FCC TEST DATA

FCC TEST DATA

4.0 Temperature VS Frequency Stability Tests

This test was performed to generate the data to demonstrate the frequency stability of the coaxial magnetron over the range of -40 to +50 degrees Celsius.

DESCRIPTION OF TEST PROCEDURE

For this test, the transmitter is set up in the temperature chamber and ready to be turned on. At that time, the power is totally removed and the chamber temperature is lowered to -40C. A temperature probe is attached to the body of the magnetron to determine the temperature. After the magnetron temperature stabilizes at ambient, primary power is applied and the filaments are warmed for 5 minutes. The system is then placed into radiate remotely from outside the chamber and frequency is recorded immediately. The frequency is then recorded in increments shown in the following charts. A block diagram (Fig. 5) shows the test setup used.

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (-40C)

TIME IN MINUTES	TEMPERATURE OF MAGNETRON	TEMPERATURE OF TEST CHAMBER	FREQUENCY
0	-34	-40	3609.090
1		-40	3609.070
2		-40	3609.100
3		-40	3609.080
4		-40	3609.070
5		-40	3609.050
6		-40	3609.120
7		-40	3609.070
8		-40	3609.080
9		-40	3609.090
10		-40	3609.090
15		-40	3609.090

20		-40	3609.060
25		-40	3609.140
30	-32	-40	3609.070

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (-30C)

TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	-30	-30	3608.080
1		-30	3608.920
2		-30	3608.900
3		-30	3608.810
4		-30	3608.850
5		-30	3608.780
6		-30	3608.730
7		-30	3608.750
8		-30	3608.750
9		-30	3608.720
10		-30	3608.800
15		-30	3608.700
20		-30	3608.630
25		-30	3608.620
30		-30	3608.590
35	-22	-30	3608.650

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (-20C)

TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	-20	-20	3608.420
1		-20	3608.430
2		-20	3608.380
3		-20	3608.350
4		-20	3608.310
5		-20	3608.350
6		-20	3608.300
7		-20	3608.280
8		-20	3608.330
9		-20	3608.290
10		-20	3608.270
15		-20	3608.320
20		-20	3608.170
25		-20	3608.110

30		-20	3608.150
35	-14	-20	3608.160

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (-10C)

TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	-10	-10	3607.870
1		-10	3607.910
2		-10	3607.870
3		-10	3607.830
4		-10	3607.860
5		-10	3607.740
6		-10	3607.830
7		-10	3607.720
8		-10	3607.800
9		-10	3607.790
10		-10	3607.740
15		-10	3607.700
20		-10	3607.640
25		-10	3607.650
30	-5	-10	3607.640

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (0C)

TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	0	0	3607.250
1		0	3607.360
2		0	3607.330
3		0	3607.350
4		0	3607.290
5		0	3607.300
6		0	3607.340
7		0	3607.250
8		0	3607.310
9		0	3607.230
10		0	3607.270
15		0	3607.200
20		0	3607.220
25		0	3607.220
30	2	0	3607.270

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (10C)			
TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	8	10	3606.820
1		10	3606.920
2		10	3606.770
3		10	3606.830
4		10	3606.800
5		10	3606.850
6		10	3606.810
7		10	3606.790
8		10	3606.750
9		10	3606.780
10		10	3607.200
15		10	3606.720
20		10	3606.730
25		10	3606.650
30	11	10	3606.710

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (20C)			
TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	19	20	3606.620
1		20	3606.220
2		20	3606.240
3		20	3606.150
4		20	3606.140
5		20	3606.200
6		20	3606.170
7		20	3606.160
8		20	3606.110
9		20	3606.180
10		20	3606.170
15		20	3606.180
20		20	3606.140
25		20	3606.060
30	21	20	3606.110

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (30C)

TIME IN MINUTES	TEMPERATURE OF MAGNETRON	TEMPERATURE OF TEST CHAMBER	FREQUENCY
0	30	30	3605.560
1		30	3605.610
2		30	3605.560
3		30	3605.620
4		30	3605.610
5		30	3605.570
6		30	3605.560
7		30	3605.650
8		30	3605.600
9		30	3605.590
10		30	3605.150
15		30	3605.630
20		30	3605.530
25		30	3605.580
30	31	30	3605.580

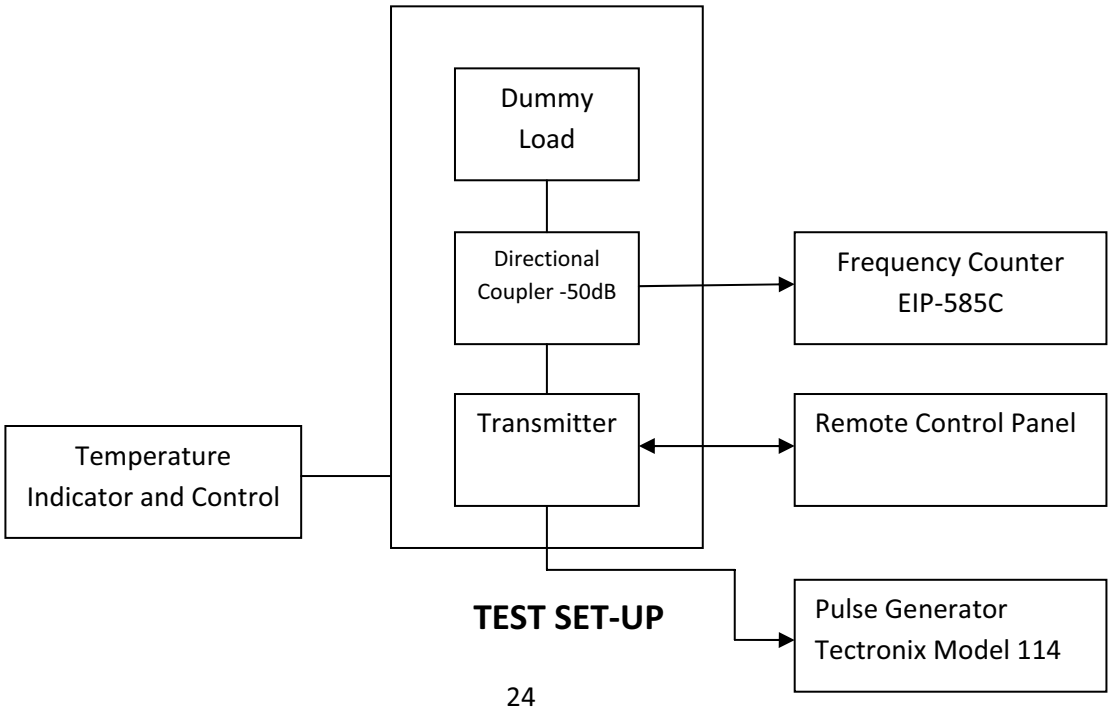
COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (40C)

TIME IN MINUTES	TEMPERATURE OF MAGNETRON	TEMPERATURE OF TEST CHAMBER	FREQUENCY
0	39	40	3604.960
1		40	3605.050
2		40	3605.100
3		40	3605.120
4		40	3605.080
5		40	3605.050
6		40	3605.020
7		40	3605.020
8		40	3605.110
9		40	3605.040
10		40	3605.070
15		40	3605.040
20		40	3605.060
25		40	3605.220
30	40	40	3605.030

COAXIAL MAGNETRON FREQUENCY VS TEMPERATURE TEST MEASUREMENTS (50C)			
TIME IN MINUTES	**TEMPERATURE OF MAGNETRON**	**TEMPERATURE OF TEST CHAMBER**	**FREQUENCY**
0	50	50	3604.460
1		50	3604.450
2		50	3604.430
3		50	3604.440
4		50	3604.410
5		50	3604.460
6		50	3604.450
7		50	3602.060
8		50	3602.010
9		50	3604.440
10		50	3604.460
15		50	3604.470
20		50	3604.460
25		50	3604.480
30	50	50	3604.420

Fig. 4

The “Frequency Stability vs. Temperature Test” was run at the operating frequency for this particular VHDD-1000S transmitter. The frequency remained stable over the complete temperature range.



TEST SET-UP

Fig. 5

5.0 Transmitter Stability with Line Voltage Fluctuations

The transmitter Line Voltage Fluctuation test was not performed due to the Uninterruptable Power Supply and Voltage Regulator installed with the transmitter. This UPS/VR is designed to regulate the voltage to within +-5 volts of the transmitter operating voltage. If the system drifts out of tolerance due to a failure of UPS components or increasing / decreasing line voltage, the UPS power output will shut off, effectively removing power from the VHDD-1000S transmitter.

6.0 Spectrum Analysis

The following tests were performed to record the signature of the transmitted spectrum of the VHDD-1000S radar system. The plots of the spectrum analyzer are shown on the following pages and sequentially numbered in the bottom left hand corner of each plot. The plots and results of the measurements are listed as follows:

VHDD-1000S EMISSION MEASUREMENTS		
Plot Number	Test	Comments
1	Emitted Spectrum, Narrow Pulse (.8us) 3550MHz **NOTE: Used for maximum spectrum occupancy**	.8µs Pulse, Spectrum width 11.45MHz, -30dBm down points at 3.54145GHz and 3.5520GHz
2	Emitted Spectrum, Narrow Pulse (.8us) 3550MHz	.8µs pulse, 13MHz span
3	Emitted Spectrum, Wide Pulse (2.0us), 3550MHz	2.0µs pulse, Spectrum width 1.288MHz, Side lobes -10.94dB and -15.18dB
4	Emitted Spectrum, Wide Pulse (2.0us), 3550MHz	2.0µs pulse, spectrum width 6.384MHz, Side lobes, -17.11dB and -28.91dB
5	Emitted Spectrum, Wide Pulse (2.0us), 3550MHz	2.0µs pulse, Emission bandwidth at -30dB = 6.8MHz
6	Emitted Spectrum, Wide Pulse (2.0us), 3550MHz	2.0µs pulse, Emission bandwidth at -60dB = 47.8MHz
10	Spurious Emissions Test	Plot 20MHz to 5GHz, -15.24dBm (Main Transmit Pulse at 3550MHz)
11	Spurious Emissions Test	Plot 5GHz to 10GHz, -72.82dBm
12	Spurious Emissions Test	Plot 10GHz to 15Ghz, -69.03dBm
13	Spurious Emissions Test	Plot 15GHz to 20Ghz, -69.02dBm
14	Spurious Emissions Test	Plot 20GHz to 25GHz, -66.85dBm
15	Spurious Emissions Test	Plot 25Ghz to 30Ghz, -65.41dBm
16	Spurious Emissions Test	Plot 500kHz to 20MHz, -72.05dBm
17	RF Leakage, 1m from chassis using double ridge horn, Reference plot, Transmitter Radiation OFF	Reference Plot of 2.5GHz to 5GHz, TX OFF
18	RF Leakage, 1m from chassis using double ridge horn, Transmitter Radiation ON	Plot 0Hz to 5GHz, -57.38dBm signal

19	RF Leakage, 1m from chassis using double ridge horn, Transmitter Radiation ON	Plot 5GHz to 10GHz, -57.09dBm signal
20	RF Leakage, 1m from chassis using double ridge horn, Transmitter Radiation ON	Plot 10GHz to 15GHz, -65.54dBm signal
21	RF Leakage, 1m from chassis using double ridge horn, Transmitter Radiation ON	Plot 15GHz to 20GHz, -71.36dBm signal
22	Detected RF Pulse	2.0μs Detected RF Pulse
23	Detected RF Pulse	1.0μs Detected RF Pulse
24	Detected RF Pulse	.8μs Detected RF Pulse,
25	RF Peak Power Measurement	2.0us RF Pulse, 81.2dBm attenuation correction
26	RF Peak Power Measurement	1.0μsRF Pulse, 81.2dBm attenuation correction
27	RF Peak Power Measurement	.8μs RF Pulse, 81.2dBm attenuation correction
28	Antenna Specification Table	Table containing Antenna specifications

Fig. 6