RS MICROWAVE COMPANY, INC

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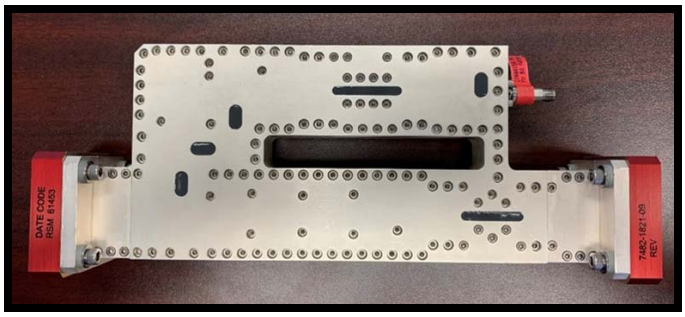
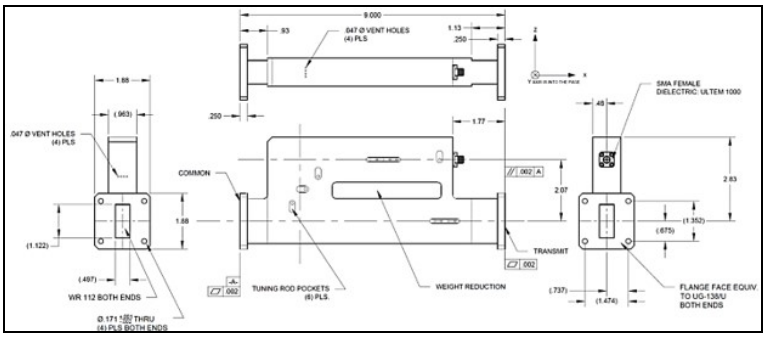
New Product Announcement

P/N 71173C-1



Outline Drawing



TTNT Deep Space X Band Diplexer

P/N 71173C-1 is a high-performance multifactor-free diplexer developed at RS Microwave for spacecraft and space stations communicating through the Deep Space Network (DSN) X band frequencies allocated to the Space Research Service (SRS) for deep space exploration/research missions. Thanks to advanced design techniques implementing pseudo-elliptic filtering functions and the integration of various sub-parts into a single unit (optimized as a whole), very low losses and extremely high levels of isolation are guaranteed while minimizing the size and mass of the diplexer. The unit also provides harmonics rejection and isolation up to 27 GHz for any potential higher order mode excited by the waveguide assembly which will eventually host the unit.

Both receiver (uplink, Earth to Space) and transmitter channels (downlink, Space to Earth) are designed to accommodate wide passbands comfortably covering the whole Deep Space frequency bands as well as including the additional frequencies allocated as Near Space bands, thus making this a universal diplexer readily suitable for every space exploration/research program operating at X band. The common and the transmitter ports employ standard WR-112 waveguide interfaces, while a convenient SMA interface is provided at the receiver channel (for straightforward connection to the receiver low noise amplifier).

Various external finishes are available upon request, such as microwave silver, chem-film, or low outgassing paint. All the materials and construction techniques are properly selected to withstand the highest vibration and shock levels experienced during launch, as well as the harshest deep space environmental conditions (including high levels of magnetic radiation such as those found in the vicinity of Jupiter), while being in accordance with NASA's outgassing requirements.

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Specifications

CHANNEL FREQUENCIES			
Downlink (Space to Earth), Transmit Channel TX_BW	8.360 – 8.540 GHz (minimum)		
Uplink (Earth to Space), Receive Channel RX_BW	7.130 – 7.250 GHz (minimum)		
COMMON-TRANSMIT CHANNEL	@ +25 C	@ -50 C	@ +90 C
Return Loss at Common Port in TX_BW	25 dB min	25 dB min	25 dB min
Return Loss at Transmit Port in TX_BW	25 dB min	25 dB min	25 dB min
Insertion Loss in TX_BW	0.23 dB max	0.18 dB max	0.28 dB max
Insertion Loss Variation in TX_BW	0.05 dB max	0.05 dB max	0.05 dB max
Attenuation in RX_BW	100 dB min	100 dB min	100 dB min
Attenuation in 16.7-17.1 GHz (2nd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
Attenuation in 25.0-25.7 GHz (3rd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
COMMON-RECEIVE CHANNEL	@ +25 C	@ -50 C	@ +90 C
Return Loss at Common Port in RX_BW	25 dB min	25 dB min	25 dB min
Return Loss at Receive Port in RX_BW	25 dB min	25 dB min	25 dB min
Insertion Loss in RX_BW	0.32 dB max	0.27 dB max	0.37 dB max
Insertion Loss Variation in RX_BW	0.05 dB max	0.05 dB max	0.05 dB max
Attenuation in TX_BW	100 dB min	100 dB min	100 dB min
Attenuation below 5.800 GHz	100 dB min	100 dB min	100 dB min
Attenuation in 16.7-17.1 GHz (2nd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
Attenuation in 25.0-25.7 GHz (3rd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
ISOLATION TRANSMIT-RECEIVE	@ +25 C	@ -50 C	@ +90 C
Isolation in TX_BW	70 dB min	70 dB min	70 dB min
Isolation in RX_BW	70 dB min	70 dB min	70 dB min
Isolation in 16.7-17.1 GHz (2nd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
Isolation in 25.0-25.7 GHz (3rd harmonic of TX_BW)	70 dB min	70 dB min	70 dB min
MULTIPACTOR ANALYSIS (Spark3D)			
Maximum multipactor-free CW power (from TX Port)	2420 W (simulated @ 8.4 GHz, single carrier) (conservative simulation based on Aluminum TOR-2014)		

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