Checking the Isolation of the Heathkit HD-1234 Coaxial Switch

This is a revision of what I did in March 28, 2018. I wanted to make it simpler and it was also inspired by an excellent recent YouTube video done by W2AEW. Here is the link "Coax switch to connect multiple rigs to a single antenna system". He tested two different switches that had better performance than this Heathkit. His results prompted me to re-check my measurements. The results this time were virtually the same as when it was done back in March of 2018.

I have a couple of these switches and was interested in using them with my Icom-7300 and my SDRPLAY RSP1A receiver. I wanted to know the isolation between the ports so I would not overload the RSP1A when the Icom was in use. The manual for the Heathkit HD-1234 switch does not give the isolation specs. It provides only the power limit and the SWR it will introduce.

I tested the switch in 3 ways. One method was using a HP 8640B signal generator and a Boonton 92B RF millivoltmeter. The second was with a NanoVNA. This is the method that W2AEW used. And the third and simplest was using my ICOM 7300 with an HF RF voltmeter. The voltmeter used was a Ballantine 323. This one had good accuracy up to about 40 MHz. The results of all 3 methods were similar.

Below are the test results (Table 1) of the third method. Tests were performed on 10 through 80 meters using the IC7300 and a Ballantine 323 AC Voltmeter. The antenna port or common port on the switch was terminated in a 50 OHM load. Connector 1 on the switch was connected to the IC7300 and connector 2 was connected to the Ballantine 323 and terminated into 50 OHMS. The switch was in position 1. The transmitter was run at full power and we can assume about 100 Watts output.

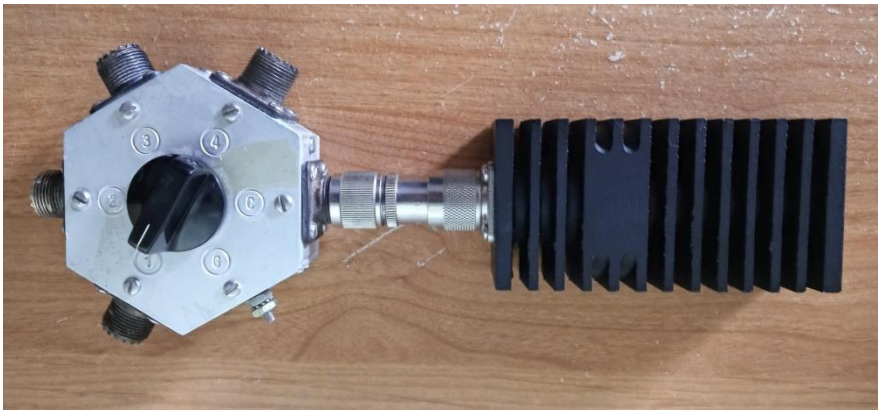

Table 1

FREQUENCY	ISOLATION BETWEEN Port 1 and 2 (SW in pos. 1)	MAXIMUM LEVEL ALLOWED FOR RSP1A 0 dBm
28 MHz	46.5 dB	3.51 dBm
21 MHz	49 dB	1.57 dBm
14 MHz	52.1 dB	-2.13 dBm
7 MHz	58.6 dB	-8.61 dBm
3.5 MHz	63.6 dB	-13.55 dBm

I did not do a test on 50 MHz with this set-up but previous tests indicated that the isolation was about 4.5 dB less (worse) than on 28 MHz. The right column on the table above would have 50 MHz at about 8 dBm.

So what can we make of the results? The spec. for the RSP1A ("max. rated input 0 dBm continuous or +10 dBm for a short duration"). In the spec. "for a short duration" was not defined. Based on my above measurements only 14 MHz and below would be acceptable. Also 14 MHz has little safety margin based on the continuous spec. for the RSP1A.

I don't know what effect a high SWR would have on these readings. I guess this is one of the reasons you want margins.

In conclusion the switches that W2AEW tested had better performance than the switch I tested and I would be reluctant to use the Heathkit switch while transmitting above 40 meters when the RSP1A is connected to another port on the switch.

DISCLAMER: Use this information at your own risk. Your situation may vary.

November 3, 2021

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