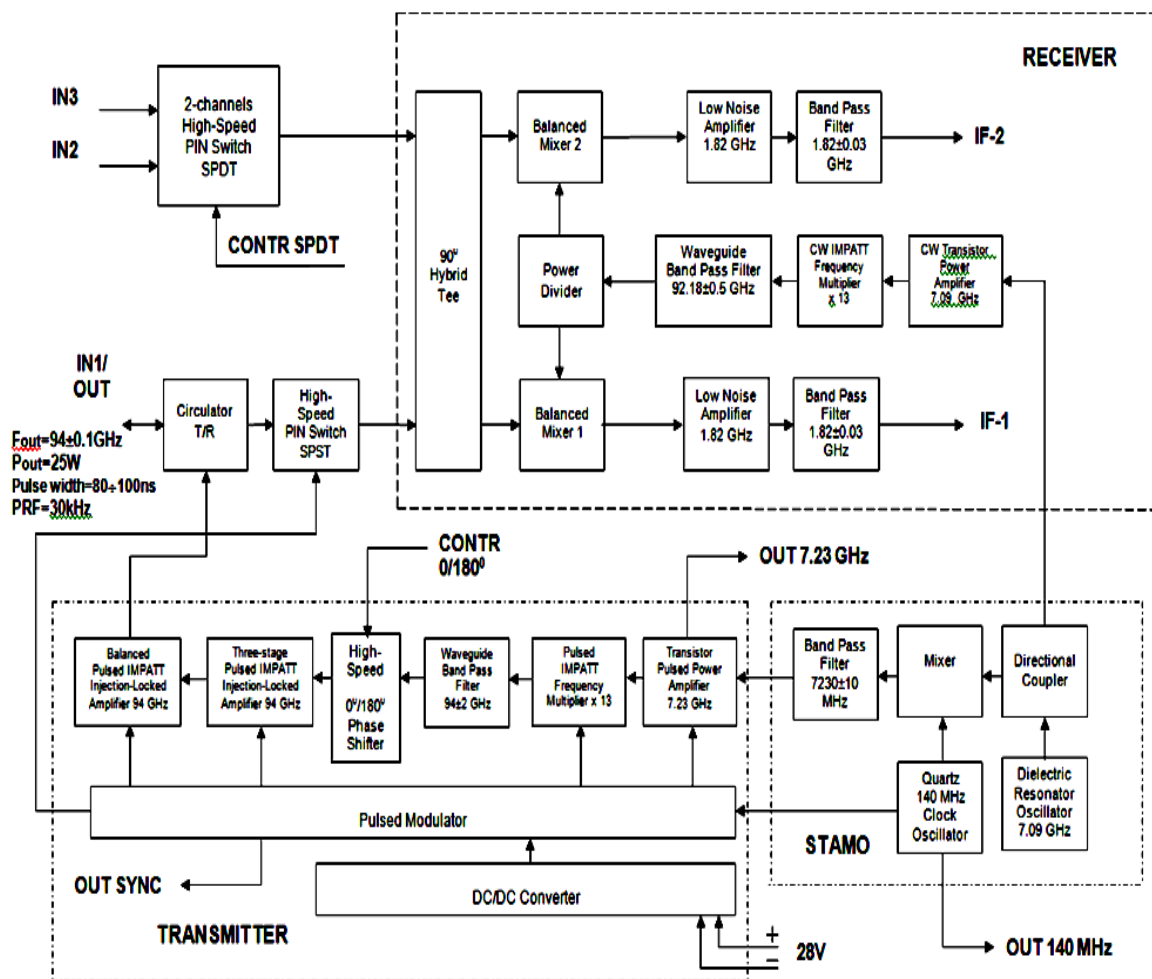
Noise factor measured at transceiver output flange in the basic channel is within 13 dB in each of the quadrature channels of the receiver.

There are output leads of sync signal, a signal of a reference quartz resonator and also the signals of the checkout and control in the transceiver.

The transceiver is supplied by one source of constant voltage 28 V, thus power consumption will not exceed 30 W.

Overall dimensions are within 150 mm in diameter and 220 mm on height. Weight of the device is of no more than 7 kg.

Structural diagram





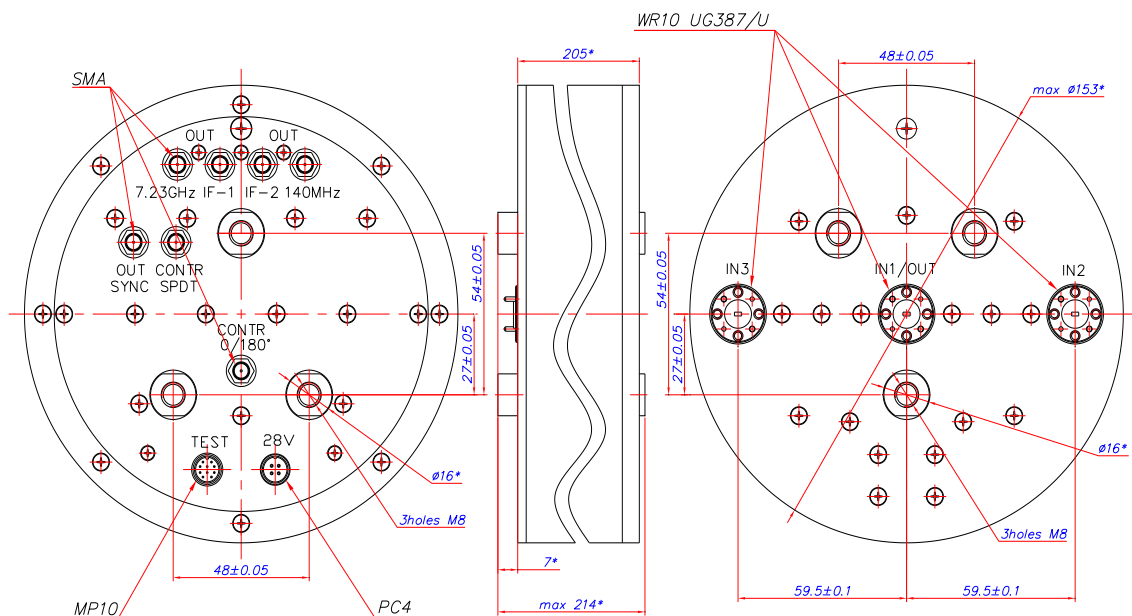
SPECIFICATION

Parameter, unit of measure		Typical value	
<i>Electrical parameters of transmitter output signal</i>			
Operating frequency, GHz		94.0±0,1	
Pulse power, W, not less		25	
Pulse width, nanosecond		70–100	
Pulse repetition rate, no more, kHz		30	
Phase manipulation of a signal		0/π	
Precision of phase installation, degree		2	
Reference frequency, F _{out} , GHz		7.2306	
<i>Electrical parameters of the receiver</i>			
Operating frequency, GHz		94.0±0,1	
Noise factor in quadrature channels, dB, no more		<i>IF1</i>	<i>IF2</i>
	IN1/OUT	13.0	13.0
	IN2	13.0	13.0
	IN3	13.0	13.0
Center frequency of IF channel, GHz		1,82	
Signal transfer ratio from input to output, dB, not less		<i>IF1</i>	<i>IF2</i>
		+20	+20
Difference of output signal levels in IF channel of receiver two channels, dB, no more		1.0	
Output signal compression at 0 dBm of output power, dB, no more		<i>IF1</i>	<i>IF2</i>
		-1.0	-1.0



<i>Electrical parameters of a base quartz resonator</i>	
Output signal frequency, MHz	140
Relative stability of signal frequency	$2 \cdot 10^{-6}$
Output signal power, mW, not less	1.0
Level of sync output signal	TTL
<i>Supply mode</i>	
Supply voltage, V	28±2
Current consumption, mA, no more	1000
Average power consumption, W, no more	30
<i>Transceiver overall dimensions and weight</i>	
Diameter, mm, no more	153
Height, mm, no more	214
Weight, kg, no more	7

OVRALL DIMENSIONS DRAWING





CHARACTERISTICS

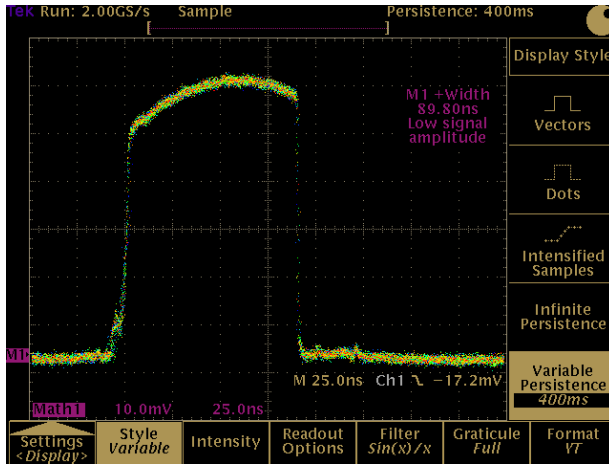


Figure 1

Oscillogram of standard envelope of radio pulse of the transceiver signal

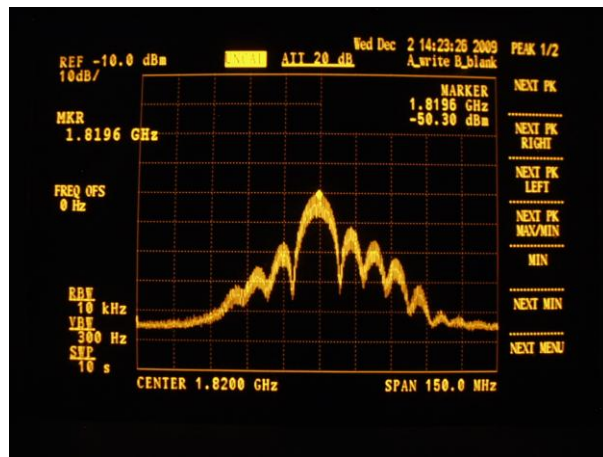


Figure 2

Spectrogram of transceiver standard pulse signal taken at IF

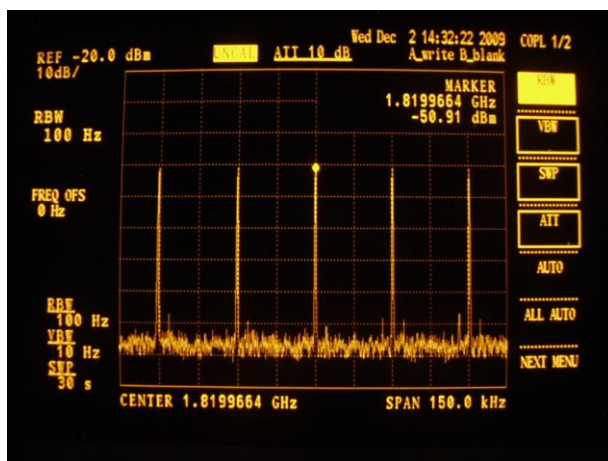


Figure 3

Spectrogram of standard linear structure of transceiver pulse signal taken at IF