6-3.2 Frequency Adjust

6-3.2.1 Test Setup

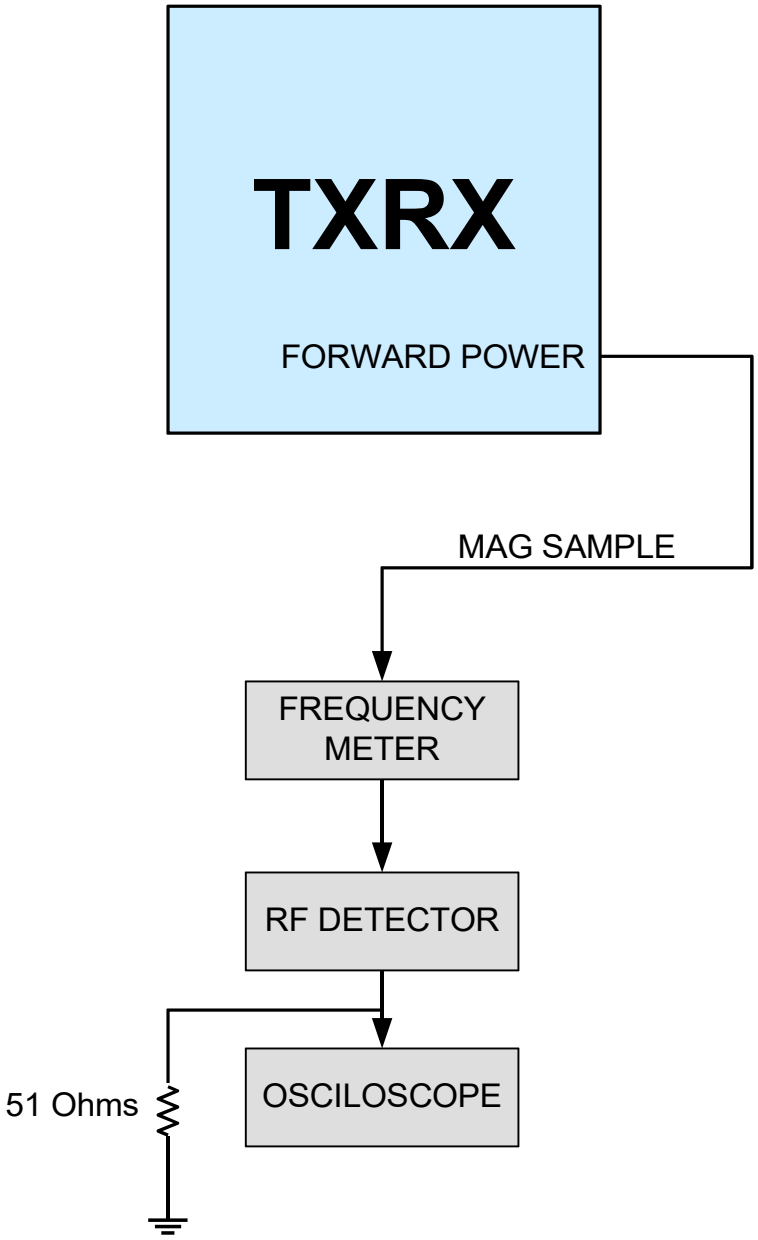


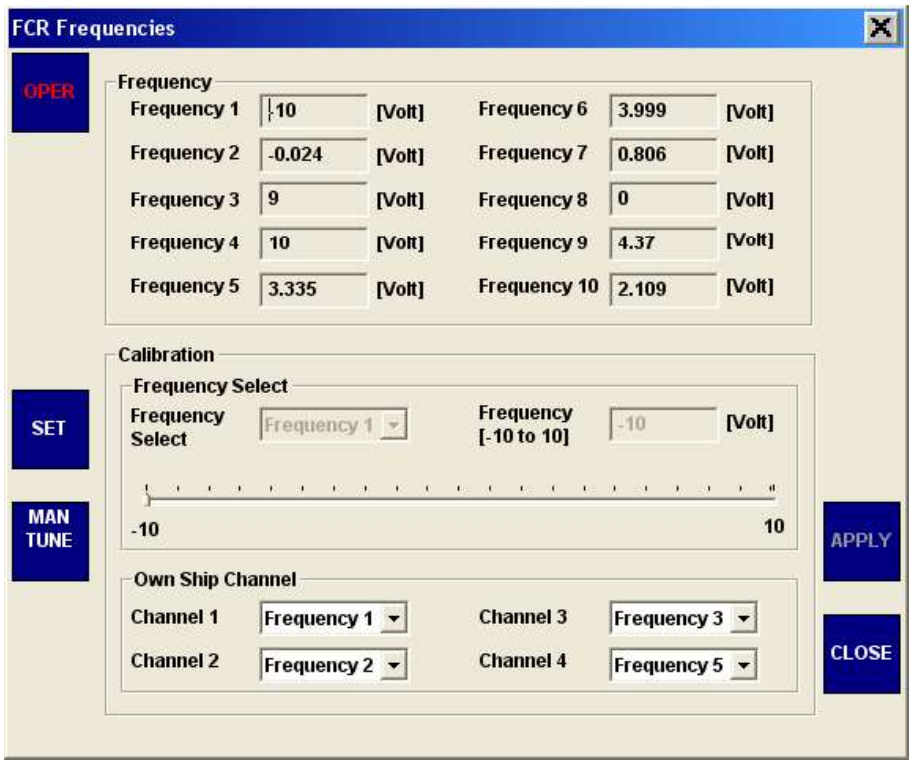
Figure 6-1. Frequency adjustment – Test Setup

6-3.2.2 Procedure

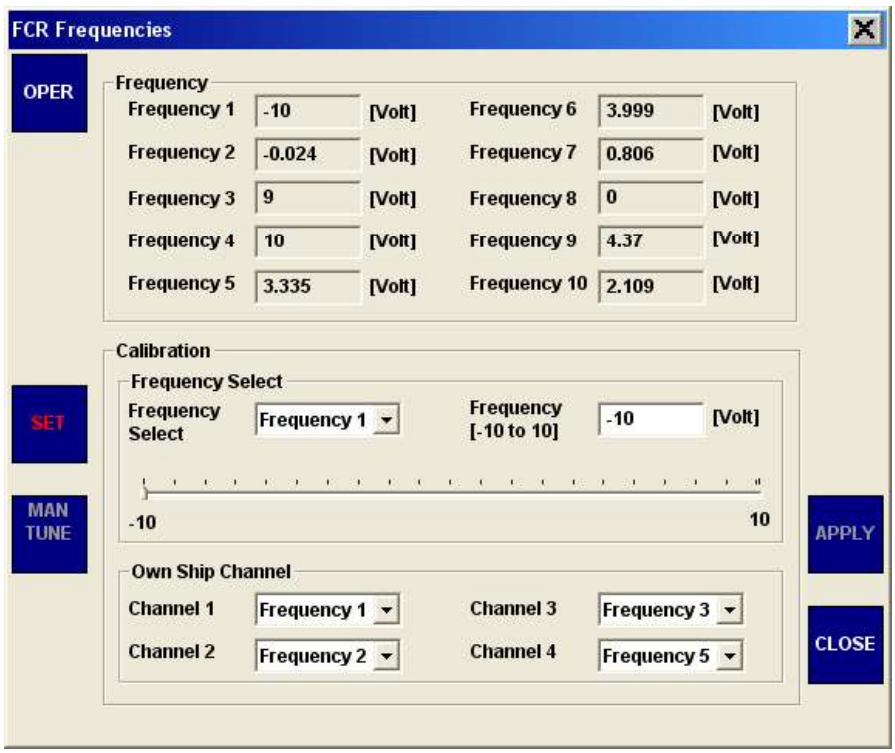
a. In WCS MOC switch on transmit in CH1 for at least 10 minutes.

b. In lower monitor select the form by keying the PDM: SET > FCR FREQ

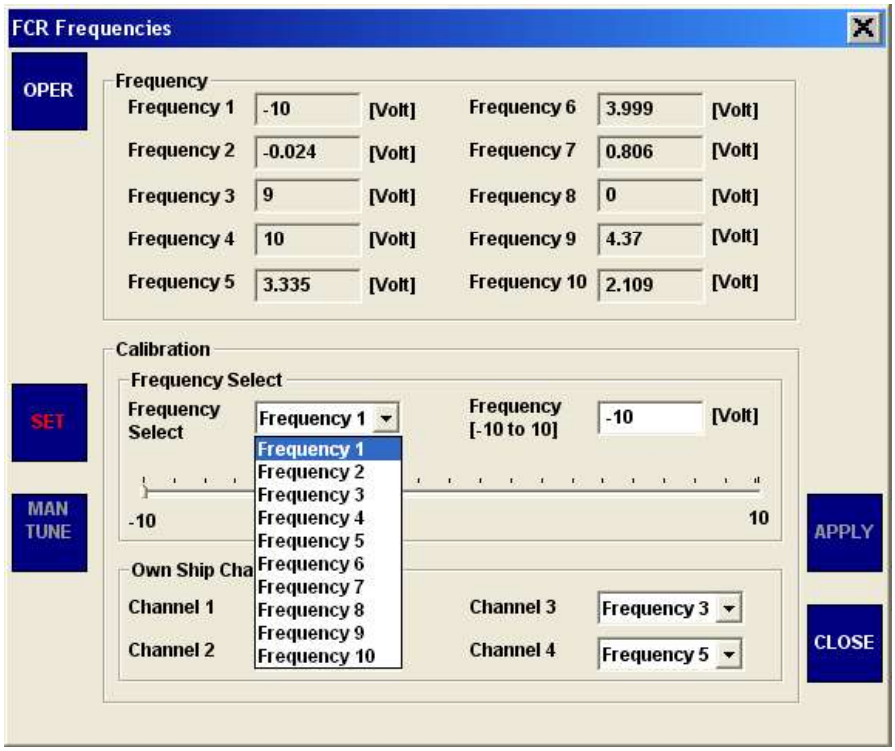
Verify that the following form is displayed:



c. Key the **SET** button and verify that the following form is displayed:



d. Open the **Frequency Select** combo to select the frequency to adjust, verify that the following form is displayed:



e. Change the transmitted frequency by typing the required value in the **Frequency** edit box or by clicking the scroll bar and using the arrow keys.

NOTE

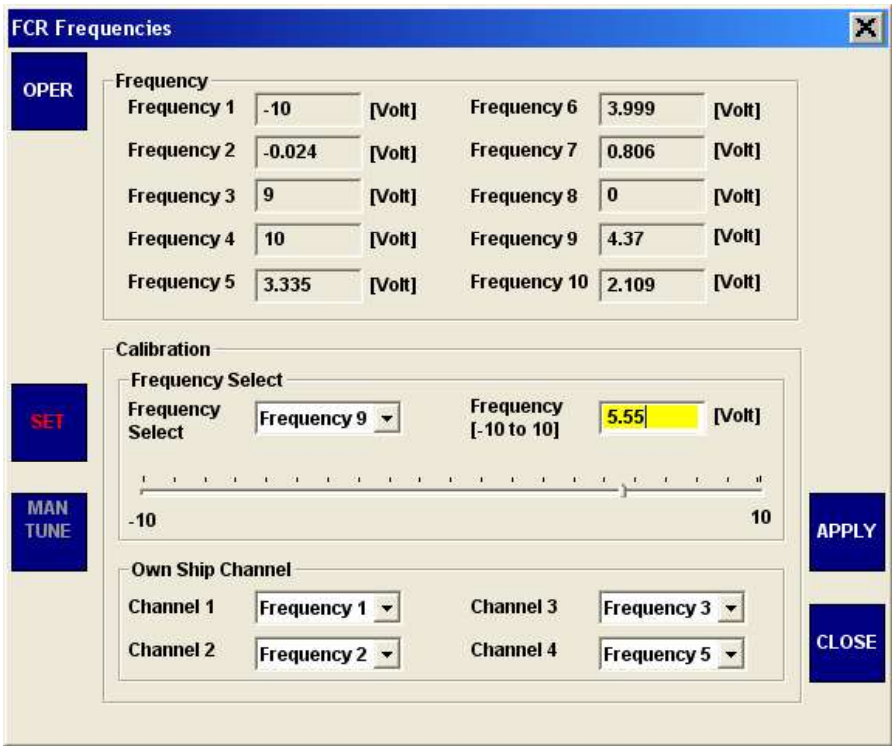
Frequencies range of: 8.85 GHz to 9.35 GHz is represented by the -10 to +10 Volts change of Frequency slider.

f. Tune for a minimum on the detected signal on the scope to measure the frequency.

NOTE

Adjustment by use of the arrows keys is the fine tune control tool.

g. Verify that the following form is displayed:



h. Key the **APPLY** button.

i. Continue to next required frequency adjust or key the **OPER** button and close the form.

j. Disassemble the test setup and switch off the FCR transmission.

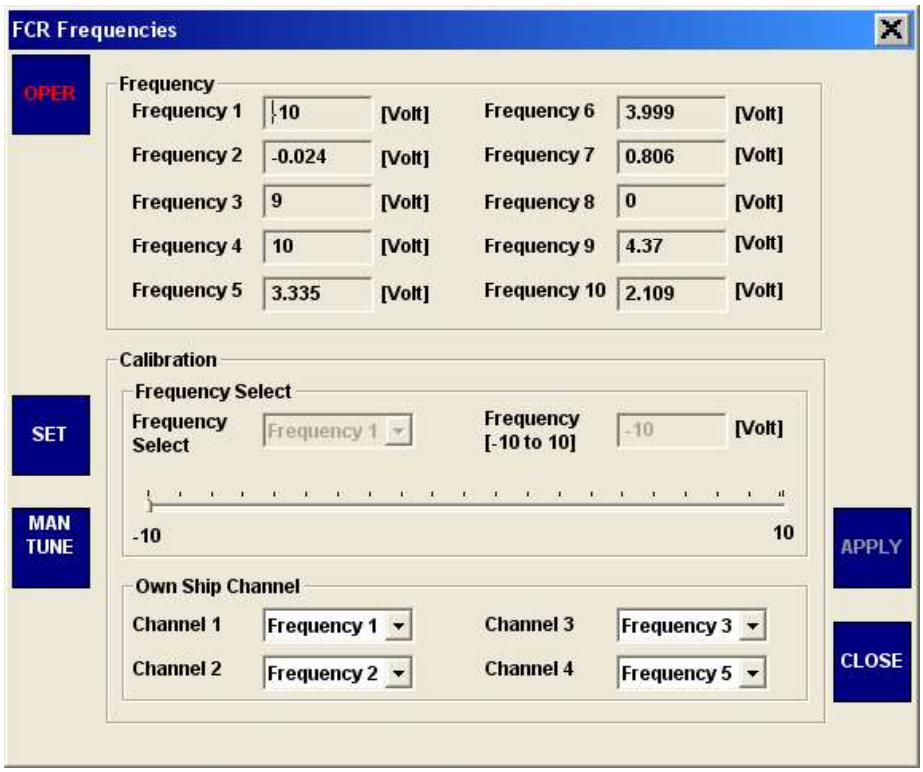
6-3.3 Local Oscillator Frequency Adjust – Manual Tune State

6-3.3.1 Procedure

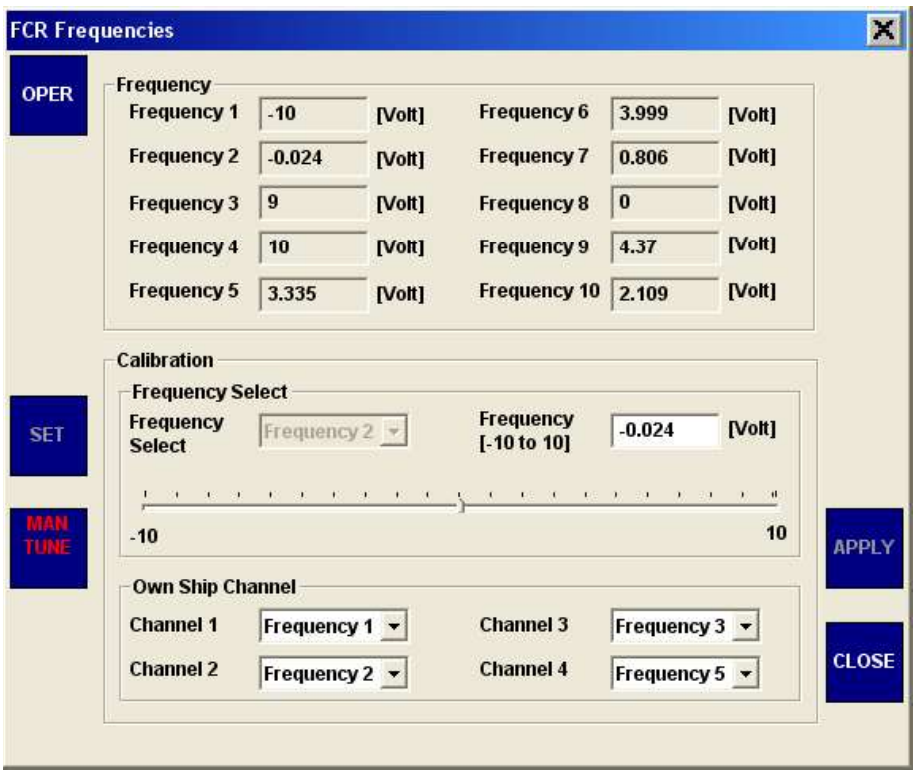
a. In WCS MOC switch on transmit in any channel for at least 10 minutes.

b. In lower monitor select the form by keying the PDM: **SET** > **FCR FREQ**

Verify that the following form is displayed:



c. Key in the **MAN TUNE** button and verify that the following form is displayed:



d. Change the Local Oscillator frequency by typing the required value in the **Frequency** edit box or by clicking the scroll bar and using the arrow keys.

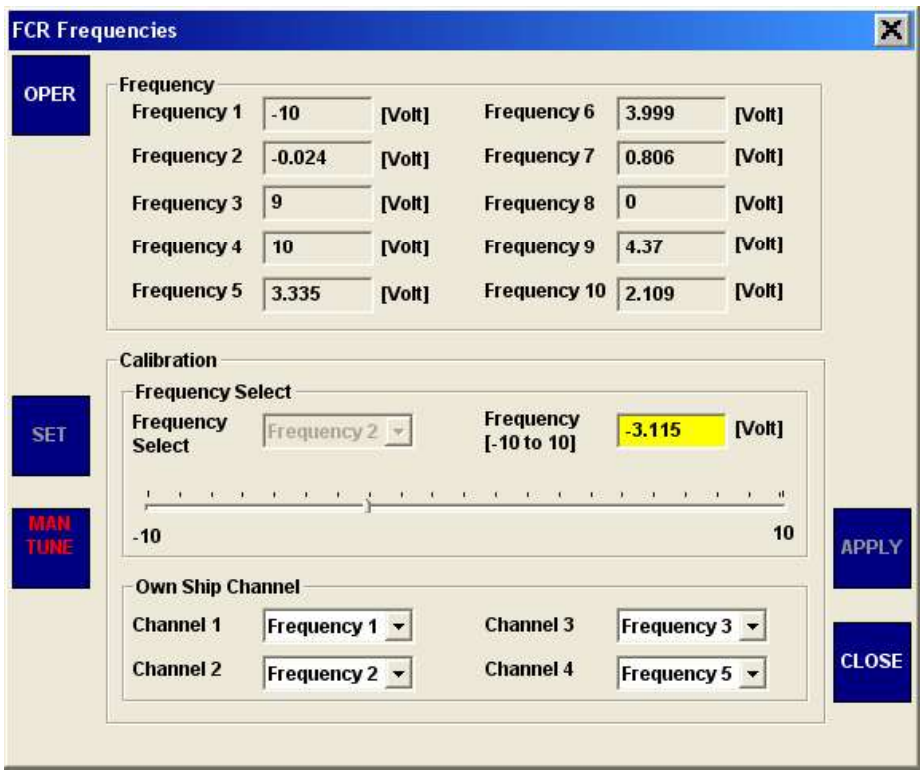
e. Tune for the best reception results at the transmitted frequency.

NOTE

Adjust by using the arrow keys as the fine tune control tool.

f. Go to Manual Designation for target acquisition performance and verify best echo reception before saturation of the signal.

Verify that the following form is displayed:



g. The MAN TUNE state is valid for the existing transmitted frequency only, at end of state - key the **OPER** button and close the form.

6-4 FCR Calibrations

6-4.1 General

FCR calibration is described in details according to the following order of activities:

- Prior installation on-board ship:
  - Alignment of Antenna RF axis and the optical axis aiming
- On-board FCR TX/RX calibrations:
  - Transmission pulse width adjustment
  - FCR range zero set adjust – TX trigger position setting
  - RX trigger position setting
  - LIN channel AGC characteristics test
  - LOG channel INTENSITY characteristics test
  - LIN channel thresholds calibration
  - LOG channel thresholds calibration
  - Target acquisition level adjustments (TGT FOUND)
  - Frequency Agility checkup
- Transponder tracking calibration
- Targets tracking checkup
- FCR video adjust

6-4.2 RF Axis Mechanical Alignment in the Naval Base

6-4.2.1 Preparations before Test

The following activities are required to be performed in the office / lab, prior to the alignment process:

a. Connect RF Signal Generator output to the directional feed horn.

b. Operate the the Signal Generator (SG) in CW mode at 9100 MHz frequency.

c. Direct the feed horn towards an Spectrum Analyzer and verify proper reception of the RF output

d. Deploy the TV camera setup connection (as shown in Figure 6-2):
   - Camera loom cable – video out to the Controller unit input (BORESIGHT) and power to the 28 VDC Power Supply
   - Camera Controller supply (DISPLAY) to the VDC Power Supply (see Figure 6-3).
   - Camera Controller output (VIDEO OUT) to the TV monitor input (see Figure 6-3).

e. Verify video display including the Cross Hair cursor display in the TV monitor.

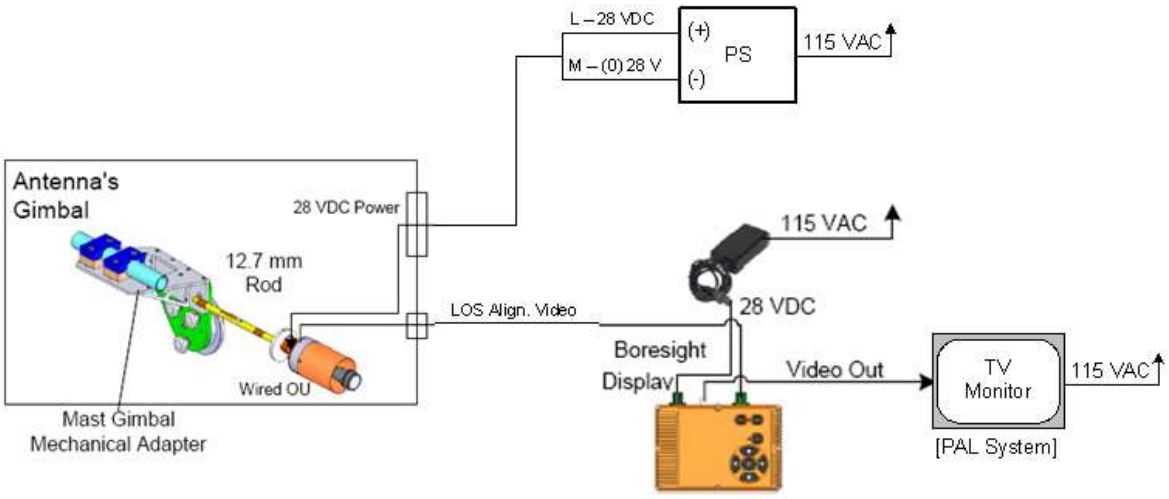


Figure 6-2. TV Camera Deployment Setup Connection

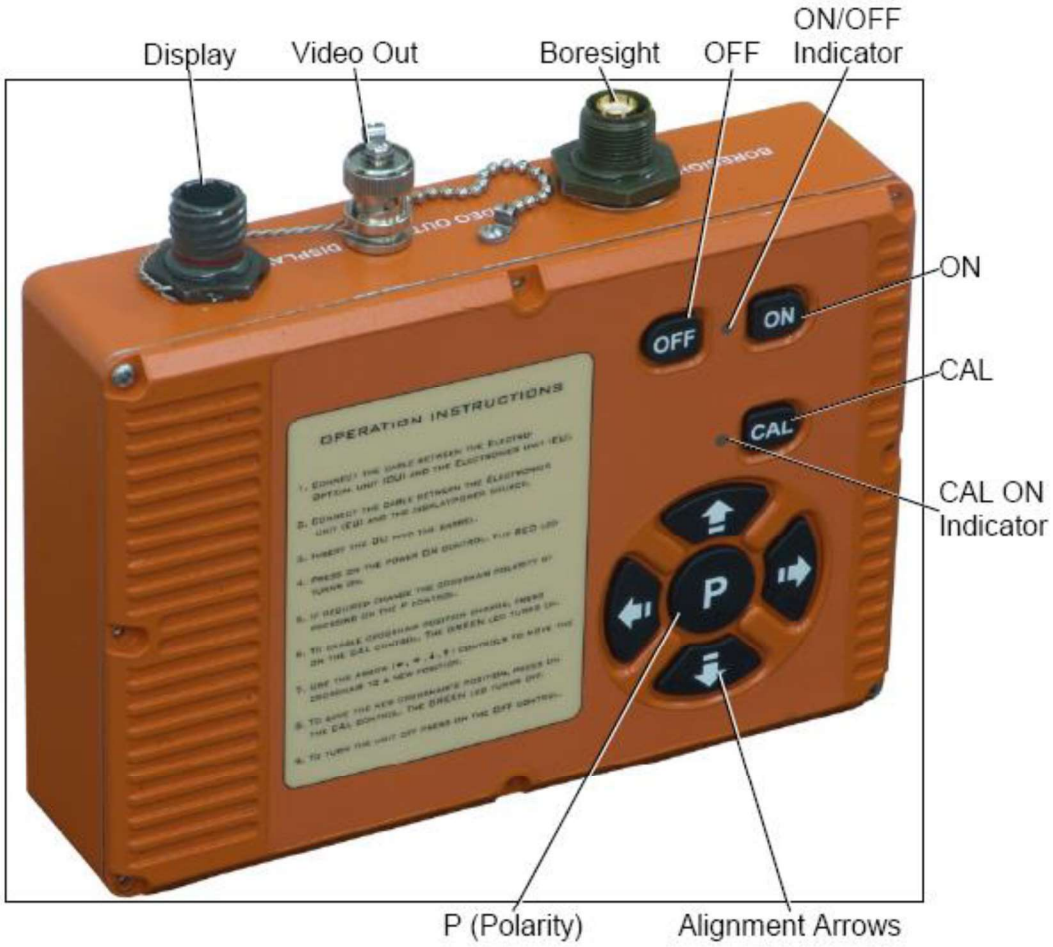


Figure 6-3. TV Camera Controller

Following are the activities required to be performed in the Antenna pedestal prior to the alignment process:

f. Verify that the antenna turret is fastening on base capable to be transported by the fork-lift to the test area.

g. Ensure that the turret is locked for transportation in azimuth & elevation.

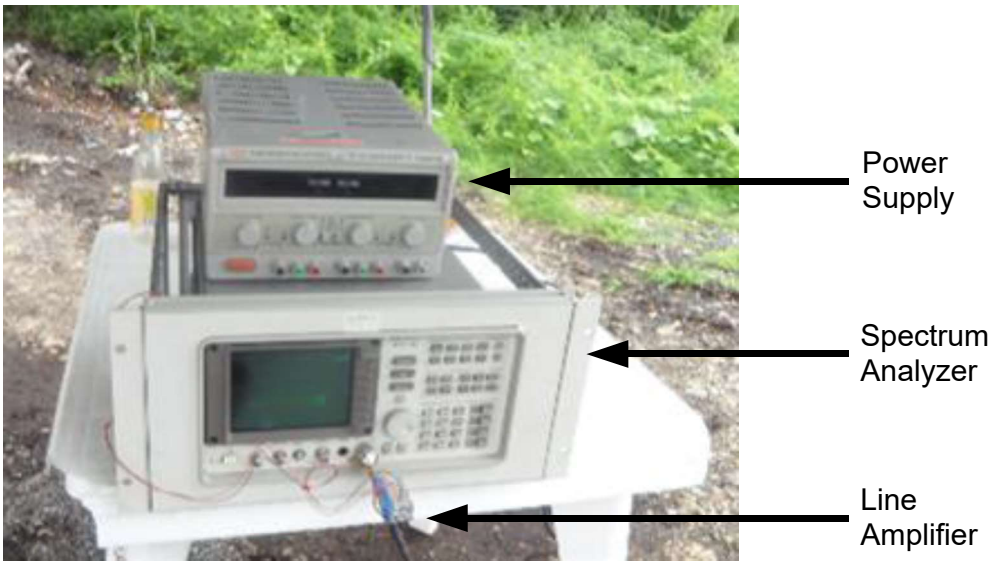
h. Identify the feeder plate notch and mark the Top, Bottom, Left and Right notches, as illustrated below:

Following are the activities required to be performed in the test site field prior to the alignment process:

i. Transfer the Antenna turret to the Antenna position

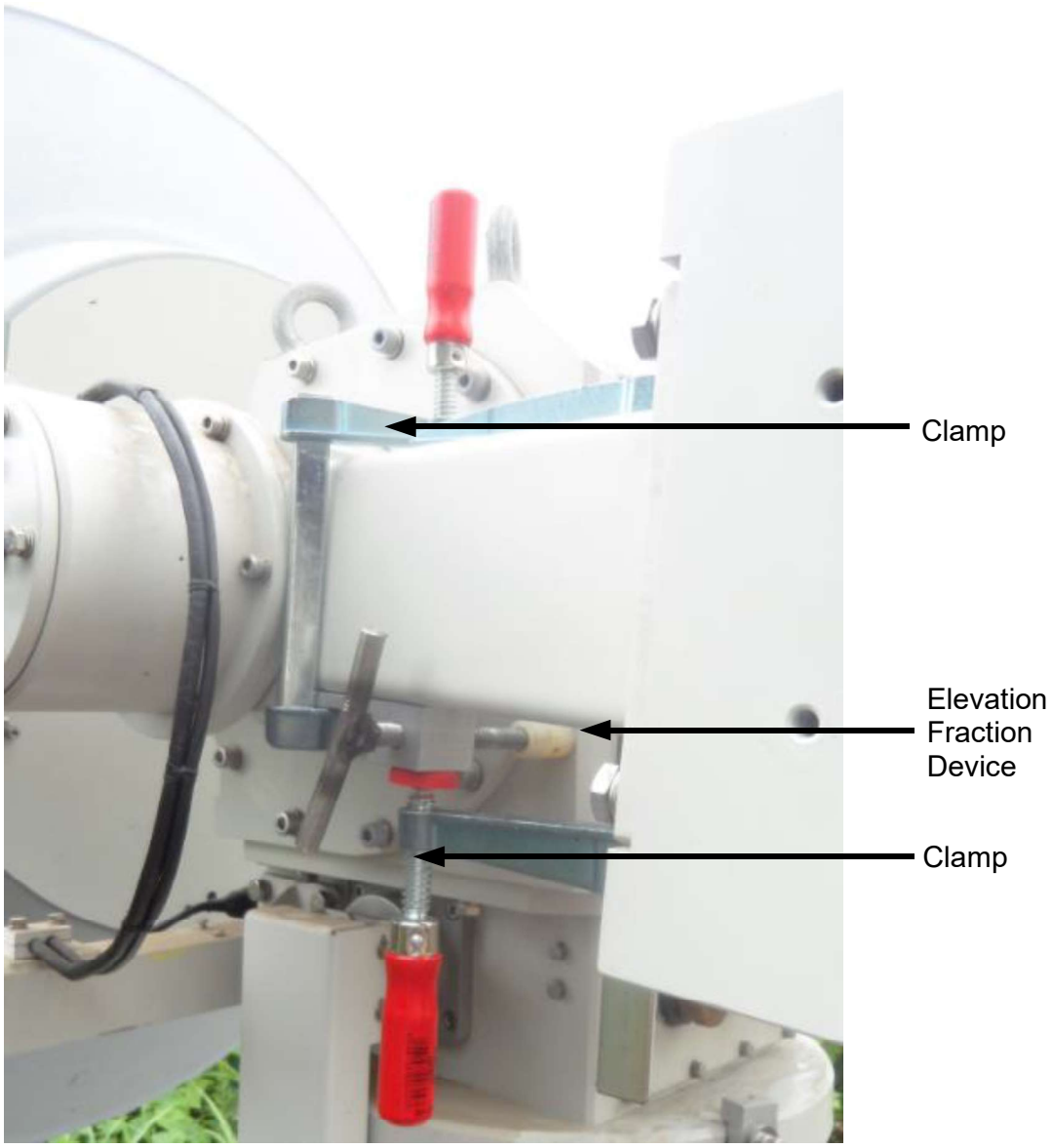
j. Transfer source post with the Signal Generator and feed the horn to be mounted in the Command Building 6th floor and direct the horn towards the Antenna post.

k. Mount the antenna post with the equipment besides the turret, as follows:

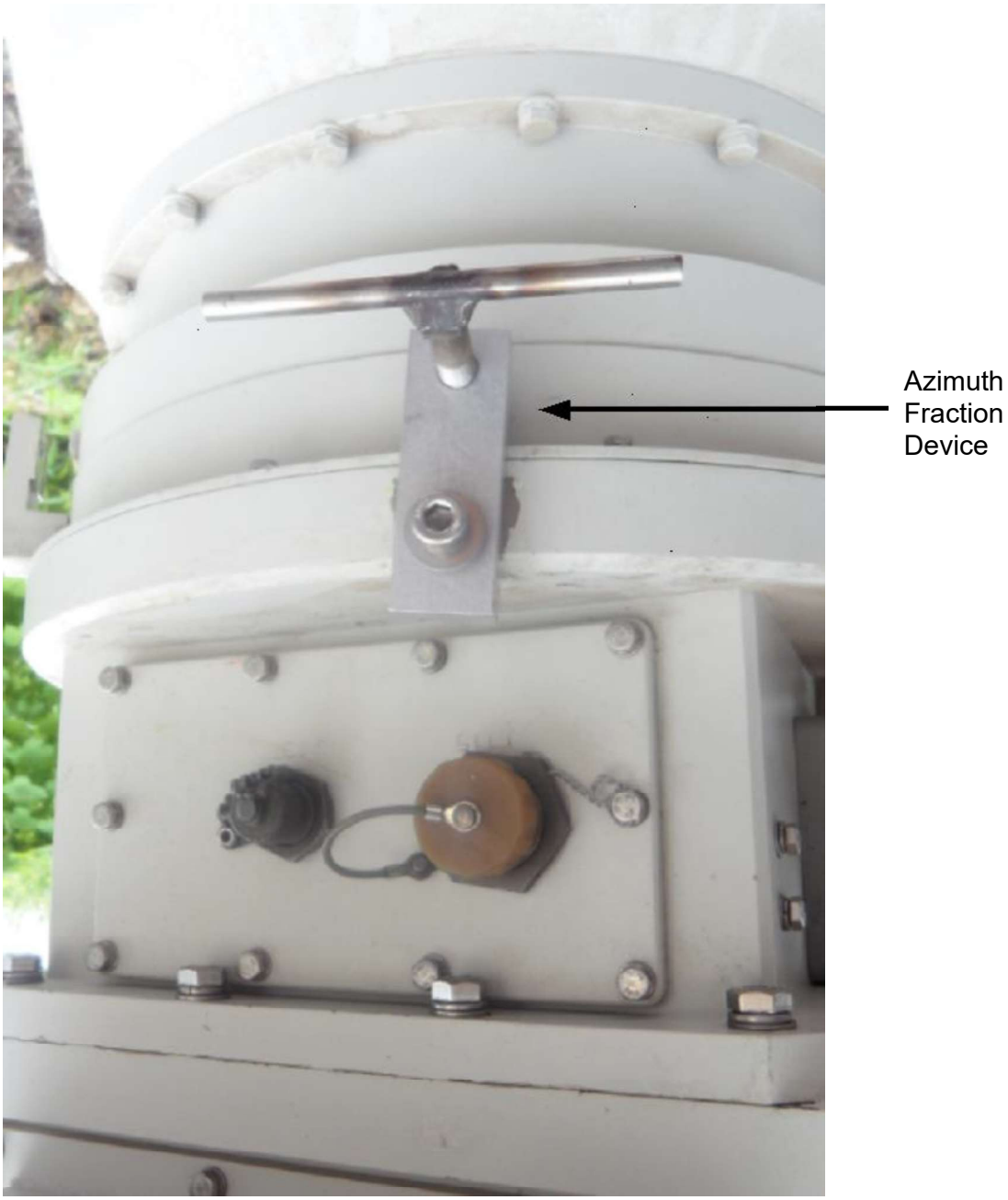


l. Attach the wave guide adapter to the antenna lower azimuth Rotary Joint, as follows:

m. Release the antenna lockers and connect the clamps in the elevation yoke with the fraction device, as follows:



n. Connect the azimuth fraction device, as follows:



6-4.2.2 Test Procedure

a. Operate the test setup as follows:

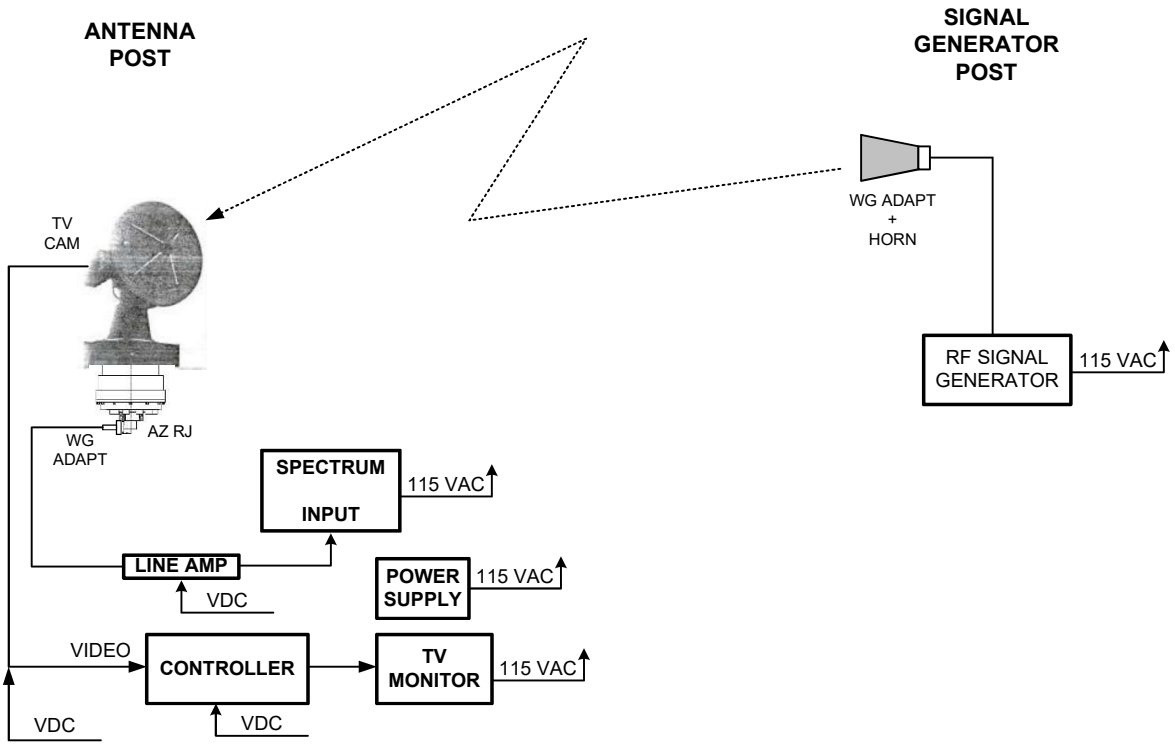


Figure 6-4. Field Site Test Setup

b. Move the antenna turret in azimuth and elevation directions towards the Signal Generator (SG) post, by means of the TV camera display in the monitor.

c. Place the antenna reflector feeder notch in the Top position and identify reception in the spectrum analyzer by moving the dish respectively – releasing and tightening the elevation fraction device alternately.

d. Identify to ensure the peak reception point in elevation at the notch Top position.

e. Place the antenna reflector feeder notch in the Bottom position and identify reception in the spectrum analyzer by moving the dish respectively – as specified for the Top position.

f. Bring to the elevation peak reception point in the notch Bottom position.

g. Adjust antenna elevation position so as to get the same level of reception in both elevation states (Top and Bottom)

h. Repeat steps (c) to (f) for azimuth adjustments, and bring the antenna dish direction so as to get the same reception level in both R and L feeder notches.

i. Repeat the dish elevation position to get the optimal position for the same reception level in all feeder notches.

j. Lock the antenna position in elevation and azimuth for standstill state by means of the fraction devices in azimuth and elevation.

The antenna dish is now directed towards the target in the radar reception line.

k. Direct the TV camera On Target by means of the camera base screws, as follows:

l. Disconnect the supplies from the equipment in both posts.

m. Disassemble the fraction devices on the antenna turret and lock for transportation the antenna to the ship.

n. Assemble the antenna pedestal onboard the ship.

6-4.3 On-Board TX/RX Calibrations

6-4.3.1 Test Equipment

The following test equipment is required for the tests on the ship:

Description	Model
Frequency Meter	HP X532B
Scope 4 Channels	TEK MSO 4034
Function Waveform Generator	AGILENT
Power Meter	HP 437B
RF Sweep Generator	HP
Attenuators Stepper	HP
Triax to BNC Coax Cables (F)	
Triax to BNC Coax Cables (M)	
Directional Coupler	10db HP H752
High Power Load min. 600W Avg. 5-10 GHz	
Crystal Detector	

6-4.3.2 FCR Transmission Pulse Width Adjustment

Description: Set the transmission pulse width in PRF Long (2000PPS) and Short (3000PPS).

Period: This test is to be carried out whenever a magnetron or a modulator is replaced in the TXRX.

Involves: Form FCR ALIGN:

- Pulse frame: Long & Short edit boxes.

Pre-Requisites:

- Open the FCR TX/RX rack door and pull out the interlock.
- FCR is in transmission for at least 10 minutes
- MOC WCS is set to MAINTENANCE

Test Equipment:

- Crystal Diode Detector
- Scope

6-4.3.2.1 Test Set Up

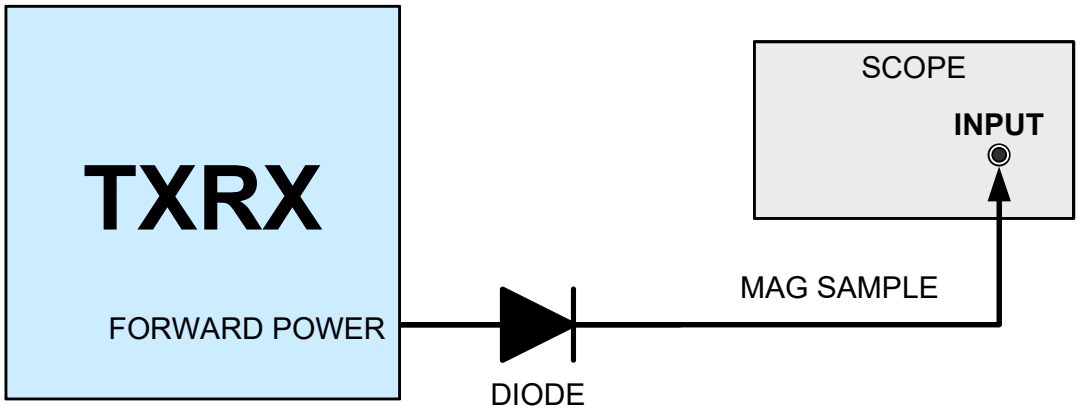
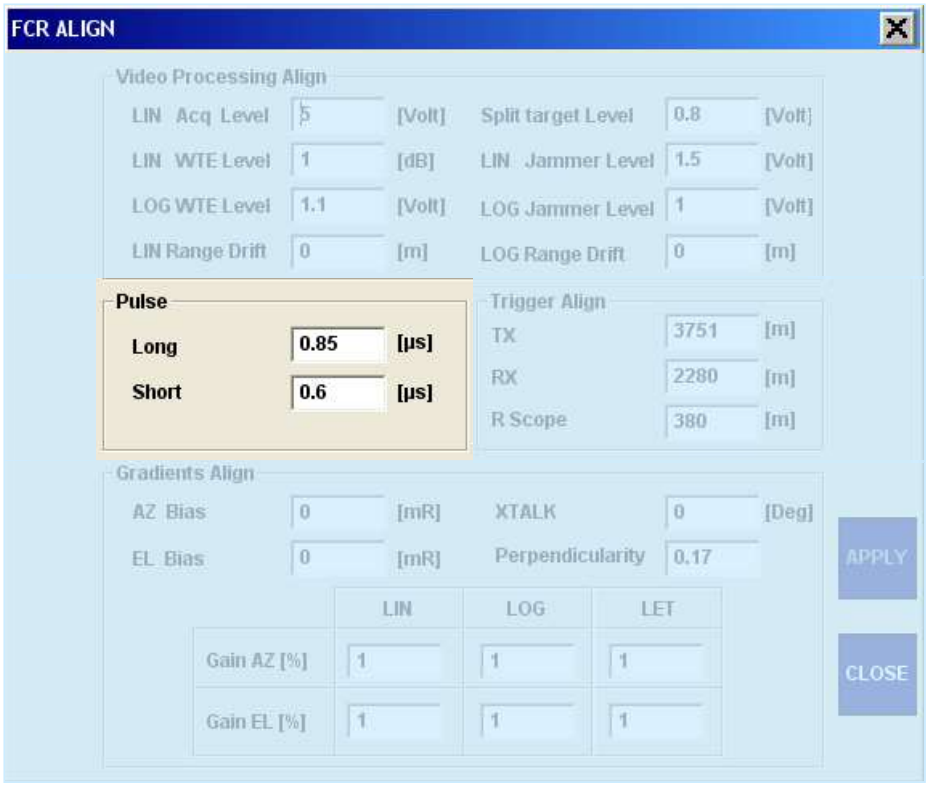


Figure 6-5. FCR Transmission – Test Setup

6-4.3.2.2 Form Controls Adjustment



6-4.3.2.3 Procedure

a. In WCS MOC switch on transmit for at least 10 minutes.

   1) In FCR form A/R display verifies the gain level variables in both channels LIN & LOG when adjusting the **GANANCIA** potentiometer.

   2) The counter readout displays the transmission frequency and the pulse width.

   3) Pulse width for Long PRF (2000PPS) shall be: **0.5 µSec**.

   4) Pulse width for Short PRF (3000PPS) shall be: **0.3 µSec**.

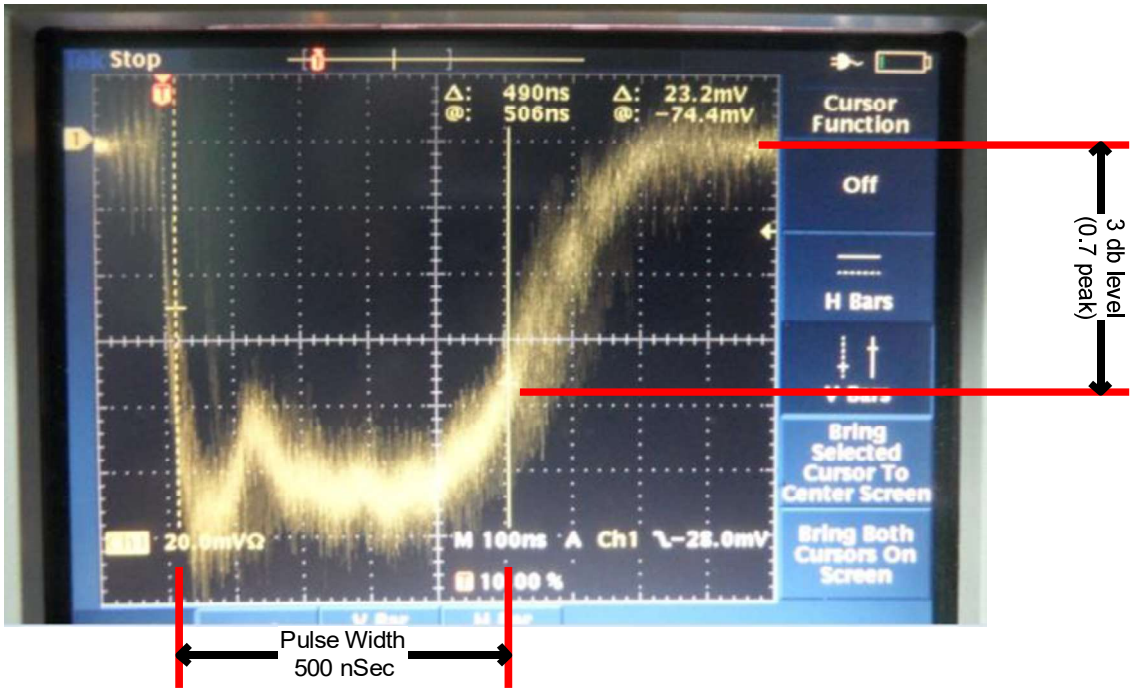
b. In case width adjustment is required, open the FCR ALIGN form and key the required value in the frame "Pulse" relevant edit boxes.

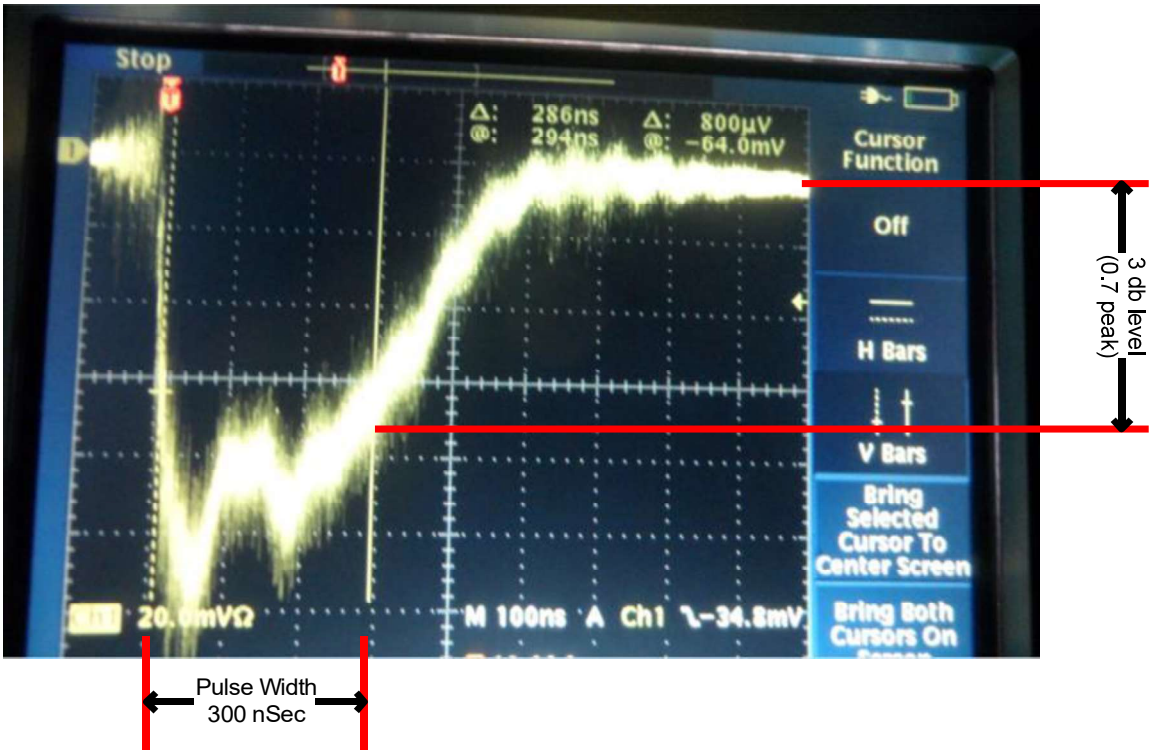
IMPORTANT NOTICE

There are differences between the transmitted RF pulses and the Modulator pulse sent by the FCS:

- *To get an RF pulse width of 0.3 µsec: send a 0.5 µsec. pulse.*
- *To get an RF pulse width of 0.5 µsec: Send a 0.8 µsec pulse.*
- *Applicable range for "Long" width adjustment is: 450 - 750 nanoseconds.*
- *Applicable range for "Short" width adjustment is: 650 - 950 nanoseconds.*

c. The pulse width measurement is required to be repeated in different frequencies throughout the transmission range (8.85 – 9.35 GHz) to validate the pulse width adjustment.




Stop
Δ: 286ns
@: 294ns
Δ: 800µV
@: -64.0mV
Cursor Function
Off
H Bars
V Bars
Bring Selected Cursor To Center Screen
Bring Both Cursors On
M 100ns A Ch1 ↘-34.8mV
3 db level
(0.7 peak)
Pulse Width
300 nSec

6-4.3.3 FCR Range Zero Set Adjust

6-4.3.3.1 Preparations

a. Set MOC2 in MAINT mode.

b. In MU connect a scope to the range gates test points terminals as folows:

   1) Attach test points card to the card RNG TRK test plug J7 (note the terminal 36 as the lead pin position)

   2) Connect the SYNC pulse of the scope to pin 22 (Pre_trig_tp)

   3) Connect the INP1 of the scope to pin 30 (late_gate)

c. Connect the Main Bang pulse (Test Point ¨FORWARD POWER¨ in Transmitter panel) after detector to INP2 of the scope. Use ***only*** the 22 m RG 58 coaxial special cable for this connection.

d. Open the form Maintenance Switches and select the "***Zero Range***" checkbox followed by Apply.

6-4.3.3.2 Process

a. Set the TXRX in full transmission

b. Verify the main bang position well in the center of the range gate as follows:

   - Center of the TX trigger is positioned at the start of the LATE GATE pulse

c. In case not – open the form FCR ALIGN and set a value in the frame "Trigger Align" ***TX*** edit box to place the main bang precisely on the center.

d. In the form Maintenance Switches de-select the "***Zero Range***" checkbox followed by Apply.

Note: Any change of the "Trigger Align" ***TX*** position, require recalibration of the AFC.

Figure 6-6. TX Main Bang Trigger Connections

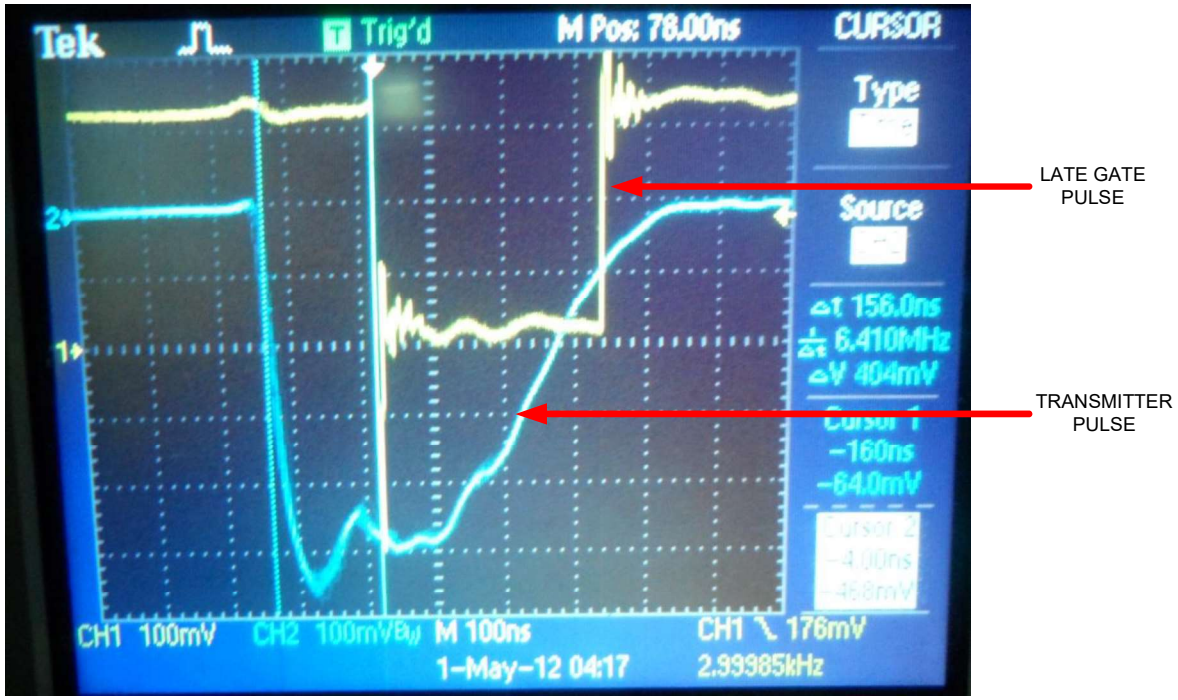


Figure 6-7. TX Trigger and Range Gate – Scope Waveform

Legend:

Yellow line wave form – the range gate signal

Blue line wave form – the main bang pulse

6-4.3.4 FCR RX Trigger Set Adjust

IMPORTANT NOTE

This procedure is required whenever the TX pulse adjustment was changed.

The performance is required immediately after the completion of the TX adjustment.

6-4.3.4.1 Preparations

a. Set MOC1 in MAINT mode.

b. In vicinity of the TXRX connect a scope to the following Transmitter Test Points

- **Forward Power** with an 50 ohms line load
- **Disc Gate** with an 50 ohms line load and input set with BW Limiter

6-4.3.4.2 Process

a. Apply the TXRX to full operation transmission mode.

b. Let the transmitter work for at least ten minutes.

c. Notice the **Disc Gate** pulse to be in full presence within the Main Bang pulse but the end of this pulse is to be no less than 100 nSec from the Main Bang 3 db last edge.

d. In case not, apply the proper value required in the FCR ALIGN form: "Trigger Align" frame, ***RX*** edit box – to place the pulse precisely on the required position.

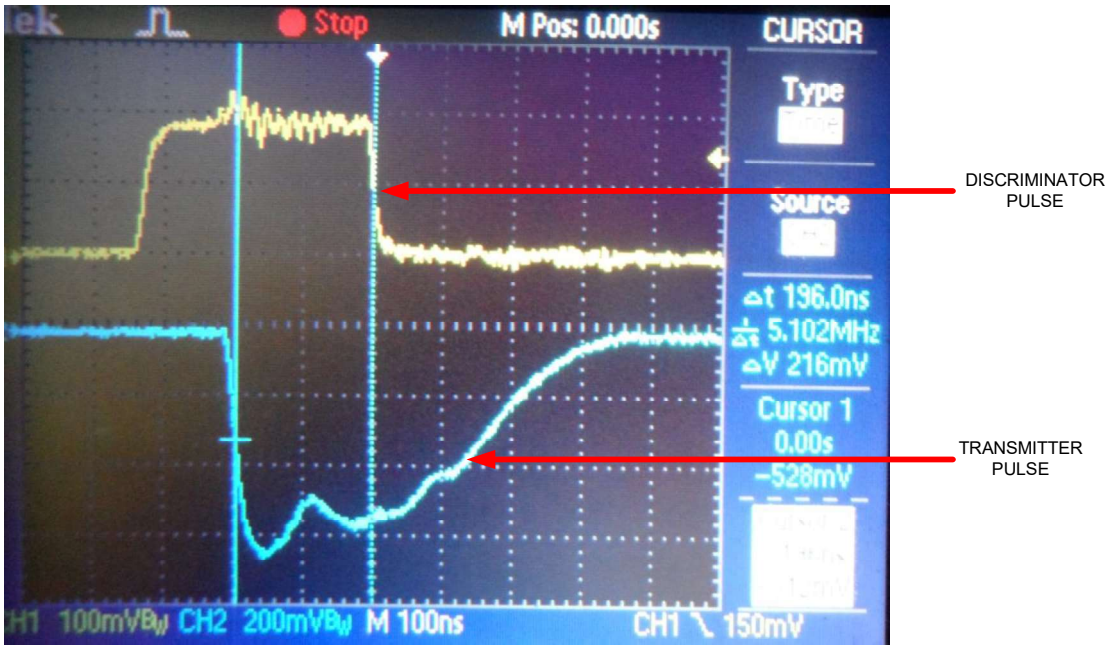


Figure 6-8. RX Trigger Position Adjustment – Scope Waveform

6-4.3.5 Receiver Calibrations Test Set-Up

The test set up shown below should be established in the ship for the following on-board tests procedures (see Paragraphs 6-4.3.6 - 6-4.3.8):

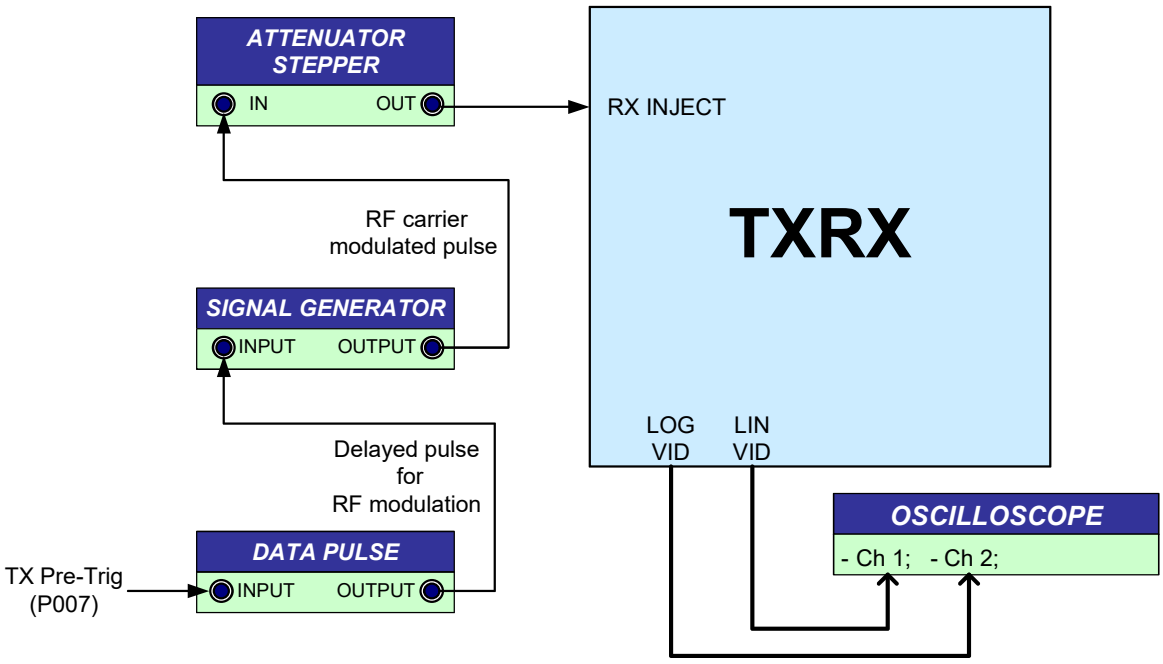


Figure 6-9. Receiver On Board Test Setup

6-4.3.6 AGC Reference Process

6-4.3.6.1 Set Up Connection

a. Connect for the test process the following:

- LIN channel output to the scope
- LOG channel output to the scope
- Pulse injection to receiver by connection of the RF Signal Generator output to REC INJ

6-4.3.6.2 Preparations

a. Set the Signal Generator (SG) output frequency at 9100 MHz and set attenuation of output to 0 dbm.

b. Set the SG output to CW mode.

c. Verify the output power by means of Power Meter to 1 mw power and adjust if required.

d. Set the SG output to PULSE mode.

e. Set the FCR in the LIN channel operation.

f. Verify the target display in the FCR Form A/R sweep display after frequency fully adjustment

g. In the SYS DATA form load the following data for the test:

FCR: LIN AGC GAIN	FCR: RANGE NOISE	FCR: JAMMER
FCR: LOG GAIN	FCR: END NOISE	FCR: WTE
FCR: INTENSITY		

Process

h. Lock on the signal and verify range track

i. Check the receiver S/N by setting the signal size to tangential pulse, add to that size 6 db – this is the receiver S/N value.

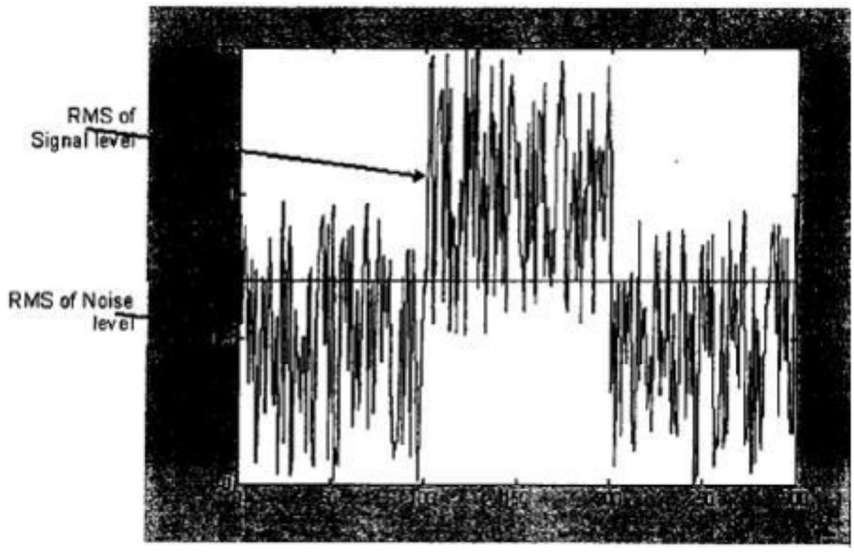


Figure 6-10. Tangential Signal Pulse

j. Change the signal output attenuation as specified in the following table and record the signal size:

S/N [db]	LIN AGC GAIN [V]
6	
10	
15	
20	
30	
40	
50	

k. In the FCR form switch to LOG receiver channel verify range track on the signal

l. Check the receiver LOG channel S/N by setting the signal size to tangential pulse, add to that size 6 db – this is the receiver S/N value.

m. Change the signal output attenuation as specified in the following table and record the signal Intensity size:

S/N [db]	LOG Intensity [V]
6	
10	
15	
20	
30	
40	
50	

n. In the FCR form switch to LET receiver channel and verify range track on the signal in same performance as the LOG channel.

AGC Characteristics Test – Typical Results

INP PWR (-dbm)	LIN AGC (Volts)	LOG INTENSITY (Volts)	Check
90	0.6	---	
85	1.2	2	
80	1.9	2.4	
75	2.6	2.8	
70	3.3	3.1	
65	4	3.5	
60	4.7	3.9	
55	5.4	4.3	
50	6.1	4.7	
45	6.8	5	
40	7.6	5.4	
	0.7V = 5db	0.4V = 5db	
	140 mV = 1 db	80 mV = 1 db	
	OFFSET : 0.6 = -90 DBM	OFFSET : 2.0 = -85 DBM	

6-4.3.7 LIN Acquisition Level Calibration Process

a. Set the receiver channel to LIN.

b. Under the same set up – set the input RF signal to the level of 6db above the noise level: S/N=6db.

- Verify LIN AGC GAIN readout in the SYS DATA form and enter the value into the FCR ALIGN form, "Video Processing Align" frame, ***LIN Acq Level*** edit box.(About 0.55 Volts)

c. Set the following logic state: AUTO DES without any target in the range gate.

- Verify that no tracking is performed and after Time Out period the logic state changes to MAN DES.
- In case Track logic state appears – increase the value in the edit box ***LIN Acq Level*** till no track state exist.

d. Set the input RF signal to the level of 5db above the noise level: S/N = 5db.

e. Bring the range gate over the target signal position and verify:

- TGT FOUND indication extinguished or flickers in FCR form.

f. Set the input RF signal to the level of 7db above the noise level: S/N=7db.

g. Bring the range gate over the target signal position and verify:

- TGT FOUND indication in FCR form is lit constantly without blinking.

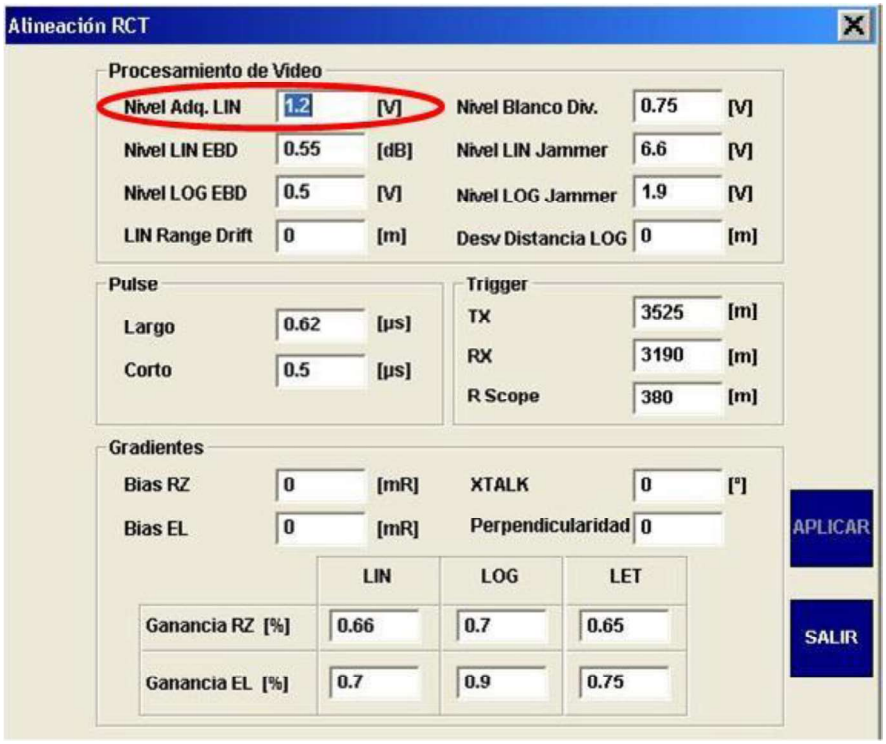


Figure 6-11. LIN Acquisition Level Adjustment

6-4.3.8 LIN WTE Level Calibration Process

a. Under the same set up – bring the FCR to track on the target signal to idicate the TRACK indication full lit.

b. Set the input RF signal to the level of 6db above the noise level: S/N = 6db.

- WTE red indication in FCR form is lit

c. In case not – change the value of the edit box ***LIN WTE Level*** so as to get the interchange constantly.

d. Repeat step (b) in S/N = 10db and verify Track state is valid.

e. Set the SG signal output to be 3db less and verify indication WTE lit red or flickering.

f. Repeat step (b) in S/N = 15db and verify the LIN AGC GAIN readout in the SYS DATA form to be edited in ***LIN Jammer Level*** edit box.

g. In SG set the output mode to CW, go to Track state in MAN R and verify JAMMER indication lit red in the FCR form.

h. Set the input RF signal to the level of 10db above the noise level: S/N = 10db.

- Verify the JAMMER indication changes to WTE in FCR form

i. In SG set the output mode to PULSE.

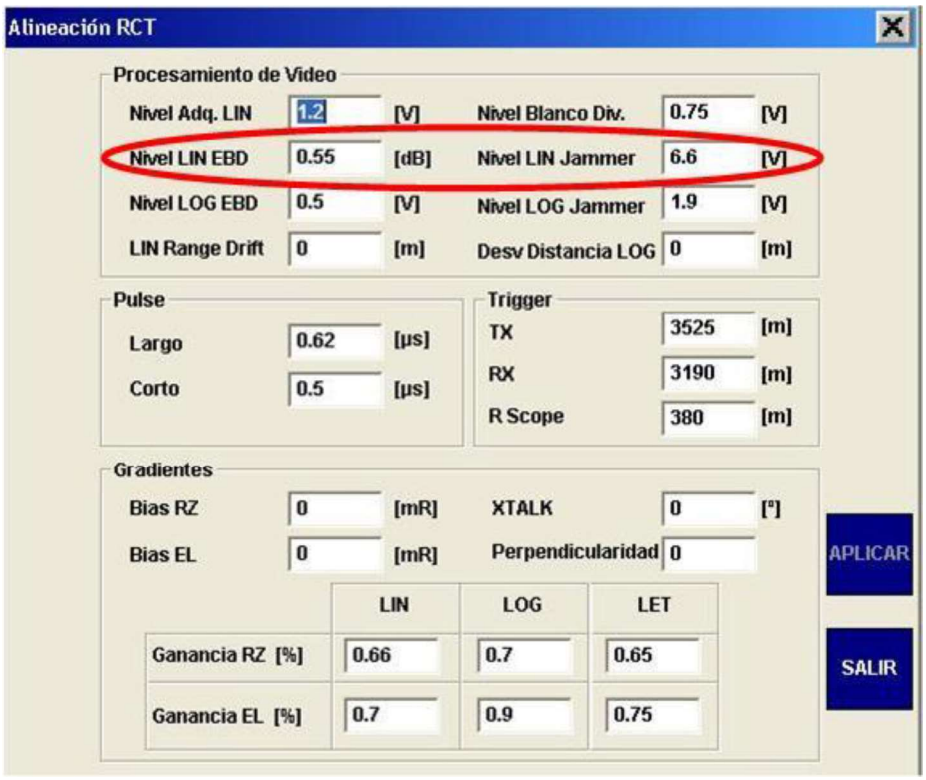


Figure 6-12. LIN WTE Level Adjustment

6-4.3.9 LOG Acquisition Level Calibration Process

a. Under the same set up, switch to LOG receiver channel.

b. Set the input RF signal to the level of 7db above the noise level: S/N=7db and lock on the target signal.

- Verify Track logic state is valid, in case not – adjust the value of ***Split Target Level*** accordingly. (That is the level of the LOG channel)

c. Repeat step (b) in S/N = 5 db and verify the indication WTE lit red or Trak indication flickering.

d. Set the input RF signal to the level of 10db above the noise level: S/N=10db.

- Verify the following: TRACK green indication in FCR form is lit

e. Set the injected input signal to CW mode and track the target in MAN R state, verify the indication JAMMER is lit red.

f. Repeat step (b) in S/N = 15db and verify the JAMMER indication lit red in FCR form. In case note – adjust the value in the ***LOG Jammer Level*** edit box.

g. Stop the CW mode and go to Pulse mode within the tracking state.

- Verify the indication in the FCR form changes to TRACK green indication instead of JAMMER.

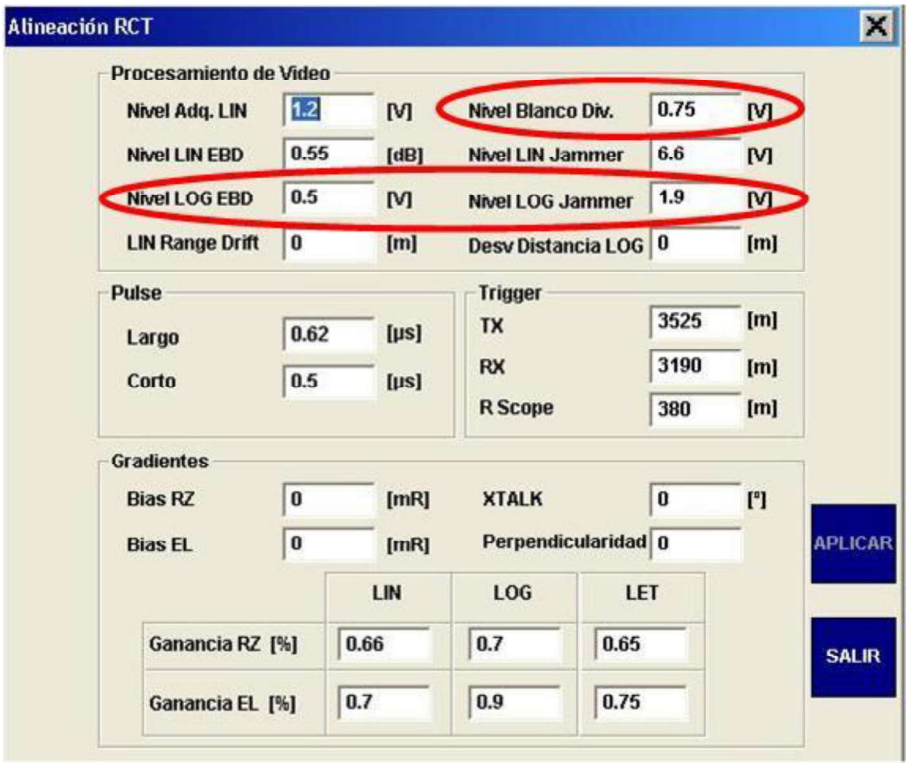


Figure 6-13.LOG Acquisition Level Adjustment

6-4.4 Transponder Tracking Calibrations

6-4.4.1 Preparations for Test

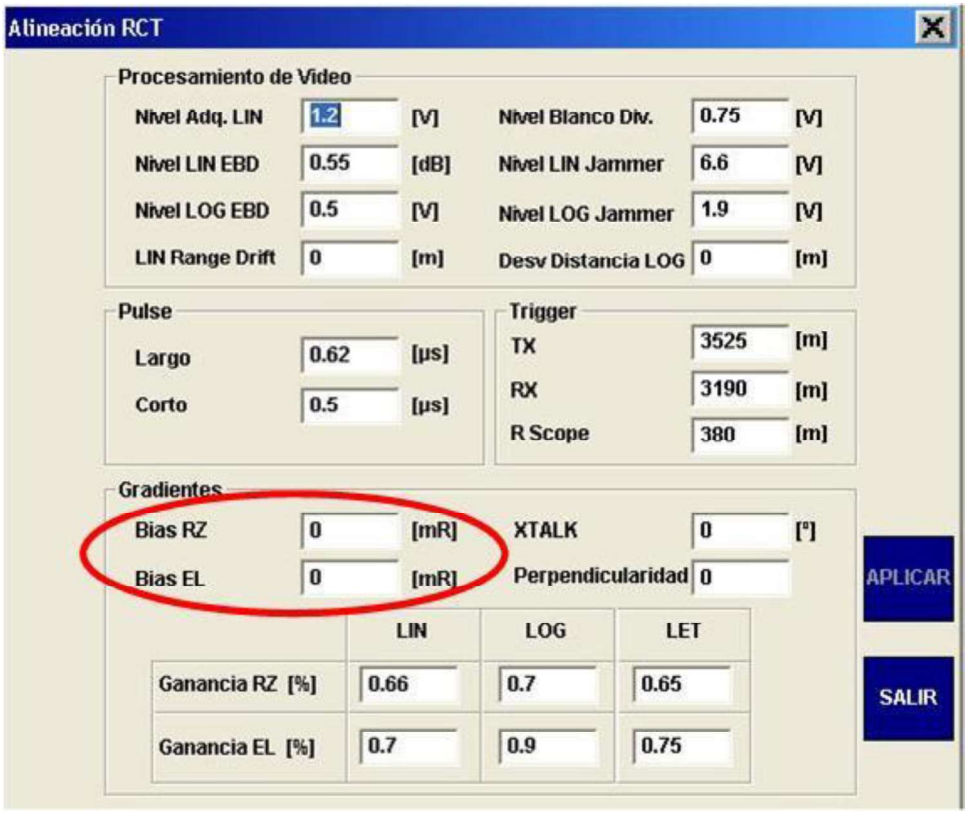
a. Operate the Transponder with the rechargeable battery (or equivalent power supply +28V) by erecting it with a Signal Generator (SG) modulated RF pulse:

Disconnect the Omni antenna and connect the SG output to it directly.

b. Identify response of RF pulse reception by a crystal diode connected to a receptacle horn and to a scope.

c. The transponder system is now ready for the integration test.

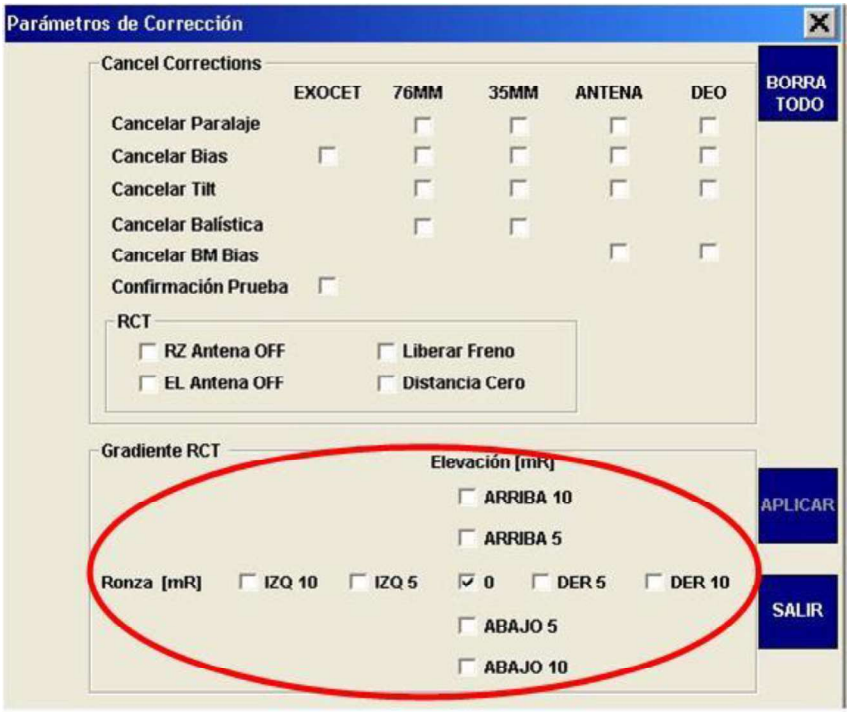
g. In FCR ALIGN form, key-in proper values in Bias AZ & Bias EL edit boxes, to set the Antenna in zero deviation, on both azimuth and elevation, as shown below:



h. In SYS DATA form, verify the pointing errors values (DEL_AZ & DEL_EL) to comply with the optical display deviations.

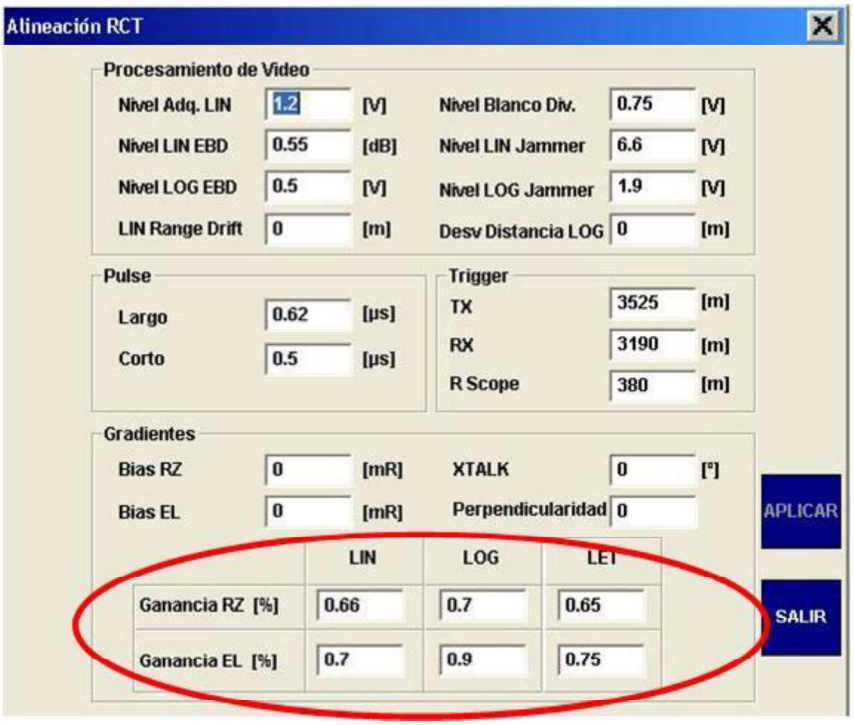
i. Open the MAIN SWTCH maintenance form and the FCR ALIGN maintenance form.

j. Apply the fixed deviation of ±5 & ±10 mR on both azimuth and elevation to ensure the optically deviation, respectively, as shown below:



k. If required – set the Point Gradient Factor value (AZ, EL) in the FCR ALIGN form edit boxes.

l. Repeat the procedure for tracking in LOG & LET, respectively.



6-4.5 Target Tracking Checkup

6-4.5.1 Introduction

The target track test should be performed in SUR and AIR policies on real controlled targets as follows:

- Surface target shall be the Buoy in the canal – the zone for tracking maneuvering
- Air target shall be the Helo in trials at the canal tracking zone

The exercises shall also include the FCR video adjusted to the map picture in each MOC

In case the SGRS is operational – the alignment between two radars targets data alignment should be set.

6-4.5.2 FCR Video Picture Adjust

a. During the sail in the canal to the trials zone, apply the SUR policy mode of operation, go to SERACH logic state and CONT.

b. Verify the area video picture of the FCR in the upper monitor in PPI display.

c. Check coordination of the straits banks of the canal (according the map) to the coast line draw by the FCR video.

d. In case of non fitting – apply azimuth and range corrections by opening of the form TURR ALIGN > RADARS and edit values in the VIDEO frame – FCRF AZ & RANGE edit boxes.

e. Repeat for other MOC set of values.

Figure 6-15. Radar Video Adjust Form

6-4.5.3 SUR Target Track

a. Position the ship so as the buoy target will be directed in azimuth 00 and range of 4-5 Km.

b. Lock on the Buoy and track in Close Loop only.

c. Verify target in the center of ANT TV camera display and pointing errors of ±1 mR.

d. Apply the deviation of pointing errors in MAINT SWTCH form.

e. Verify compatibility between optical deviations to DEL_AZ & DEL_EL record in the SYS DATA form display.

f. Repeat the above steps in azimuth 90.

6-4.5.4 SGRS Video Data Adjust

a. Repeat track on the Buoy by FCR and set the FCS in non-fusion function.

b. Verify and ensure the tracked target echo to be recognized by an SGRS track.

c. Verify target ID in the upper PPI display and in the Target List table form.

d. Verify that the FCR target location is identical to the SGRS ID target.

e. In case it is not – apply correction as required, by setting values at: TURR ALIN > RADARS form in the SGRS DATA frame Sur AZ-Bias and Sur Range Bias edit boxes, until both target echoes are matched and unite.

6-4.5.5 AIR Target Track

a. Start the trial by placing the Helo in front of the ship, in standing position at a range of about 3000 meter and height of 1000 meters.

b. Acquisition process should be handled as follows:

- Acquire the target by the EOD throughout MOC1 (CCS) and verify proper tracking
- Designate from MOC1 to MOC2 (WCS) by the ME PDM in AUTO DES

c. Verify proper tracking on the Helo, in case not – check position of target related to the clutter area around the ship.

d. If required, place the Helo at higher altitude (or different range) until proper and safe track is achieved. (see Figure 6-16 and Figure 6-17).

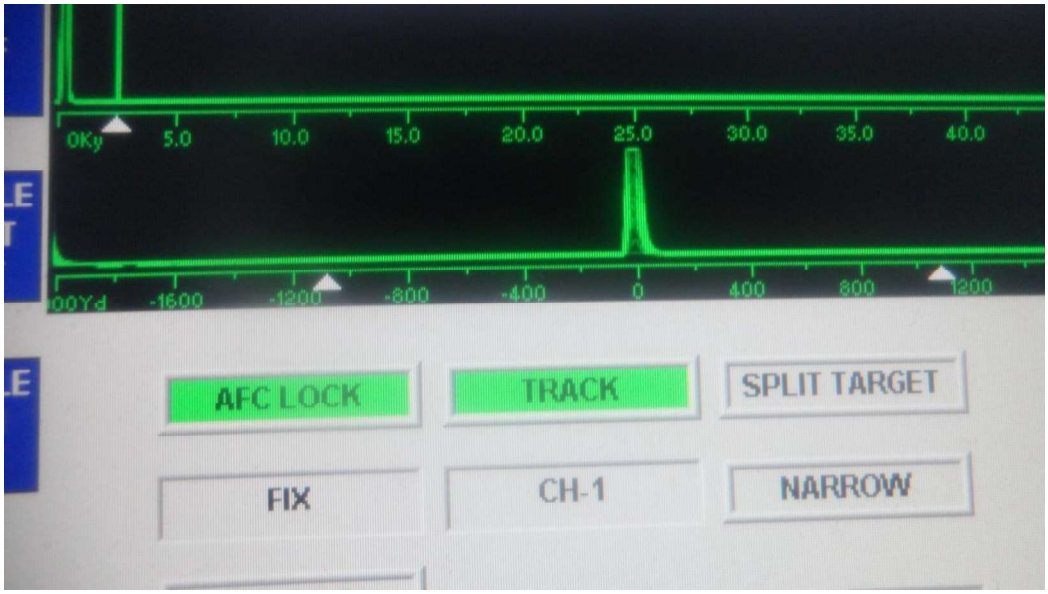


Figure 6-16. Helo Tracking - A/R display

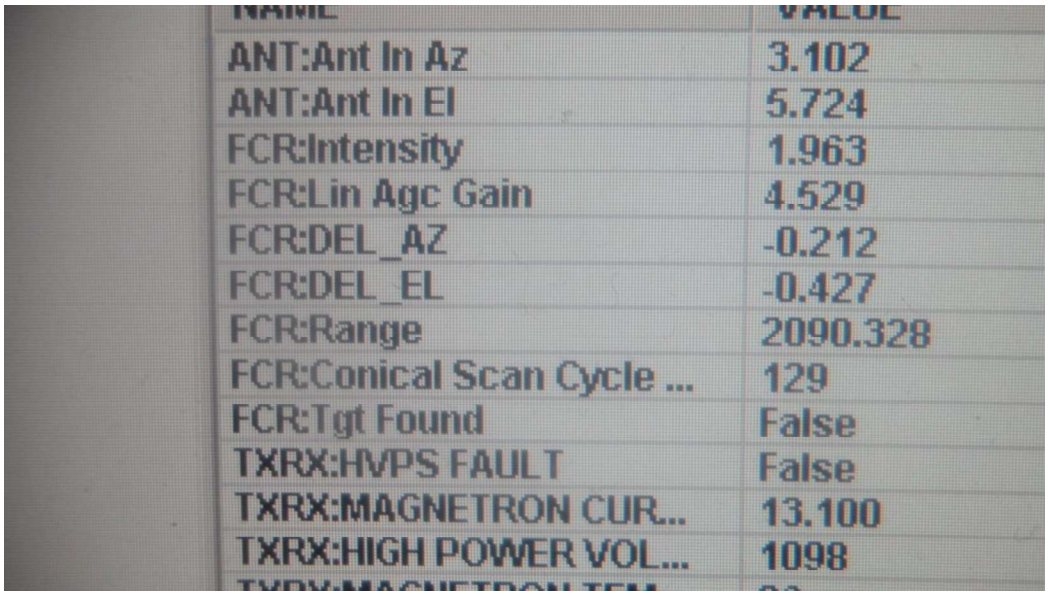


Figure 6-17. Helo Tracking – SYS DATA typical record

e. Apply the deviation drills on the Helo as applied on the AIR target.

f. If required – update the values in the AIR AZ & EL edit boxes accordingly.

g. In completion of the angles calibrations in the AIR policy, let the Helo to attack the ship from bow to aft and approach back in the movements of "8" around the ship. (see Figure 6-18 and Figure 6-19).

h. Verify acquisition and track on the target in the pointing errors of ±1mR in SYS DATA record and in optical display.

- Level = ± 10 Volt

6) Inject Function Generator (FG) into the Tuning voltage as follows: apply the TUNE command to pin 10 in TX side and to pin 9 the TUNE RTN.
7) Connect the Lin Video and the Log Video outputs to a Scope and synchronize the Scope by the "Pre Trigger" signal (On the front panel)
8) Verify appearance of video pulses on the Scope.
9) Adjust potentiometers in the AFC card to get minimum modulation on the video pulses.
10) On the Spectrum Analyzer (SA), set the following parameters:
    - Start Frequency = 8.7 GHz
    - Stop Frequency = 9.3 GHz
    - Level = -30 dBm
11) On SA, perform "Max Hold". Measure Band width; verify 500 MHz
12) Reconnect the W300 directly to the MU

6-4.6.2 Transmitter Test

a. Purpose

The purpose of the test is to verify the Magnetron performances with regard to proper transmitting frequencies range.

b. Method

The test will check the frequency of the magnetron in given V-tune commands, in order to cover the whole range of the working transmitter band, while checking the LO frequency setting through the AFC.

V-tune commands are set by the proper form in FCC at MAINTENANCE mode, where the values will put the magnetron in the lowest, medium and upper frequency band.

The Local Oscillator pre-set frequency will also be recorded, to ensure VCO working range coverage.

The results are to be filled in the attached Table 6-2 AFC Table, designed for this issue.

c. Preparations

1) Set the FCS to MAINTENANCE mode
2) In the FCC lower monitor, display the following forms: TX PARAMETERS, FCR FREQUENCIES.

3) Set the frequencies to be transmitted as follows:

Channel	V Tune [Volts]	Freq. [GHz]
1	-8.35	8.85
2	0	9.1
3	8.35	9.35

4) Connect Spectrum Analyzer to test point VCO SAMP in the FCR transmitter and set center frequency in accordance with channel selection; set the Span to 500MHz.

5) The FCR FREQ form is to set as follows:

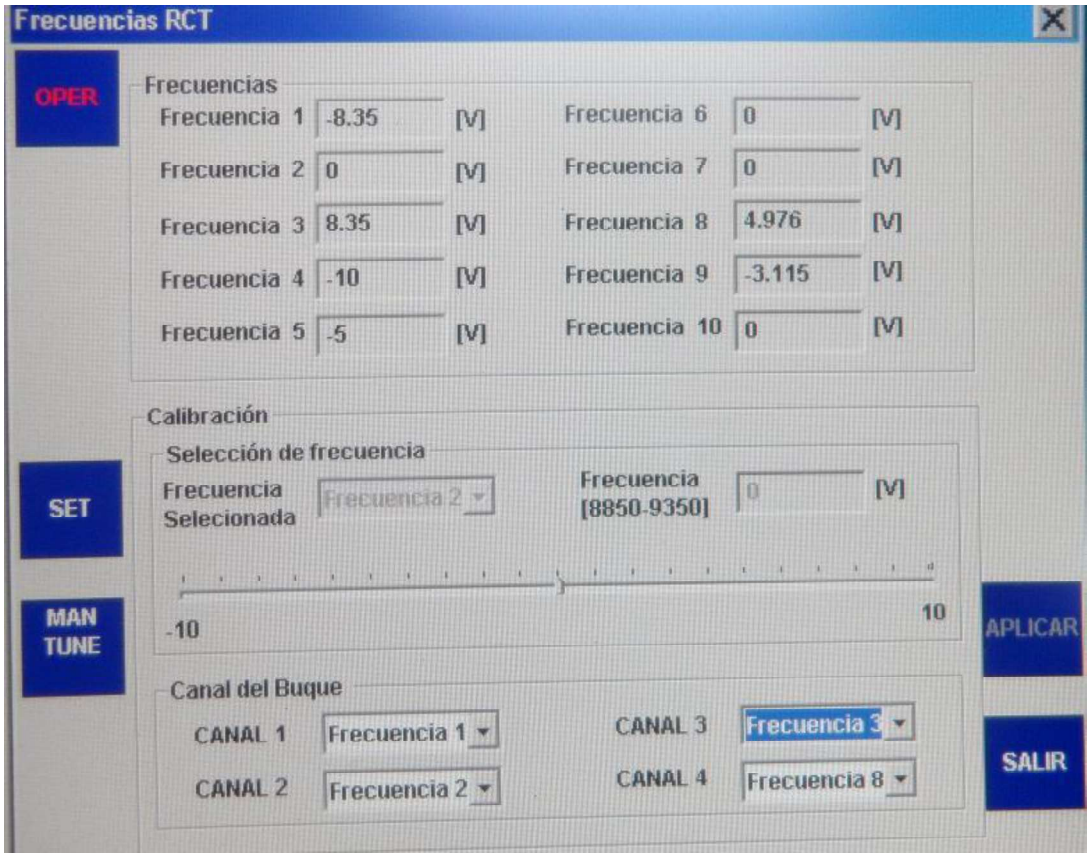


Figure 6-21. FCR Frequency Setting

d. <u>Test Procedure</u>

1) Switch to ANT ON, set system policy to AIR, go to SRCH > CONT, and elevate the antenna to 15 degrees position.
2) Set the FCR in transmission for at least 15 minutes radiation.
3) Verify in the form TX PARAMETERS that the working temperature is above 25 degrees as follows:

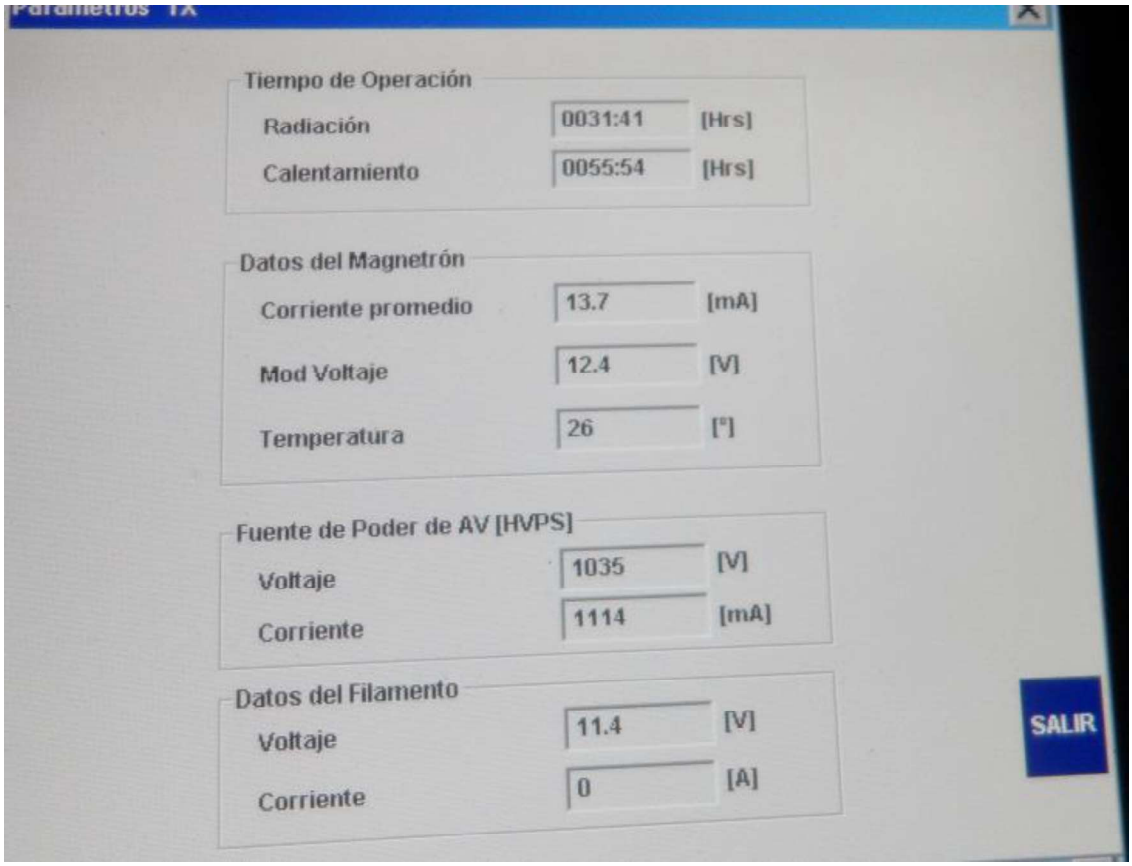


Figure 6-22. Tx Parameter Form

4) In the spectrum analyzer, read the frequencies of the Magnetron and Local Oscillator
5) Set to channel (as set in Preparation steps), switch to OFF the radiation, check the VCO Preset frequency and record it in the column "F" ("Preset VCO") at the AFC Excel table.
6) Switch to ON the radiation and record the Magnetron frequency in column "D" ("Actual"), while the present VCO frequency in column "G" ("Correct VCO")

Sampling readout for lower frequency display:

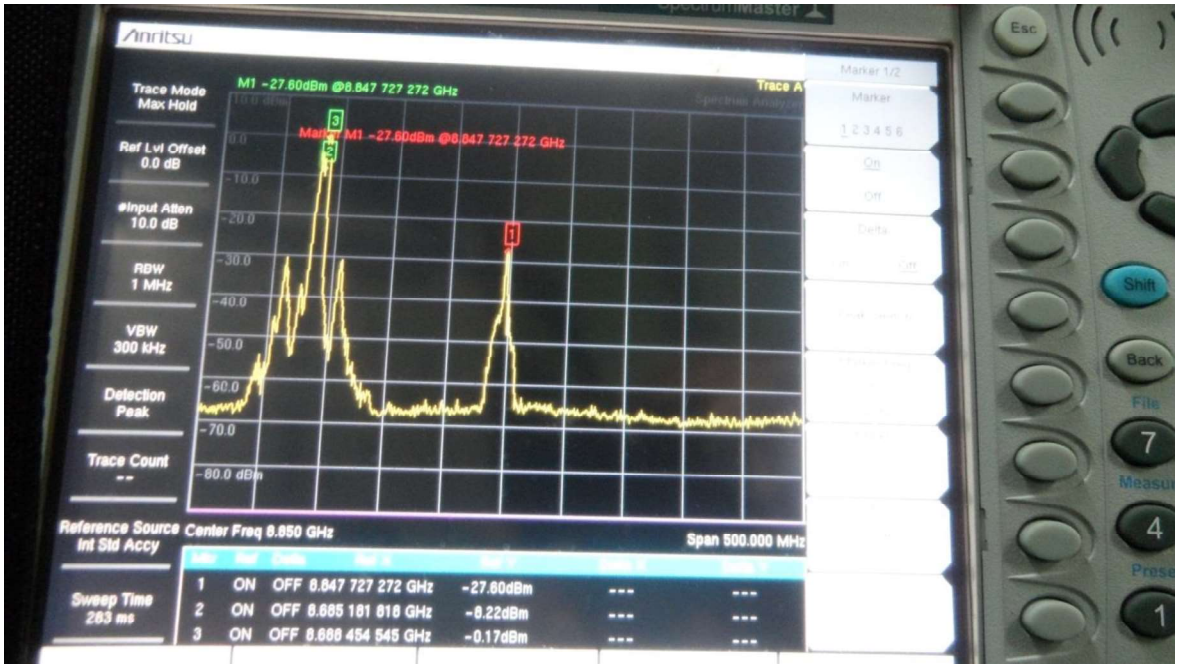


Figure 6-23. Magnetron VCO low band Frequency

Recording Results

Record the following results in the appropriate column in Table 6-2 (Page1) below, according the following LEGEND.

See typical results in Table 6-2 (Page 2)

LEGEND:

Expected: Expected nominal magnetron frequency

Actual: Magnetron measured frequency

Delta: The difference between the expected and the measured value

PresetVCO: The LO frequency as set prior to transmission

CorrectVCO: The LO frequency as measured during transmission

Delta: The difference between the corrected and the set VCO

AFC offset: The difference between the corrected and the Actual value

Error: The difference between AFC offset and IF nominal value (160 MHz)

Table 6-2. AFC Table (Page 1 of 2)

Ship: Quito **Transmitter:** sn01 dc 1030

	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	AFC offset	Error
1	8850							
2	9100							
3	9350							

Ship: Cuenca **Transmitter:** sn03 dc 1026

	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	AFC offset	Error
1	8850							
2	9100							
3	9350							

Ship: Guayaquil **Transmitter:** sn02 dc 1005

	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	AFC offset	Error
1	8850							
2	9100							
3	9350							

Table 6-2. Typical Results of AFC, dated July 2013 (Page 2 of 2)

Cuenca **Transmitter:** sn03 dc 1026

Ship:

	MHz	MHz	MHz	MHz	MHz	MHz	Volts	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	STBY VCO	AFC offset	Error
1	8850	8851	1	8687	8691	4	4.919	160	0
2	9100	9104	4	8960	8945	-15	8.08	159	1
3	9350	9353	3	9210	9194	-16	11.08	159	1

Ship: Guayaquil **Transmitter:** sn02 dc 1005*

	MHz	MHz	MHz	MHz	MHz	MHz	Volts	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	STBY VCO	AFC offset	Error
1	8850	0	-8850	8710	0	-8710	5.8	160	0
2	9100	0	-9100	8977	0	-8977	8.63	160	0
3	9350	0	-9350	9211	0	-9211	11.62	160	0

**** Faulty transmitter results during the test***

Ship: Quito **Transmitter:** sn01 dc 1030

	MHz	MHz	MHz	MHz	MHz	MHz	Volts	MHz	MHz
Channel	Expected	Actual	Delta	Preset VCO	Corect VCO	Delta	STBY VCO	AFC offset	Error
1	8830	8840	10	8705	8681	-24		159	1
2	9100	9100	0	8970	8944	-26		156	4
3	9369	9370	1	9224	9214	-10		156	4