出國報告（出國類別：開會）

汰換臺北飛航情報區儀降系統案107年工廠驗收測試出國報告書

服務機關：飛航服務總臺
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林偉翔（工務員）
派赴國家/地區：美國/堪薩斯
出國期間：107/04/28~107/05/09
報告日期：107/07/03

目錄

壹、 目的

近年來飛航服務總臺所屬各機場的助導航設備 ILS/DME,已陸陸續續接近使用年限，總臺有鑑於過去各臺設備因汰換時間不同數量不一，採購得標廠商不同而有各式各樣型號的裝備，因而造成各臺無法技術交流及備份組件無法共用之窘境，也造成更多公帑的支出，為了確保各儀降設備工作正常，所以總臺為改善此一現象，計畫將目前逐年汰換之採購方式改成"一次採購，分年執行"來汰換各機場的 ILS/DME 設備，本年度供應商 SELEX 公司需架設嘉義機場 18 ILS/DME、金門機場 06 ILS/DME、及花蓮機場 21 LDA/DME，總臺在架裝前，將派員前往 SELEX 工廠進行裝備測試。

本次工廠測試目的在檢測將於 107 年度交貨的 LOC、GP、DME 之性能做詳細的測試檢驗與觀察，以期架設時能夠順利與快速在合約所規定的範圍內經由嚴密的測試步驟，詳加檢視每一個項目的結果並做紀錄，來為各臺所需之裝備把關，以免因誤差太大而影響 ILS 性能，來確保本年度的合約能順利完成。

貳、 過 程

一、參與人員：

劉建宏/民用航空局飛航服務總臺/嘉義助航臺/工程司

彭文均/民用航空局飛航服務總臺/花蓮助航臺/幫工程司

林偉翔/民用航空局飛航服務總臺/金門助航臺/工務員

二、日期：民國一百零七年四月二十八日至一百零七年五月九日，共計十二日。

三、行程：

107 年 4 月 28 日：搭乘長榮航空班機，由桃園國際機場飛往美國舊金山機場。

107 年 4 月 29 日：抵達美國舊金山機場。

107 年 4 月 29 日：搭乘美國聯合航空班機由舊金山機場至芝加哥機場，。

107 年 4 月 29 日：搭乘美國聯合航空班機由芝加哥機場至堪薩斯機場。

107 年 4 月 30 日~5 月 6 日：開始於 SELEX ES INC.進行工廠測試。

107 年 5 月 7 日：搭乘美國聯合航空班機由堪薩斯機場至舊金山機場。

107 年 5 月 8 日：搭乘長榮航空班機由舊金山機場至桃園國際機場。

107 年 5 月 9 日：返抵桃園國際機場。

參、 工廠測試程序與結果

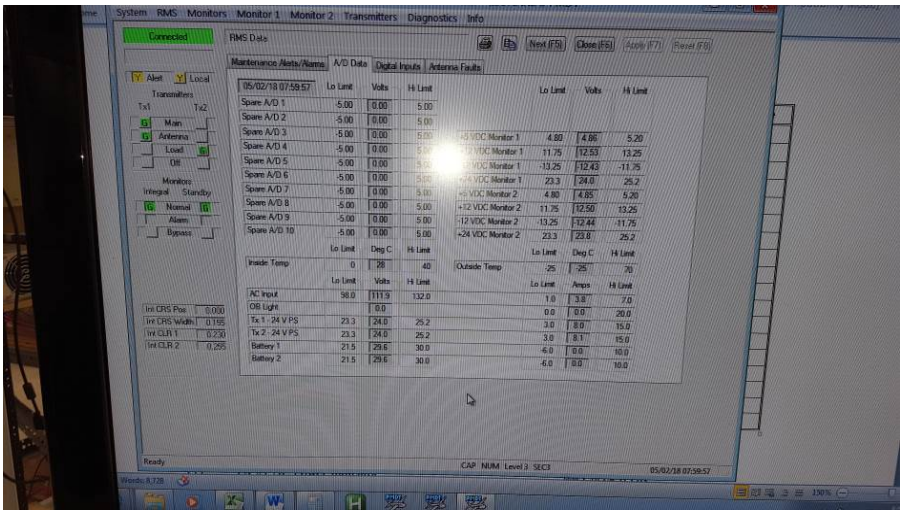
一、 LOCALIZER 2100 性能測試：(金門06LOC測試結果)

1. Maintenance Alerts : 檢視系統電壓電流值。

(1). On the PMDT select [RMS/Configuration/A/D Limits] and verify limits in the table provided below:

Parameter	Low Limit	High Limit
AC Input Volts	98 (196)	132 (264)
AC Input Current	1	7
TX#1-24V P.S. Volts	23.3	25.2
TX#1-24V P.S. Current	3	15
TX#2-24V P.S. Volts	23.3	25.2
TX#2-24V P.S. Current	3	15
Battery 1 Volts	21.5	30
Battery 1 Current	-6	10
Battery 2 Volts	21.5	30
Battery 2 Current	-6	10
+ 5V DC	4.80	5.20
+12V DC	11.75	13.25
- 12 V DC	-13.25	-11.75

(2). On the PMDT select [RMS/Data/A/D Data] and verify that there are no maintenance alerts. Record nominal value.



(2)

Parameter	Low Limit	High Limit	Nominal Value
AC Input Volts	98 (196)	132 (264)	115.6
AC Input Current	1	7	3.6
TX #1 - 24 V P.S. Volts	23.3	25.2	24.1
TX #1 - 24 V P.S. Current	3	15	8.0
TX #2 - 24 V P.S. Volts	23.3	25.2	24.0
TX #2 - 24 V P.S. Current	3	15	7.6
Battery 1 Volts	21.5	30	29.8
Battery 1 Current	-6	10	0.0
Battery 2 Volts	21.5	30	28.1
Battery 2 Current	-6	10	0
+ 5V DC Monitor #1	4.80	5.20	4.86
+12V DC Monitor #1	11.75	13.25	12.52
- 12 V DC Monitor #1	-13.25	-11.75	-12.44
+24V DC Monitor #1	23.3	25.2	23.9
+ 5V DC Monitor #2	4.80	5.20	4.88
+12V DC Monitor #2	11.75	13.25	12.50
-12V DC Monitor #2	-13.25	-11.75	-12.49
+24V DC Monitor #2	23.3	25.2	24.1

2. Power On/Off Indications： 檢視AC、DC電源開關狀態。

Observe the Localizer front panel for correct indications of:

(1). TX #1 AC power Indication on/off. Check if OK.

(2). TX #1 DC power indication on/off. Check if OK.

(3). TX #2 AC power indication on/off. Check if OK.

(4). TX #2 DC power indication on/off. Check if OK.

(1) TX #1 AC Power Indicator ☑ Check if OK

(2) TX #1 DC Power Indicator ☑ Check if OK

(3) TX #2 AC Power Indicator ☑ Check if OK

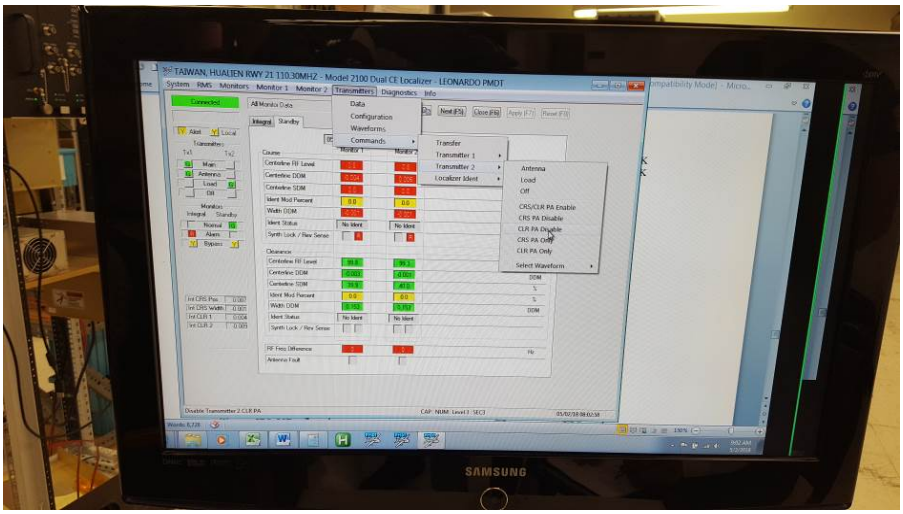
(4) TX #2 DC Power Indicator ☑ Check if OK

3. Transmitter RF Control： 確認CRS和CLR發射機控制功能。

(1). Log on to the PMDT with level 3 security password in Local Control Mode. Enter the amplifier assembly number for each corresponding amplifier that is installed on the system under the dropdown box in thePMDT/Transmitter/Configuration/Transmitter_ screen. Save the configuration under PMDT/RMS/ConfigBackup.

(2). Using the PMDT transmitter control window, turn the Course and Clearance RF on and off and observe Wattmeter. Check if OK.

(3). Repeat steps 1 and 2 for Transmitter 2.



		TX1	TX2
(2)	Course Transmitter On/Off Control	☑	☑ Check if OK
(2)	Clearance Transmitter On/Off Control	☑	☑ Check if OK

4. Radio Frequency and RF Frequency Control： 檢視CRS RF及CLR RF頻率正確性。

SETUP：*Connect Frequency Counter to the course/clearance test points of assembly 012106 (TRU),* ***TP5*** *CLR LO and TRU,* ***TP13*** *CRS LO. Place transmitter 1 on standby.*

(1). Record Localizer channel frequency.

(2). Measure the frequency of the Course channel RF and record.

(3). Measure the frequency of the Clearance channel RF and record.

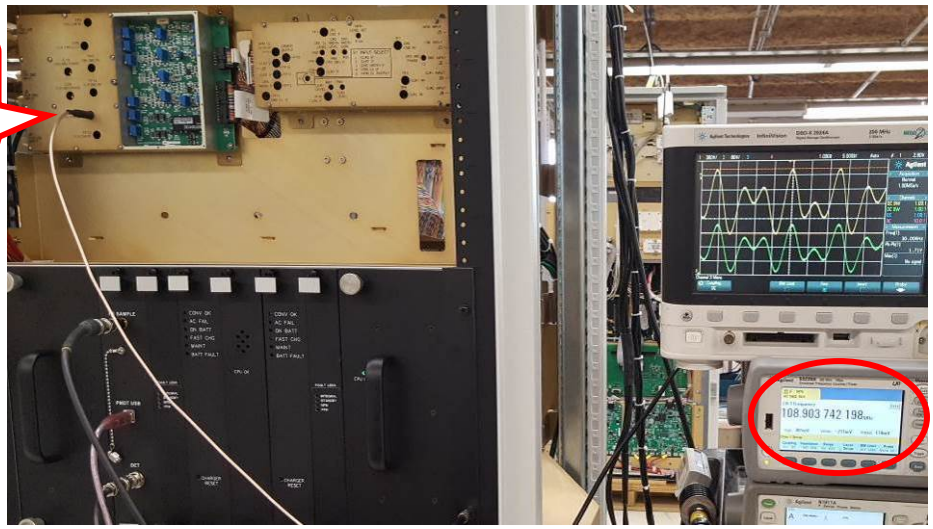
(4). Record frequency difference.

(5). Read frequency difference from the transmitter screen and record.

(6). Repeat steps 3 thru 6 for Transmitter 2 with transmitter 2 placed on standby.

TRU TP5
CLR LO

TRU TP13
CRS LO



(1)	S1 Switch Setting: (6 5 4 3 2 1): Enter Setting	001000
(2)	Localizer Channel Frequency	108.9 MHz
		TX1
(3)	Meas. CRS Freq. (Channel +4 kHz) A15A3 J4	108.903805 ± 0.001 %
(4)	Meas. CLR Freq. (Channel -4 kHz) A15A3 J1	108.895805 ± 0.001%
(5)	Measured Frequency Difference	8000 (7500Hz to 8500Hz)
(6)	Indicated Frequency Difference	8000 (7500Hz to 8500Hz)
		TX2
(3)	Meas. CRS Freq. (Channel +4 kHz) A15A3 J4	108.903751 ± 0.001 %
(4)	Meas. CLR Freq. (Channel -4 kHz) A15A3 J1	108.895751 ± 0.001%
(5)	Measured Frequency Difference	8000 (7500Hz to 8500Hz)
(6)	Indicated Frequency Difference	8000 (7500Hz to 8500Hz)

5. **CRS CSB Reflected Power and VSWR**： 檢視CRS CSB順向功率及反相功率，並計算VSWR。

(1). Read CRS CSB Forward Power on Wattmeter and record.

(2). Read CRS CSB Reflected Power on Wattmeter and record.

(3). Calculate VSWR using VSWR formula and record.

(4). Repeat steps 1 thru 3 for Transmitter 2.

		TX1	TX2
(1)	CRS CSB forward power	15.0	15.0 Record
(2)	CRS CSB reflected power	0.0	0.0 Record
(3)	CRS CSB VSWR (calculated)	1.00:1	1.00:1 Record

6. **CRS SBO Reflected Power and VSWR**： 檢視CRS SBO順向功率及反相功率，並計算VSWR。

(1). Read CRS SBO Forward Power on Wattmeter and record.

(2). Read CRS SBO Reflected Power on Wattmeter and record.

(3). Calculate VSWR using VSWR formula and record.

(4). Repeat steps 1 thru 3 for Transmitter 2.

		TX1	TX2	
(1)	CRS SBO forward power	0.2	0.2	Record
(2)	CRS SBO reflected power	0	0	Record
(3)	CRS SBO VSWR (calculated)	1:1	1:1	Record

7. **CLR CSB Reflected Power and VSWR :** 檢視CLR CSB順向功率及反相功率，並計算VSWR。

(1). Read CLR CSB Forward Power on Wattmeter and record.

(2). Read CLR CSB Reflected Power on Wattmeter and record.

(3). Calculate VSWR using VSWR formula and record.

(4). Repeat steps 1 thru 3 for Transmitter 2.

		TX1	TX2	
(1)	CLR CSB forward power	12	12	Record
(2)	CLR CSB reflected power	0	0	Record
(3)	CLR CSB VSWR (calculated)	1:1	1:1	Record

8. **CLR SBO Reflected Power and VSWR :** 檢視CLR SBO順向功率及反相功率，並計算VSWR。

(1). Read CLR SBO Forward Power on Wattmeter and record.

(2). Read CLR SBO Reflected Power on Wattmeter and record.

(3). Calculate VSWR using VSWR formula and record.

(4). Repeat steps 1 thru 3 for Transmitter 2.

		TX1	TX2	
(1)	CLR SBO forward power	0.2	0.2	Record
(2)	CLR SBO reflected power	0	0	Record
(3)	CLR SBO VSWR (calculated)	1:1	1:1	Record

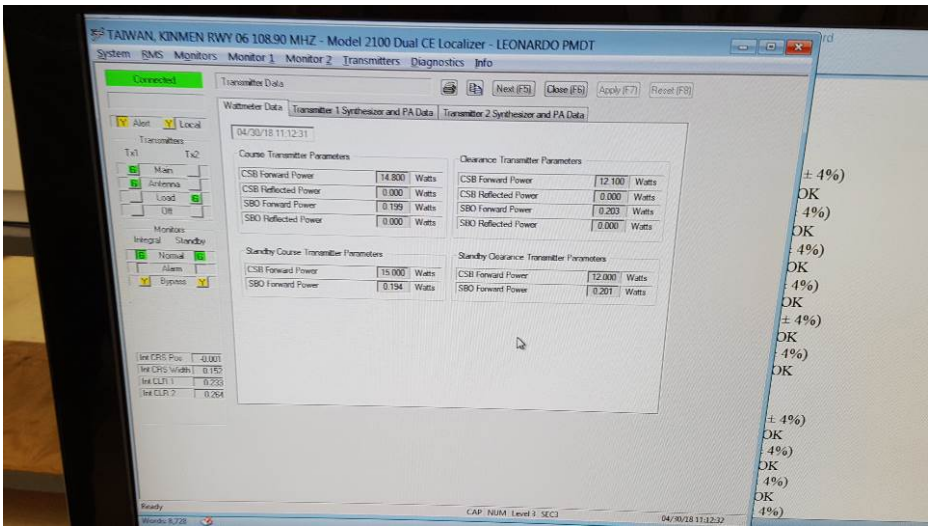
9. RF Power Metering： 檢視面板量測功率與PMDT顯示功率之誤差值及波形正確性。

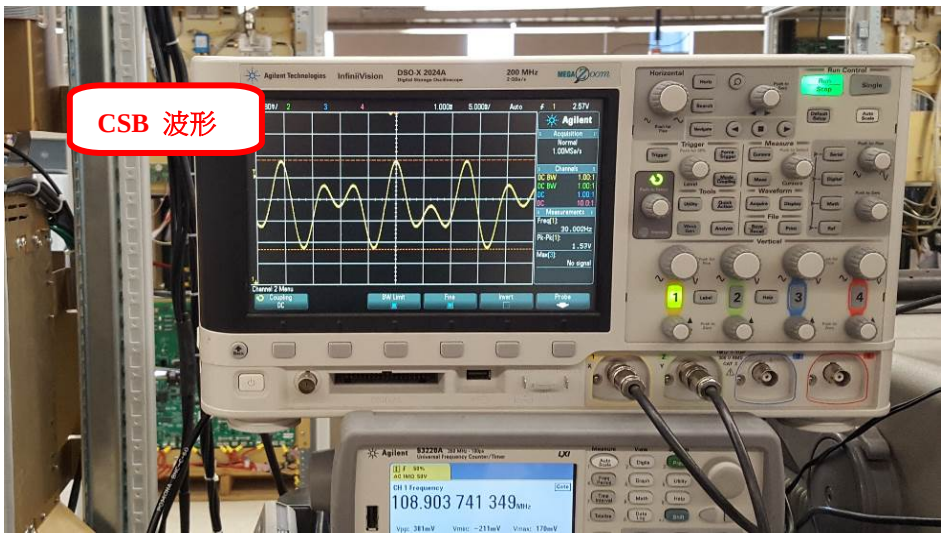
(1). Measure the Main Course CSB Forward power reading on the Wattmeter Display and record.

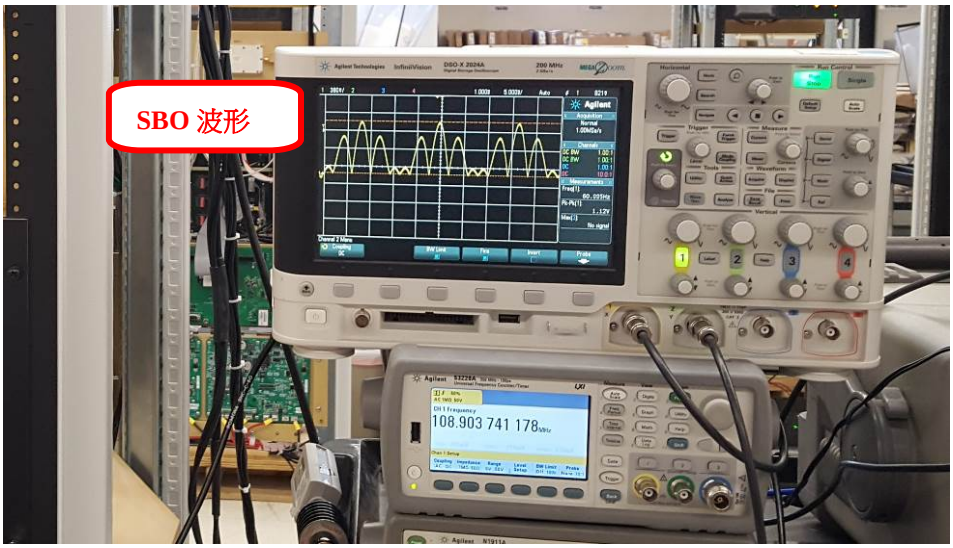
(2). On the PMDT, select [Transmitters / Data / Wattmeter Data] and record the internal CSB forward power reading. Verify the reading is within ± 4 % of the Wattmeter reading.

(3). Verify the Course CSB waveform is available at the front panel Wattmeter Test jack. Check if OK.

(4). Repeat steps 1 thru 3 for the remainder of the readings requested on the data sheets.







Wattmeter Functions:

	CRS Transmitter		
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 15	Int 15 (Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0	Int 0 (Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO F Pwr Reading Accuracy	Wm 0.2	Int 0.209 (Wm ± 4%)
(3)	Main SBO F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO R Pwr Reading Accuracy	Wm 0	Int 0 (Wm ± 4%)
(3)	Main SBO R Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 15	Int 15 (Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby SBO Pwr Reading Accuracy	Wm 0.2	Int 0.204 (Wm ± 4%)
(3)	Stby SBO Pwr Select and Waveform		☑ Check if OK
	CLR Transmitter		
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 12	Int 12 (Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0	Int 0 (Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO F Pwr Reading Accuracy	Wm 0.2	Int 0.207 (Wm ± 4%)
(3)	Main SBO F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO R Pwr Reading Accuracy	Wm 0	Int 0 (Wm ± 4%)
(3)	Main SBO R Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 12	Int 12 (Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby SBO Pwr Reading Accuracy	Wm 0.2	Int 0.205 (Wm ± 4%)
(3)	Stby SBO Pwr Select and Waveform		☑ Check if OK

10. CRS System Spurious Emissions：量測CRS頻率2次諧波及3次諧波是否符合標準。

SETUP：*Connect a Spectrum Analyzer to the output of the CRS CSB attenuator.*

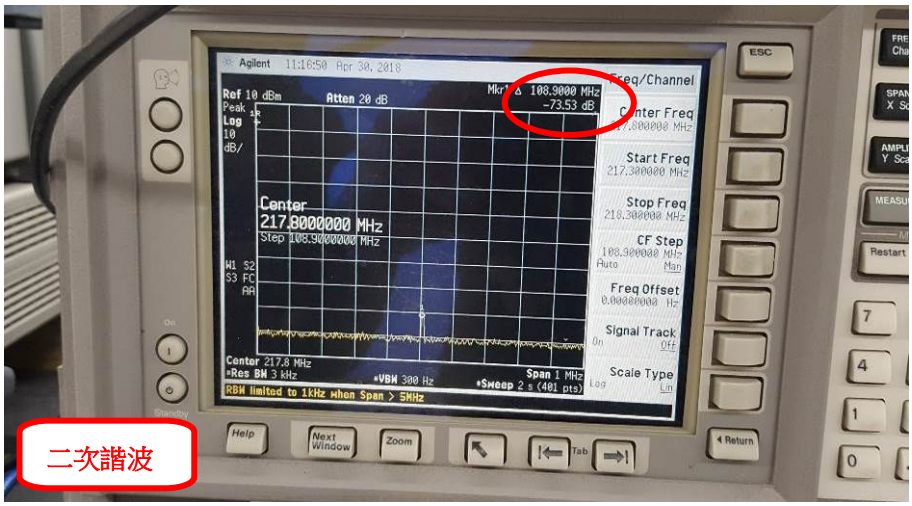
(1). Set CRS 90 and 150 Hz modulation off.

(2). Set CRS keying off.

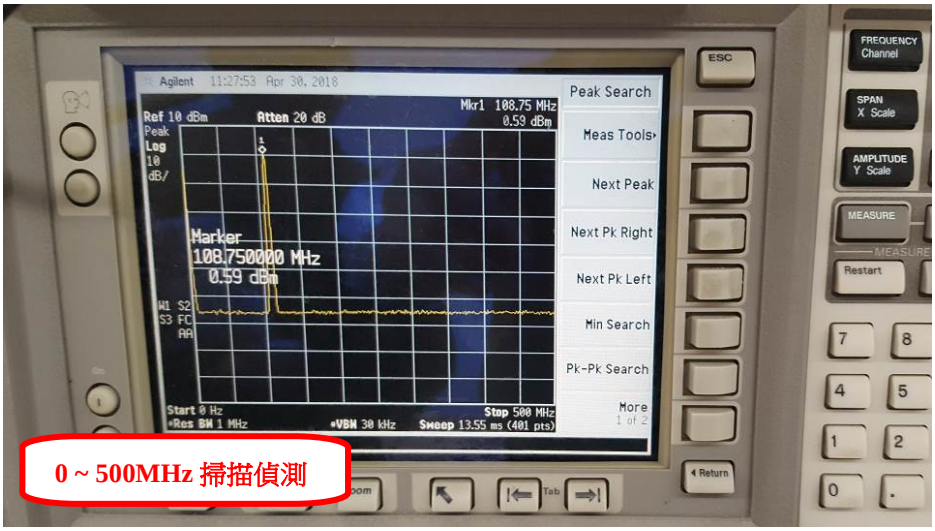
(3). Set spectrum analyzer to carrier signal. Note level in dBm. Set span to 1MHz, step to manual and

enter center frequency.

(4). Measure and compare the second and third harmonics to the carrier frequency. Record the frequency and amplitude difference, with respect to the carrier level in dB (dBc), of each harmonic.



(5). Verify with the spectrum analyzer that from 0 Hz to 500 MHZ, no spurs are larger than -60dBC. Check if OK.



(6). Remove spectrum analyzer from system.

(7). Set 90/150 Hz modulation and keyer on to return system to normal.

(8). Repeat steps 1 thru 7 for Transmitter 2.

	TX1	Frequency	Level
(3)	Fundamental	108.9 MHz	0 Record
(4)	Second Harmonic	217.8 MHz	-72 < -60 dBC
	Third Harmonic	326.7 MHz	-82 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

	TX2	Frequency	Level
(3)	Fundamental	108.9 MHz	0 Record
(4)	Second Harmonic	217.8 MHz	-72 < -60 dBC
	Third Harmonic	326.7 MHz	-82 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

11. CLR System Spurious Emissions： 量測CLR頻率2次諧波及3次諧波是否符合標準。

SETUP：Connect a Spectrum Analyzer to the output of the CLR CSB attenuator.

(1). Set CLR 90 and 150 Hz modulation off.

(2). Set CLR keying off.

(3). Set spectrum analyzer to carrier signal. Note level in dBm. Set span to 1MHz step to manual and enter center frequency.

(4). Measure and compare the second and third harmonics to the carrier frequency. Record the frequency and amplitude difference, with respect to the carrier level in dB (dBc), of each harmonic.

(5). Verify with the spectrum analyzer that from 0 Hz to 500 MHZ, no spurs are larger than -60dBC. Check if OK.

(6). Remove spectrum analyzer from system.

(7). Set 90/150 Hz modulation and keyer on to return system to normal.

(8). Repeat steps 1 thru 7 for Transmitter 2.

	TX1	Frequency	Level
(3)	Fundamental	108.9 MHz	0 Record
(4)	Second Harmonic	217.8 MHz	-73.2 < -60 dBC
	Third Harmonic	326.7 MHz	-81.2 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

	TX2	Frequency	Level
(3)	Fundamental	108.9 MHz	0 Record
(4)	Second Harmonic	217.8 MHz	-73 < -60 dBC
	Third Harmonic	326.7 MHz	-80.1 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

12. CRS Carrier Signal at Sideband Output： 用頻譜分析儀量測CRS CSB及CRS SBO於carrier level之差是否符合標準。

SETUP：1. Disable transmission and disconnect the CRS CSB feed cable and connect Spectrum Analyzer to CRS CSB output using a 30-dB attenuator.

2. Find Station Frequency.

3. Set Center Frequency.

4. Adjust Spectrum Analyzer to the following settings:

Span 2 KHz *RBW 30 Hz*

VBW 30 Hz *SWP 2.5 Sec*

Atten 10dB

(1). Measure the CRS CSB carrier level and set marker on spectrum analyzer to marker zero.

(2). Disable transmission, place the CRS CSB feed cable back to the normal position, and place the 30 dB attenuator and spectrum analyzer on the CRS SBO output. Measure and record the reading.

(3). Repeat steps 1 and 2 for Transmitter 2.

(4). Place the system back to the normal state.

(2) CRS carrier signal at sideband output TX1 -78.4 TX2 -71.5 <-30 dBC

13. CLR Carrier Signal at Sideband Output : 用頻譜分析儀量測 CLR CSB 及 CLR SBO 於 carrier level 之差是否符合標準。

SETUP：*1. Disable transmission and disconnect the CLR CSB feed cable and connect Spectrum Analyzer to CLR CSB output using a 30-dB attenuator.*

2. Find Station Frequency.

3. Set Center Frequency.

4. Adjust Spectrum Analyzer to the following settings:

Span 2 KHz *RBW 30 Hz*

VBW 30 Hz *SWP 2.5 Sec*

Atten 10dB

(1). Measure the CLR CSB carrier level and set marker on spectrum analyzer to marker zero.

(2). Disable transmission, place the CLR CSB feed cable back to the normal position, and place the 30 dB attenuator and spectrum analyzer on the CLR SBO output. Measure and record the reading.

(3). Repeat steps 1 and 2 for Transmitter 2.

(4). Place the system back to the normal state.

		TX1	TX2	
(2)	CLR carrier signal at sideband output	-73	-71	<-30 dBC

14. **LO Outputs**： 量測CRS LO及CLR LO的輸出功率。

(1). Connect Power Meter to the cable feeding into J4 on the TRU.

(2). Measure and record the CRS LO output power.

(3). Connect Power Meter to the cable feeding into J1 on the TRU.

(4). Measure and record the CLR LO output power.

(5). Repeat steps 1 thru 4 for Transmitter 2.

		TX1	TX2	
(2)	CRS LO Output Power	8.6	8.7	≥ 6.3 mW but ≤ 63.1 mW
(4)	CLR LO Output Power	8.6	8.6	≥ 6.3 mW but ≤ 63.1 mW

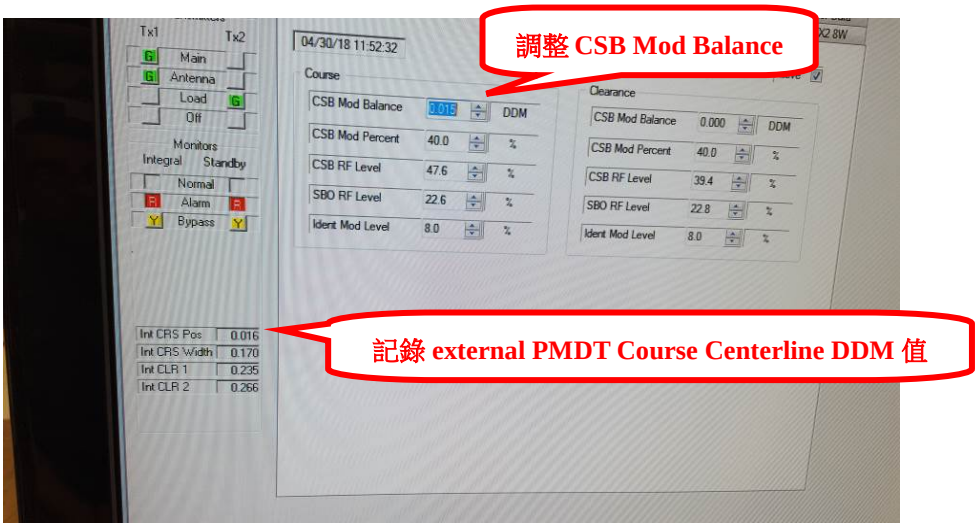
15. **CRS Modulation Balance Adjustment**： 調整CRS Modulation Balance，並確認外部PMDT與內部PIR監測的Centerline DDM 是否在標準內。

SETUP：*Connect PIR to the RF Sample port located on the front panel of the RF Monitor. Select CRS CSB on the LCU wattmeter. Turn off CRS SBO Power.*

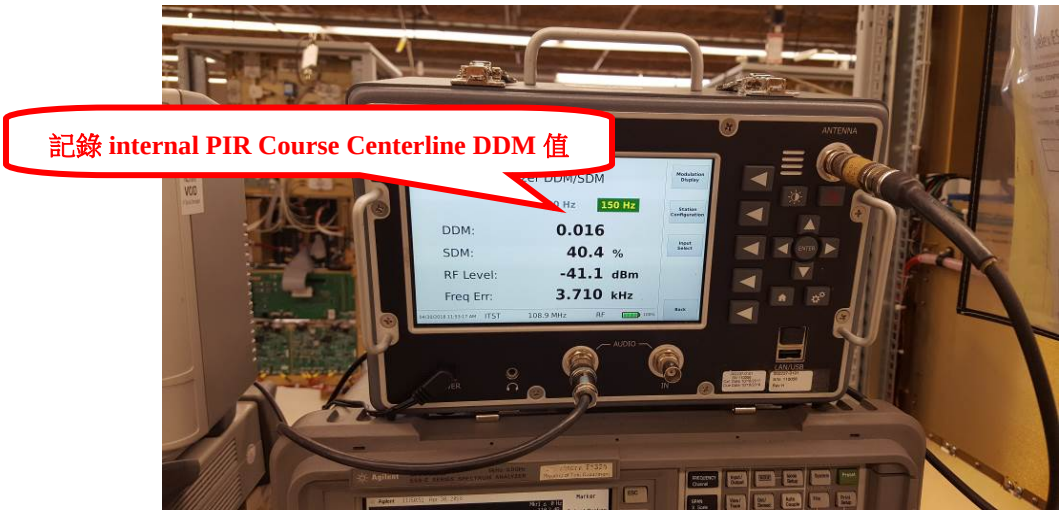
(1). On the PMDT, select [Transmitter / Waveforms / Waveform 1] to change the DDM settings.

(2). Adjust the Course CSB Carrier Power Level to 15 Watts, SDM to 40%, and DDM to 0.000 and Apply.

(3). On the PMDT, select [Monitor 1 / Data / Integral] and record the external Course Centerline DDM reading for each of the DDM settings.



(4). On the PIR, record the internal DDM reading for each of the DDM settings.



(5). Repeat steps 1 thru 4 for Transmitter 2.

TX1

At 40% SDM (Nominal Modulation Setting)

(3,4) DDM setting	External	Internal	Tolerance
0.000	0	0	S (standard)
0.015	0.015	0.015	S + 0.015 ± 0.002
0.030	0.030	0.030	S + 0.030 ± 0.004
-0.015	-0.016	-0.016	S - 0.015 ± 0.002
-0.030	-0.031	-0.031	S - 0.030 ± 0.004

TX2

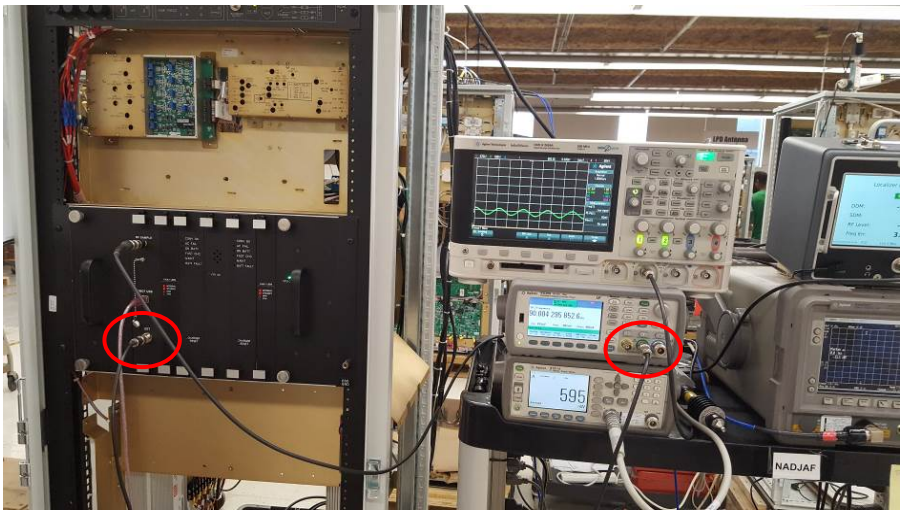
At 40% SDM (Nominal Modulation Setting)

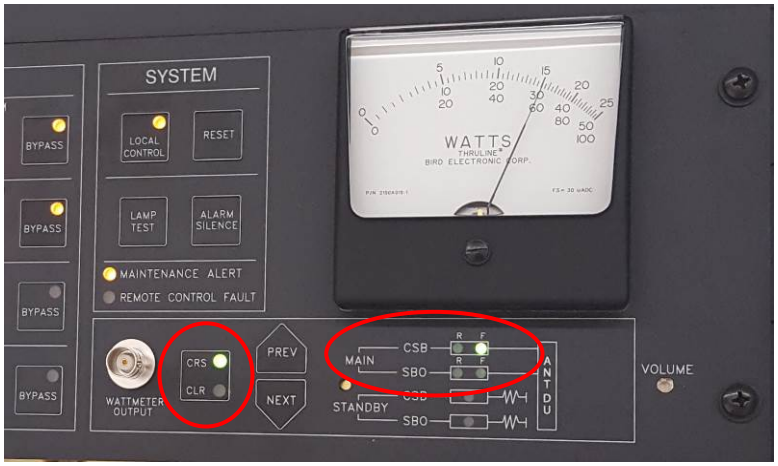
(3,4) DDM setting	External	Internal	Tolerance
0.000	0	0	S (standard)
0.015	0.015	0.015	S + 0.015 ± 0.002
0.030	0.030	0.030	S + 0.030 ± 0.004
-0.015	-0.016	-0.016	S - 0.015 ± 0.002
-0.030	-0.031	-0.031	S - 0.030 ± 0.004

16. CRS Nav Tones Audio Frequency：用計頻器量測CRS音頻90Hz及150Hz是否正確。

SETUP：*1. Connect frequency counter to the Detected port located on the front panel of the RF Monitor.*

2. Select CRS CSB on the LCU wattmeter.





(1). Turn only 90 Hz modulation on.

(2). Record external reading from frequency counter.

(3). Turn only 150 Hz modulation on.

(4). Record external reading from frequency counter.

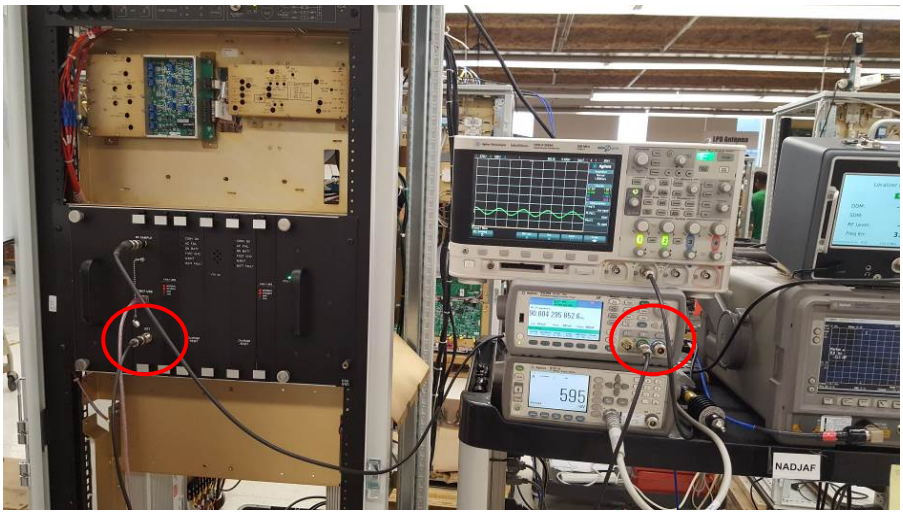
(5). Repeat steps 1 thru 4 for Transmitter 2.

		TX1	TX2	External
(2)	90 Hz frequency	90	90	90 ± 1% (0.90 Hz)
(4)	150 Hz frequency	150	150	150 ±1% (1.50Hz)

17. CLR Nav Tones Audio Frequency：用計頻器量測CLR音頻90Hz及150Hz是否正確。

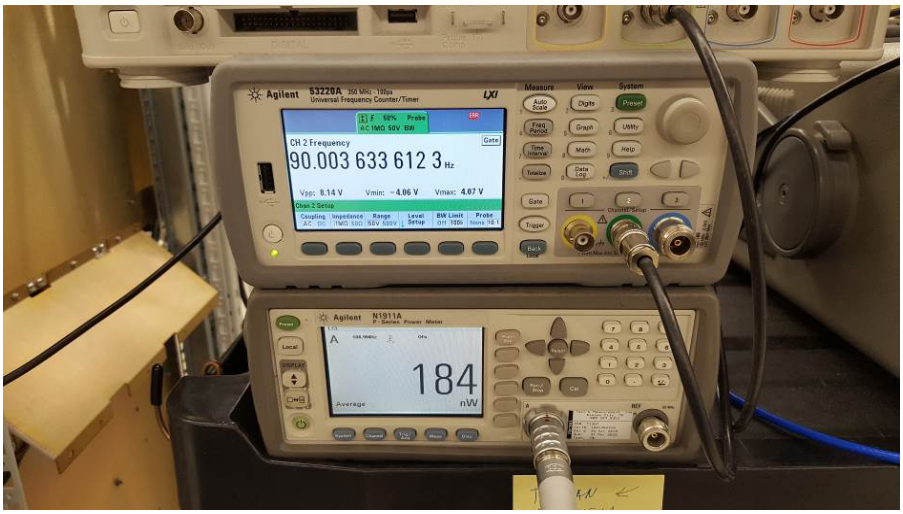
SETUP：*1. Connect frequency counter to the Detected port located on the front panel of the RF Monitor.*

2. Select CLR CSB on the LCU wattmeter.



(1). Turn only 90 Hz modulation on.

(2). Record external reading from frequency counter.



(3). Turn only 150 Hz modulation on.

(4). Record external reading from frequency counter.

(5). Repeat steps 1 thru 4 for Transmitter 2.

		TX1	TX2	External
(2)	90 Hz frequency	90	90	90 ± 1% (0.90 Hz)
(4)	150 Hz frequency	150	150	150 ±1% (1.50 Hz)

18. Integral Monitor Voting Logic：驗證監視邏輯於AND及OR狀態下是否運作正常。

SETUP：*Station Operating Normally*

1. On the PMDT, select [Monitors/Configuration/Integral] and set the alarm limits as shown in the following table:

Integral Alarm Limits				
Parameter Alarm Low	Alarm Low	Prealarm Low	Prealarm High	Alarm High
Course				
Centerline RF Level	*80%*	*85%*	*115%*	*120%*
Centerline DDM	*-0.004*	*-0.003*	*0.003*	*0.004*
Centerline SDM	*36%*	*37%*	*43%*	*44%*
Ident Mod Percent	*6.0%*	*6.5%*	*9.5%*	*10.0%*
Width DDM	*0.140*	*0.144*	*0.166*	*0.170*

Cont/Lack Ident	*17*	*N/A*	*N/A*	*N/A*
Clearance				
Centerline RF Level	80%	85%	115%	120%
CLR 1 DDM	0.235 (*)	0.240 (*)	0.280 (*)	0.285 (*)
Centerline SDM	36%	37%	43%	44%
Ident Mod Percent	*6.0%*	*6.5%*	*9.5%*	*10.0%*
CLR 2 DDM	0.280 (*)	0.285 (*)	0.325 (*)	0.330 (*)

** If connected to a DU/CU the values should CLR 1 and 2 alarm values should be ± 0.025 DDM from the nominal and prealarm values should be ± 0.020 DDM from the nominal.*

2. On the PMDT, in the [RMS / Configuration/General] screen, verify the Monitor Voting Logic is set to the AND configuration.

(1). On the PMDT, select [Monitor 1/ Data / Status] and verify no alarms are shown for Monitor #1. Record.

(2). On the PMDT, select [Monitor 2 / Data / Status] and verify no alarms are shown for Monitor #2. Record.

(3). Set the Local/Remote switch on the transmitter front panel to the Remote position.

(4). On the PMDT, select [Monitors / Commands / Integral Monitor Bypass / On] and verify a bypass indication is indicated for the Integral Monitor in the Monitors Status group at the left of the PMDT screen. Also verify the transmitter front panel Bypass light illuminates for the Integral Monitor.

(5). Set the Local/Remote switch on the front panel to the Local position. Press the Integral Monitor Bypass button on the transmitter front panel and verify the Bypass is removed.

(6). Remove all monitor bypass conditions.

(7). On the PMDT, select [Monitor 1 / Offsets and Scale Factors / Integral] and set the CRS Centerline SDM Scale Factor to 0. This should result in an alarm condition for Monitor 1.

(8). Verify the transmitter front panel Integral Monitor 1 alarm light is illuminated.

(9). On the PMDT, select [RMS /Status/Monitor/Transmitter Status] and verify an Integral Monitor Mismatch indication.

(10). Verify the station continues to operate in this condition.

(11). On the PMDT, select [Monitor 2 / Offsets and Scale Factors / Integral] and set the Path SDM Scale Factor to 0. This should result in an alarm condition for Monitor 2.

(12). Verify the transmitter front panel Integral Monitor 2 alarm light is illuminated and the station transfers and shuts down. This confirms the Monitor AND function.

(13). Place the Integral Monitor in Bypass and reset the Offset for Monitor 2 to the normal condition. Restart the station. This should result in a normal indication for Monitor 2. Monitor 1 should remain in alarm.

(14). On the PMDT, in the [RMS / Configuration / General] screen, set the Monitor Voting Logic to the OR configuration.

(15). Remove the Integral Monitor Bypass. The station should immediately transfer and shut down. This confirms the Monitor OR function.

(16). Bypass the Integral Monitor and reset the SDM Scale Factors for Monitors 1 and 2 to their normal values.

(17). On the PMDT, in the [RMS / Configuration / General] screen, reset the Monitor Voting Logic to the AND configuration.

(18). Restart the station. Normal operation with no monitor alarms should be indicated.

(1)	Monitor #1 Normal Indication	☑ Check if OK
(2)	Monitor #2 Normal Indication	☑ Check if OK
(4)	Integral Monitor Bypass Function	☑ Check if OK
	Integral Monitor bypass light	☑ Check if OK
(5)	Integral monitor bypass removed	☑ Check if OK
(8)	Integral monitor 1 alarm	☑ Check if OK
(9)	Integral Monitor Mismatch indication	☑ Check if OK
(10)	Station operational w/mon 1 alarm	☑ Check if OK
(12)	Integral monitor 2 alarm/station transfer/ Shut down (monitor "and" function)	☑ Check if OK
(15)	Station transfer /shut down (Monitor "OR" Function)	☑ Check if OK

19. Integral and Standby Monitor Alarms： 驗證Monitor各參數於超過High Alarm與

Low Alarm上時，是否正常顯示告警。

SETUP：*System Operating Normal Place all Bypass switches to ON.*

(1). On the PMDT, select [Monitor 1 / Data / Integral] and verify no alarms are shown for Monitor #1 and that the CRS Centerline DDM Value is 0.000 + 0.001. Check if OK.

(2). On the PMDT, select [Monitor 1 / Data / Standby] and verify no alarms are shown for Monitor #1 and that the CRS and CLR Centerline DDM Value is 0.000 + 0.001. Check if OK.

(3). On the PMDT, select [Monitor 2 / Data / Integral] and verify no alarms are shown for Monitor #2 and that the CRS Centerline DDM Value is 0.000 +0.001. Check if OK.

(4). On the PMDT, select [Monitor 2 / Data / Standby] and verify no alarms are shown for Monitor #2 and that the CRS and CLR Centerline DDM Value is 0.000 +0.001. Check if OK.

(5). On the PMDT, select [Transmitters/Waveform/Waveform1]and adjust the CRS and CLR CSB RF Levels down to cause the integral monitor to go into alarm.

(6). On the PMDT, select [Monitor 1 / Data / Integral] and confirm a low alarm condition for the CRS and CLR RF Levels.

(7). On the PMDT, select [Monitor 1 / Data / Standby] and confirm a low alarm condition for the CRS and CLR RF Levels.

(8). Repeat Steps 6 and 7 for Monitor 2.

(9). On the PMDT, select [Transmitters/Waveform/Waveform1]and adjust the CRS and CLR CSB RF Levels up to cause the integral monitor to go into alarm.

(10). On the PMDT, select [Monitor 1 / Data / Integral] and confirm a high alarm condition for the CRS and CLR RF Levels.

(11). On the PMDT, select [Monitor 1 / Data / Standby] and confirm a high alarm condition for the CRS and CLR RF Levels.

(12). Repeat Steps 10 and 11 for Monitor 2.

(13). Return CRS and CLR RF Levels to normal power.

(14). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB Mod Percent Values down to cause the integral monitor to go into alarm.

(15). On the PMDT, select [Monitor1/Data/Integral] and confirm a low alarm condition for the CRS Centerline SDM.

(16). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the CRS Centerline SDM.

(17). Repeat Steps 15 and 16 for Monitor 2.

(18). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB Mod Percent up to cause the integral monitor to go into alarm.

(19). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the CRS Centerline SDM.

(20). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the CRS Centerline SDM.

(21). Repeat Steps 19 and 20 for Monitor 2.

(22). Return the CRS and CLR CSB Mod Percent Values to nominal.

(23). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS CSB Mod Balance Values down to cause the integral monitor to go into alarm.

(24). On the PMDT, select [Monitor1/Data/Integral] and confirm a low alarm condition for the CRS Centerline DDM.

(25). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the CRS Centerline DDM.

(26). Repeat Steps 24 and 25 for Monitor 2.

(27). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS CSB Mod Balance Values up to cause the integral monitor to go into alarm.

(28). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the CRS Centerline DDM.

(29). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the CRS Centerline DDM.

(30). Repeat Steps 28 and 29 for Monitor 2.

(31). Return the CRS CSB Mod Balance Values to nominal.

(32). 32. On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR SBO RF Level Values down to cause the integral monitor to go into alarm.

(33). On the PMDT, select [Monitor1/Data/Integral] and confirm a low alarm condition for the CRS and CLR Width DDM.

(34). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the CRS and CLR Width DDM.

(35). Repeat Steps 33 and 34 for Monitor 2.

(36). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR SBO RF Level Values up to cause the integral monitor to go into alarm.

(37). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the CRS and CLR Width DDM.

(38). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the CRS and CLR Width DDM.

(39). Repeat Steps 37 and 38 for Monitor 2.

(40). Return the CRS and CLR SBO RF Level Values to Nominal.

(41). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR Ident Mod Level Values down to cause the integral monitor to go into alarm.

(42). On the PMDT, select [Transmitters, Commands, Loc Ident, Normal]. Select [Monitor1/Data/Integral] and confirm a low alarm condition for the CRS and CLR Ident Mod Level.

(43). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the CRS and

CLR Ident Mod Level.

(44). Repeat Steps 42 and 43 for Monitor 2.

(45). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR Ident Mod Level Values up to cause the integral monitor to go into alarm.

(46). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the CRS and CLR Ident Mod Level.

(47). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the CRS and CLR Ident Mod Level.

(48). Repeat Steps 46 and 47 for Monitor 2.

(49). Return the CRS and CLR Ident Mod Level Values to Nominal.

(50). On the PMDT, select [Transmitters/Commands/Localizer Ident/Continuous].

(51). On the PMDT, select [Monitor1/Data/Integral] and confirm that a continuous ident alarm appears.

(52). On the PMDT, select [Monitor1/Data/Standby] and confirm that a continuous ident alarm appears.

(53). Repeat Steps 51 and 52 for Monitor 2.

(54). On the PMDT, select [Transmitters/Commands/Localizer Ident/Normal].

(55). On the PMDT, select [Transmitters/Commands/Localizer Ident/Off].

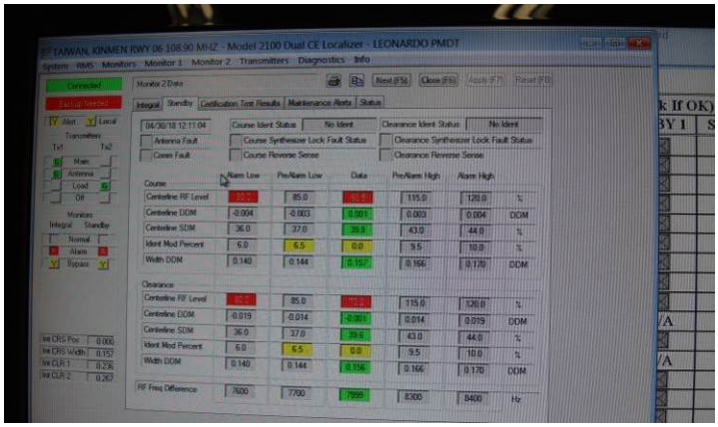
(56). On the PMDT, select [Monitor1/Data/Integral] and confirm that No Ident appears.

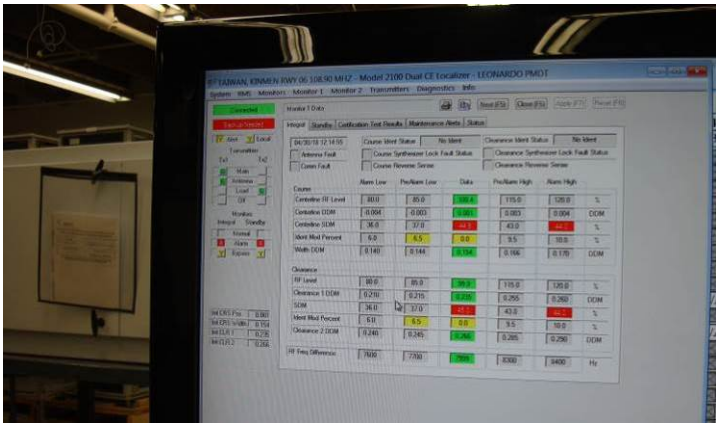
(57). On the PMDT, select [Monitor1/Data/Standby] and confirm that No Ident appears.

(58). Repeat Steps 56 and 57 for Monitor 2.

(59). On the PMDT, select [Transmitters/Commands/Localizer Ident/Normal].

(60). Restart the station. Normal operation with no monitor alarms should be indicated.





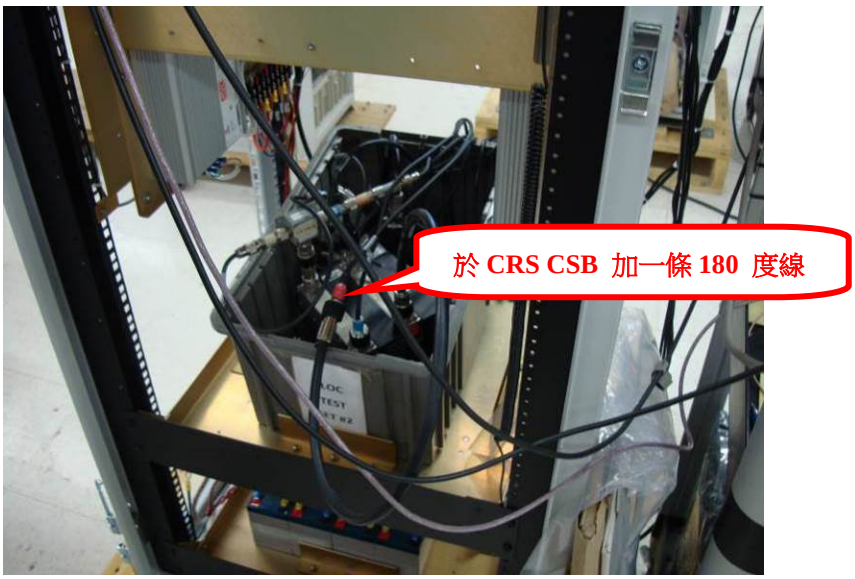
(1) Integral Mon 1 CRS Centerline DDM Value ☑ Check if OK
(2) Standby Mon 1 CRS Centerline DDM Value ☑ Check if OK
Standby Mon 1 CLR Centerline DDM Value ☑ Check if OK
(3) Integral Mon 2 CRS Centerline DDM Value ☑ Check if OK
(4) Standby Mon 2 CRS Centerline DDM Value ☑ Check if OK
Standby Mon 2 CLR Centerline DDM Value ☑ Check if OK

Test Step	Alarm	CRS/CLR	Monitor Test (Check If OK)			
			INT 1	INT 2	STBY 1	STBY 2
(6,7,8)	RF Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(10,11,12)	RF Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(15,16,17)	Centerline SDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(19,20,21)	Centerline SDM Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(24,25,26)	Centerline DDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	N/A	N/A	N/A	N/A
(28,29,30)	Centerline DDM Alarm High	CRS	☑	☑	☑	☑
		CLR	N/A	N/A	N/A	N/A
(33,34,35)	Width DDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(37,38,39)	Width DDM Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(42,43,44)	Ident Mod Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(46,47,48)	Ident Mod Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(51,52,53)	Continuous Ident Timeout		☑	☑	☑	☑
(56,57,58)	No Ident Timeout		☑	☑	☑	☑

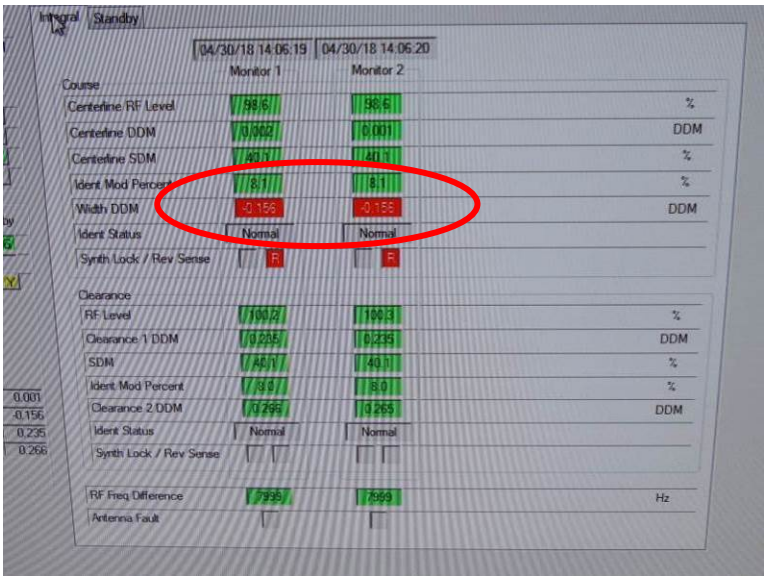
20. **Integral Monitor Reverse Sensing Alarms**：於CRS CSB及CLR CSB加入180度線，並檢視Monitor Width DDM使否發生反相。

SETUP：*System operation normal*

(1). Remove the Integral CRS CSB feed line and add 180 deg. Line section and reconnect.



(2). Observe on the PMDT the CRS width monitor reads approx. -0.155 DDM 90Hz.



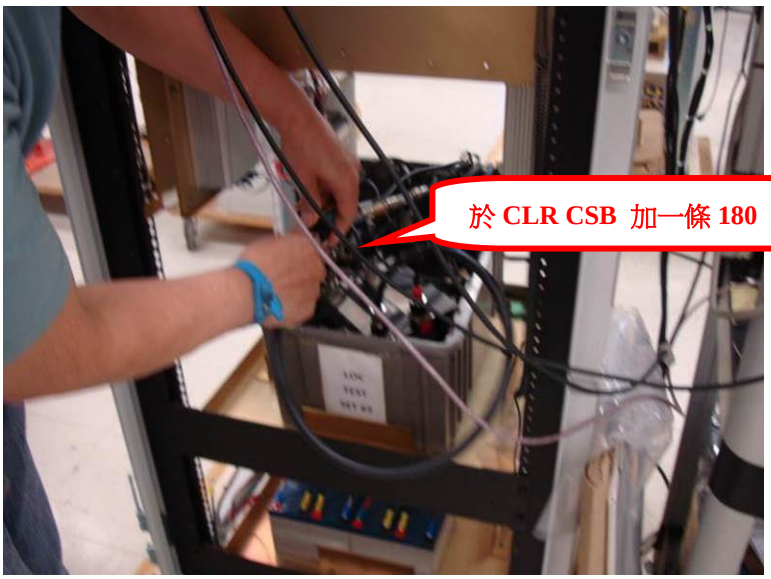
(3). Confirm the monitor shows a reverse sensing alarm.

(4). Remove system from bypass and confirm a hard shutdown.

(5). Confirm there is an alarm on monitor 2.

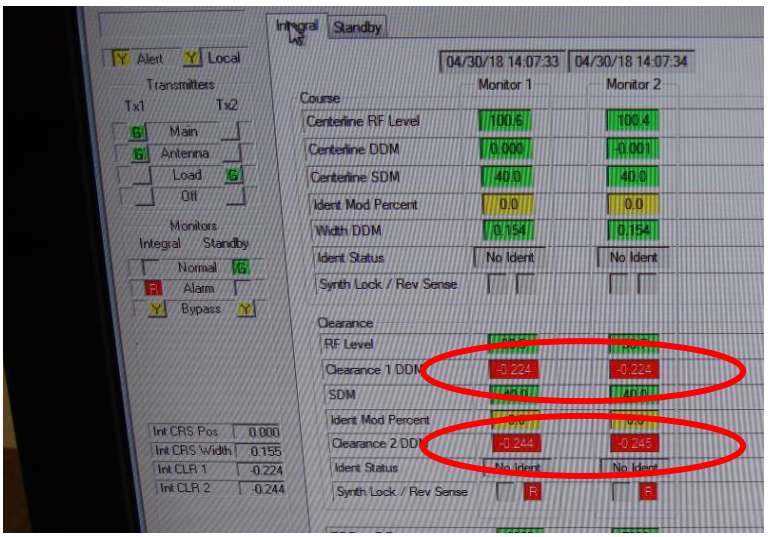
(6). Return the system to normal.

(7). Remove the Integral CLR CSB feed line and add 180 deg. Line section and reconnect.



(8). Observe on the PMDT the CLR 1 width monitor reads approx. -0.260 DDM.

(9). Observe on the PMDT the CLR 2 width monitor reads approx. -0.305 DDM.



(10). Confirm the monitor shows a reverse sensing alarm.

(11). Remove system from bypass and confirm a hard shutdown.

(12). Confirm there is an alarm on monitor 2.

(13). Return the system to normal.

CRS TX

(2)	CRS Width DDM	-0.156 Approx -0.155 DDM
(3)	Monitor indicates reverse sensing alarm	☑ Check if OK
(4)	Hard shutdown	☑ Check if OK
(5)	Alarm on monitor 2	☑ Check if OK

CLR TX

(7)	CLR 1 Width DDM	-0.234 Approx -0.260 DDM
(8)	CLR 2 Width DDM	-0.255 Approx -0.305 DDM
(9)	Monitor indicates reverse sensing alarm	☑ Check if OK
(10)	Hard shutdown	☑ Check if OK
(11)	Alarm on monitor 2	☑ Check if OK

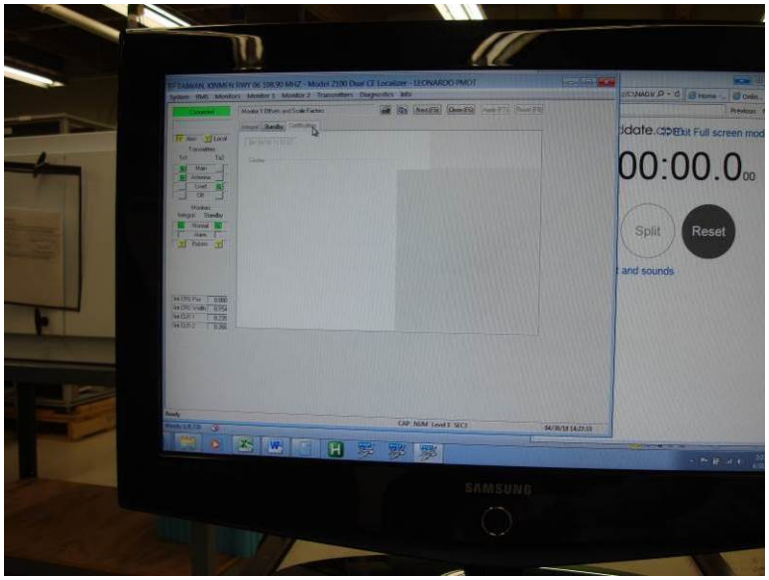
21. Monitors Certification and Certification Limits： 測試監視自我驗證功能是否正常。

SETUP：*System Operation Normal*

(1). On the PMDT, log-on at Level 3 Password. Select the [RMS / Configuration / General].

(2). Disable Monitor Certification.

(3). On the PMDT, select [Monitor 1 / Data /] and verify the Certification Test Results tab does not appear.



(4). On the PMDT, select [RMS / Configuration / General].

(5). Enable Monitor Certification.

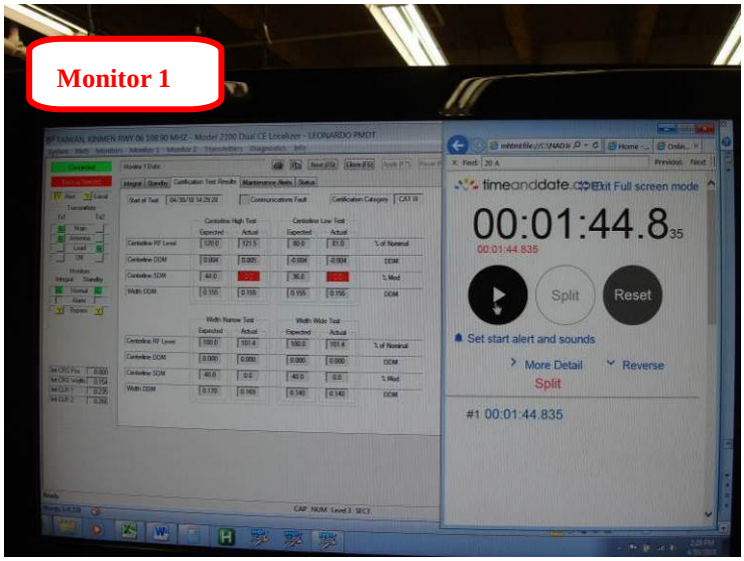
(6). On the PMDT, select [Monitor 1 / Data / Certification Test Results] and verify the monitor certification interval is less than or equal to ≤ two minutes.

(7). On the PMDT, select [Monitor 1/ Monitor Offsets and Scale Factors/Certification].

(8). Change the SDM Scale to 0% Mod.

(9). On the PMDT, select [Monitor 1 / Data / Certification Test Results].

(10). Verify that an out-of-tolerance condition exists for Centerline SDM.



(11). On the PMDT, select [RMS / Status / Monitor/Transmitter Status] and verify the Monitor 2 Indicator is Green and Monitor 1 Indicator is not Green. This indicates the Monitor is disabled from voting.

(12). Verify Monitor 1 is in an alarm condition for Integral, Standby Transmitter and Near Field Monitor (if configured present) on the LCU.

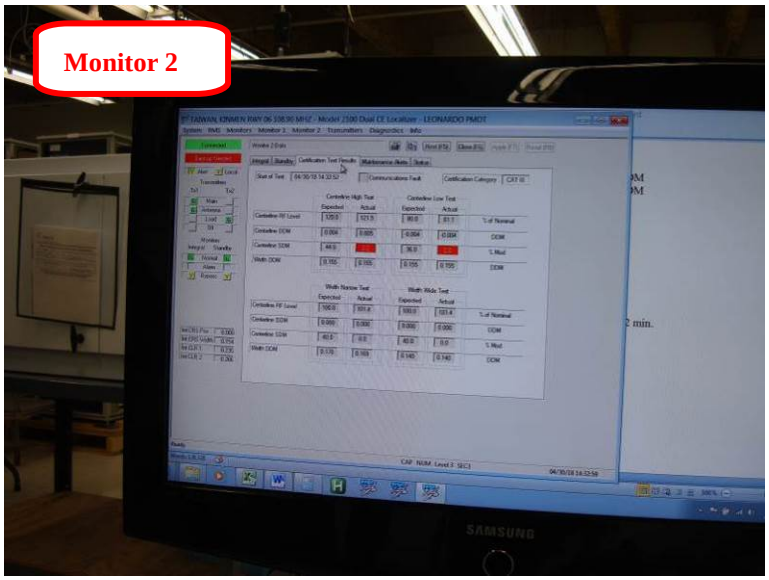
(13). On the PMDT, select [Monitor 1 / Offsets and Scale Factors/Certification] and change the Centerline SDM Scale to 100% Mod.

(14). On the PMDT, select [Monitor 2 / Offsets and Scale Factors/Certification].

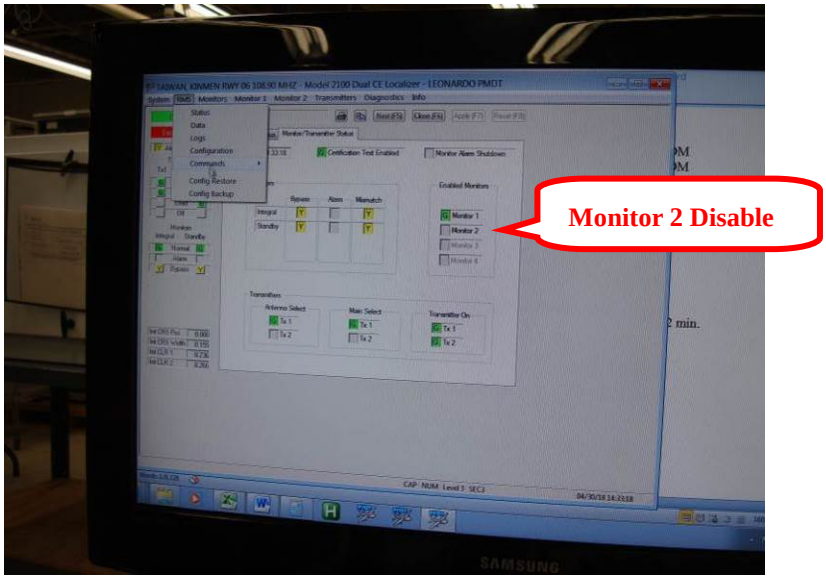
(15). Change the Centerline SDM Scale to 0 % Mod.

(16). On the PMDT, select [Monitor 2 / Data / Certification Test Results].

(17). Verify an out-of-tolerance condition exists for Centerline SDM.



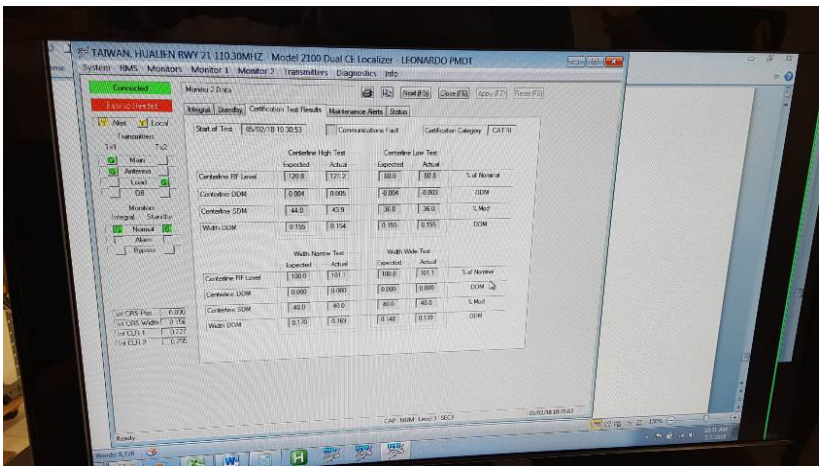
(18). On the PMDT, select [RMS / Status / Monitor/Transmitter Status] and verify the Monitor 1 Indicator is Green and the Monitor 2 indicator is not Green. This indicates Monitor 2 is disabled from voting.



(19). On the PMDT, select [Monitor 2 / Offsets and Scale Factors/Certification] and change the Centerline SDM Scale to 100 % Mod.

(20). On the PMDT, select [Monitor 1 / Data / Certification Test Results] and verify the Certification Results are in tolerance for all parameters.

(21). On the PMDT, select [Monitor 2 / Data / Certification Test Results] and verify the Certification Results are in tolerance for all parameters.



(2)	Monitor Certification On/Off Control	☑ Check if OK
(3)	No monitor certification tab	☑ Check if OK
(6)	Monitor Certification Interval	1min, 32sec < 2 min.
(10)	Mon. 1 centerline SDM out of tolerance	☑ Check if OK
(11)	Mon. 1 voting disabled	☑ Check if OK
(12)	Mon. 1 alarm for integral, standby tx and nfim	☑ Check if OK
(17)	Mon. 2 centerline SDM out of tolerance	☑ Check if OK
(18)	Mon. 2 voting disabled	☑ Check if OK
(20)	Certification results in tolerance for all parameters for monitor #1	☑ Check if OK
(21)	Certification results in tolerance for all parameters for monitor #2	☑ Check if OK

22. Transmitter Selection and Indications： 檢視發射機切換和指示正常。

SETUP：*System Operation Normal*

Operate the system to observe the following indications are normal:

(1). Transfer TX #1 and TX #2 as main and observe the indicator lamps.

(2). Transfer TX #1 and TX #2 and observe the on- antenna indicator lamps.

(3). Make standby TX hot and observe correct indications of load lamps.

(4). Turn TX #1 then #2 off and observe the correct indication of off lamps.

(1)	Main Transmitter Select and Indication	☑ Check if OK
(2)	Transmitter Antenna Select and Indication	☑ Check if OK
(3)	Transmitter Load Select and Indication	☑ Check if OK
(4)	Transmitter OFF Select and Indication	☑ Check if OK

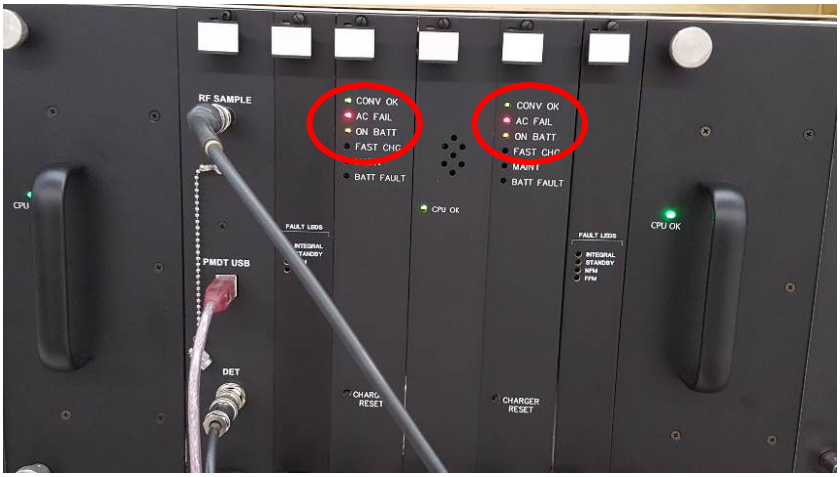
23. Power Supply Functions： 測試備用電池電源運作正常。

SETUP：*System Operation Normal*

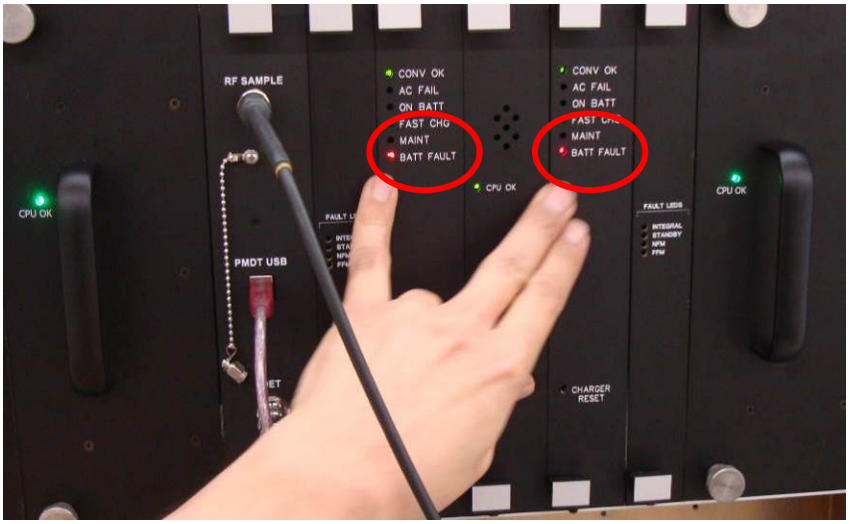
Operate the system to observe the following indications and functions are normal:

(1). Remove AC power from system and observe the AC fail indication.

(2). With AC removed observe the on-batteries indication.



(3). With AC back on disconnect batteries and observe battery fault indication.



(4). With the system normal observe the DC-DC converter indication.

(5). Shut system down by turning off AC inputs. Turn on AC input only and observe the system returns to normal no alarm operation without a reset command.

(6). Remove AC input and turn on DC (battery) input and observe that the system does not restart.

(7). Press both BCPS reset buttons and observe the station returns to normal (with no alarm) operation.

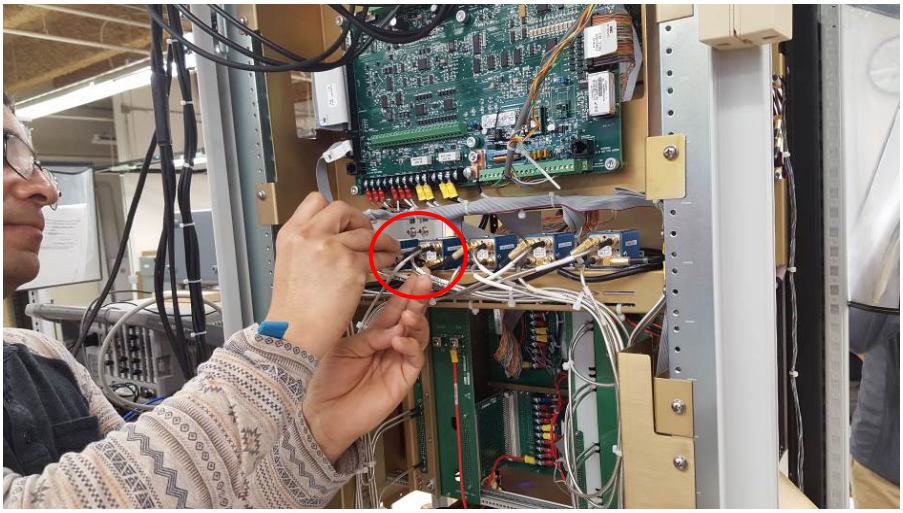
(1)	AC Line Fail Indication	☑	Check if OK
(2)	Station On-Battery Indication	☑	Check if OK
(3)	Battery Fault Indication	☑	Check if OK
(4)	DC - DC Convertor OK Indication	☑	Check if OK
(5)	Automatic Station Power-Up on AC power restoration (No Batteries)	☑	Check if OK
(6)	System does not restart	☑	Check if OK
(7)	Station On/Off Control on Batteries only - (No AC Power Present)	☑	Check if OK

24. **Station Transfer Action：Main-to-Standby；Hot Standby Operation** : Hot Standby下檢視告警觸發時，於標準時間內正常執行切換機。

SETUP：*Dual System Operating in Hot Standby Configuration with Both Transmitters On.*

Operate the system to observe the following indications and functions are normal:

(1). Disconnect the CRS system SBO Feed Line From main Transmitter output (Relay K3-J4).



(2). Start stopwatch.

(3). Observe the transfer to Standby Transmitter occurs in 1.0 second or less.

(4). Observe the visual and aural alarms on the Localizer system upon transfer.

(5). Observe the system stays on line after transfer (no alarms).

(6). Disconnect the SBO feed cable to the antenna simulator.

(7). Observe the system shuts down the Standby transmitter, and is in the OFF condition.

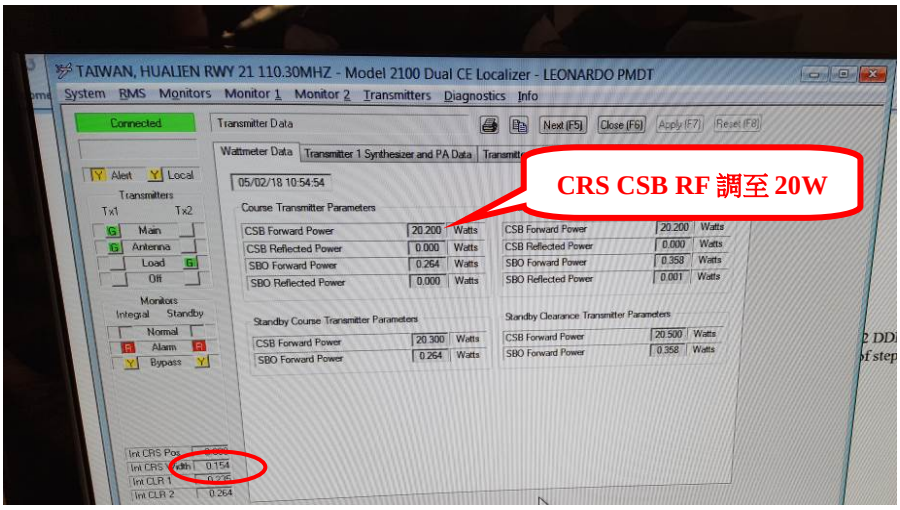
(8). Observe the visual and aural alarms on the Localizer system.

(3)	Station Transfer Action: Main to Stby	0.1 ≤1 sec
(4)	Local Aural + Visual Alarms	☑ Check if OK
(5)	Continued Operation on Stby	☑ Check if OK
(7)	Station Shutdown: Main and Stby to Off	0.1 ≤1 sec
(8)	Local Aural + Visual Alarms	☑ Check if OK

25. CRS CSB Power Range : 檢視當CRS CSB RF輸出功率調至20W及8W時，各參數是否正確，且兩者相差值於標準內。

SETUP：*Connect Oscilloscope to the Detected port located on the front panel of the RF Monitor. Select CRS CSB on the LCU wattmeter to see the "Kissing" pattern.*

(1). Adjust Course CSB RF output to 20 watts.

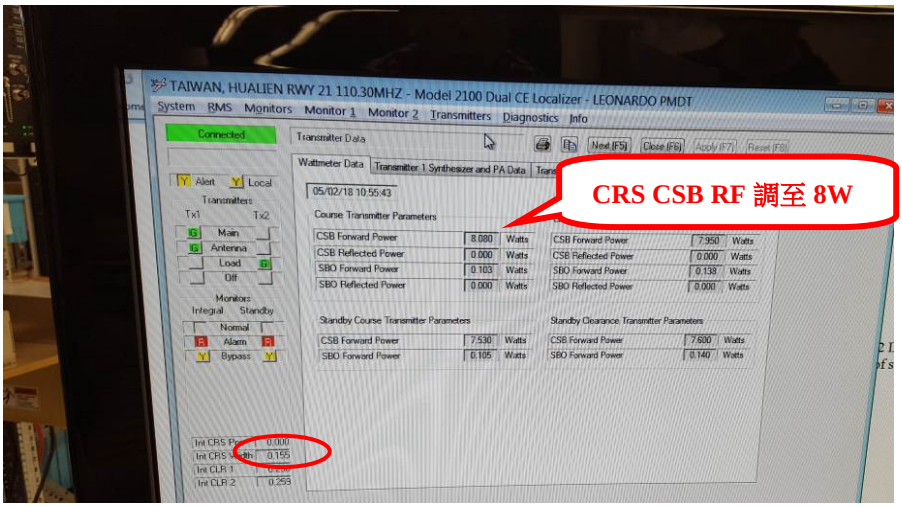


(2). Connect a PIR to the RF sample port located on the front panel of the RF Monitor and select CRS CSB on the LCU wattmeter, measure Mod Bal and record.

(3). Measure CSB SDM with PIR and record.

(4). Using the Monitor Data Window read CSB width and record.

(5). Adjust CRS CSB to 8 watts.



(6). Measure Mod Bal with PIR and record.

(7). Measure SDM with PIR and record.

(8). Using the Monitor Data window read CSB width and record.

(9). Calculate Step 6 minus Step 2 and record.

(10). Calculate Step 8 minus Step 4 and record.

(11). Calculate Step 7 minus Step 3 and record.

(12). Reset to Nominal Power.

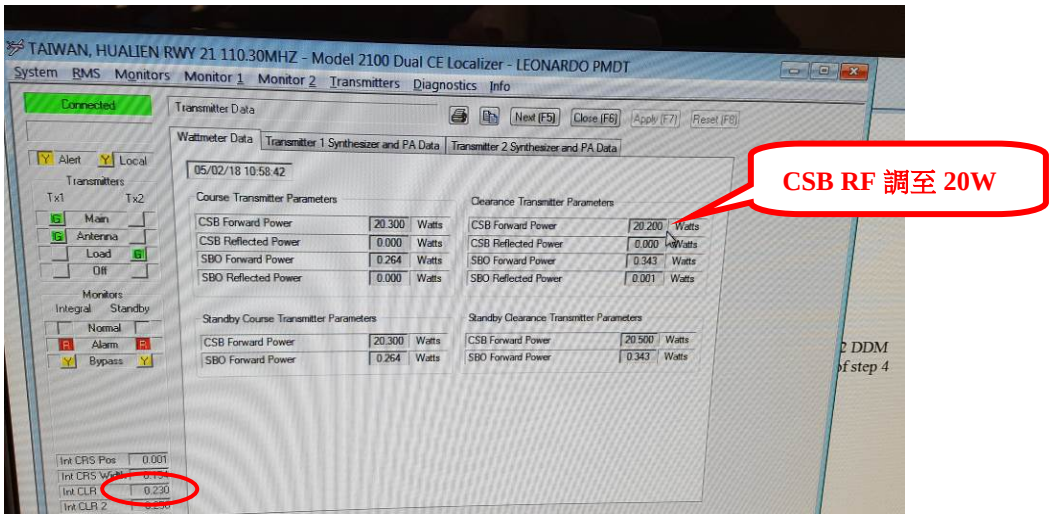
(13). Repeat steps 1 thru 12 for Transmitter 2.

		TX1	TX2	
(2)	Mod Bal at 20 Watts CSB	0	0	DDM
(3)	SDM at 20 W CSB	40.4	40.3	%
(4)	Course Width at 20 W CSB	0.155	0.154	DDM
(6)	Mod Bal at 8 Watts (40% CSB)	-0.001	-0.001	DDM
(7)	SDM at 8 Watts (40% CSB)	39.3	39.5	%
(8)	Course Width at 8 W (40% CSB)	0.155	0.154	DDM
(9)	Modulation balance difference	0.001	0	≤ 0.002 DDM
(10)	Course width difference	0.001	0	± 2% of step 4
(11)	SDM difference	0.8	0.8	± 1%

26. **CLR CSB Power Range**：檢視當CLR CSB RF輸出功率調至20W及8W時，各參數是否正確，且兩者相差值於標準內。

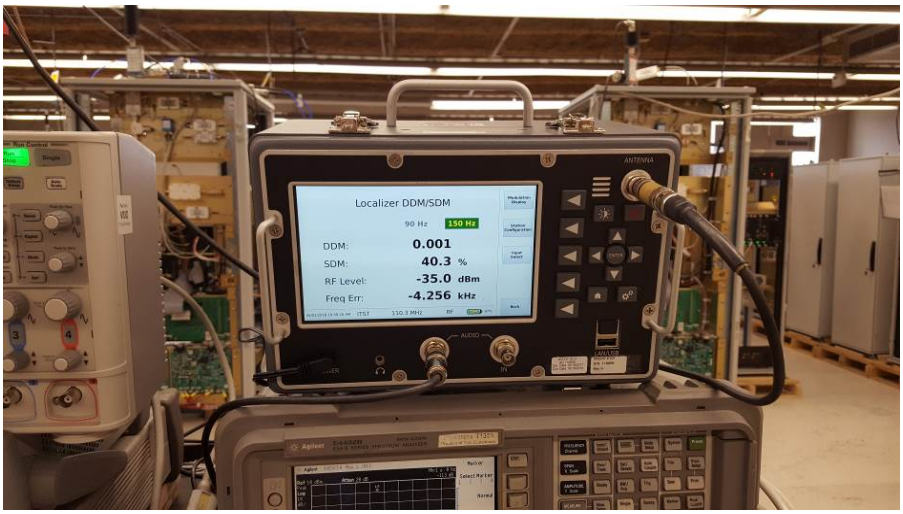
SETUP：*Connect Oscilloscope to the Detected port located on the front panel of the RF Monitor. Select CLR CSB on the LCU wattmeter to see the "Kissing" pattern.*

(1). Adjust CLR CSB RF output to 20W.



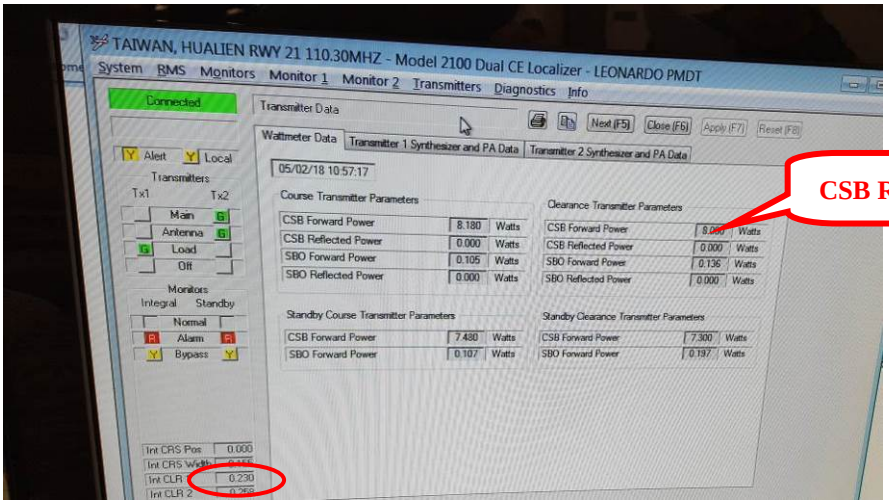
(2). Connect a PIR to the RF sample port located on the front panel of the RF Monitor and select CLR CSB on the LCU wattmeter, measure Mod Bal and record.

(3). Measure CLR CSB SDM with PIR and record.



(4). Using the Monitor Data Window read CLR 1 DDM and record.

(5). Adjust CLR CSB to 8 watts.



(6). Measure Mod Bal with PIR and record.

(7). Measure SDM with PIR and record.

(8). Using the Monitor Data window read CLR 1 DDM and record.

(9). Calculate Step 6 minus Step 2 and record.

(10). Calculate Step 8 minus Step 4 and record.

(11). Calculate Step 7 minus Step 3 and record.

(12). Reset to Nominal Power.

(13). Repeat steps 1 thru 12 for Transmitter 2.

		TX1	TX2	
(2)	Mod Bal at 20 Watts CSB	0	0	DDM
(3)	SDM at 20 W CSB	40.7	40.6	%
(4)	CLR 1 DDM at 20 W CSB	0.235	0.235	DDM
(6)	Mod Bal at 8 Watts (40% CSB)	-0.000	0	DDM
(7)	SDM at 8 Watts (40% CSB)	39.8	39.8	%
(8)	CLR 1 DDM at 8 W (40% CSB)	0.235	0.235	DDM
(9)	Modulation balance difference	0	0	≤ 0.002 DDM
(10)	CLR 1 DDM difference	0.001	0	± 2% of step 4
(11)	SDM difference	0.9	0.8	± 1%

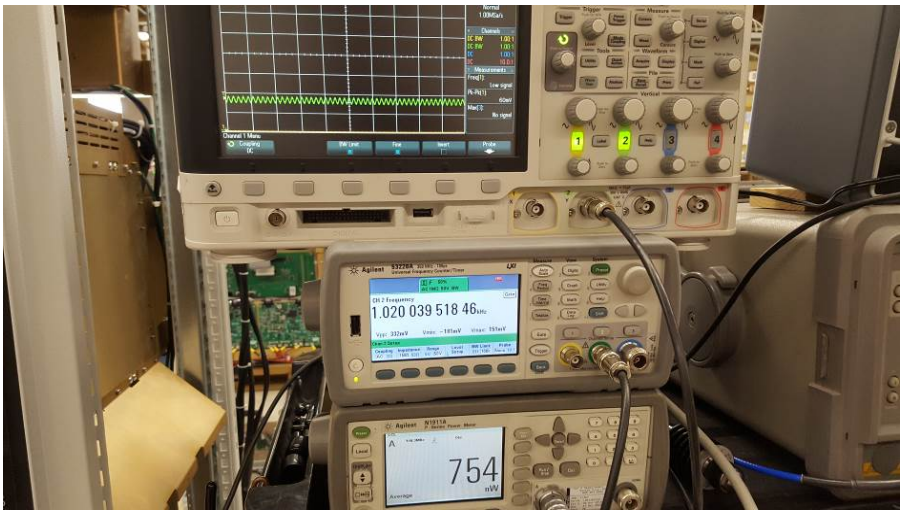
27. Identification Signal and Modulation Range： 量測ID頻率及Code是否正確。

SETUP：*Connect Frequency Counter to the Detected port located on the front panel of the RF Monitor. Select CRS CSB on the LCU wattmeter.*

(1). Turn off 90/150 Hz tone modulation.

(2). Set Ident to continuous tone.

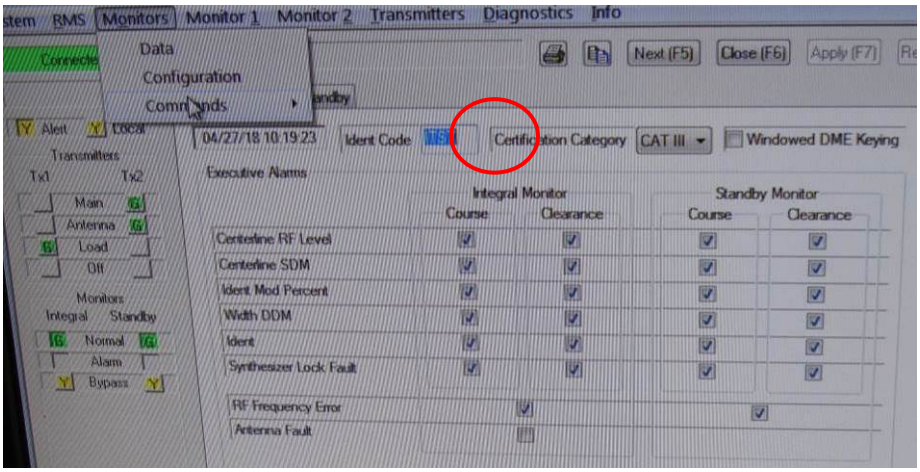
(3). Measure and record the Ident tone frequency.



(4). Set Ident to keyed.

(5). Select CRS Ident to Speaker and verify that the Ident code is the same as the Monitor Configuration Screen.

(6). Select CLR Ident to Speaker and verify that the Ident code is the same as the Monitor Configuration Screen.



(7). Repeat steps 1 thru 6 for Transmitter 2.

TX1

(3)	Audio Frequency	1020 1020 ± 0.1% (1.02 Hz)
(5)	CRS Identification Coding verification	ITST "I" + 3 Letters
(6)	CLR Identification Coding verification	ITST "I" + 3 Letters

TX2

(3)	Audio Frequency	1020 1020 ± 0.1% (1.02 Hz)
(5)	CRS Identification Coding verification	ITST "I" + 3 Letters
(6)	CLR Identification Coding verification	ITST "I" + 3 Letters

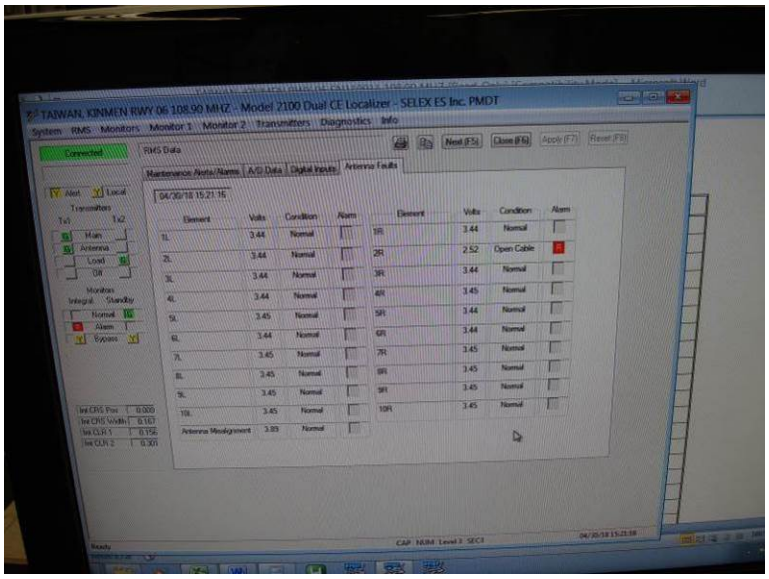
28. **Antenna Fault Alarms**：測試DU/CU箱之Antenna Fault卡板功能運作正常。

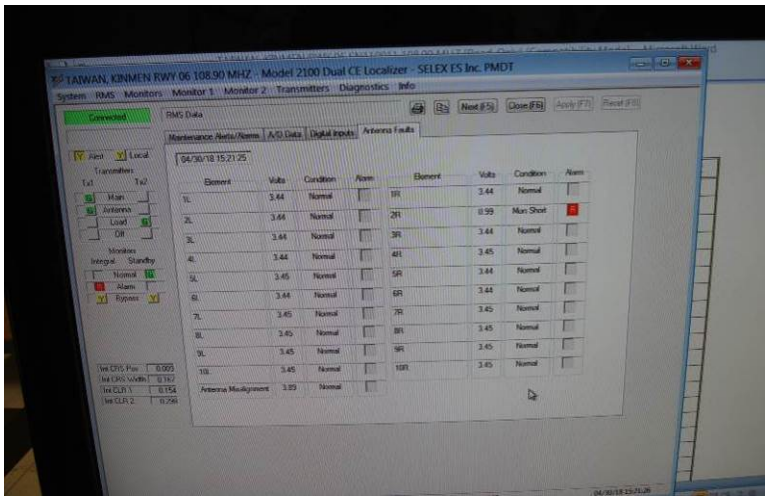
SETUP：*Transmitter off, Antenna series resistor emulator in antenna feed lines*

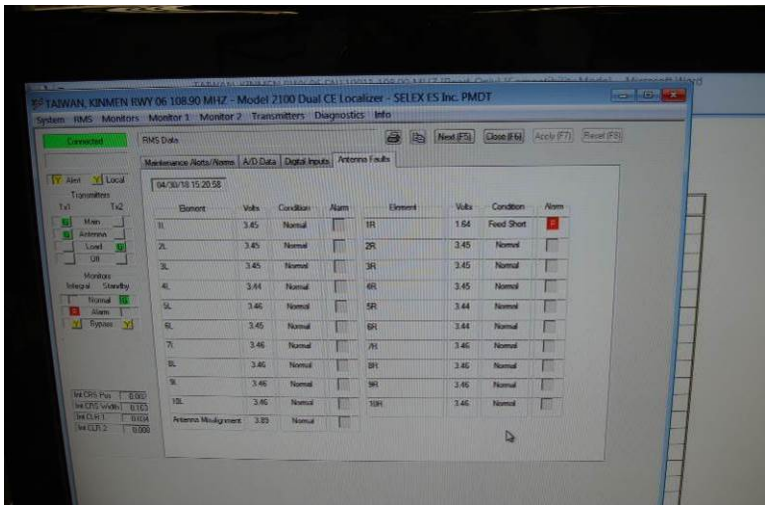
(1). Select antenna # (8, 14, 16, or 20) in RMS Configuration.

(2). Display antenna fault screen.

(3). Cause antenna feed line open, monitor line short, and feed line short faults on each cable and verify the faults are displayed on the antenna fault screen. Check the appropriate boxes on the test data sheet.

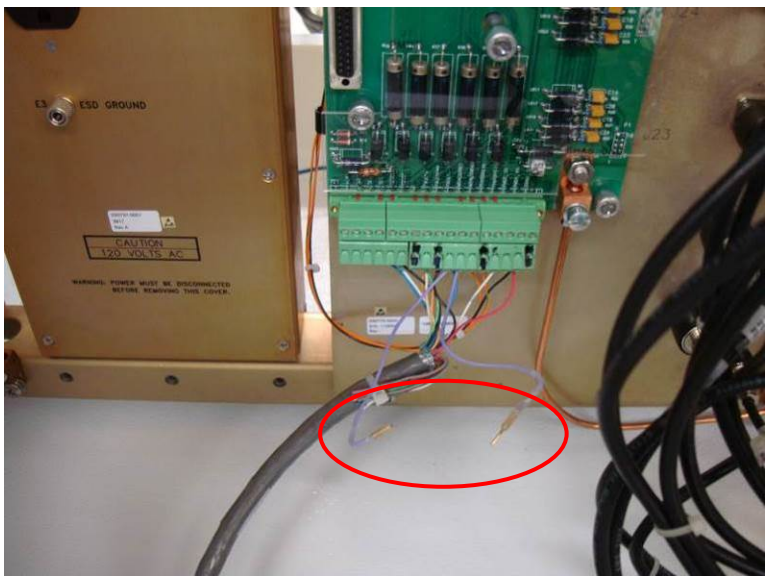






(4). Restore system to normal operation and verify normal condition is displayed for all antennas.

(5). Disconnect the jumper on the misalignment switch input to the Localizer. Verify that the misalignment fault detector is displayed.



(6). On the PMDT, select [RMS/Data/Maintenance Alerts/Alarms] and verify an Antenna

Misalignment Maintenance Alert.

(7). Reconnect the Jumper and place system in normal operation.

(8). Disconnect in-line antenna feed cable.

(9). Verify system shuts down. Check if OK.

(10). Verify that no restart on #2 Transmitter occurs. Check if OK.

(11). Reconnect in-line antenna feed cable.

(3) Individual Antenna Indications

Antenna #	Normal	Open	Mon. Short	Feed Short
1L	☑	☑	☑	☑
2L	☑	☑	☑	☑
3L	☑	☑	☑	☑
4L	☑	☑	☑	☑
5L	☑	☑	☑	☑
6L	☑	☑	☑	☑
7L	☑	☑	☑	☑
8L	☑	☑	☑	☑
9L	☑	☑	☑	☑
10L	☑	☑	☑	☑
1R	☑	☑	☑	☑
2R	☑	☑	☑	☑
3R	☑	☑	☑	☑
4R	☑	☑	☑	☑
5R	☑	☑	☑	☑
6R	☑	☑	☑	☑
7R	☑	☑	☑	☑
8R	☑	☑	☑	☑
9R	☑	☑	☑	☑
10R	☑	☑	☑	☑

(5) Antenna Misalignment is Displayed ☑ Check

(6) Antenna Misalignment Causes Maint. Alert ☑ Check

(9) Antenna Fault Causes System Shutdown ☑ Check

(10) No restart on #2 Transmitter ☑ Check

29. Final System Settings：列印最終系統參數設定。

(1). Print the Final System settings by selecting System/ Configuration Print and put with the test data sheets.

二、 GLIDESLOPE 2110性能測試：(金門06GP測試結果)

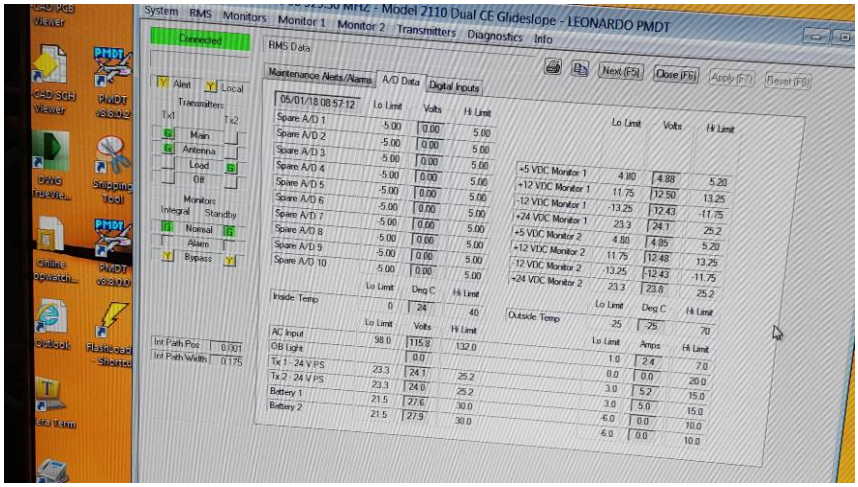
1. Maintenance Alerts： 檢視系統電壓電流值。

SETUP：Station operation normal

(1). On the PMDT select [RMS/Configuration/A/D Limits] and verify limits in the table provided below:

Parameter	Low Limit	High Limit
AC Input Volts	98 (196)	132 (264)
AC Input Current	1	7
TX#1-24V P.S. Volts	23.3	25.2
TX#1-24V P.S. Current	3	15
TX#2-24V P.S. Volts	23.3	25.2
TX#2-24V P.S. Current	3	15
Battery 1 Volts	21.5	30
Battery 1 Current	-6	10
Battery 2 Volts	21.5	30
Battery 2 Current	-6	10
+ 5V DC	4.80	5.20
+12V DC	11.75	13.25
- 12 V DC	-13.25	-11.75

(2). On the PMDT select [RMS/Data/A/D Data] and verify that there are no maintenance alerts. Record nominal value and Check if OK.



(2)

Parameter	Low Limit	High Limit	Nominal Value
AC Input Volts	98 (196)	132 (264)	115.8
AC Input Current	1	7	2.4
TX #1 - 24 V P.S. Volts	23.3	25.2	24.1
TX #1 - 24 V P.S. Current	3	15	5.2
TX #2 - 24 V P.S. Volts	23.3	25.2	24.0
TX #2 - 24 V P.S. Current	3	15	4.9
Battery 1 Volts	21.5	30	27.6
Battery 1 Current	-6	10	0
Battery 2 Volts	21.5	30	27.9
Battery 2 Current	-6	10	0
+ 5V DC Monitor #1	4.80	5.20	4.88
+12V DC Monitor #1	11.75	13.25	12.52
- 12 V DC Monitor #1	-13.25	-11.75	-12.43
+24V DC Monitor #1	23.3	25.2	23.9
+ 5V DC Monitor #2	4.80	5.20	4.85
+12V DC Monitor #2	11.75	13.25	12.48
-12V DC Monitor #2	-13.25	-11.75	-12.43
+24V DC Monitor #2	23.3	25.2	23.8

2. Power On/Off Indications： 檢視AC、DC電源開關狀態。

Observe the Glideslope front panel for correct indications of:

(1). TX #1 AC power Indication on/off. Check if OK.

(2). TX #1 DC power indication on/off. Check if OK.

(3). TX #2 AC power indication on/off. Check if OK.

(4). TX #2 DC power indication on/off. Check if OK.

(1)	TX #1 AC Power Indicator	☑	Check if OK
(2)	TX #1 DC Power Indicator	☑	Check if OK
(3)	TX #2 AC Power Indicator	☑	Check if OK
(4)	TX #2 DC Power Indicator	☑	Check if OK

3. Transmitter RF Control： 確認CRS和CLR發射機控制功能。

(1). Log on to the PMDT with level 3 security password in Local Control Mode. Enter the amplifier assembly number for each corresponding amplifier that is installed on the system under the dropdown box in the PMDT/Transmitter/Configuration/Transmitter_ screen. Save the configuration under PMDT/RMS/Config Backup.

(2). Using the PMDT transmitter control window, turn the Course and Clearance RF on and off and

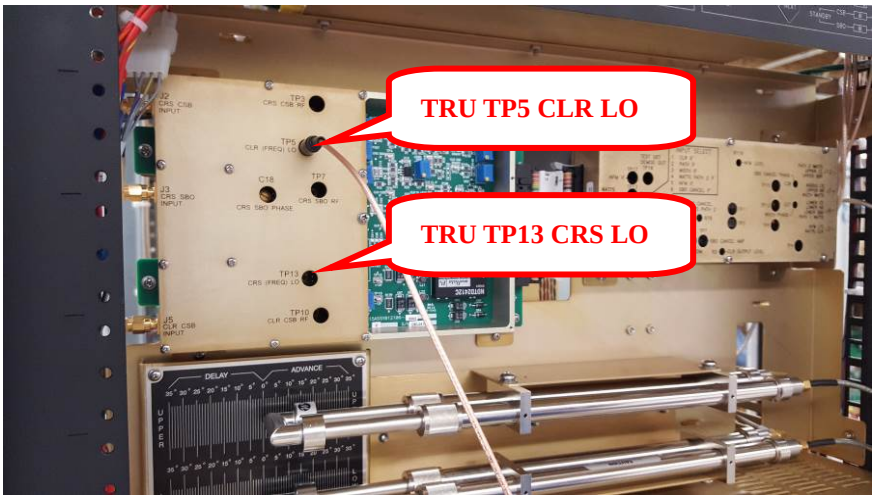
observe Wattmeter. Check if OK.

(3). Repeat step 1 and 2 for transmitter 2.

		TX1	TX2	
(2)	Course Transmitter On/Off Control	☑	☑	Check if OK
(2)	Clearance Transmitter On/Off Control	☑	☑	Check if OK

4. Radio Frequency and RF Frequency Control : 檢視CRS RF及CLR RF頻率正確性。

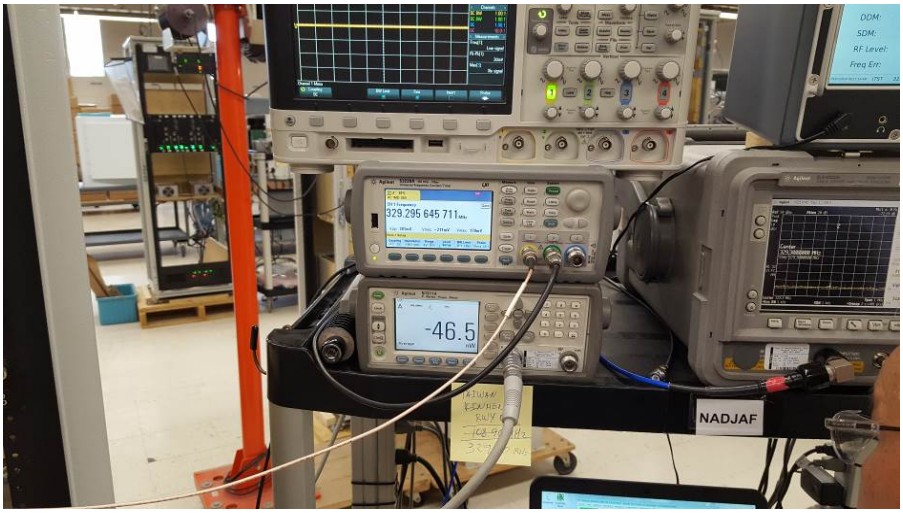
SETUP：*Connect Frequency Counter to the course /clearance input of assembly 012106 (Recombiner),* ***TP13*** *CRS LO and* ***TP5*** *CLR LO.*



(1). Record Glideslope channel frequency.

(2). Place Transmitter 1 on load. Measure the frequency of Transmitter 1 Course channel RF and record.

(3). Measure the frequency of the Clearance channel RF and record.



(4). Record frequency difference.

(5). Read frequency difference from the transmitter screen and record.

(6). Place Transmitter 2 on load. Repeat steps 3 thru 6 for transmitter 2.

(1)	Glideslope Channel Frequency	329.3	MHz
		TX1	
(2)	Meas. CRS Freq. (Channel +4 kHz)	329.303611	± 0.001 %
(3)	Meas. CLR Freq. (Channel -4 kHz)	329.295600	± 0.001%
(4)	Measured Frequency Difference	8011	(7500 Hz to 8500 Hz)
(5)	Indicated Frequency Difference	8009	(7500 Hz to 8500 Hz)
		TX2	
(2)	Meas. CRS Freq. (Channel +4 kHz)	329.303614	± 0.001 %
(3)	Meas. CLR Freq. (Channel -4 kHz)	329.295604	± 0.001%
(4)	Measured Frequency Difference	8010	(7500 Hz to 8500 Hz)
(5)	Indicated Frequency Difference	8009	(7500 Hz to 8500 Hz)

5. RF Power Metering： 檢視面板量測功率與PMDT顯示功率之誤差值及波形正確性。

(1). Measure the Main CSB Forward power reading on the Wattmeter Display and record.

(2). On the PMDT, select [Transmitters / Data / Wattmeter Data] and record the internal CSB forward power reading. Verify the reading is within ±4 % of the Wattmeter reading.

(3). Verify the CSB waveform is available at the front panel Wattmeter Test jack. Check if OK.

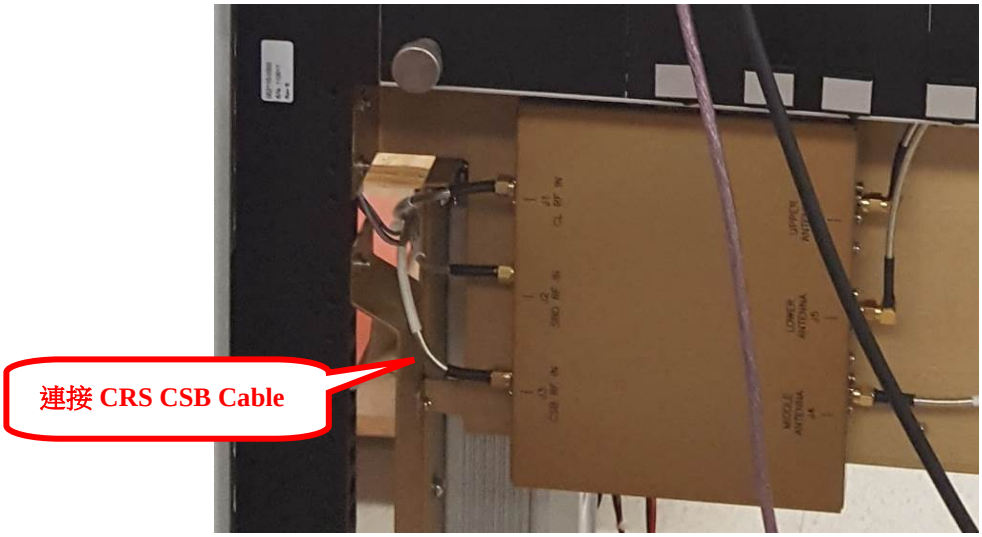
(4). Repeat steps 1 thru 3 for the remainder of the readings requested on the data sheets.

Wattmeter Functions:

CRS Transmitter				
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 3	Int 3	(Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑	Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0.01	Int 0.007	(Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑	Check if OK
(1,2)	Main SBO F Pwr Reading Accuracy	Wm 0.03	Int 0.03	(Wm ± 4%)
(3)	Main SBO F Pwr Select and Waveform		☑	Check if OK
(1,2)	Main SBO R Pwr Reading Accuracy	Wm 0	Int 0	(Wm ± 4%)
(3)	Main SBO R Pwr Select and Waveform		☑	Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 3.0	Int 3.0	(Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑	Check if OK
(1,2)	Stby SBO Pwr Reading Accuracy	Wm 0.03	Int 0.03	(Wm ± 4%)
(3)	Stby SBO Pwr Select and Waveform		☑	Check if OK
CLR Transmitter				
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 0.3	Int 0.304	(Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑	Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0	Int 0	(Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑	Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 0.3	Int 0.296	(Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑	Check if OK

6. CRS System Spurious Emissions： 量測CRS頻率2次諧波及3次諧波是否符合標準。

SETUP：*Connect Spectrum Analyzer to the CRS CSB cable, located at the APCU, using a 30 dB attenuator.*



(1). Set CRS 90 and 150 Hz modulation off (select Waveform RF ONLY).

(2). Set spectrum analyzer to carrier signal. Note level in dBm.

(3). Measure and compare the second and third harmonics to the carrier frequency. Record the frequency and amplitude difference, with respect to the carrier level in dB (dBC), of each harmonic.

(4). Verify with the spectrum analyzer that from 0 Hz to 1 GHz, no spurs are larger than -60 dBC. Check if OK.

(5). Remove spectrum analyzer from system.

(6). Set 90/150 Hz modulation and keyer on to return system to normal.

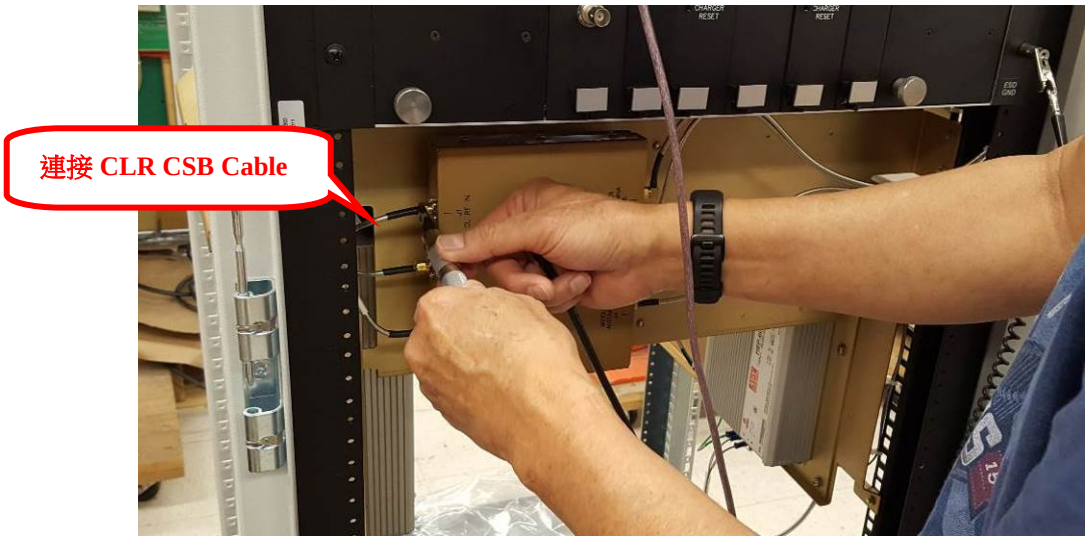
(7). Repeat steps 1 thru 6 for transmitter 2.

	TX1	Frequency		Level	
(2)	Fundamental	329.3	MHz	0	Record
(3)	Second Harmonic	658.6	MHz	-72.49	< -60 dBC
	Third Harmonic	987.9	MHz	-72.28	< -60 dBC
(4)	No spurious output greater than -60 dBC			☑	Check if OK

	TX2	Frequency		Level	
(2)	Fundamental	329.3	MHz	0	Record
(3)	Second Harmonic	658.6	MHz	-72.34	< -60 dBC
	Third Harmonic	987.9	MHz	-73.05	< -60 dBC
(4)	No spurious output greater than -60 dBC			☑	Check if OK

7. CLR System Spurious Emissions：量測CLR頻率2次諧波及3次諧波是否符合標準。

SETUP：Connect Spectrum Analyzer to the CLR CSB cable, located at the APCU, using a 30 dB attenuator.



(1). Set CLR 150 Hz modulation off.

(2). Set spectrum analyzer to carrier signal. Note level in dBm.

(3). Measure and compare the second and third harmonics to the carrier frequency. Record the frequency and amplitude difference, with respect to the carrier level in dB (dBC), of each harmonic.

(4). Verify with the spectrum analyzer that from 0 Hz to 1 GHz, no spurs are larger than -60 dBC. Check if OK.

(5). Remove spectrum analyzer from system.

(6). Set 150 Hz modulation and keyer on to return system to normal.

(7). Repeat steps 1 thru 6 for transmitter 2.

	TX1	Frequency		Level	
(2)	Fundamental	329.3	MHz	0	Record
(3)	Second Harmonic	658.6	MHz	-73.6	< -60 dBC
	Third Harmonic	987.9	MHz	-73.15	< -60 dBC
(4)	No spurious output greater than -60 dBC			☑	Check if OK

	TX2	Frequency		Level	
(2)	Fundamental	329.3	MHz	0	Record
(3)	Second Harmonic	658.6	MHz	-74.78	< -60 dBC
	Third Harmonic	987.9	MHz	-74.62	< -60 dBC
(4)	No spurious output greater than -60 dBC			☑	Check if OK

8. CRS Carrier Signal at Sideband Output : 用頻譜分析儀量測CRS CSB及CRS SBO於carrier level之差是否符合標準。

SETUP：*1. Place transmitter 1 to off.*

2. Connect Spectrum Analyzer to the CRS CSB cable, located at the APCU, using a 30 dB attenuator.

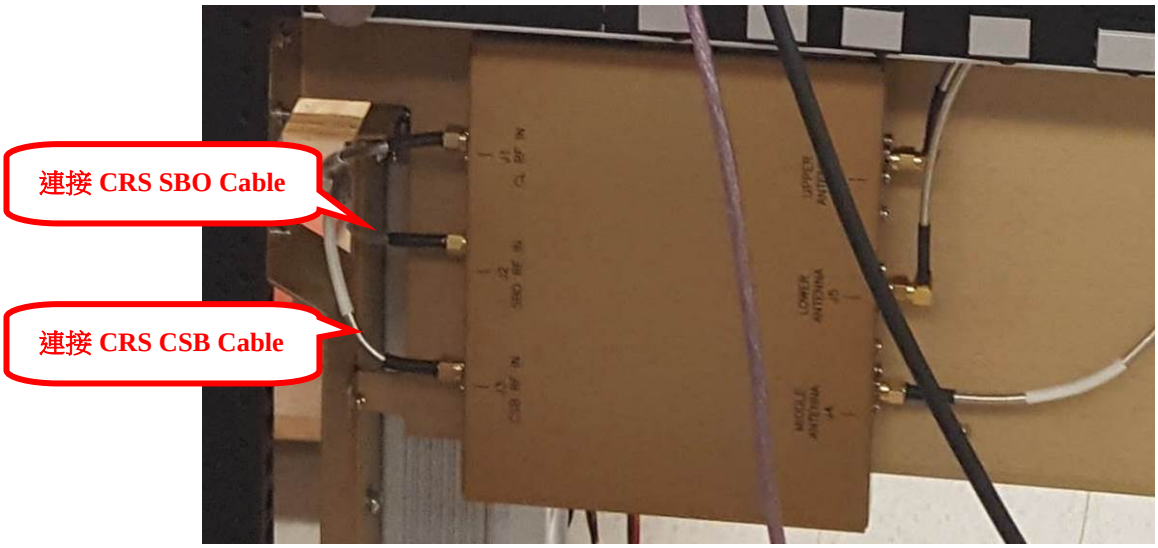
3. Find Station Frequency.

4. Set Center Frequency.

5. Adjust Spectrum Analyzer to the following settings:

Span 2 KHz *RBW 30 Hz* *VBW 30 Hz*

SWP 2.5 Sec *Attenuation 10 dB*



(1). Place transmitter to on. Measure the CSB carrier level.

(2). Place the transmitter to off.

(3). Connect the Spectrum Analyzer and 30 dB attenuator to the CRS SBO cable located at the APCU. Measure and record difference in signal level.

(4). Repeat steps 1 through 3 for transmitter 2.

(5). Place the system back to normal operation.

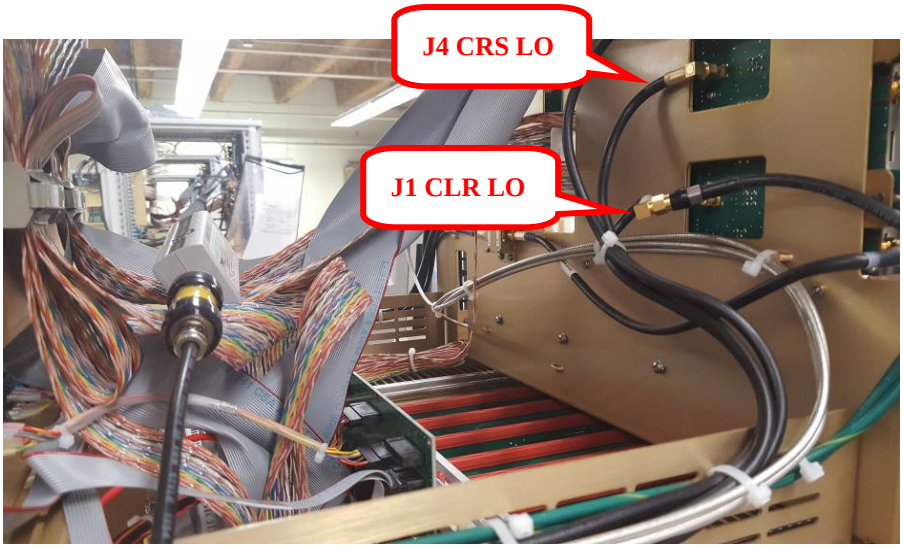
		TX1	TX2	
(3)	CRS Carrier Signal at Sideband Output	-61.7	-61.3	< -30 dBC

9. LO Outputs：量測CRS LO及CLR LO的輸出功率。

Note measuring transmitter on load.

(1). Place transmitter 1 on Standby.

(2). Connect Power Meter to the cable feeding into J4 on the TRU.

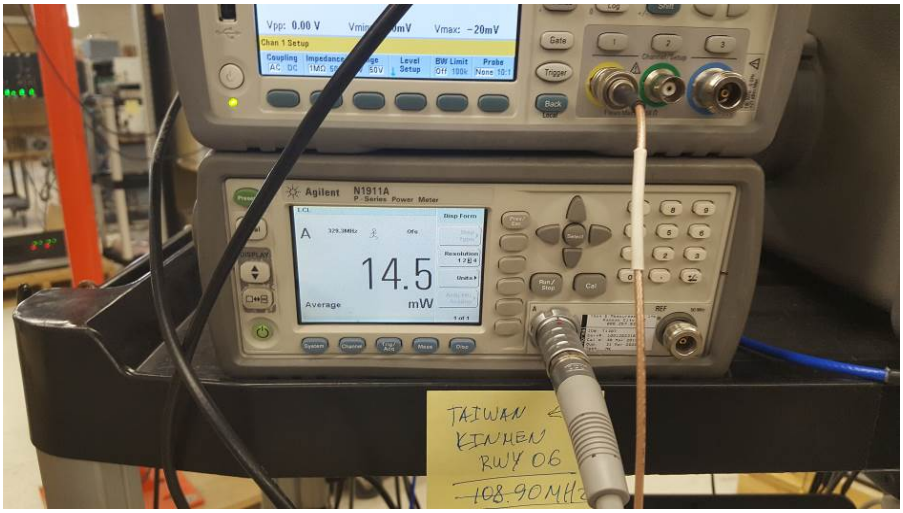


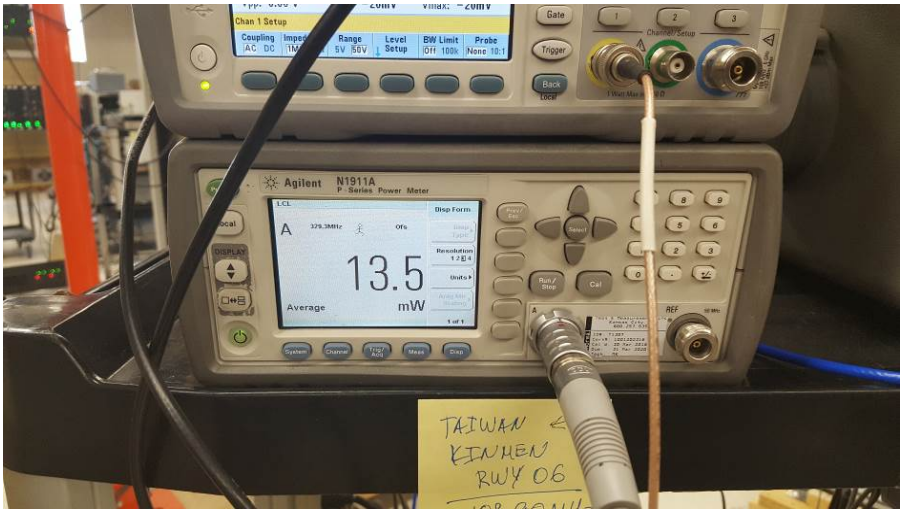
(3). Measure and record the CRS LO output power.

(4). Connect Power Meter to the cable feeding into J1 on the TRU.

(5). Measure and record the CLR LO output power.

(6). Repeat steps 1 through 5 for transmitter 2.





		TX1	TX2	
(3)	CRS LO Output Power	15	14.9	>6.0 mW but ≤ 63.1mW
(5)	CLR LO Output Power	13.5	14.5	>6.0 mW but ≤ 63.1mW

10. **CRS Modulation Balance Adjustment**：調整CRS Modulation Balance，並確認外部PMDT與內部PIR監測的Centerline DDM 是否在標準內。

SETUP：*Connect PIR to CRS CSB the RF Monitor sample port and select CRS CSB on the LCU wattmeter.*

(1). On the PMDT, select [Transmitter / Waveforms / Waveform 1].

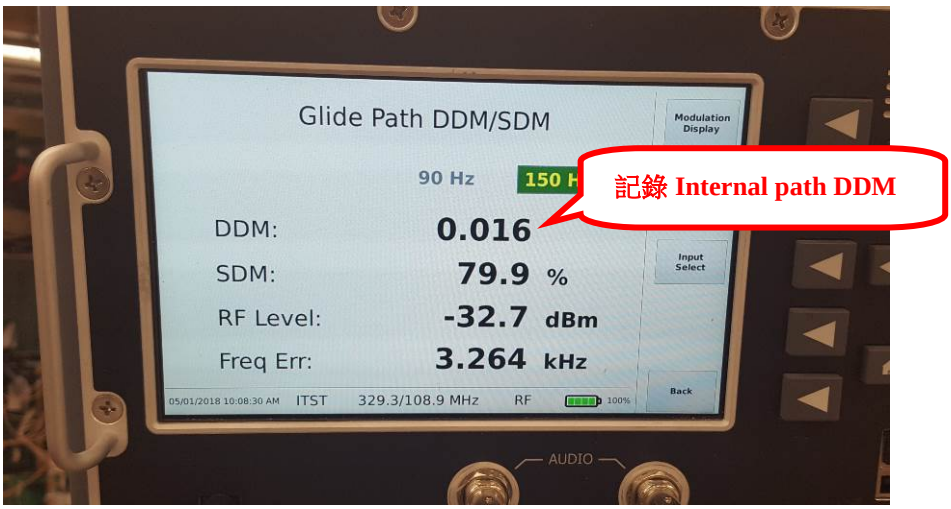
(2). Adjust the Course CSB Carrier Power Level to 3 Watts, SDM to 80%, and DDM to 0.000 and Apply.

(3). On the PMDT, select [Monitor 1 / Data / Integral] and record the external path DDM reading.

(4). On the PIR, record the internal DDM reading.

(5). Repeat steps 1 thru 4 using the DDM settings and % Modulation shown on the data sheet and record.

(6). Repeat steps 1 thru 5 for transmitter 2.



TX1 At 80% SDM (Nominal Modulation Setting)

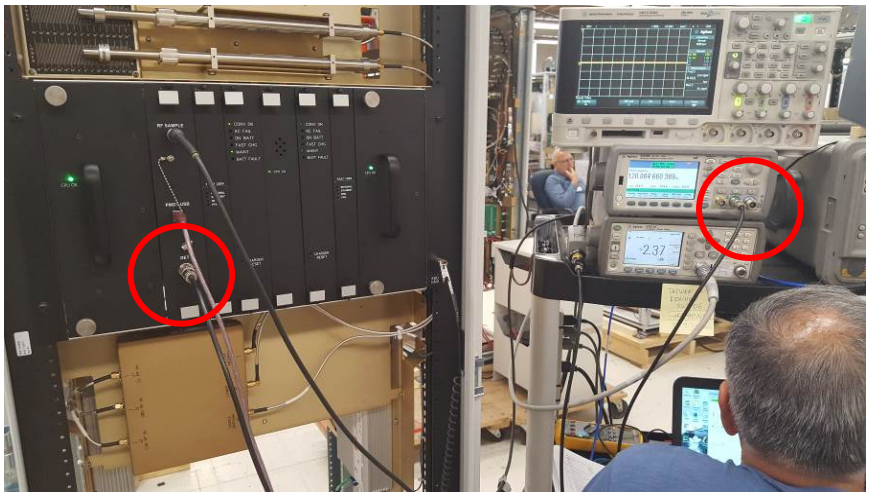
(3,4)	DDM Setting	External	Internal	Tolerance
	0.000	0	0	S (standard)
	0.015	0.016	0.016	S + 0.015 ± 0.002
	0.030	0.033	0.032	S + 0.030 ± 0.004
	-0.015	-0.015	-0.015	S - 0.015 ± 0.002
	-0.030	-0.031	-0.031	S - 0.030 ± 0.004

TX2 At 80% SDM (Nominal Modulation Setting)

(3,4)	DDM Setting	External	Internal	Tolerance
	0.000	0.001	0	S (standard)
	0.015	0.016	0.016	S + 0.015 ± 0.002
	0.030	0.031	0.032	S + 0.030 ± 0.004
	-0.015	-0.015	-0.015	S - 0.015 ± 0.002
	-0.030	-0.031	-0.031	S - 0.030 ± 0.004

11. CRS Nav Tones Audio Equipment：用計頻器量測CRS音頻90Hz及150Hz是否正確。

SETUP：*Connect frequency counter to the RF Monitor Detected port and select CRS CSB on the LCU wattmeter.*

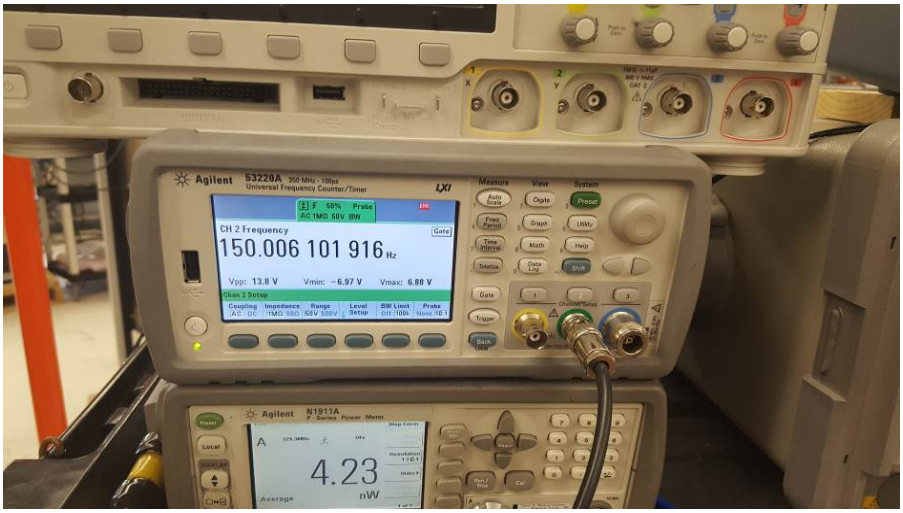


(1). Turn only 90 Hz modulation on.

(2). Record external reading from frequency counter

(3). Turn only 150 Hz modulation on.

(4). Record external reading from frequency counter.



(5). Repeat steps 1 thru 4 for transmitter 2.

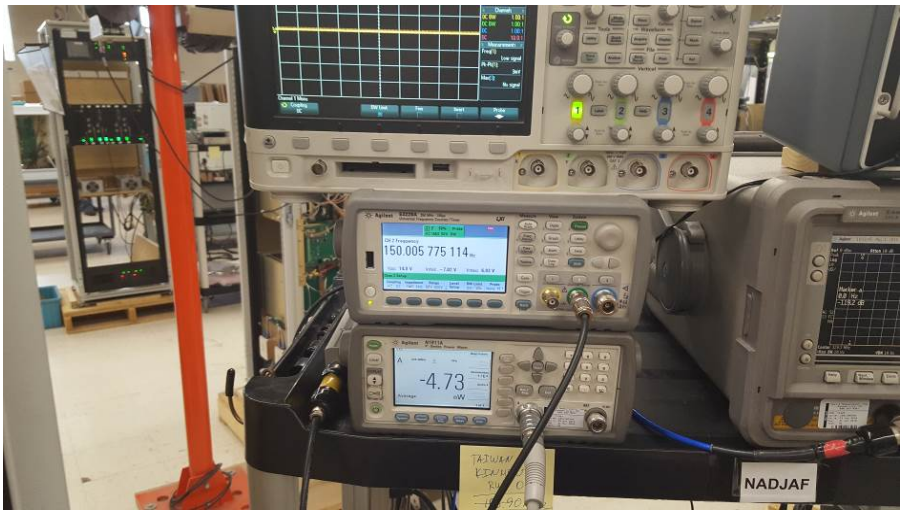
		TX1	TX2	External
(2)	90 Hz frequency	90	90	90 ± 0.1% (0.09 Hz)
(4)	150 Hz frequency	150	150	150 ± 0.1% (0.15 Hz)

12. CLR Nav Tones Audio Equipment： 用計頻器量測CLR音頻90Hz及150Hz是否正確。

SETUP：*Connect frequency counter to the RF Monitor sample port and select CLR CSB on the LCU wattmeter.*

(1). Turn only 150 Hz modulation on.

(2). Record external reading from frequency counter.



(3). Repeat steps 1 and 2 for transmitter 2.

		TX1	TX2	External
(2)	150 Hz frequency	150	150	150 ± 0.1% (0.15 Hz)

13. Integral Monitor Voting Logic：驗證監視邏輯於AND及OR狀態下是否運作正常。

SETUP：*Station Operating Normally*

1. On the PMDT, select [Monitors/Configuration/Integral] and set the alarm limits as shown in the following table.

Integral Alarm Limits				
Parameter Alarm Low	Alarm Low	Prealarm Low	Prealarm High	Alarm High
Course				
Path RF Level	*80%*	*85%*	*115%*	*120%*
Path DDM	*-0.050*	*-0.038*	*0.038*	*0.050*
Path SDM	*76%*	*77%*	*83%*	*84%*
Width DDM	*0.125*	*0.137*	*0.213*	*0.225*
Clearance				
RF Level	75%	81%	125%	133%
150 Hz Mod Percent	65%	69%	85%	88%

2. On the PMDT, in the [RMS / Configuration / General] screen, verify the Monitor Voting Logic is set to the AND configuration.

(1). On the PMDT, select [Monitor 1 / Data / Status] and verify no alarms are shown for Monitor #1. Record.

(2). On the PMDT, select [Monitor 2 / Data / Status] and verify no alarms are shown for Monitor #2. Record.

(3). Set the Local/Remote switch on the transmitter front panel to the Remote position.

(4). On the PMDT, select [Monitors / Commands / Integral Monitor Bypass / On] and verify a bypass indication is indicated for the Integral Monitor in the Monitors Status group at the left of the PMDT screen. Also verify the transmitter front panel Bypass light illuminates for the Integral Monitor.

(5). Set the Local/Remote switch on the transmitter front panel to the local position. Press the Integral Monitor Bypass button on the transmitter front panel and verify the Bypass is removed.

(6). Remove all monitor bypass conditions.

(7). On the PMDT, select [Monitor 1 / Offsets and Scale Factors / Integral] and set the Path SDM Scale Factor to 0. This should result in an alarm condition for Monitor 1.

(8). Verify the transmitter front panel Integral Monitor 1 alarm light is illuminated.

(9). On the PMDT, select [RMS / Data / Maintenance Alerts/Alarms] and verify an Integral Monitor Mismatch indication.

(10). Verify the station continues to operate in this condition.

(11). On the PMDT, select [Monitor 2 / Offsets and Scale Factors / Integral] and set the Path SDM Scale Factor to 0. This should result in an alarm condition for Monitor 2.

(12). Verify the transmitter front panel Integral Monitor 2 alarm light is illuminated and the station transfers and shuts down. This confirms the Monitor AND function.

(13). Place the Integral Monitor in Bypass and reset the Offset for Monitor 2 to the normal condition.

Restart the station. This should result in a normal indication for Monitor 2. Monitor 1 should remain in alarm.

(14). On the PMDT, in the [RMS / Configuration / General] screen, set the Monitor Voting Logic to the OR configuration.

(15). Remove the Integral Monitor Bypass. The station should immediately transfer and shut down. This confirms the Monitor OR function.

(16). Bypass the Integral Monitor and reset the SDM Scale Factors for Monitors 1 and 2 to their normal values.

(17). On the PMDT, in the [RMS / Configuration / General] screen, reset the Monitor Voting Logic to the AND configuration.

(18). Restart the station. Normal operation with no monitor alarms should be indicated.

(1)	Monitor #1 Normal Indication	☑	Check if OK
(2)	Monitor #2 Normal Indication	☑	Check if OK
(4)	Integral Monitor Bypass Function	☑	Check if OK
	Integral Monitor Bypass Light	☑	Check if OK
(5)	Integral monitor bypass removed	☑	Check if OK
(8)	Integral Monitor 1 Alarm	☑	Check if OK
(9)	Integral Monitor Mismatch	☑	Check if OK
(10)	Station Operational W/Mon 1 Alarm	☑	Check if OK
(12)	Integral Monitor 2 Alarm/Station Transfer/ Shut Down (Monitor "And" Function)	☑	Check if OK
(15)	Station Transfer /Shut Down (Monitor "OR" Function)	☑	Check if OK

14. Integral and Standby Monitor Alarms：驗證Monitor各參數於超過High Alarm與Low Alarm上時，是否正常顯示告警。

SETUP：*Station operation normal*

(1). On the PMDT, place the Integral and Standby Monitors in Bypass. Select [Monitor 1 / Data / Integral] and verify no alarms are shown for Monitor #1 and that the Path DDM Value is 0.000 + 0.001. Check if OK.

(2). On the PMDT, select [Monitor 1 / Data / Standby] and verify no alarms are shown for Monitor #1 and that the Path DDM Value is 0.000 + 0.001. Check if OK.

(3). On the PMDT, select [Monitor 2 / Data / Integral] and verify no alarms are shown for Monitor #2 and that the Path DDM Value is 0.000 + 0.001. Check if OK.

(4). On the PMDT, select [Monitor 2 / Data / Standby] and verify no alarms are shown for Monitor #1 and that the Path DDM Value is 0.000 + 0.001. Check if OK.

(5). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB RF Levels down to cause the integral monitor to go into alarm.

(6). On the PMDT, select [Monitor 1 / Data / Integral] and confirm a low alarm condition for the CRS and CLR RF Levels.

(7). On the PMDT, select [Monitor 1 / Data / Standby] and confirm a low alarm condition for the CRS and CLR RF Levels.

(8). Repeat Steps 6 and 7 for Monitor 2.

(9). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB RF Levels up to cause the integral monitor to go into alarm.

(10). On the PMDT, select [Monitor 1 / Data / Integral] and confirm a high alarm condition for the CRS and CLR RF Levels.

(11). On the PMDT, select [Monitor 1 / Data / Standby] and confirm a high alarm condition for the CRS and CLR RF Levels.

(12). Repeat Steps 10 and 11 for Monitor 2.

(13). Return CRS and CLR RF Levels to normal power.

(14). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB Mod Percent Values down to cause the integral monitor to go into alarm.

(15). On the PMDT, select [Monitor1/Data/Integral]

(16). Confirm a low alarm condition for the Path SDM and 150 Hz Mod Percent.

(17). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the Path SDM and 150 Hz Mod Percent.

(18). Repeat Steps 16 and 17 for Monitor 2.

(19). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS and CLR CSB Mod Percent up to cause the integral monitor to go into alarm.

(20). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the Path SDM and 150 Hz Mod Percent.

(21). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the Path SDM and 150 Hz Mod Percent.

(22). Repeat Steps 20 and 21 for Monitor 2.

(23). Return the CRS and CLR CSB Mod Percent Values to nominal.

(24). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS CSB Mod Balance Value down to cause the integral monitor to go into alarm.

(25). On the PMDT, select [Monitor1/Data/Integral] and confirm a low alarm condition for the Path DDM.

(26). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the Path DDM.

(27). Repeat Steps 25 and 26 for Monitor 2.

(28). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS CSB Mod Balance Value up to cause the integral monitor to go into alarm.

(29). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the Path DDM.

(30). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the Path DDM.

(31). Repeat Steps 29 and 30 for Monitor 2.

(32). Return the CRS CSB Mod Balance Value to nominal.

(33). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS SBO RF Level Value down to cause the integral monitor to go into alarm.

(34). On the PMDT, select [Monitor1/Data/Integral] and confirm a low alarm condition for the Width DDM.

(35). On the PMDT, select [Monitor1/Data/Standby] and confirm a low alarm condition for the Width DDM.

(36). Repeat Steps 34 and 35 for Monitor 2.

(37). On the PMDT, select [Transmitters/Waveform/Waveform1] and adjust the CRS SBO RF Level Value up to cause the integral monitor to go into alarm.

(38). On the PMDT, select [Monitor1/Data/Integral] and confirm a high alarm condition for the Width DDM.

(39). On the PMDT, select [Monitor1/Data/Standby] and confirm a high alarm condition for the Width DDM.

(40). Repeat Steps 38 and 39 for Monitor 2.

(41). Return the CRS SBO RF Level Values to Nominal.

(42). Restart the station. Normal operation with no monitor alarms should be indicated.

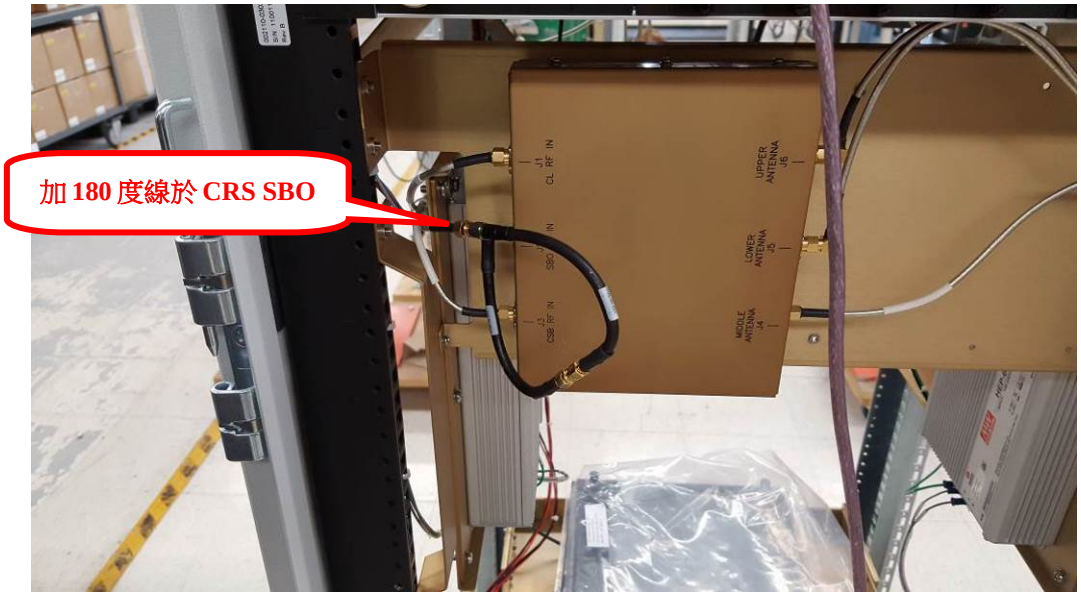
(1)	Integral Mon 1 Path DDM Value	☑	Check if OK
(2)	Standby Mon 1 Path DDM Value	☑	Check if OK
(3)	Integral Mon 2 Path DDM Value	☑	Check if OK
(4)	Standby Mon 2 Path DDM Value	☑	Check if OK

Test Step	Alarm	Freq Patt	INT 1	INT 2	STBY 1	STBY 2
(6,7,8)	RF ALARM LOW	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(10,11,12)	RF ALARM HIGH	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(16,17,18)	PATH SDM ALARM LOW	CRS	☑	☑	☑	☑
	150HZ MOD% ALARM LOW	CLR	☑	☑	☑	☑
(20,21,22)	PATH SDM ALARM HIGH	CRS	☑	☑	☑	☑
	150HZ MOD% ALARM HIGH	CLR	☑	☑	☑	☑
(25,26,27)	PATH DDM ALARM LOW	CRS	☑	☑	☑	☑
(29,30,31)	PATH DDM ALARM HIGH	CRS	☑	☑	☑	☑
(34,35,36)	WIDTH DDM ALARM LOW	CRS	☑	☑	☑	☑
(38,39,40)	WIDTH DDM ALARM HIGH	CRS	☑	☑	☑	☑

15. Integral Monitor Reverse Sensing Alarms: 於CRS CSB及CLR CSB加入180度線，並檢視Monitor Width DDM使否發生反相。

SETUP：*Station operation normal*

(1). Place Transmitter 1 on antenna. On the PMDT sidebar, select TX1 Off. Install a 180 degree cable in Transmitter 1 Course Power Amplifier SBO output. On PMDT sidebar, select TX1 Antenna.



(2). Observe on the PMDT the CRS width monitor reads approx. -0.175 DDM 90 Hz.

(3). Confirm that both monitors show a reverse sensing alarm.

(4). Remove system from bypass and confirm a hard shutdown.

	CRS TX		
(2)	CRS Width DDM	-0.172	Approx -0.175 DDM
(3)	Monitors indicate reverse sensing alarm	☑	Check if OK
(4)	Hard shutdown	☑	Check if OK

16. Monitors Certification and Certification Limits： 測試監視自我驗證功能是否正常。

SETUP：*Station operation normal*

(1). On the PMDT, log-on at Level 3 Password. Select the [RMS / Configuration / General].

(2). Disable Monitor Certification.

(3). On the PMDT, select [Monitor 1 / Data /] and verify Certification Test Results tab does not appear.

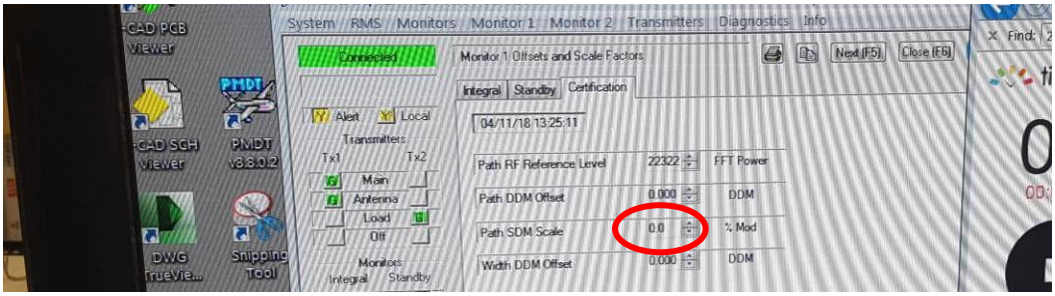
(4). On the PMDT, select [RMS / Configuration / General].

(5). Enable Monitor Certification.

(6). On the PMDT, select [Monitor 1 / Data / Certification Test Results] and verify the monitor certification interval ≤ two minutes.

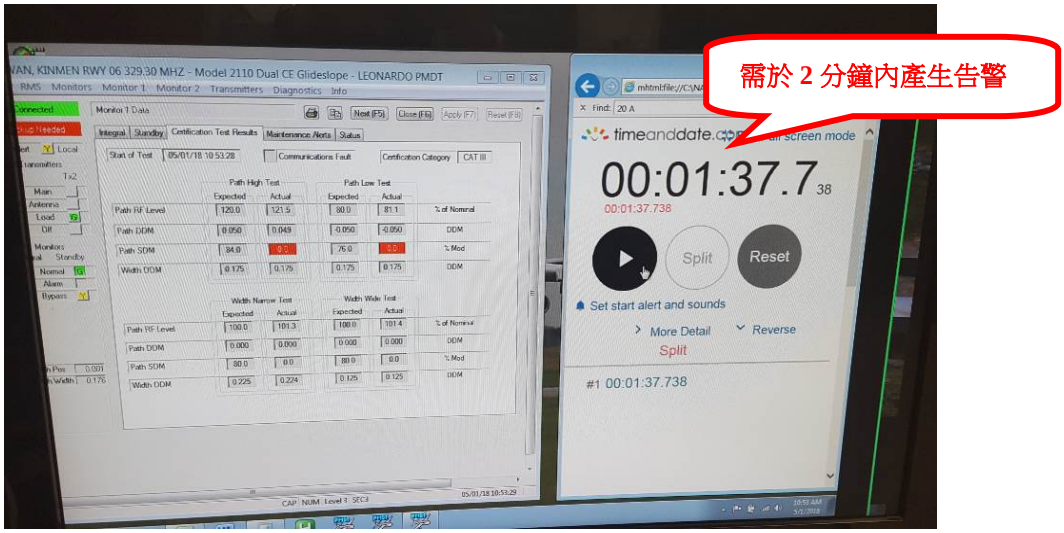
(7). On the PMDT, select [is Monitor 1/ Monitor Offsets and Scale Factors/Certification].

(8). Change the Path SDM Scale to 0% Mod.

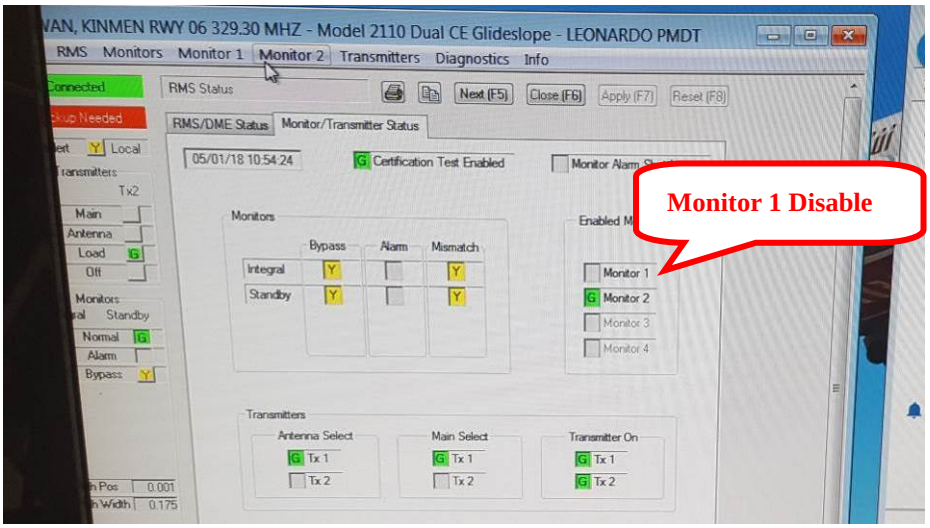


(9). On the PMDT, select [Monitor 1 / Data / Certification Test Results].

(10). Verify that an out-of-tolerance condition exists for Path SDM.



(11). On the PMDT, select [RMS / Status / Monitor/Transmitter Status] and verify the Monitor 2 Indicator is Green and Monitor 1 Indicator is not Green. This indicates the Monitor is disabled from voting.



(12). Verify Monitor 1 is in an alarm condition for Integral and Standby Transmitter on LCU.

(13). On the PMDT, select [Monitor 1 / Offsets and Scale Factors/Certification] and change the Path SDM Scale to 100% Mod.

(14). On the PMDT, select [Monitor 2 / Offsets and Scale Factors/Certification].

(15). Change the Path SDM Scale to 0% Mod.

(16). On the PMDT, select [Monitor 2 / Data / Certification Test Results].

(17). Verify an out-of-tolerance condition exists for Path SDM.

(18). On the PMDT, select [RMS / Status / Monitor/Transmitter Status] and verify the Monitor 1 Indicator is Green and the Monitor 2 indicator is not Green. This indicates Monitor 2 is disabled from voting.

(19). On the PMDT, select [Monitor 2 / Offsets and Scale Factors/Certification] and change the Path SDM Scale to +100% Mod.

(20). On the PMDT, select [Monitor 1 / Data / Certification Test Results] and verify the Certification

Results are in tolerance for all parameters.

(21). On the PMDT, select [Monitor 2 / Data / Certification Test Results] and verify the Certification Results are in tolerance for all parameters.

(2)	Monitor Certification On/Off Control	☑	Check if OK
(3)	No monitor certification tab	☑	Check if OK
(6)	Monitor Certification Interval	1min. 37 sec	< 2 min.
(10)	Mon. 1 path SDM out of tolerance	☑	Check if OK
(11)	Mon. 1 voting disabled	☑	Check if OK
(12)	Mon. 1 alarm for integral and standby TX	☑	Check if OK
(17)	Mon. 2 path SDM out of tolerance	☑	Check if OK
(18)	Mon. 2 voting disabled	☑	Check if OK
(20)	Certification results in tolerance for all parameters for monitor #1	☑	Check if OK
(21)	Certification results in tolerance for all parameters for monitor #2	☑	Check if OK

17. Transmitter Selection and Indications： 檢視發射機切換和指示正常。

SETUP：*Station operation normal*

Operate the system to observe the following indications are normal.

(1). Transfer TX #1 and TX #2 as main and observe the indicator lamps.

(2). Transfer TX #1 and TX #2 and observe the on- antenna indicator lamps.

(3). Make standby TX hot and observe correct indications of load lamps.

(4). Turn TX #1 then #2 off and observe the correct indication of off lamps.

(1)	Main Transmitter Select and Indication	☑	Check if OK
(2)	Transmitter Antenna Select and Indication	☑	Check if OK
(3)	Transmitter Load Select and Indication	☑	Check if OK
(4)	Transmitter OFF Select and Indication	☑	Check if OK

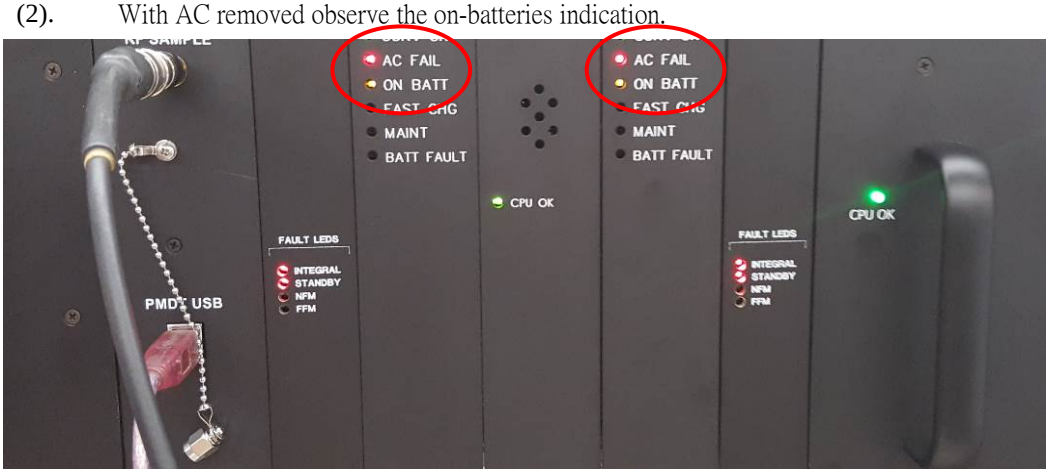
18. Power Supply Functions： 測試備用電池電源運作正常。

SETUP：*Station operation normal*

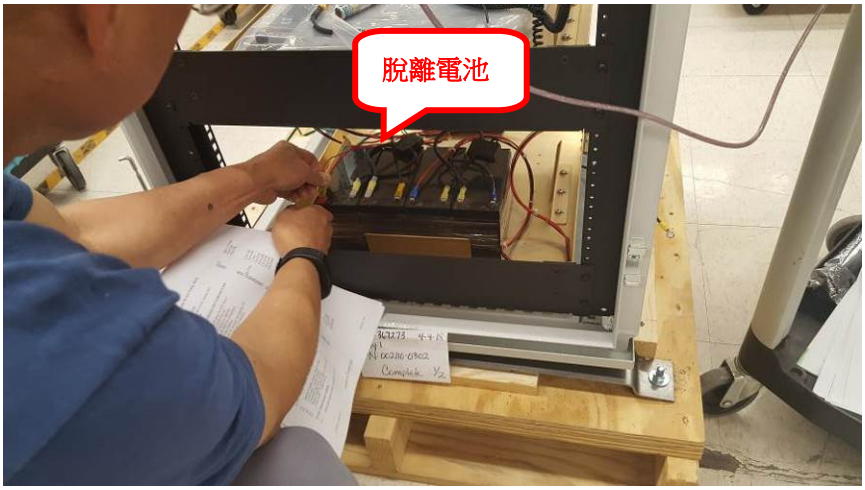
Operate the system to observe the following indications and functions are normal.

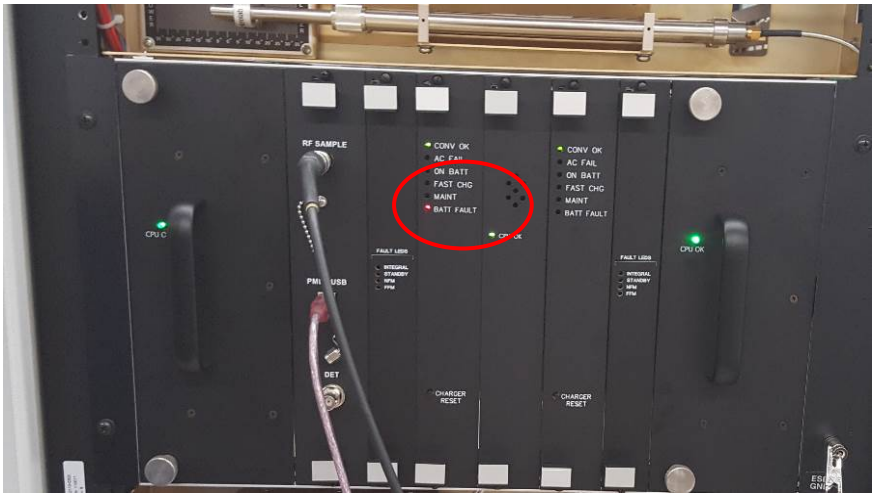
(1). Remove AC power from system and observe the AC fail indication.

(2). With AC removed observe the on-batteries indication.



(3). With AC back on disconnect batteries and observe battery fault indication.





(4). With the system normal observe the DC-DC converter indication.

(5). Shut system down by turning off AC inputs. Turn on AC input only and observe the system returns to normal no alarm operation without a reset command.

(6). Remove AC input and turn on DC (battery) input and observe that the system does not restart.

(7). Press both BCPS reset buttons and observe the station returns to normal (with no alarm) operation.

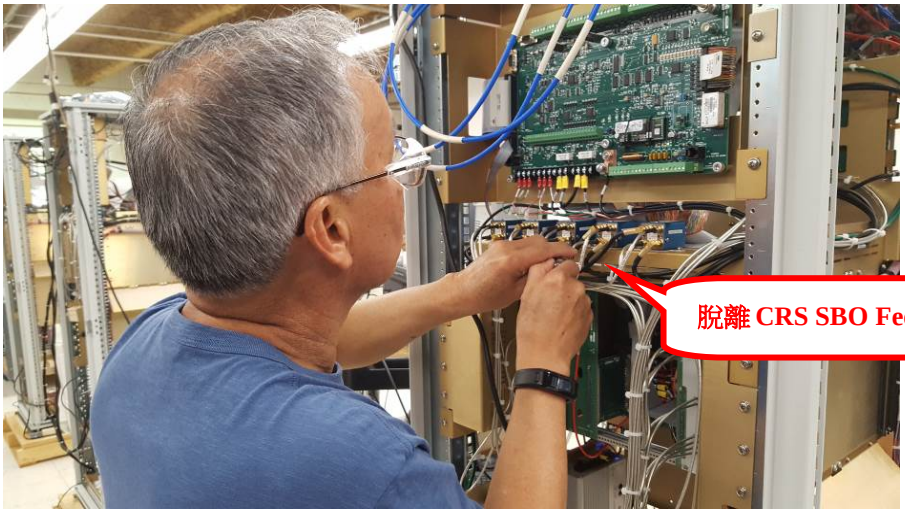
(1)	AC Line Fail Indication	☑	Check if OK
(2)	Station On-Battery Indication	☑	Check if OK
(3)	Battery Fault Indication	☑	Check if OK
(4)	DC - DC Convertor OK Indication	☑	Check if OK
(5)	Automatic Station Power-Up on AC power restoration (No Batteries)	☑	Check if OK
(6)	System does not restart	☑	Check if OK
(7)	Station On/Off Control on Batteries only - (No AC Power Present)	☑	Check if OK

19. Station Transfer Action：Main-to-Standby；Hot Standby Operation : Hot Standby下檢視告警觸發時，於標準時間內正常執行切換機。

SETUP：*Dual System Operating in Hot Standby Configuration with Both Transmitters On. On the PMDT, select [RMS/Configuration/General] and set the Automatic Restart Delay to 20 seconds. Logoff / Disconnect from the PMDT.*

Operate the system to observe the following indications and functions are normal.

(1). Disconnect the CRS system SBO Feed Line From main Transmitter output and start the stopwatch.

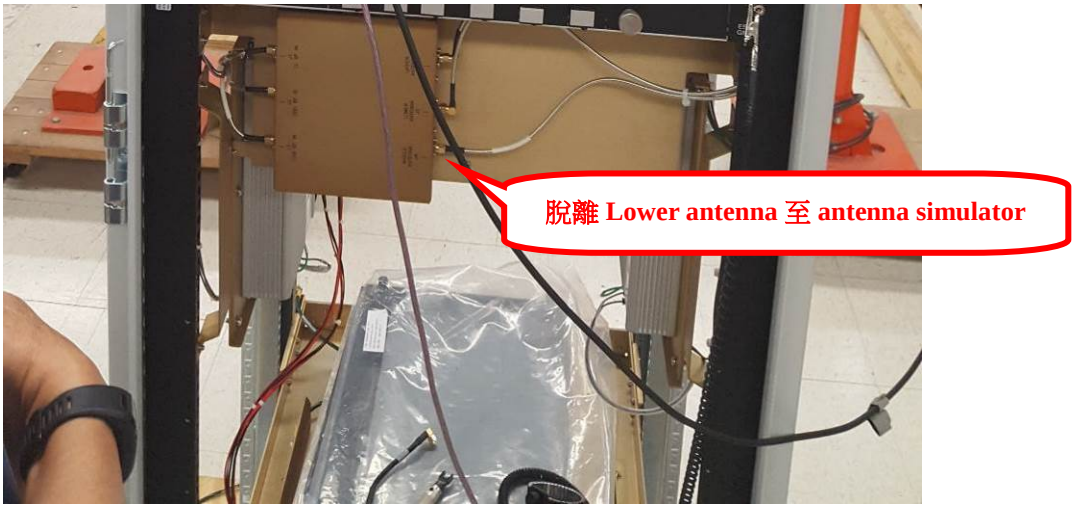


(2). Observe the transfer to Standby Transmitter occurs in 1.0 second or less.

(3). Observe the visual and aural alarms on the Glideslope system upon transfer.

(4). Observe the system stays on line after transfer (no alarms).

(5). Reset the Main Transmitter to normal and disconnect the lower antenna feed cable to the antenna simulator.



(6). Observe the system transfers and shuts down the Standby transmitter, and is in the OFF condition.

(7). Observe the visual and aural alarms on the Glideslope system.

(2)	Station Transfer Action: Main to Stby	0.1	< 1 Sec
(3)	Local Aural + Visual Alarms	☑	Check if OK
(4)	Continued Operation on Stby	☑	Check if OK
(6)	Station Transfer Action: Main to Stby to Off	0.1	< 1 Sec
(7)	Local Aural + Visual Alarms	☑	Check if OK

20. Final System Settings : 列印最終系統參數設定。

SETUP：*Station operation normal*

(1). Print the final system settings by selecting system / configuration print.

三、 DME 1118A性能測試：(金門06DME測試結果)

1. Frequency Verification Test : 檢視DME各發射接收頻率是否符合該站台。

SETUP：*This block diagram details the test setup.*

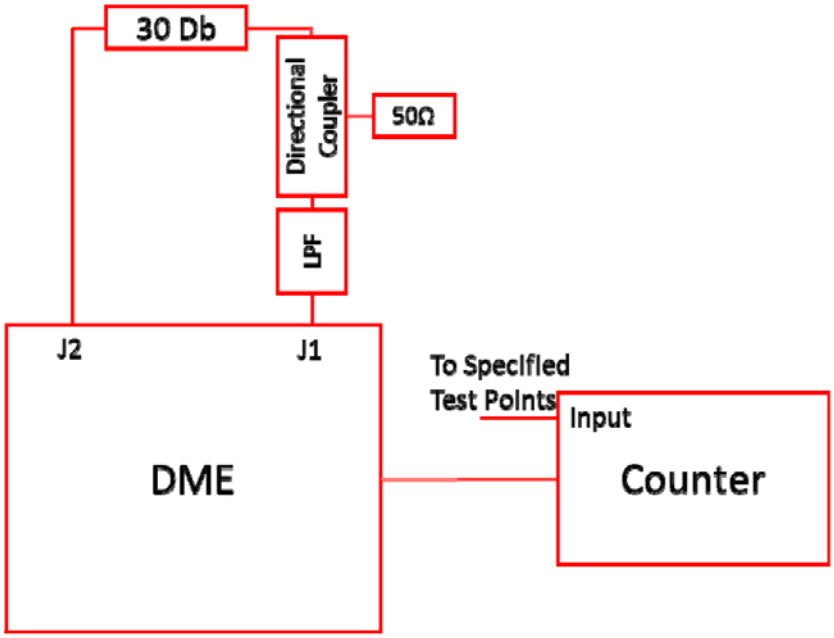
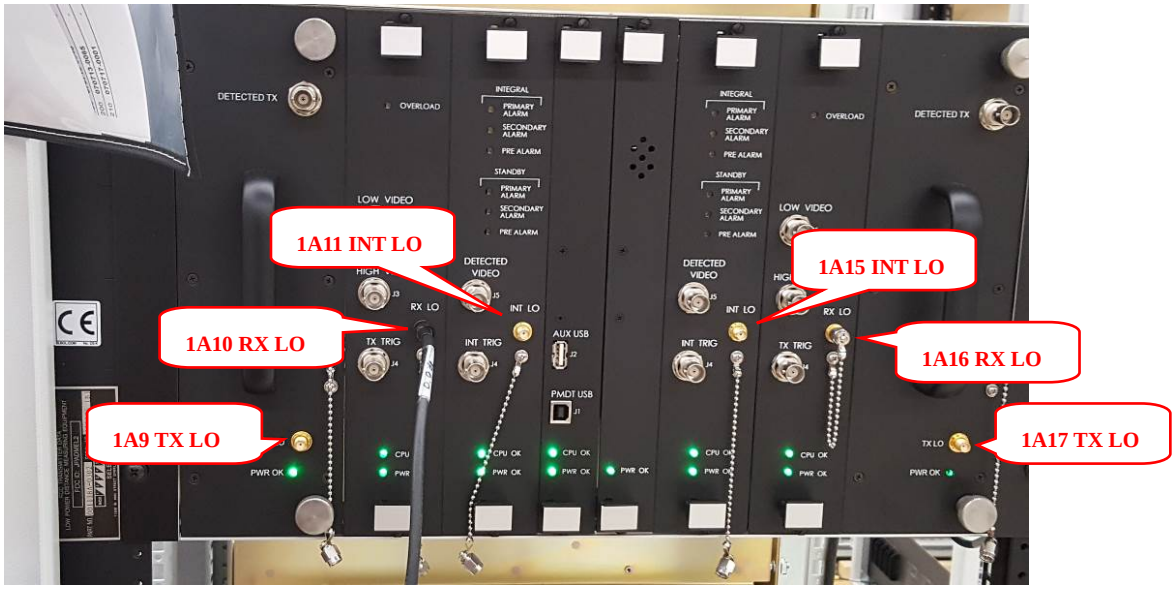


Figure 3-3 Frequency Verification Test Setup

(1). With the Power off, set up the DME for test.

(2). Turn on the system by switching the AC TX1, AC TX2, DC TX1 and DC TX2 breaker switches to the ON position.

(3). On the LCU put the DME in LOCAL mode. Select BYPASS on INTEGRAL and STANDBY Monitors. Turn ON both the MAIN and STANDBY transmitters.

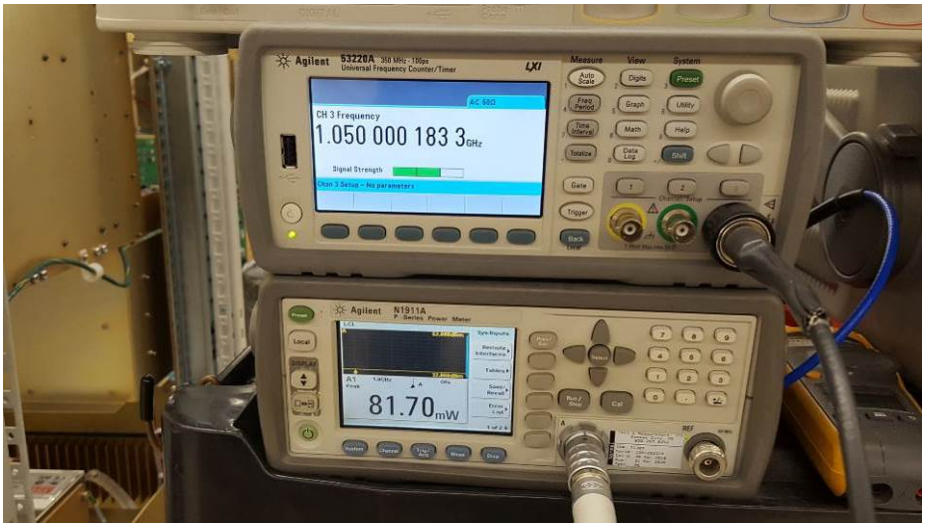


(4). Connect frequency counter to TX1 Power Amplifier (1A9) J1 TX LO connector. Measure and record the frequency.

(5). Connect frequency counter to TX2 Power Amplifier (1A17) J1 TX LO connector. Measure and record the frequency.

(6). Connect frequency counter to Monitor Interrogator (1A11) INT LO connector. Measure and record the frequency.

(7). Connect frequency counter to Monitor Interrogator (1A15) INT LO connector. Measure and record the frequency.



(8). Connect frequency counter to the Receiver Transmitter Controller (1A10) RX LO connector. This frequency is 125 MHz lower than the assigned receive frequency. Measure and record the frequency.

(9). Connect frequency counter to the Receiver Transmitter Controller (1A16) RX LO connector. This frequency is 125 MHz lower than the assigned receive frequency. Measure and record the frequency.

4.	TX1 Output Frequency (1A9 J1 TX LO)	986.999 MHz	Assigned TX Freq ± 0.001%
5.	TX2 Output Frequency (1A17 J1 TX LO)	987 MHz	Assigned TX Freq ± 0.001%
6.	Monitor/Int 1 Output Freq (1A11 INT LO)	1050 MHz	Assigned RX Freq ± 0.001%
7.	Monitor/Int 2 Output Freq (1A15 INT LO)	1050 MHz	Assigned RX Freq ± 0.001%
8.	Receiver (RTC) Local Oscillator Frequency (1A10 RX LO)	975 MHz	Assigned RX Freq -125 MHz ± 0.001%
9.	Receiver (RTC) Local Oscillator Frequency (1A16 RX LO)	974.999 MHz	Assigned RX Freq -125 MHz ± 0.001%

2. Transmitter Power Output Test： 量測DME輸出功率及Monitor顯示的功率是否符合Low Power DME 100W以上。

SETUP：*This block diagram details the test setup. Connect the PMDT to the USB Connector on the front of the RMS CCA using a USB computer cable.*

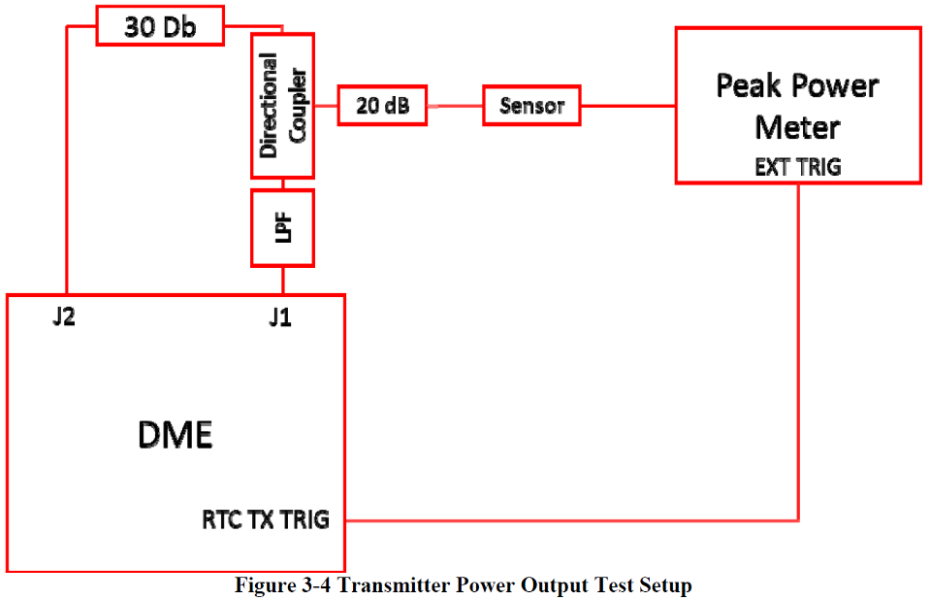
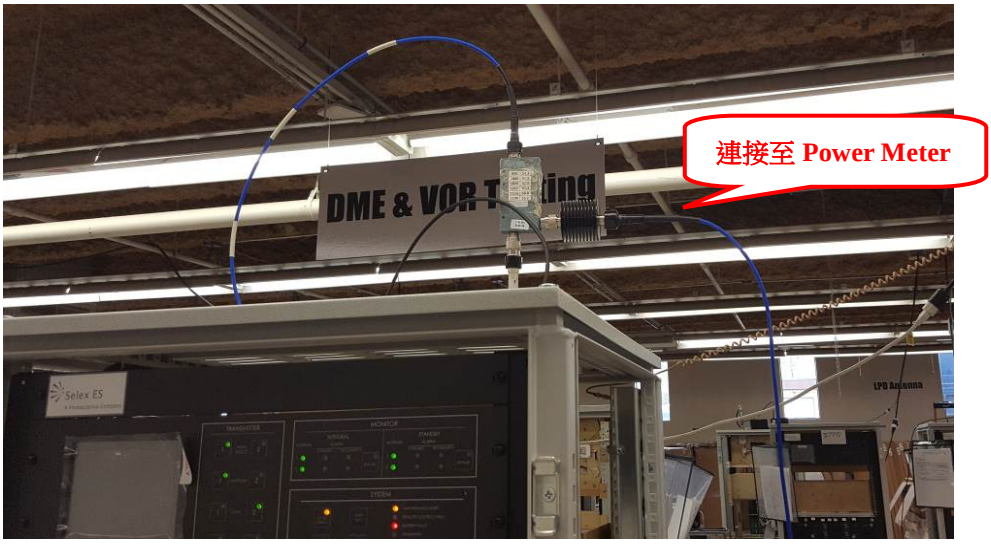


Figure 3-4 Transmitter Power Output Test Setup

(1). On the LCU turn off both transmitters. Connect the Peak Power Sensor with a 10dB attenuator in line to the coupled port of the coupler.



(2). Set the peak power meter test frequency to the DME transmitter frequency under the Channel Setup screen. Also verify Video B/W is Off.

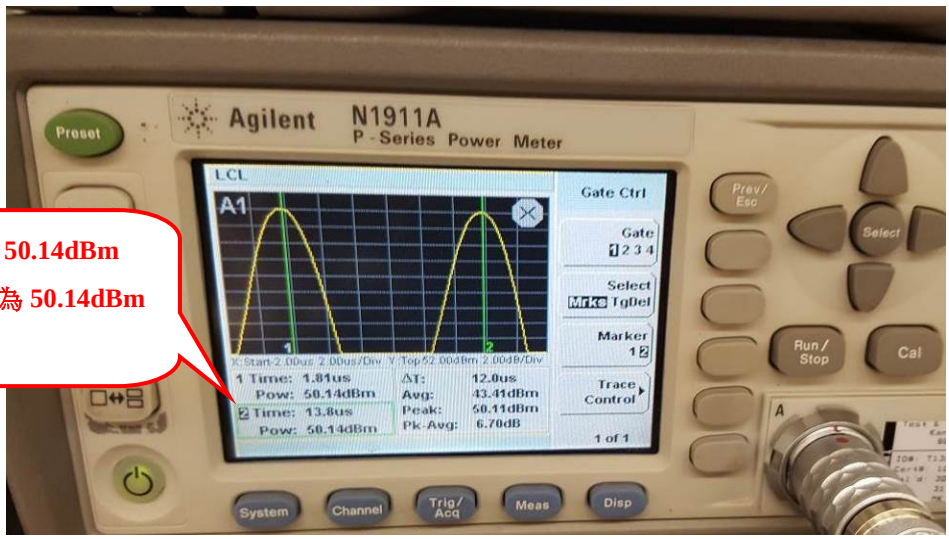
(3). Calibrate the peak power meter by pressing the CAL button then selecting Zero+Cal.

(4). Turn on both transmitters with TX1 on antenna.

(5). Position the cursors around the first TX pulse. Observe and record the peak meter reading.

(6). Position the cursors around the second TX pulse. Observe and record peak meter reading.

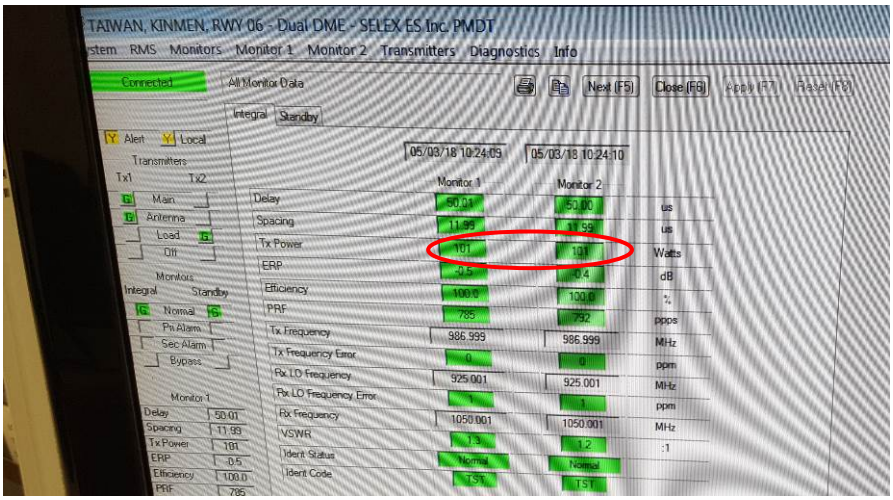
(7). Calculate the pulse pair difference reading from values obtained in Steps 7 and 8.



(8). Log on to the DME with the PMDT. Click on System>>Log RMS>> and enter User ID (SEC3) and Password (THREE). Observe and record TX PWR displayed on PMDT >> Monitors >> Data >> Integral, TX Power.

(9). Select Transmitter 2.

(10). Observe and record TX PWR displayed on PMDT >> Monitors >> Data >> Integral, TX Power.



5.	First TX Pulse Peak Power (P1)	103	≥100W
6.	Second TX Pulse Peak Power (P2)	103	≥100W
7.	Pulse Pair Amplitude Difference (P1 – P2)	0	≤ 0.5dB
8.	Display Monitor 1	104	P2 ±2.5W
	Display Monitor 2	104	P2 ±2.5W
10.	TX 2 Display Monitor 1	104	≥100W
	TX 2 Display Monitor 2	103	≥100W

3. Spectral Characteristics Test： 檢驗DME輸出信號頻寬對稱性及中心頻率±800KHz與±2MHz之dB值大小是否符合規範。

SETUP：*This block diagram details the test setup.*

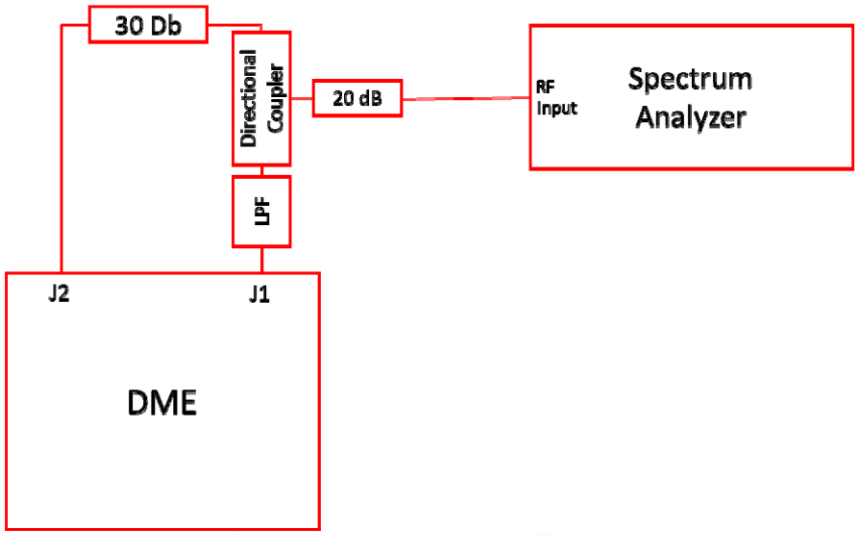


Figure 3-5 Spectral Characteristics Test Setup

(1). Disconnect Peak Power Meter from the directional coupler at the top of the DME cabinet. Connect Spectrum Analyzer to directional coupler.

(2). Turn On Transmitter 1.

(3). Adjust the spectrum analyzer for center frequency on the assigned frequency.

(4). Adjust the total span to 5 MHz. Adjust the resolution bandwidth to 30 KHz, Video bandwidth to 30 kHz and sweep time to 2 seconds.

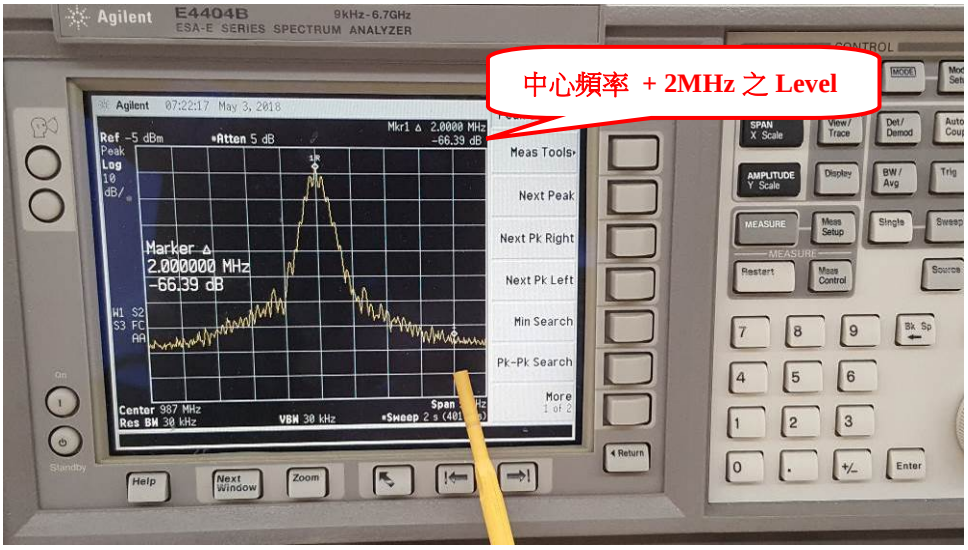
(5). Select Marker Peak Search. Record Center Frequency amplitude.

(6). Measure and record the difference between the reference level from step 5 and the level at each of the points listed on the data sheet.

(7). Select Transmitter 2.

(8). Set the top of displayed spectrum to the top reference line. Record Center Frequency amplitude.

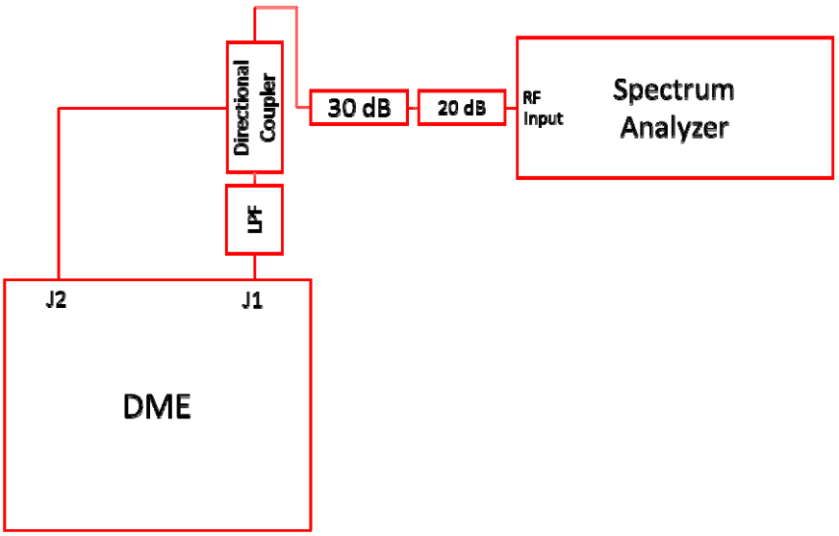
(9). Measure and record the difference between the reference level from step 5 and the level at each of the points listed on the data sheet.



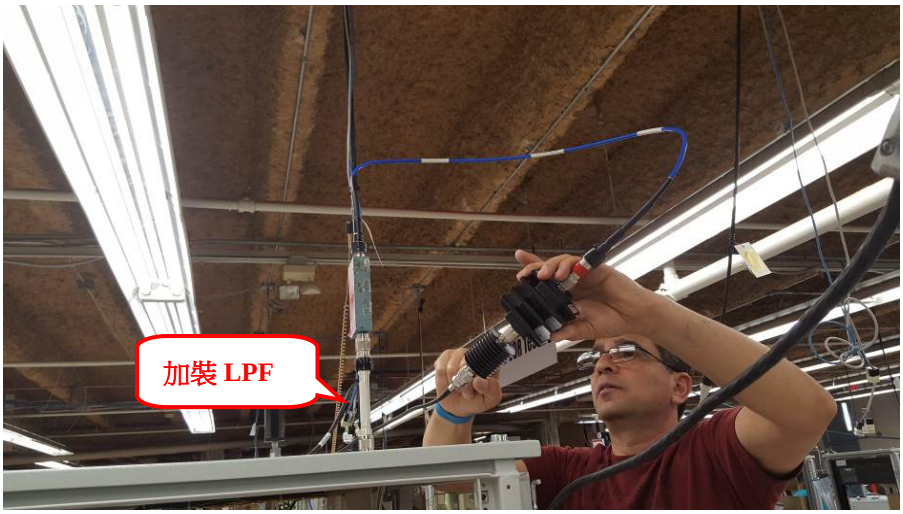
5	TX 1 Center Frequency Amplitude	0	Reference (0 dB)
6.	TX1 Offset Frequency of +2 MHz	-68.7	≥ 53 dB from reference
	TX 1Offset Frequency of +800 kHz	-57.8	≥ 33 dB from reference
	TX 1Offset Frequency of -800 kHz	-57.3	≥ 33 dB from reference
	TX 1 Offset Frequency of – 2 MHz	-68.4	≥ 53 dB from reference
8.	TX 2 Center Frequency Amplitude	0	Reference (0 dB)
9.	TX2 Offset Frequency of +2 MHz	-67.1	≥ 53 dB from reference
	TX 2Offset Frequency of +800 kHz	-57.4	≥ 33 dB from reference
	TX 2Offset Frequency of -800 kHz	-57.2	≥ 33 dB from reference
	TX 2 Offset Frequency of – 2 MHz	-67.1	≥ 53 dB from reference

4. Spectral Harmonic Characteristics Test : 量測DME REPLY頻率2次諧波及3次諧波是否符合標準。

SETUP :



(1). Spectrum Analyzer to directional coupler, as shown in Figure 3-6 with 50 dB of attenuation between the straight through port of the directional coupler and the spectrum analyzer, and the 30 dB forward coupled port of the directional coupler to J2, the monitor input. Do NOT use the coupled port of the directional coupler for harmonic measurements.



(2). Turn On Transmitter 1.

(3). Configure spectrum analyzer:

i. Center frequency = channel frequency of DME

ii. Frequency Span = 4 MHz

iii. Internal attenuation 10 dB minimum

iv. Resolution Bandwidth (RBW) 100 KHz

v. Video Bandwidth (VBW) 300 KHz

vi. Sweep time 10 seconds or greater

vii. Marker = Normal

(4). Place a marker at the peak of the carrier using peak search

(5). Set the marker mode to delta

NOTE: the spectrum analyzer marker should read 0 dB

(6). Set the Center frequency to x2 the channel frequency of the DME

(7). Select peak search to find the peak of the 2nd harmonic

(8). Record the marker value in dB in the data sheet

(9). Set the Center frequency to x3 the channel frequency of the DME

(10). Select peak search to find the peak of the 3rd harmonic

(11). Record the marker value in dB in the data sheet

(12). Select Transmitter 2 and repeat steps 3 through 11

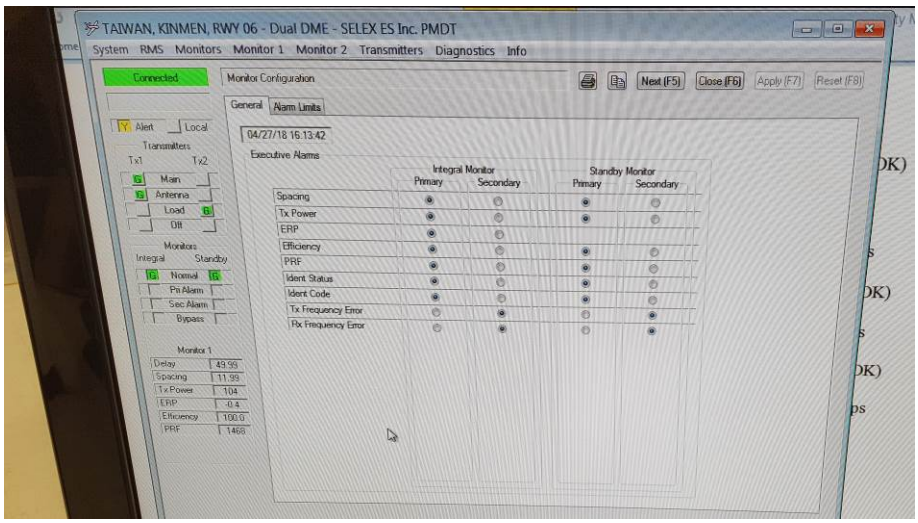
8.	TX 1 2nd Harmonic	-62.18	≥ 60 dB from reference
11.	TX 1 3rd Harmonic	-68	≥ 60 dB from reference
12.	TX 2 2nd Harmonic	-62.08	≥ 60 dB from reference
	TX 2 3rd Harmonic	-68	≥ 60 dB from reference

5. General Monitor Configuration Verification：檢視各項 MONITOR 參數設定是否正確。

(1). Select Monitors>>Monitor Configuration>>General

(2). Verify that the current settings match Figure 3-7. If not, change to match.

(3). Print the screen and attach to the data sheet.

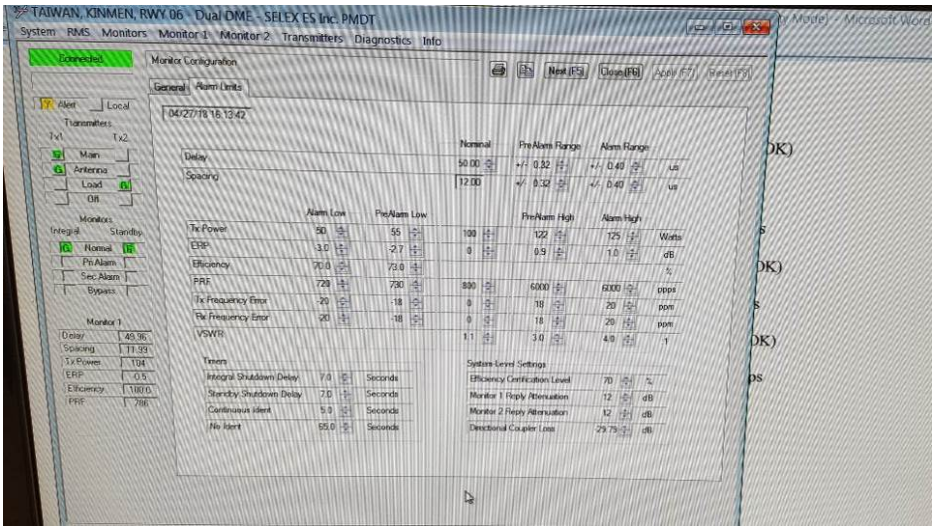


6. Monitor Alarm Limits Configuration Verification：檢視MONITORS告警臨界參數設定是否正確。

(1). Select Monitors>>Monitor Configuration>>Alarm Limits

(2). Verify that the current settings (except for Monitor Reply Attenuation and Directional Coupler Loss) match Figure 3-8. If Y-Channel, substitute 56.00 us for the Nominal Delay. If not, change to match.

(3). Print the screen and attach to the data sheet.



7. Monitor Alarm Limit Verification： 確認MONITORS告警臨界自我檢驗正常。

Select RMS>>Configuration>>General and check the box (enable) Monitor Integrity Tests. This activates the monitor integrity tests that validate each monitor’ s ability to correctly determine out of tolerance conditions. Failure of this test will disable a monitor from voting on the shutdown and/or changeover of the equipment.

(1). From the PMDT select Monitor 1 >> Test Results >> Alarm Limits.

(2). Review the Date and Time to verify that current test results are displayed.

(3). Validate that all parameters are within the high and low limit as indicated by a green background.

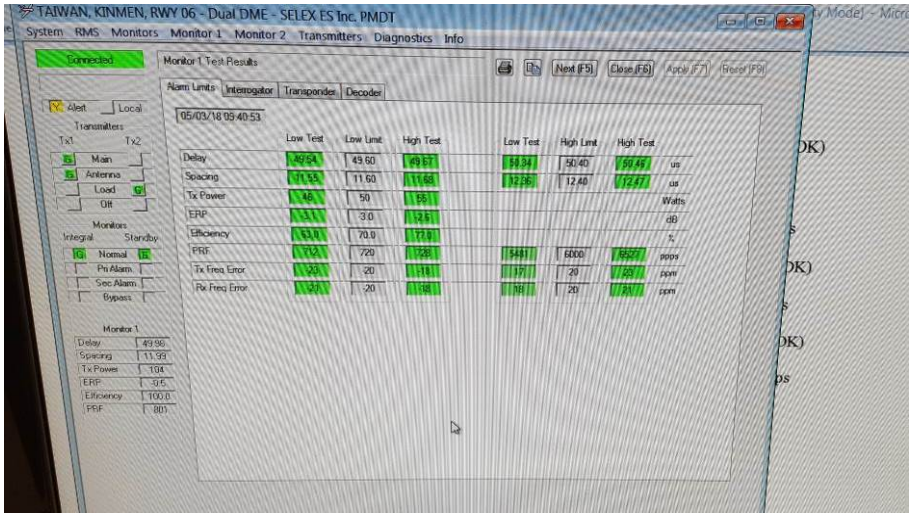
(4). Print the Screen and attach to the test data sheets.

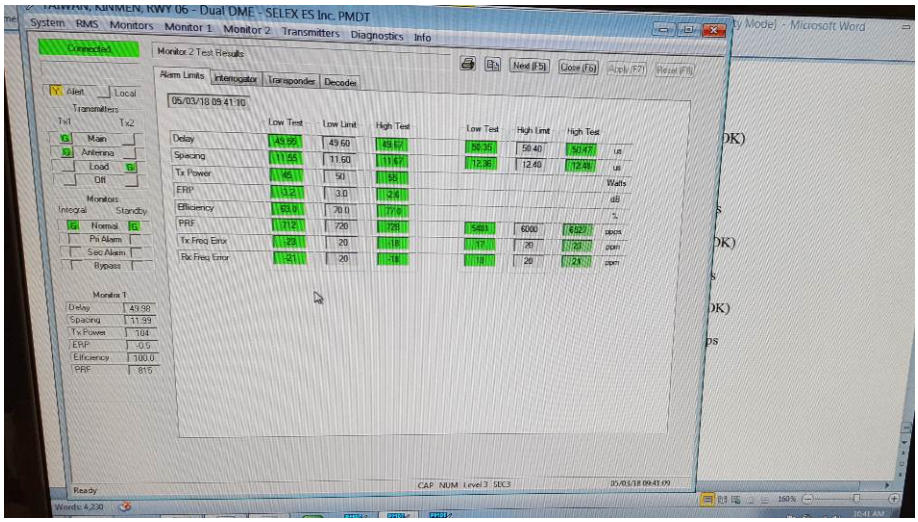
(5). From the PMDT select Monitor 2 >> Test Results >> Alarm Limits.

(6). Review the Date and Time to verify that current test results are displayed.

(7). Validate that all parameters are within the high and low limit as indicated by a green background.

(8). Print the Screen and attach to the test data sheets.





8. Monitor Interrogator Signal Generator Tests： 確認MONITORS詢問波產生器測試結果是否正常。

(1). From the PMDT select Monitor 1 >> Test Results >> Interrogator.

(2). Review the Date and Time to verify that current test results are displayed.

(3). Validate that all parameters are within the high and low limit as indicated by a green background.

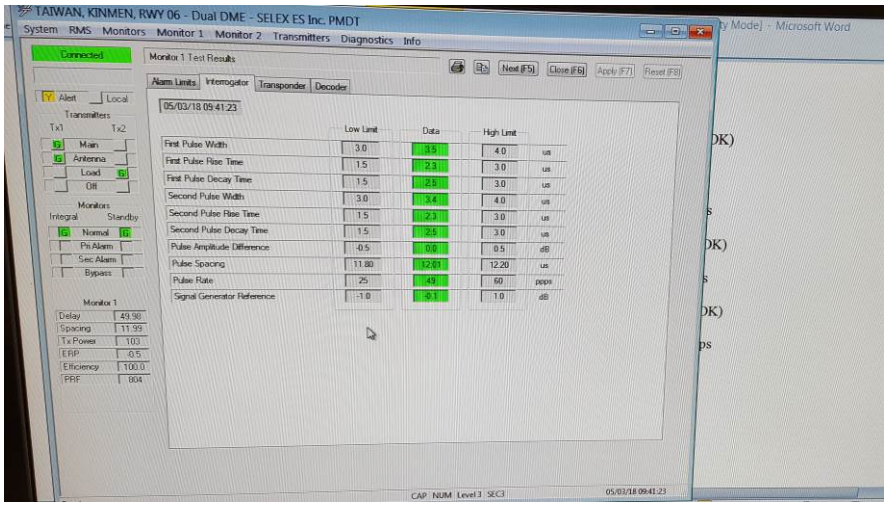
(4). Print the Screen and attach to the test data sheets.

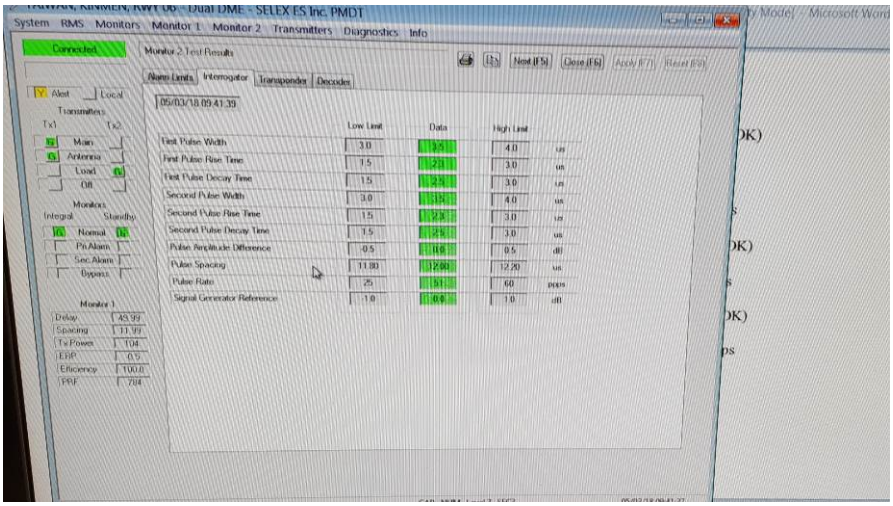
(5). From the PMDT select <u>Monitor 2 >> Test Results >> Interrogator</u>.

(6). Review the Date and Time to verify that current test results are displayed.

(7). Validate that all parameters are within the high and low limit as indicated by a green background.

(8). Print the Screen and attach to the test data sheets.





9. Transponder Signal Test： 檢視MONITORS對TX1及TX2發射信號之測試是否正常。

(1). From the PMDT select <u>Monitor 1 >> Test Results >> Transponder</u>.

(2). Review the Date and Time to verify that current test results are displayed.

(3). Validate that all parameters are within the high and low limit as indicated by a green background.

(4). Print the Screen and attach to the test data sheets.

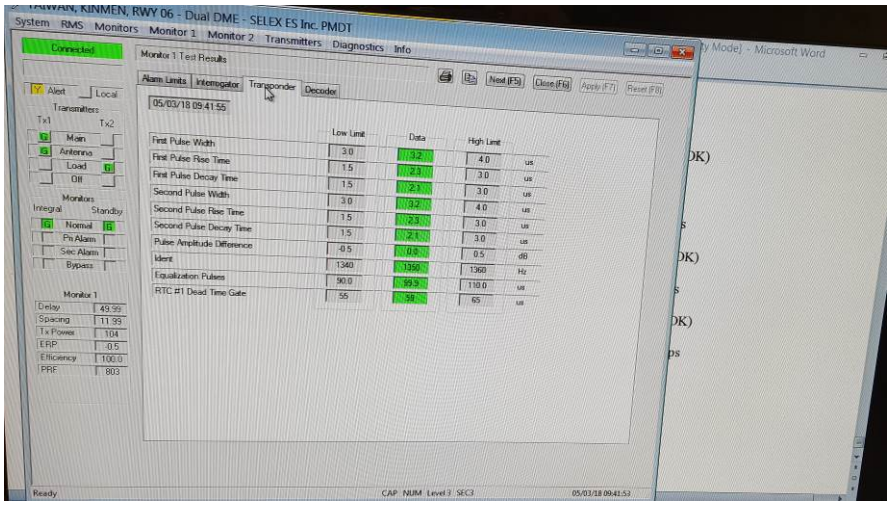
(5). From the PMDT select <u>Monitor 2 >> Test Results >> Transponder</u>.

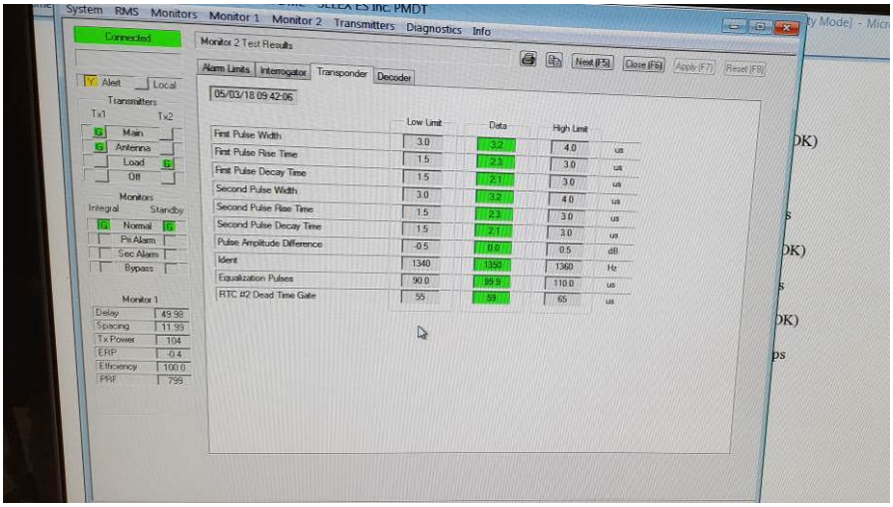
(6). Review the Date and Time to verify that current test results are displayed.

(7). Validate that all parameters are within the high and low limit as indicated by a green background.

(8). Print the Screen and attach to the test data sheets.

(9). Put TX2 on antenna and repeat steps 1 to 8 for transmitter 2.





10. **Transponder Decoder Tests**：檢視MONITORS對TX1及TX2的DECODER之測試是否正常。

(1). Using the LCU controls bypass the Integral and Standby monitors.

(2). Put TX1 on antenna

(3). From the PMDT select Monitors>>Special Tests. Select Decoder Tests for Monitor 1 and 2 then press the “Apply” button followed by the “Start” button.

(4). From the PMDT select Monitor 1 >> Test Results >> Decoder. Wait for all tests to complete.

(5). Validate that all parameters are within the high and low limits as indicated by a green background.

(6). Print the Screen and attach to the test data sheets.

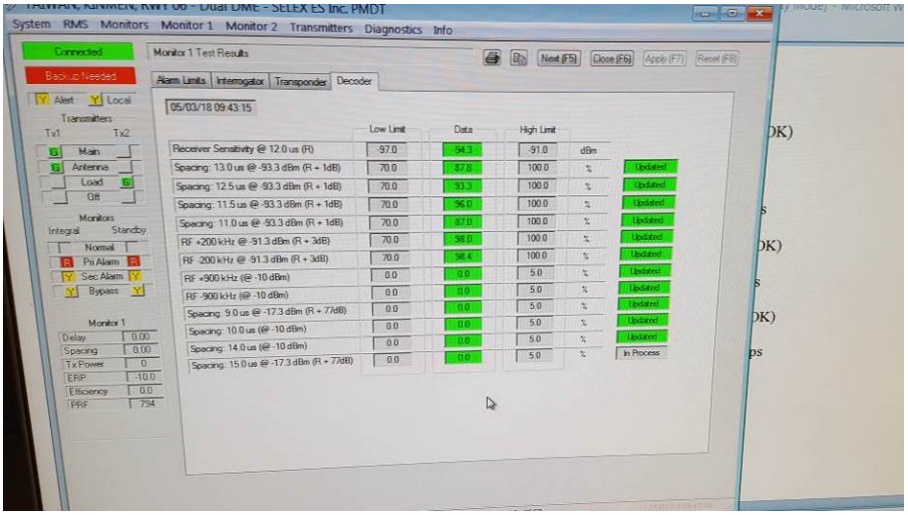
(7). From the PMDT select Monitor 2 >> Test Results >> Decoder. Wait for all tests to complete.

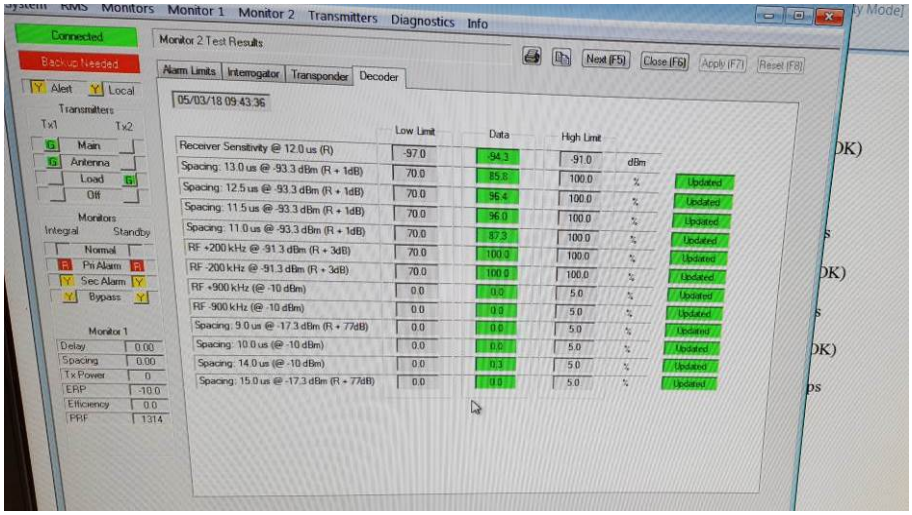
(8). Validate that all parameters are within the high and low limits as indicated by a green background.

(9). Print the Screen and attach to the test data sheets.

(10). Put TX2 on antenna and repeat steps 3 to 9 for transmitter 2.

(11). Logoff the PMDT then press the RESET button on the LCU.





11. RSCU Controls：驗證RCSU之連線功能及軟體連線操作，RCSU面板操作控制及燈號顯示是否正常。

(1). Connect a dedicated pair of wires from the RCSU to the DME at the Interface CCA terminals TB2 pins 1 and 2 (polarity is not important)

(2). Logon to the DME at Security Level Three and put the system in Local Mode.

(3). From the RMS>>Configuration screen, set RCSU Present and Connection Type to “Dedicated Modem”. Press “Apply” then select RMS>>Config Backup to save the settings.

(4). Logoff the PMDT then press the RESET button on the LCU.

(5). After the DME boots up, verify that there is communication indication between the RCSU and the DME by viewing the communication status. Check Data Sheet if OK.

(6). Verify a normal condition on both Main and Standby DMEs. Check Data Sheet if OK.

(7). From the RCSU turn OFF the DME. Verify both transmitters respond by shutting down. Silence any audible alarms at the RCSU or DME. Check Data Sheet if OK.

(8). Wait more than 20 seconds then turn the DME ON from the RCSU.Verify the Integral and Standby monitors are normal and the main transmitter is running. Check Data Sheet if OK.

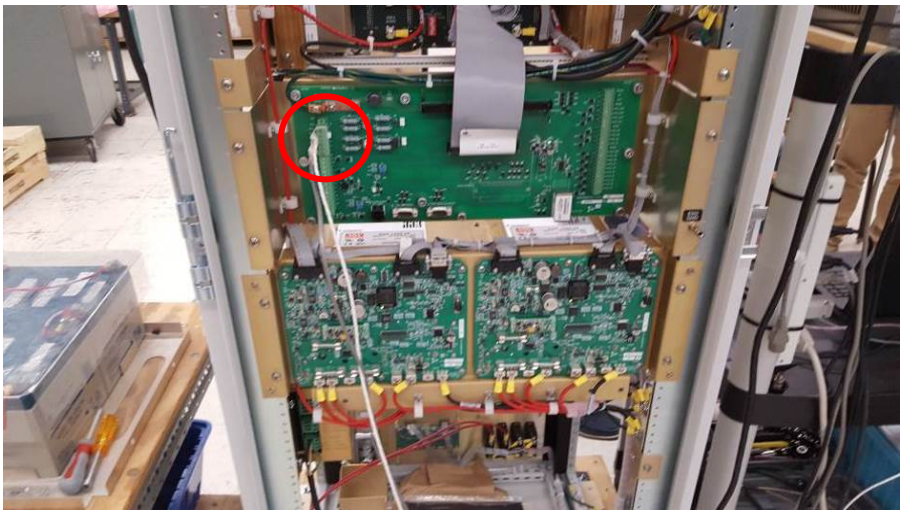
(9). On the RCSU press the TRANSFER button. Verify system transfer. Check Data Sheet if OK.

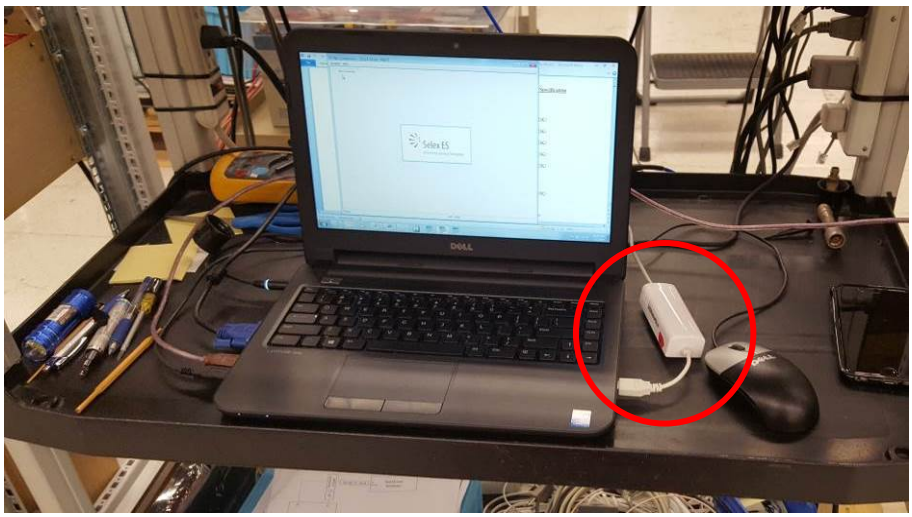
5.	Communication established as indicated on the RCSU	☑	(Check if OK)
6.	RCSU indicates Main and Standby in Normal condition	☑	(Check if OK)
7.	Both Main and Standby DMEs Shutdown	☑	(Check if OK)
8.	Both Main and Standby DMEs Startup after 20 sec	☑	(Check if OK)
9.	Transfer Command switches main	☑	(Check if OK)

12. Modem Remote Monitoring：驗證RCSU能透過外部MODEM連線至裝備，並進行相關之監視及控制。

(1). Log OFF from PMDT. Connect a telephone line to the DME modem at the Interface CCA (TB2 Pins 3 and 4). Using a remote computer with PMDT software, call the DME and establish communications. Log on to the system.

(2). Check data sheet if OK then logoff the PMDT.





2.	Communications to the DME with the remote PMDT established	☑	(Check if OK)

13. Battery Backup :檢驗DME裝備BCPS對蓄電池充放電功能，市電中斷、蓄電池故障等監視功能是否正常。

(1). Turn off the AC and DC breakers for both systems. Connect four discharged 12Vdc batteries in series to the DME TX1 and TX2 DC breakers and the ground buss bar.

NOTE: If the batteries are fully charged it may be necessary to check when batteries are at a lower level.

(2). Place a DC current probe around the negative battery cable then turn on the AC and DC breakers for TX1. Verify that BCPS1 is supplying 4 to 7 amps of peak charge current. Record on the data sheet.

NOTE: The battery charge current will dip every five seconds as the BCSP is performing a battery fault test.

(3). Turn off TX1 AC circuit breaker and verify TX1 continues to operate on battery power. Check data sheet if OK. Turn off TX1 DC breaker.

(4). Turn on TX2 AC and DC breakers. Verify that BCPS2 is supplying 4 to 7 amps of peak charge current. Record on the data sheet.

(5). Turn off TX2 AC circuit breaker and verify TX2 continues to operate on battery power. Check

data sheet if OK. Turn off TX2 DC breaker.

(6). Turn on TX1 and TX2 AC and DC breakers. Verify that the summed chargers are supplying 8 to 14 amps of charge current. Record on the data sheet.

2.	BCPS1 Charge current	6.2	4 to 7 amps
3.	TX1 operates on Batteries	☑	(Check if OK)
4.	BCPS2 Charge current	6.5	4 to 7 amps
5.	TX2 operates on Batteries	☑	(Check if OK)
6.	Summed Charge current	12.7	8 to 14 amps

14. Fault Isolation：以PMDT軟體連線至DME，執行完整的錯誤偵測，確認DME裝備無故障訊息產生。

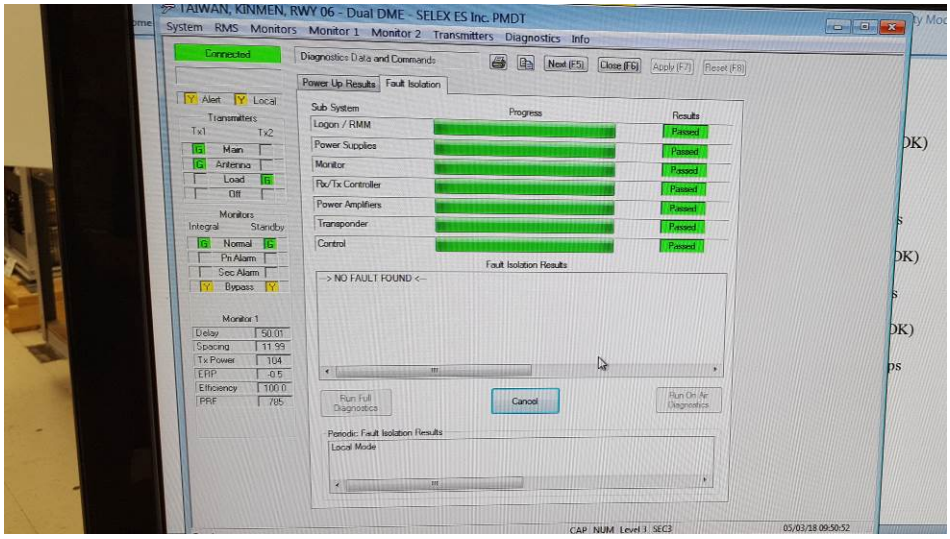
(1). Put the DME in Local mode

(2). Logon locally at Security Level 3

(3). From the PMDT select Diagnostics >> Fault Isolation. Press the Run Full Diagnostics button.

(4). Verify the DME passes fault isolation with no faults found.

(5). Print the Screen and attach to the test data sheets.



15. **Configuration at time of Final Testing**：恢復DME裝備正常使用狀態，列印DME裝備系統參數。

(1). Select system configuration from the PMDT

(2). Select System >> Configuration print

(3). Attach the printout to the test data sheets.

肆、 心得及建議

一、心得

(一)本次為本總臺五年計 17 套 ILS/DME(或 LDA/DME)採購案之第二梯次工廠測試，測試設備計有金門 06 ILS/DME 及花蓮 21 LDA/DME。有鑑於本案已完成嘉義 36ILS、馬公 02ILS 及高雄 27ILS 之架設，故本次工廠測試驗收期間，SELEX 公司亦安排原廠工程師團隊與本總臺廠測人員進行技術研討會議，討論自架設以來各 ILS 架設陣地所遇到的各項技術性問題，藉由現場操作經驗說明，使 SELEX 工程師團隊得以更確切瞭解並掌握裝備之技術性問題，避免了因問題報告單(PCR)之書面簡短問題敘述，致 SELEX 工程師團隊誤解問題而造成回覆偏差，透過本次裝備設計者與操作者齊聚的座談會，有利於問題釐清及技術交流，並能有效且快速解決問題。

(二)此次汰換 SELEX 公司 ILS/DME 設備為該公司最新開發生產之裝備型號，除了設備外型由「壁掛式機體」改為「落地式機櫃」外，其中最大的差異實屬 LOC 及 GP 設備的核心-功率放大模組(PA Module)的改變，其 PA Module 除了將前一代 ILS 的 Synthesizer CCA、CRS PA 及 CLR PA 等整合在一起，亦將音頻測試訊號連接至 RF Monitor CCA，因此當測試 CRS 或 CLR 的音頻訊號時已不需如前一代 ILS 一樣頻繁地更改測試點，只需在 LCU 面板上切換訊號源即可執行各種訊號的量測，如此大大提升了測試的效率及增加維護時的便利性。而裝備由壁掛式機體改為落地式機櫃，讓各模組放置的空間更為寬裕，使維護人員查修時及更換模組時更加方便，同時將裝備電池整合於機櫃內，使外觀更加美觀。SELEX 原廠亦將 PA Module 的相位調校修改成可由 PMDT 軟體調設 360 度相位，改善以前調校相位時需外加 90 度相位線的缺點，由軟體調校相位不僅增加裝備維護的效率，更避免了拆裝傳輸線接頭造成的損壞風險。

(三)在工廠測試期間，於 SELEX 公司人員帶領下參觀廠內其他部門，含生產、維修、研發、品管、測試及軟體設計等單位，各部門間井然有序地分工處理各業管事務，處處可見嚴謹的管理模式。另參訪物料倉儲管理單位時發現該公司針對各世代系統之庫儲料件均存有 15 年的備料，這對該公司的客戶是一種安全保障；爰此，該公司亦承諾提供本總臺採購 ILS 裝備 10 年的保固承諾。

二、建議：

(一)本次採購案係以一次性採購分年安裝方式執行，並於 5 年內完成本總臺轄下各陣地含訓練機在內共 17 套 ILS/DME 或 LDA/DME 設置，本次辦理成果已因廠牌系統相同及性能一致，使得各陣地的備份件得以互相支援調撥，設備發生故障時，各陣地維護人員亦可彼此討論故障原因及解決方式。同時，本次得標商 SELEX 公司亦於臺灣成立備品交換中心，使本總臺各陣地的組件發生故障時，經換上本總臺自有的備份件後，該故障組件可再送交臺灣備品交換中心取得良品並運抵各陣地，確保備品之可用性，此舉大幅提升助航導裝備的組件後勤補給能力，有鑑於本總臺的助導航設施採購汰換已朝向一次採購分年汰換的計畫執行方式，爰建議未來助航設備採購中，除各設備主要模組於各陣地備份外，亦建議於契約中載明得標商應於臺灣成立完整備品交換中心，俾確保裝備故障組件的立即換修能力。

(二)本次工廠測試得以順利且有效率的完成原因，除了有經驗豐富的原廠工程師主導外，尚需備有充足且先進的儀表輔助，有道是”工欲善其事必先利其器”。本總臺將陸續執行各陣地 ILS/DME 或 LDA/DME 汰換，惟每個維護單位所擁有的測試儀表均因不同時期採購而有所不同，為期更有效率的執行裝備檢測，爰建議於各設備採購時，一併購入符合各陣地設備需求的檢測儀表，俾利新裝備的維修測試。

(三)此次在美期間與原廠的會議中，SELEX 公司展現解決架設期間所面臨各項問題的重視，相關系統規劃設計軟/硬體工程師均親自與會討論，實屬難得，爰建議未來之國外工廠測試及訓練課程中，應要求原廠成立軟/硬體工程師團隊，介紹原始系統設計理念並進行技術交流座談，俾利設備維護學員們能更迅速發現系統問題並解決問題。

伍、 附錄:花蓮 21LDA/DME 工廠測試文件

一、 花蓮LOCALIZER測試文件

3.4.1.2 Maintenance Alerts

(2)

Parameter	Low Limit	High Limit	Nominal Value
AC Input Volts	98 (196)	132 (264)	111.9
AC Input Current	1	7	3.8
TX #1 - 24 V P.S. Volts	23.3	25.2	24.0
TX #1 - 24 V P.S. Current	3	15	7.9
TX #2 - 24 V P.S. Volts	23.3	25.2	24
TX #2 - 24 V P.S. Current	3	15	8.1
Battery 1 Volts	21.5	30	29.6
Battery 1 Current	-6	10	0
Battery 2 Volts	21.5	30	29.5
Battery 2 Current	-6	10	0
+ 5V DC Monitor #1	4.80	5.20	4.86
+12V DC Monitor #1	11.75	13.25	12.52
- 12 V DC Monitor #1	-13.25	-11.75	-12.43
+24V DC Monitor #1	23.3	25.2	23.9
+ 5V DC Monitor #2	4.80	5.20	4.85
+12V DC Monitor #2	11.75	13.25	12.5
-12V DC Monitor #2	-13.25	-11.75	-12.44
+24V DC Monitor #2	23.3	25.2	23.9

3.4.2.2 Power On/Off Indications

(1) TX #1 AC Power Indicator ☑ Check if OK
(2) TX #1 DC Power Indicator ☑ Check if OK
(3) TX #2 AC Power Indicator ☑ Check if OK
(4) TX #2 DC Power Indicator ☑ Check if OK

3.4.3.2 Transmitter RF Control

		TX1	TX2
(2)	Course Transmitter On/Off Control	☑	☑ Check if OK
(2)	Clearance Transmitter On/Off Control	☑	☑ Check if OK

3.4.4.2 Radio Frequency and RF Frequency Control

(1) S1 Switch Setting: (6 5 4 3 2 1): Enter Setting 0/0/1/0
(2) Localizer Channel Frequency 110.3 MHz

TX1

(3) Meas. CRS Freq. (Channel +4 kHz) A15A3 J4 110.303906 ± 0.001 %
(4) Meas. CLR Freq. (Channel -4 kHz) A15A3 J1 110.295906 ± 0.001%
(5) Measured Frequency Difference 8000 (7500Hz to 8500Hz)
(6) Indicated Frequency Difference 8000 (7500Hz to 8500Hz)

TX2

(3) Meas. CRS Freq. (Channel +4 kHz) A15A3 J4 110.303896 ± 0.001 %
(4) Meas. CLR Freq. (Channel -4 kHz) A15A3 J1 110.295896 ± 0.001%
(5) Measured Frequency Difference 8000 (7500Hz to 8500Hz)
(6) Indicated Frequency Difference 8000 (7500Hz to 8500Hz)

3.4.5.2 CRS CSB Reflected Power and VSWR

		TX1	TX2	
(1)	CRS CSB forward power	15	15	Record
(2)	CRS CSB reflected power	0	0	Record
(3)	CRS CSB VSWR (calculated)	1:1	1:1	Record

3.4.6.2 CRS SBO Reflected Power and VSWR

		TX1	TX2	
(1)	CRS SBO forward power	0.2	0.2	Record
(2)	CRS SBO reflected power	0	0	Record
(3)	CRS SBO VSWR (calculated)	1:1	1:1	Record

3.4.7.2 CLR CSB Reflected Power and VSWR

		TX1	TX2	
(1)	CLR CSB forward power	12	12	Record
(2)	CLR CSB reflected power	0	0	Record
(3)	CLR CSB VSWR (calculated)	1:1	1:1	Record

3.4.8.2 CLR SBO Reflected Power and VSWR

		TX1	TX2	
(1)	CLR SBO forward power	0.2	0.2	Record
(2)	CLR SBO reflected power	0	0.0	Record
(3)	CLR SBO VSWR (calculated)	1:1	1:1	Record

3.4.9.2 RF Power Metering

Wattmeter Functions:

	CRS Transmitter		
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 15.0	Int 15.2 (Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0.0	Int 0 (Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO F Pwr Reading Accuracy	Wm 0.2	Int 0.205 (Wm ± 4%)
(3)	Main SBO F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO R Pwr Reading Accuracy	Wm 0.0	Int 0 (Wm ± 4%)
(3)	Main SBO R Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 15.0	Int 15.1 (Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby SBO Pwr Reading Accuracy	Wm 0.2	Int 0.205 (Wm ± 4%)
(3)	Stby SBO Pwr Select and Waveform		☑ Check if OK
	CLR Transmitter		
(1,2)	Main CSB F Pwr Reading Accuracy	Wm 12.0	Int 12.2 (Wm ± 4%)
(3)	Main CSB F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main CSB R Pwr Reading Accuracy	Wm 0.0	Int 0 (Wm ± 4%)
(3)	Main CSB R Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO F Pwr Reading Accuracy	Wm 0.2	Int 0.207 (Wm ± 4%)
(3)	Main SBO F Pwr Select and Waveform		☑ Check if OK
(1,2)	Main SBO R Pwr Reading Accuracy	Wm 0.0	Int 0 (Wm ± 4%)
(3)	Main SBO R Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby CSB Pwr Reading Accuracy	Wm 12.0	Int 12.1 (Wm ± 4%)
(3)	Stby CSB Pwr Select and Waveform		☑ Check if OK
(1,2)	Stby SBO Pwr Reading Accuracy	Wm 0.2	Int 0.210 (Wm ± 4%)
(3)	Stby SBO Pwr Select and Waveform		☑ Check if OK

3.4.10.2 CRS System Spurious Emissions

	TX1	Frequency	Level
(3)	Fundamental	110.3 MHz	0 Record
(4)	Second Harmonic	220.6 MHz	-71.17 < -60 dBC
	Third Harmonic	330.9 MHz	-82.01 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

	TX2	Frequency	Level
(3)	Fundamental	110.3 MHz	0 Record
(4)	Second Harmonic	220.6 MHz	-71.19 < -60 dBC
	Third Harmonic	330.9 MHz	-81.1 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

3.4.11.2 CLR System Spurious Emissions

	TX1	Frequency	Level
(3)	Fundamental	110.3 MHz	0 Record
(4)	Second Harmonic	220.6 MHz	-71.5 < -60 dBC
	Third Harmonic	330.9 MHz	-80.73 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

	TX2	Frequency	Level
(3)	Fundamental	110.3 MHz	0 Record
(4)	Second Harmonic	220.6 MHz	-71.53 < -60 dBC
	Third Harmonic	330.9 MHz	-81.46 < -60 dBC
(5)	No spurious output greater than -60 dBC		☑ Check if OK

3.4.12.2 CRS Carrier Signal at Sideband Output (SBO Carrier Suppression)

		TX1	TX2
(2)	CRS carrier signal at sideband output	-69.51	-69.9 <-30 dBC

3.4.13.2 CLR Carrier Signal at Sideband Output (SBO Carrier Suppression)

		TX1	TX2
(2)	CLR carrier signal at sideband output	-75.21	-74.8 <-30 dBC

3.4.14.2 LO Outputs

		TX1	TX2
(2)	CRS LO Output Power	8.6	8.91 ≥ 6.3 mW but ≤ 63.1 mW
(4)	CLR LO Output Power	8.64	8.49 ≥ 6.3 mW but ≤ 63.1 mW

3.4.15.2 CRS Modulation Balance Adjustment

TX1

At 40% SDM (Nominal Modulation Setting)

(3,4)	DDM setting	External	Internal	Tolerance
	0.000	0.000	0.000	S (standard)
	0.015	0.016	0.015	S + 0.015 ± 0.002
	0.030	0.031	0.030	S + 0.030 ± 0.004
	-0.015	-0.015	-0.016	S - 0.015 ± 0.002
	-0.030	-0.030	-0.031	S - 0.030 ± 0.004

TX2

At 40% SDM (Nominal Modulation Setting)

(3,4)	DDM setting	External	Internal	Tolerance
	0.000	0.000	0.000	S (standard)
	0.015	0.016	0.015	S + 0.015 ± 0.002
	0.030	0.031	0.030	S + 0.030 ± 0.004
	-0.015	-0.015	-0.016	S - 0.015 ± 0.002
	-0.030	-0.030	-0.031	S - 0.030 ± 0.004

3.4.16.2 CRS Nav Tones Audio Frequency

		TX1	TX2	External
(2)	90 Hz frequency	90	90	90 ± 1% (0.90 Hz)
(4)	150 Hz frequency	150	150	150 ±1% (1.50Hz)

3.4.17.2 CLR Nav Tones Audio Frequency

		TX1	TX2	External
(2)	90 Hz frequency	90	90	90 ± 1% (0.90 Hz)
(4)	150 Hz frequency	150	150	150 ±1% (1.50 Hz)

3.4.18.2 Integral Monitor Voting Logic

(1)	Monitor #1 Normal Indication	☑ Check if OK
(2)	Monitor #2 Normal Indication	☑ Check if OK
(4)	Integral Monitor Bypass Function	☑ Check if OK
	Integral Monitor bypass light	☑ Check if OK
(5)	Integral monitor bypass removed	☑ Check if OK
(8)	Integral monitor 1 alarm	☑ Check if OK
(9)	Integral Monitor Mismatch indication	☑ Check if OK
(10)	Station operational w/mon 1 alarm	☑ Check if OK
(12)	Integral monitor 2 alarm/station transfer/ Shut down (monitor "and" function)	☑ Check if OK
(15)	Station transfer /shut down (Monitor "OR" Function)	☑ Check if OK

3.4.19.2 Integral and Standby Monitor Alarms

(1)	Integral Mon 1 CRS Centerline DDM Value	☑ Check if OK
(2)	Standby Mon 1 CRS Centerline DDM Value	☑ Check if OK
	Standby Mon 1 CLR Centerline DDM Value	☑ Check if OK
(3)	Integral Mon 2 CRS Centerline DDM Value	☑ Check if OK
(4)	Standby Mon 2 CRS Centerline DDM Value	☑ Check if OK
	Standby Mon 2 CLR Centerline DDM Value	☑ Check if OK

Test Step	Alarm	CRS/CLR	Monitor Test (Check If OK)			
			INT 1	INT 2	STBY 1	STBY 2
(6,7,8)	RF Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(10,11,12)	RF Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(15,16,17)	Centerline SDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(19,20,21)	Centerline SDM Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(24,25,26)	Centerline DDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	N/A	N/A	N/A	N/A
(28,29,30)	Centerline DDM Alarm High	CRS	☑	☑	☑	☑
		CLR	N/A	N/A	N/A	N/A
(33,34,35)	Width DDM Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(37,38,39)	Width DDM Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(42,43,44)	Ident Mod Alarm Low	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(46,47,48)	Ident Mod Alarm High	CRS	☑	☑	☑	☑
		CLR	☑	☑	☑	☑
(51,52,53)	Continuous Ident Timeout		☑	☑	☑	☑
(56,57,58)	No Ident Timeout		☑	☑	☑	☑

3.4.20.2 Integral Monitor Reverse Sensing Alarms

CRS TX

(2)	CRS Width DDM	-0.16 Approx -0.155 DDM
(3)	Monitor indicates reverse sensing alarm	☑ Check if OK
(4)	Hard shutdown	☑ Check if OK
(5)	Alarm on monitor 2	☑ Check if OK

CLR TX

(7)	CLR 1 Width DDM	-0.229 Approx -0.260 DDM
(8)	CLR 2 Width DDM	-0.286 Approx -0.305 DDM
(9)	Monitor indicates reverse sensing alarm	☑ Check if OK
(10)	Hard shutdown	☑ Check if OK
(11)	Alarm on monitor 2	☑ Check if OK

3.4.21.2 Monitor Certification and Certification Limits

(2)	Monitor Certification On/Off Control	☑ Check if OK
(3)	No monitor certification tab	☑ Check if OK
(6)	Monitor Certification Interval	48sec <2 min.
(10)	Mon. 1 centerline SDM out of tolerance	☑ Check if OK
(11)	Mon. 1 voting disabled	☑ Check if OK
(12)	Mon. 1 alarm for integral, standby tx and nfm	☑ Check if OK
(17)	Mon. 2 centerline SDM out of tolerance	☑ Check if OK
(18)	Mon. 2 voting disabled	☑ Check if OK
(20)	Certification results in tolerance for all parameters for monitor #1	☑ Check if OK
(21)	Certification results in tolerance for all parameters for monitor #2	☑ Check if OK

3.4.22.2 Transmitter Selection and Indications

(1)	Main Transmitter Select and Indication	☑ Check if OK
(2)	Transmitter Antenna Select and Indication	☑ Check if OK
(3)	Transmitter Load Select and Indication	☑ Check if OK
(4)	Transmitter OFF Select and Indication	☑ Check if OK

3.4.23.2 Power Supply Functions

(1)	AC Line Fail Indication	☑	Check if OK
(2)	Station On-Battery Indication	☑	Check if OK
(3)	Battery Fault Indication	☑	Check if OK
(4)	DC - DC Convertor OK Indication	☑	Check if OK
(5)	Automatic Station Power-Up on AC power restoration (No Batteries)	☑	Check if OK
(6)	System does not restart	☑	Check if OK
(7)	Station On/Off Control on Batteries only - (No AC Power Present)	☑	Check if OK

3.4.24.2 Station Transfer Action: Main-to-Standby; Hot Standby Operation

(3)	Station Transfer Action: Main to Stby	0.1 ≤1 sec
(4)	Local Aural + Visual Alarms	☑ Check if OK
(5)	Continued Operation on Stby	☑ Check if OK
(7)	Station Shutdown: Main and Stby to Off	0.1 ≤1 sec
(8)	Local Aural + Visual Alarms	☑ Check if OK

3.4.25.2 CRS CSB Power Range

		TX1	TX2	
(2)	Mod Bal at 20 Watts CSB	0	0	DDM
(3)	SDM at 20 W CSB	40.1	40.3	%
(4)	Course Width at 20 W CSB	0.155	0.155	DDM
(6)	Mod Bal at 8 Watts (40% CSB)	0.000	0.000	DDM
(7)	SDM at 8 Watts (40% CSB)	39.3	39.7	%
(8)	Course Width at 8 W (40% CSB)	0.154	0.155	DDM
(9)	Modulation balance difference	0.00	0.00	≤ 0.002 DDM
(10)	Course width difference	0.01	0.00	± 2% of step 4
(11)	SDM difference	0.8	0.6	± 1%

3.4.26.2 CLR CSB Power Range

		TX1	TX2	
(2)	Mod Bal at 20 Watts CSB	0.00	0.001	DDM
(3)	SDM at 20 W CSB	40.3	40.2	%
(4)	CLR 1 DDM at 20 W CSB	0.331	0.329	DDM
(6)	Mod Bal at 8 Watts (40% CSB)	0.000	0.0	DDM
(7)	SDM at 8 Watts (40% CSB)	39.5	39.6	%
(8)	CLR 1 DDM at 8 W (40% CSB)	0.330	0.330	DDM
(9)	Modulation balance difference	0.0	0.001	≤ 0.002 DDM
(10)	CLR 1 DDM difference	0.001	0.001	± 2% of step 4
(11)	SDM difference	0.8	0.6	± 1%

3.4.27.2 Identification Signal and Modulation Range

TX1

(3)	Audio Frequency	1020 ± 0.1% (1.02 Hz)
(5)	CRS Identification Coding verification	"I" + 3 Letters
(6)	CLR Identification Coding verification	"I" + 3 Letters

TX2

(3)	Audio Frequency	1020 ± 0.1% (1.02 Hz)
(5)	CRS Identification Coding verification	"I" + 3 Letters
(6)	CLR Identification Coding verification	"I" + 3 Letters

3.4.28.2 Antenna Fault Alarms

(3) Individual Antenna Indications

Antenna #	Normal	Open	Mon. Short	Feed Short
1L	☑	☑	☑	☑
2L	☑	☑	☑	☑
3L	☑	☑	☑	☑
4L	☑	☑	☑	☑
5L	☑	☑	☑	☑
6L	☑	☑	☑	☑
7L	☑	☑	☑	☑
8L	☐	☐	☐	☐
9L	☐	☐	☐	☐
10L	☐	☐	☐	☐
1R	☑	☑	☑	☑
2R	☑	☑	☑	☑
3R	☑	☑	☑	☑
4R	☑	☑	☑	☑
5R	☑	☑	☑	☑
6R	☑	☑	☑	☑
7R	☑	☑	☑	☑
8R	☐	☐	☐	☐
9R	☐	☐	☐	☐
10R	☐	☐	☐	☐

(5)	Antenna Misalignment is Displayed	☑ Check
(6)	Antenna Misalignment Causes Maint. Alert	☑ Check
(9)	Antenna Fault Causes System Shutdown	☑ Check
(10)	No restart on #2 Transmitter	☑ Check

3.4.29.2 Final System Settings

(1) Attach the printed system configuration file.

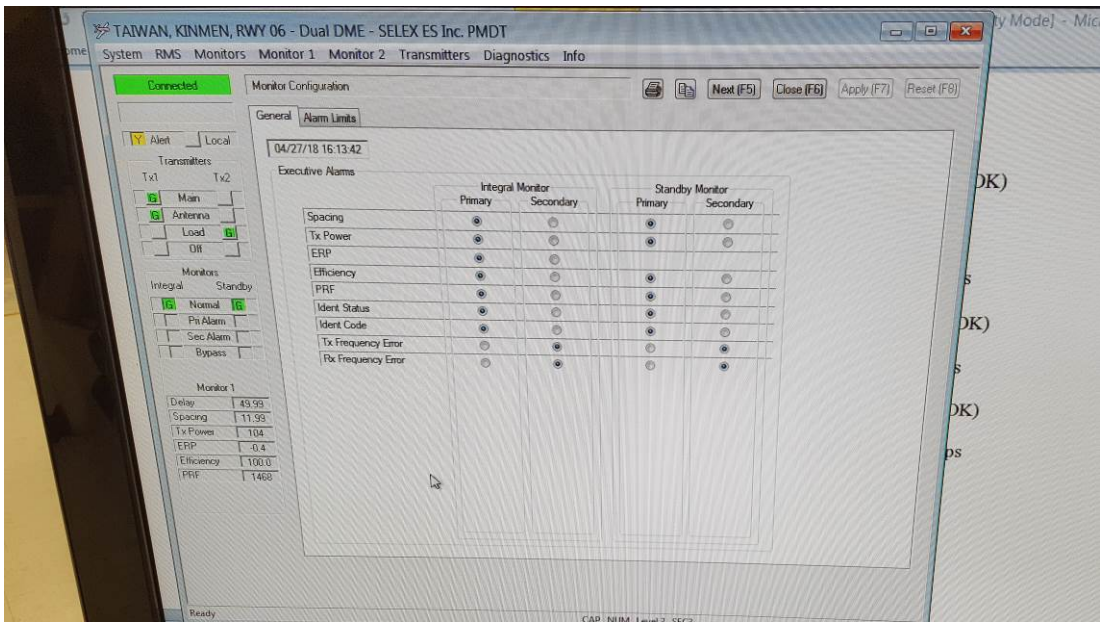
二、 花蓮DME測試文件

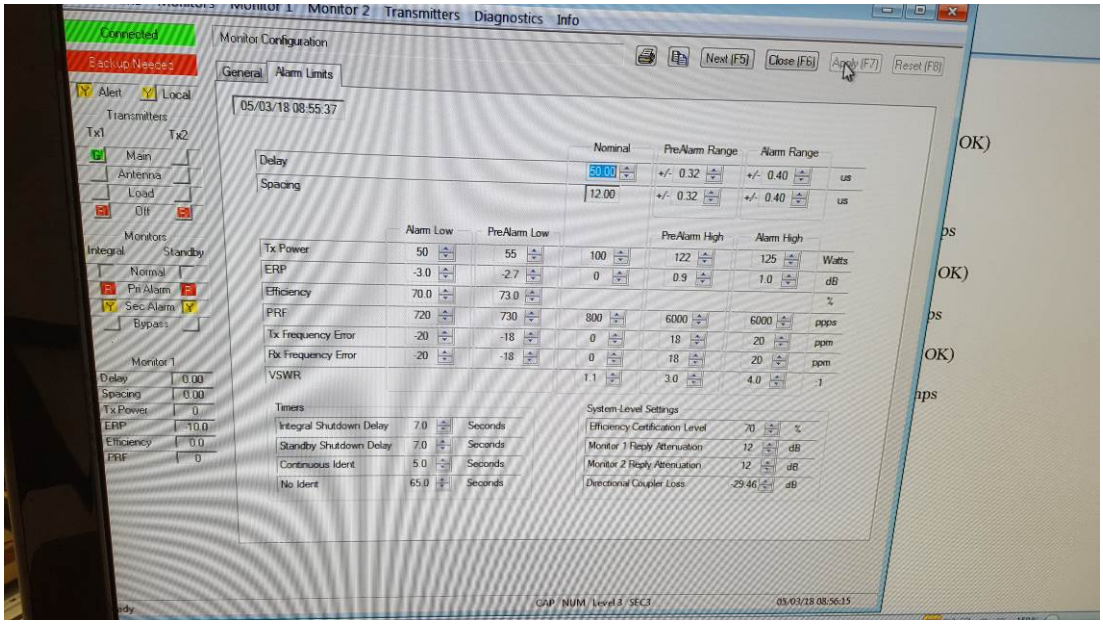
Ref	Measurement	Recorded Data	Standard Specification
3.4.1.1 Frequency Verifications			
4.	TX1 Output Frequency (1A9 J1 TX LO)	1000.999 MHz	Assigned TX Freq ± 0.001%
5.	TX2 Output Frequency (1A17 J1 TX LO)	1000.999 MHz	Assigned TX Freq ± 0.001%
6.	Monitor/Int 1 Output Freq (1A11 INT LO)	1064.000 MHz	Assigned RX Freq ± 0.001%
7.	Monitor/Int 2 Output Freq (1A15 INT LO)	1064.000 MHz	Assigned RX Freq ± 0.001%
8.	Receiver (RTC) Local Oscillator Frequency (1A10 RX LO)	939.000 MHz	Assigned RX Freq -125 MHz ± 0.001%
9.	Receiver (RTC) Local Oscillator Frequency (1A16 RX LO)	939.000 MHz	Assigned RX Freq -125 MHz ± 0.001%
3.4.2.1 Transmitter Output Power			
5.	First TX Pulse Peak Power (P1)	103.5	≥100W
6.	Second TX Pulse Peak Power (P2)	103.5	≥100W
7.	Pulse Pair Amplitude Difference (P1 – P2)	0	≤ 0.5dB
8.	Display Monitor 1	103	P2 ±2.5W
	Display Monitor 2	103	P2 ±2.5W
10.	TX 2 Display Monitor 1	103	≥100W
	TX 2 Display Monitor 2	104	≥100W
3.4.3.1 Spectral Characteristics			
5	TX 1 Center Frequency Amplitude	0	Reference (0 dB)
6.	TX1 Offset Frequency of +2 MHz	-67.8	≥ 53 dB from reference
	TX 1Offset Frequency of +800 kHz	-57.4	≥ 33 dB from reference
	TX 1Offset Frequency of -800 kHz	-56.3	≥ 33 dB from reference
	TX 1 Offset Frequency of – 2 MHz	-67.2	≥ 53 dB from reference
8.	TX 2 Center Frequency Amplitude	0	Reference (0 dB)
9.	TX2 Offset Frequency of +2 MHz	-68.5	≥ 53 dB from reference
	TX 2Offset Frequency of +800 kHz	-58.1	≥ 33 dB from reference
	TX 2Offset Frequency of -800 kHz	-57.1	≥ 33 dB from reference
	TX 2 Offset Frequency of – 2 MHz	-66.4	≥ 53 dB from reference

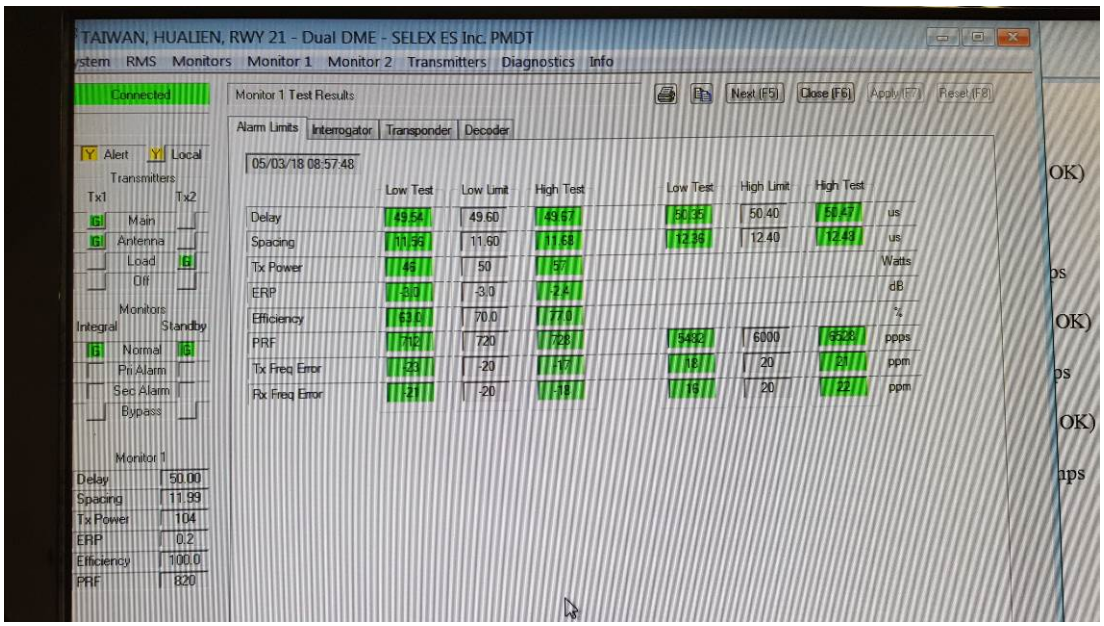
3.4.3.2 Spectral Characteristics –Harmonics

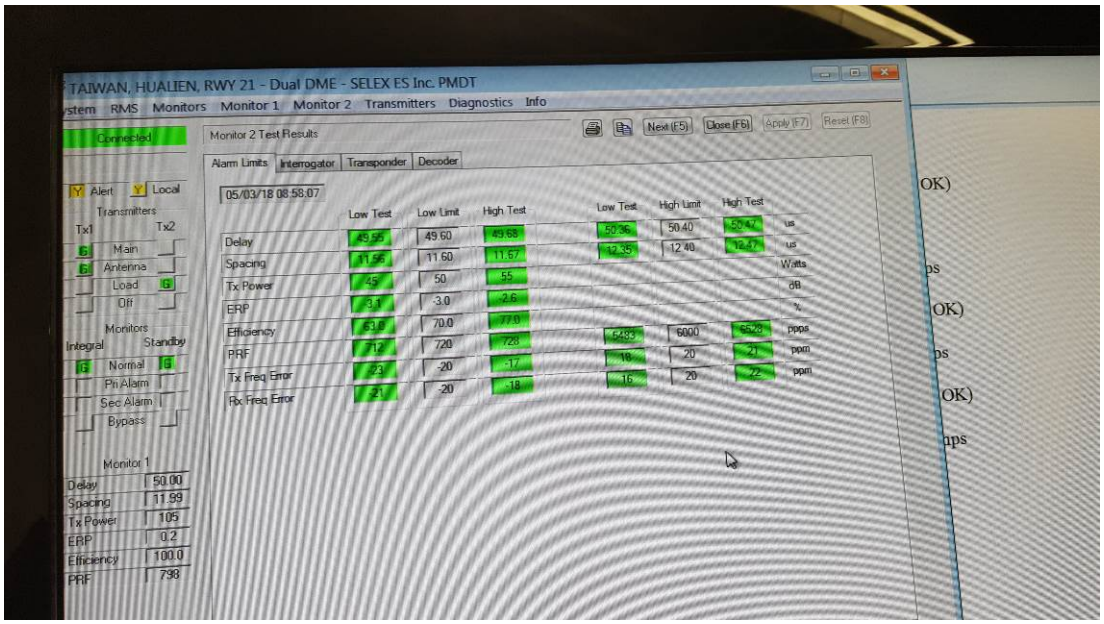
8.	TX 1 2nd Harmonic	-62	≥ 60 dB from reference
11.	TX 1 3rd Harmonic	-69	≥ 60 dB from reference
12.	TX 2 2nd Harmonic	-64	≥ 60 dB from reference
	TX 2 3rd Harmonic	-69	≥ 60 dB from reference

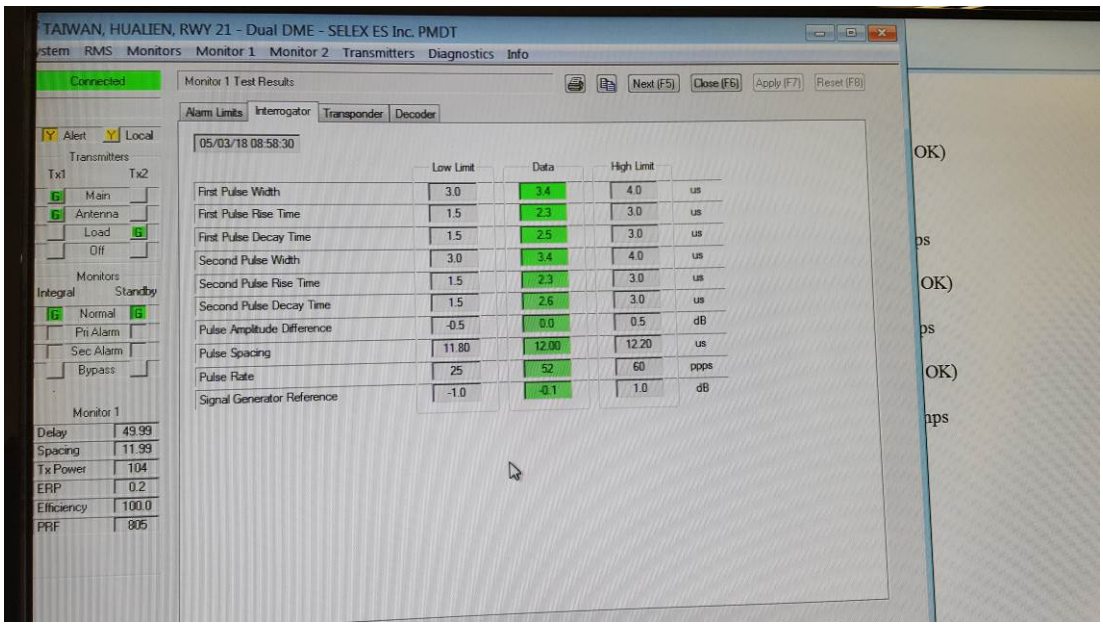
Ref	Measurement	Recorded Data	Standard Specification
3.4.5 RCSU Controls			
5.	Communication established as indicated on the RCSU	☑	(Check if OK)
6.	RCSU indicates Main and Standby in Normal condition	☑	(Check if OK)
7.	Both Main and Standby DMEs Shutdown	☑	(Check if OK)
8.	Both Main and Standby DMEs Startup after 20 sec	☑	(Check if OK)
9.	Transfer Command switches main	☑	(Check if OK)
3.4.6 Modem Remote Monitoring			
2.	Communications to the DME with the remote PMDT established	☑	(Check if OK)
3.4.7 Battery Backup			
2.	BCPS1 Charge current	6.4	4 to 7 amps
3.	TX1 operates on Batteries	☑	(Check if OK)
4.	BCPS2 Charge current	6.3	4 to 7 amps
5.	TX2 operates on Batteries	☑	(Check if OK)
6.	Summed Charge current	12.7	8 to 14 amps

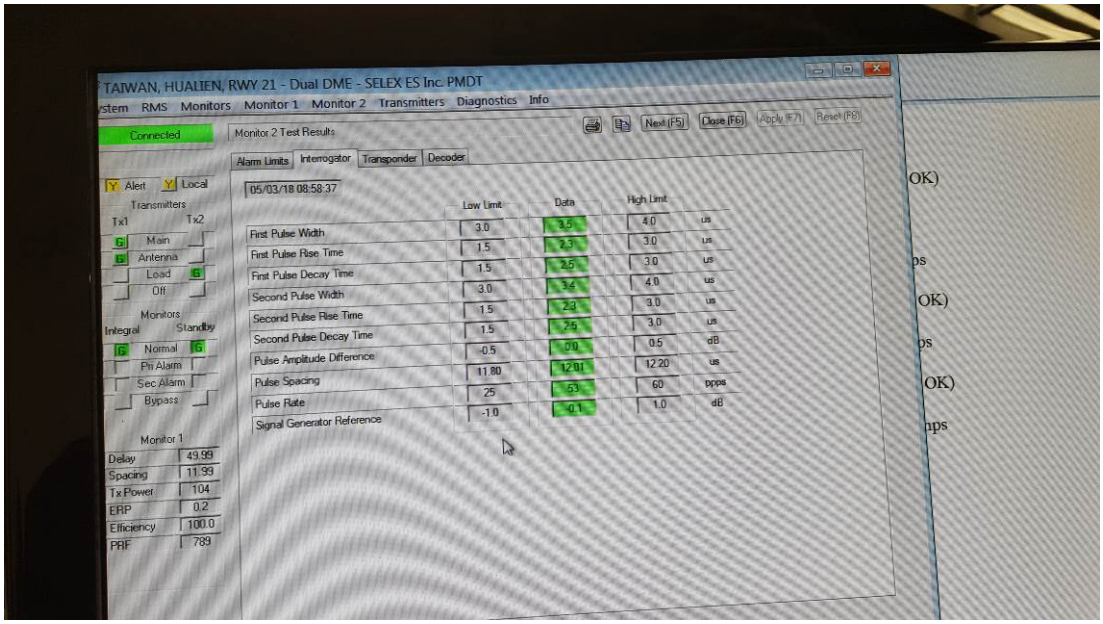

TAIWAN, KINMEN, RWY 06 - Dual DME - SELEX ES Inc. PMDT
System RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor Configuration
Next (F5) Close (F6) Apply (F7) Reset (F8)
General Alarm Limits
04/27/18 16:13:42
Executive Alarms
Integral Monitor
Standby Monitor
Primary Secondary Primary Secondary
Spacing
Tx Power
ERP
Efficiency
PRF
Ident Status
Ident Code
Tx Frequency Error
Rx Frequency Error
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 49.99
Spacing 11.99
Tx Power 104
ERP 0.4
Efficiency 100.0
PRF 1468
Ready

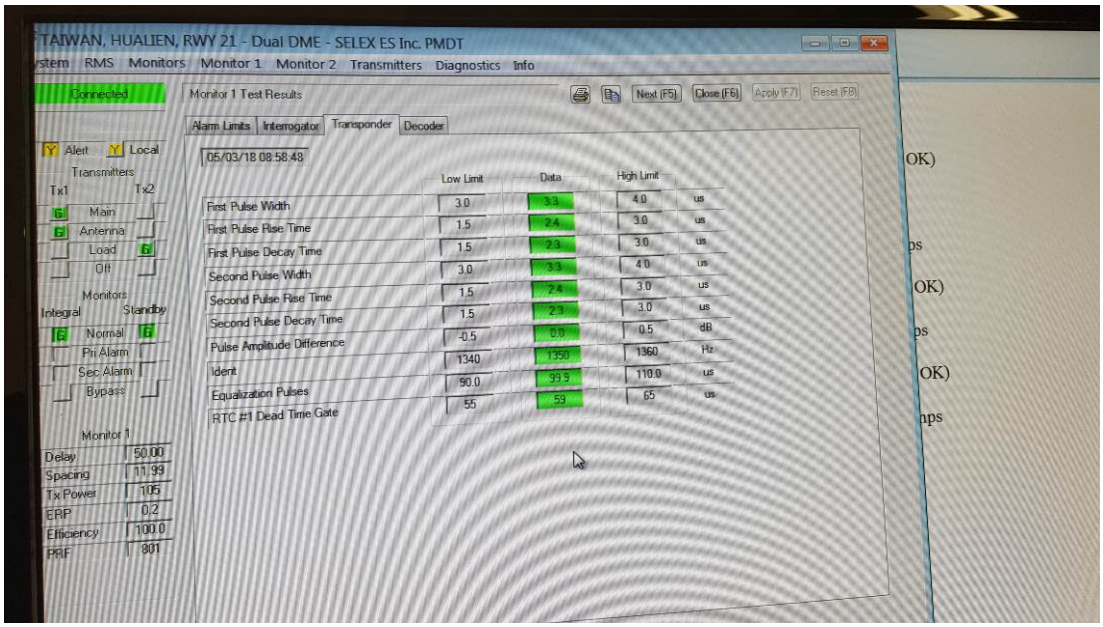

Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Backup Needed
Monitor Configuration
Next (F5) Close (F6) Apply (F7) Reset (F8)
General Alarm Limits
05/03/18 08:55:37
Nominal PreAlarm Range Alarm Range
Delay 50.00 +/- 0.32 +/- 0.40 us
Spacing 12.00 +/- 0.32 +/- 0.40 us
Alarm Low PreAlarm Low PreAlarm High Alarm High
Tx Power 50 55 100 122 125 Watts
ERP -3.0 -2.7 0 0.9 1.0 dB
Efficiency 70.0 73.0 %
PRF 720 730 800 6000 6000 ppps
Tx Frequency Error -20 -18 0 18 20 ppm
Rx Frequency Error -20 -18 0 18 20 ppm
VSWR 1.1 3.0 4.0 :1
Timers
Integral Shutdown Delay 7.0 Seconds
Standby Shutdown Delay 7.0 Seconds
Continuous Ident 5.0 Seconds
No Ident 65.0 Seconds
System-Level Settings
Efficiency Certification Level 70 %
Monitor 1 Reply Attenuation 12 dB
Monitor 2 Reply Attenuation 12 dB
Directional Coupler Loss 29.46 dB
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 0.00
Spacing 0.00
Tx Power 0
ERP 10.0
Efficiency 0.0
PRF 0
CAP NUM Level3 SEC3
05/03/18 08:56:35

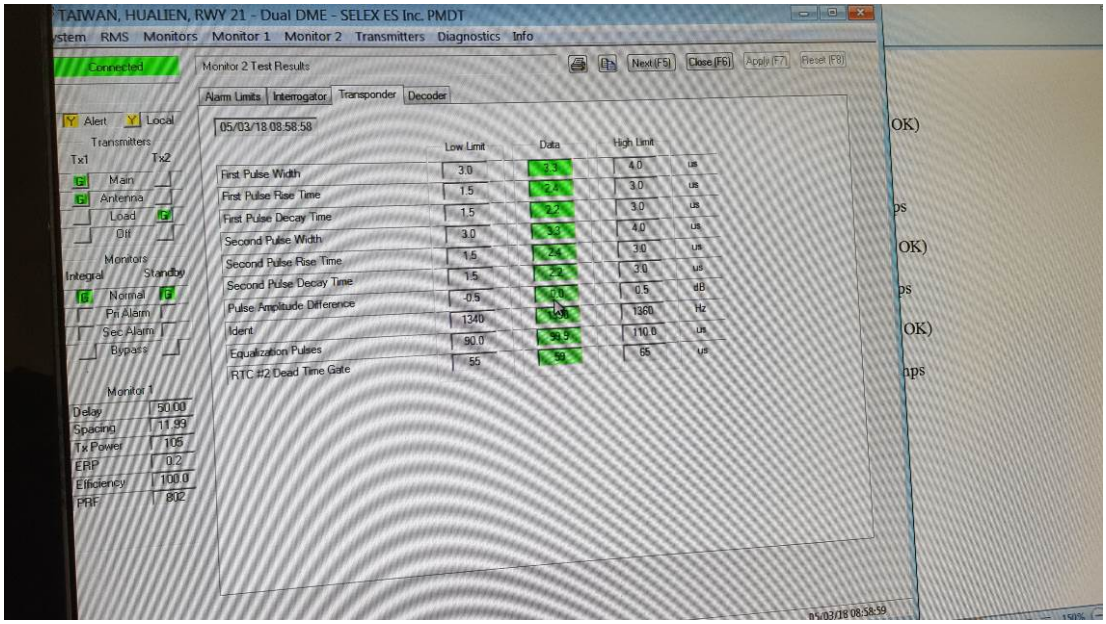

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 1 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:57:48
Low Test Low Limit High Test Low Test High Limit High Test
Delay 49.54 49.60 49.67 50.36 50.40 50.47 us
Spacing 11.56 11.60 11.68 12.36 12.40 12.48 us
Tx Power 46 50 57 Watts
ERP -3.0 -3.0 -2.4 dB
Efficiency 63.0 70.0 77.0 %
PRF 712 720 728 5432 6000 6528 ppps
Tx Freq Error -23 -20 -17 18 20 21 ppm
Rx Freq Error -21 -20 -18 16 20 22 ppm
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 50.00
Spacing 11.99
Tx Power 104
ERP 0.2
Efficiency 100.0
PRF 820

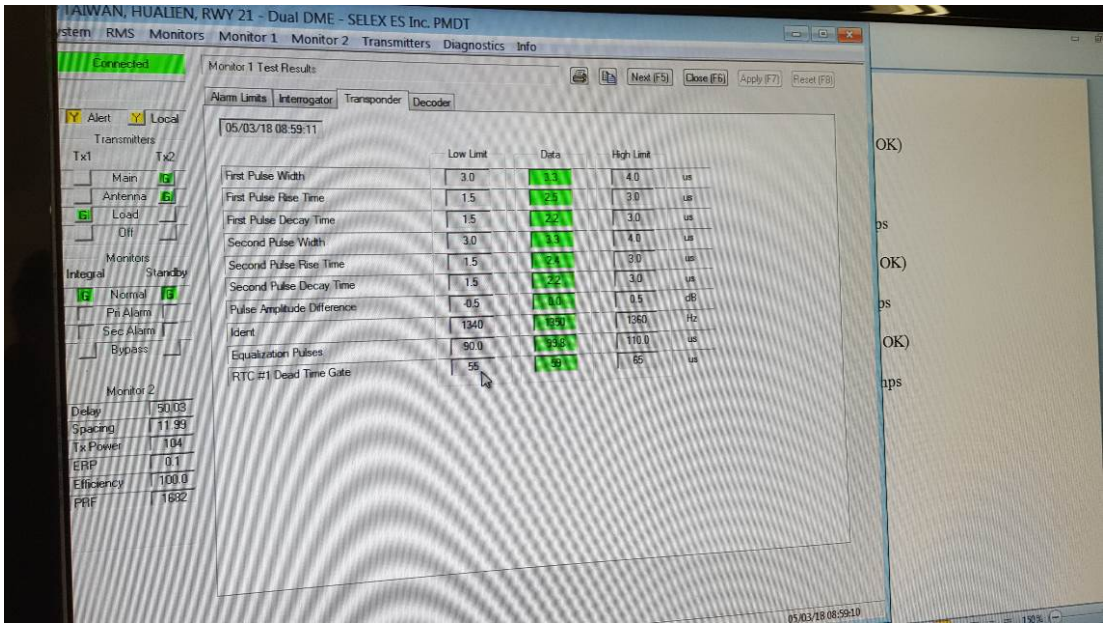

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 2 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:58:07
Low Test Low Limit High Test Low Test High Limit High Test
Delay 49.55 49.60 49.68 50.36 50.40 50.47 us
Spacing 11.56 11.60 11.67 12.35 12.40 12.47 us
Tx Power 45 50 55 Watts
ERP -3.1 -3.0 -2.6 dB
Efficiency 63.6 70.0 77.0 %
PRF 712 720 728 5485 6000 6528 ppps
Tx Freq Error -23 -20 -17 18 20 21 ppm
Rx Freq Error -21 -20 -18 16 20 22 ppm
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 50.00
Spacing 11.99
Tx Power 105
ERP 0.2
Efficiency 100.0
PRF 798

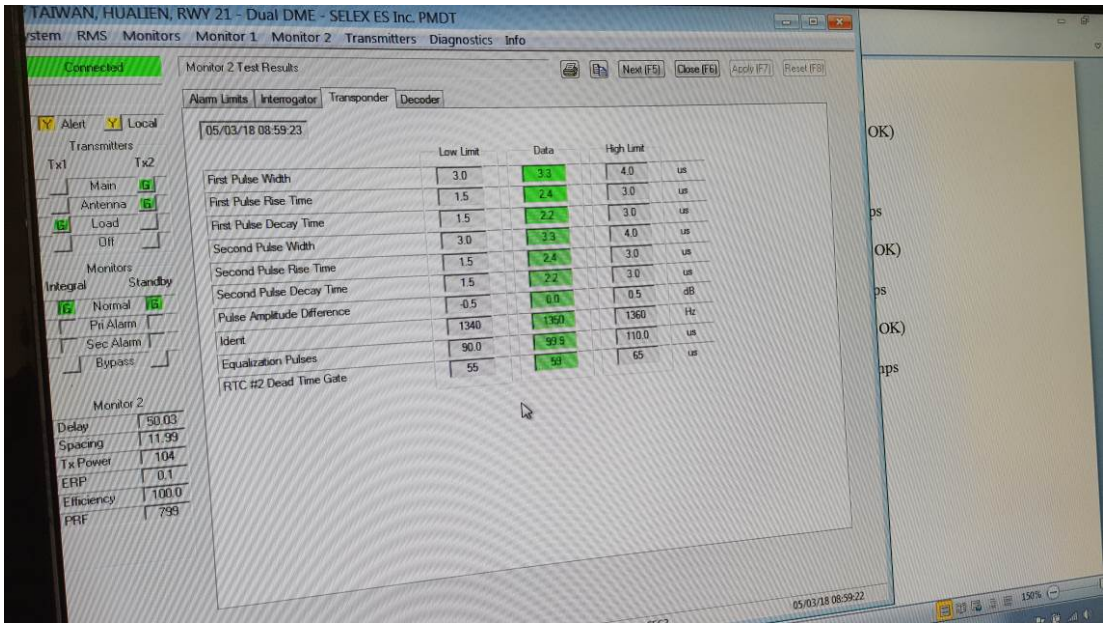

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 1 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:58:30
Low Limit Data High Limit
First Pulse Width 3.0 3.4 4.0 us
First Pulse Rise Time 1.5 2.3 3.0 us
First Pulse Decay Time 1.5 2.5 3.0 us
Second Pulse Width 3.0 3.4 4.0 us
Second Pulse Rise Time 1.5 2.3 3.0 us
Second Pulse Decay Time 1.5 2.6 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Pulse Spacing 11.80 12.00 12.20 us
Pulse Rate 25 52 60 ppps
Signal Generator Reference -1.0 -0.1 1.0 dB
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 49.99
Spacing 11.99
Tx Power 104
ERP 0.2
Efficiency 100.0
PRF 805

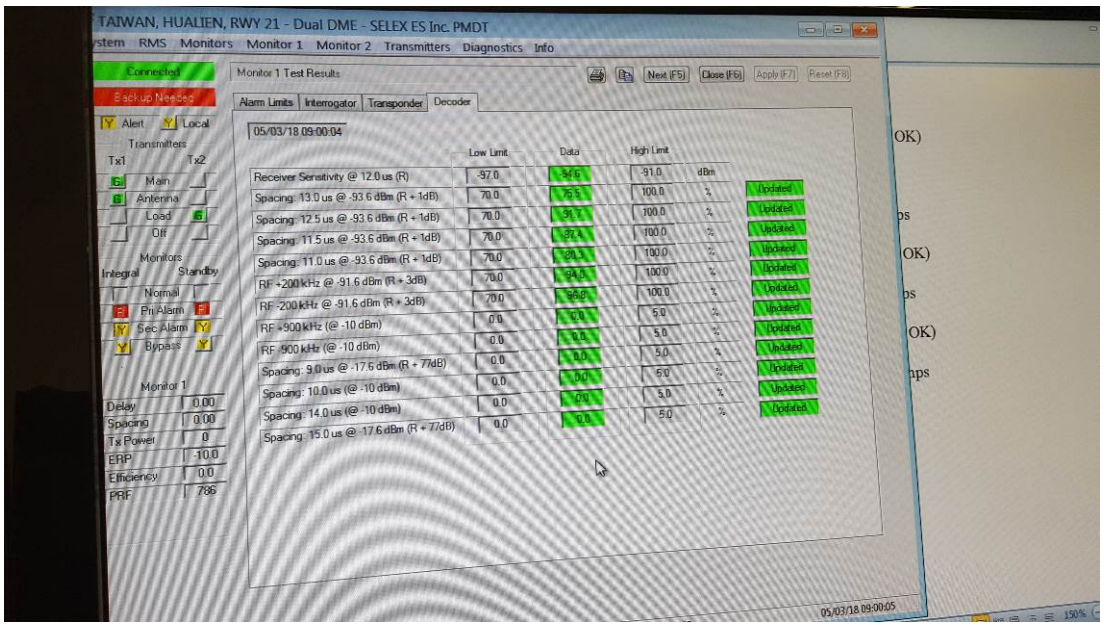

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 2 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:58:37
Low Limit Data High Limit
First Pulse Width 3.0 3.5 4.0 us
First Pulse Rise Time 1.5 2.3 3.0 us
First Pulse Decay Time 1.5 2.5 3.0 us
Second Pulse Width 3.0 3.4 4.0 us
Second Pulse Rise Time 1.5 2.3 3.0 us
Second Pulse Decay Time 1.5 2.6 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Pulse Spacing 11.80 12.01 12.20 us
Pulse Rate 25 53 60 ppps
Signal Generator Reference -1.0 -0.1 1.0 dB
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 49.99
Spacing 11.99
Tx Power 104
ERP 0.2
Efficiency 100.0
PRF 789

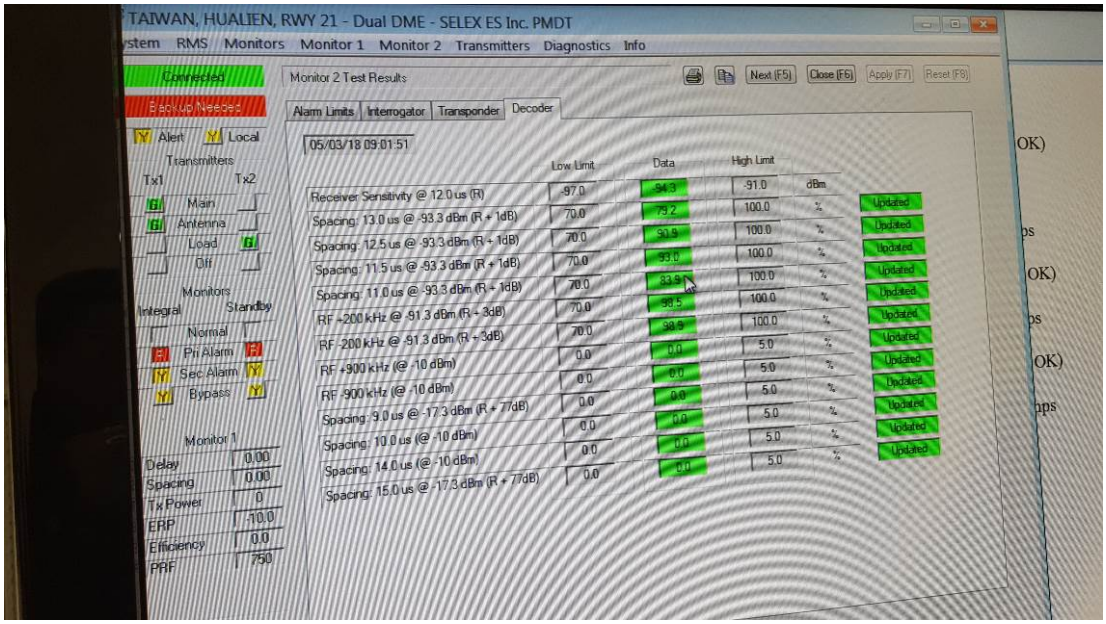

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 1 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:58:48
Low Limit Data High Limit
First Pulse Width 3.0 3.3 4.0 us
First Pulse Rise Time 1.5 2.4 3.0 us
First Pulse Decay Time 1.5 2.3 3.0 us
Second Pulse Width 3.0 3.3 4.0 us
Second Pulse Rise Time 1.5 2.4 3.0 us
Second Pulse Decay Time 1.5 2.3 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Ident 1340 1350 1360 Hz
Equalization Pulses 90.0 99.5 110.0 us
RTC #1 Dead Time Gate 55 59 65 us
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 50.00
Spacing 11.99
Tx Power 105
ERP 0.2
Efficiency 100.0
PRF 801

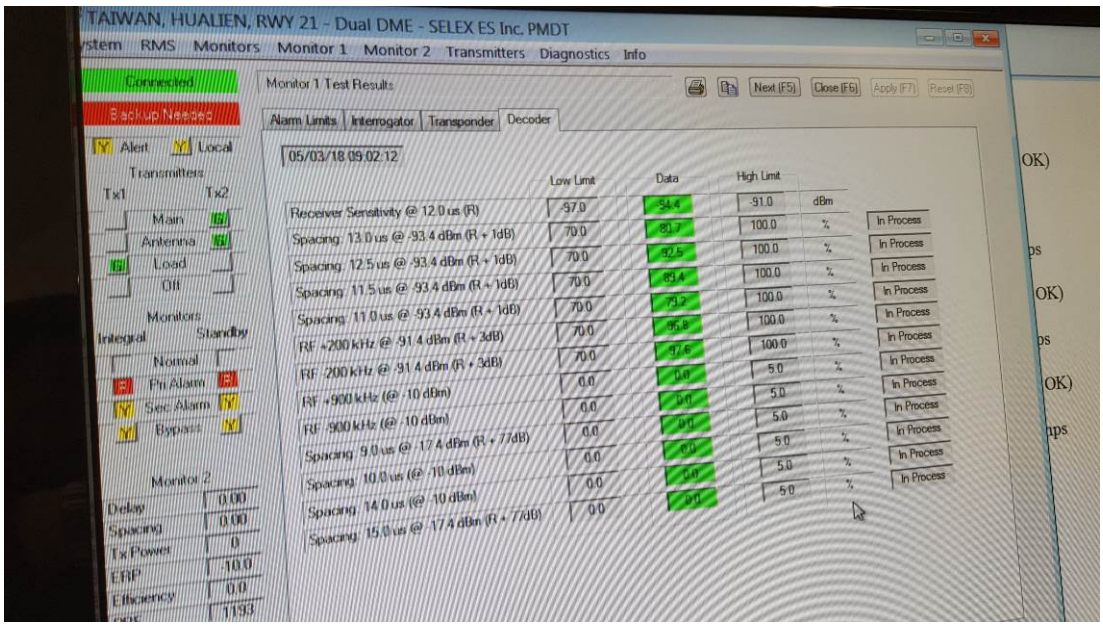

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 2 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:58:58
Low Limit Data High Limit
First Pulse Width 3.0 3.3 4.0 us
First Pulse Rise Time 1.5 2.2 3.0 us
First Pulse Decay Time 1.5 2.2 3.0 us
Second Pulse Width 3.0 3.3 4.0 us
Second Pulse Rise Time 1.5 2.2 3.0 us
Second Pulse Decay Time 1.5 2.2 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Ident 1340 1350 1360 Hz
Equalization Pulses 90.0 99.5 110.0 us
RTC #2 Dead Time Gate 55 59 65 us
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay 50.00
Spacing 11.99
Tx Power 105
ERP 0.2
Efficiency 100.0
PRF 802

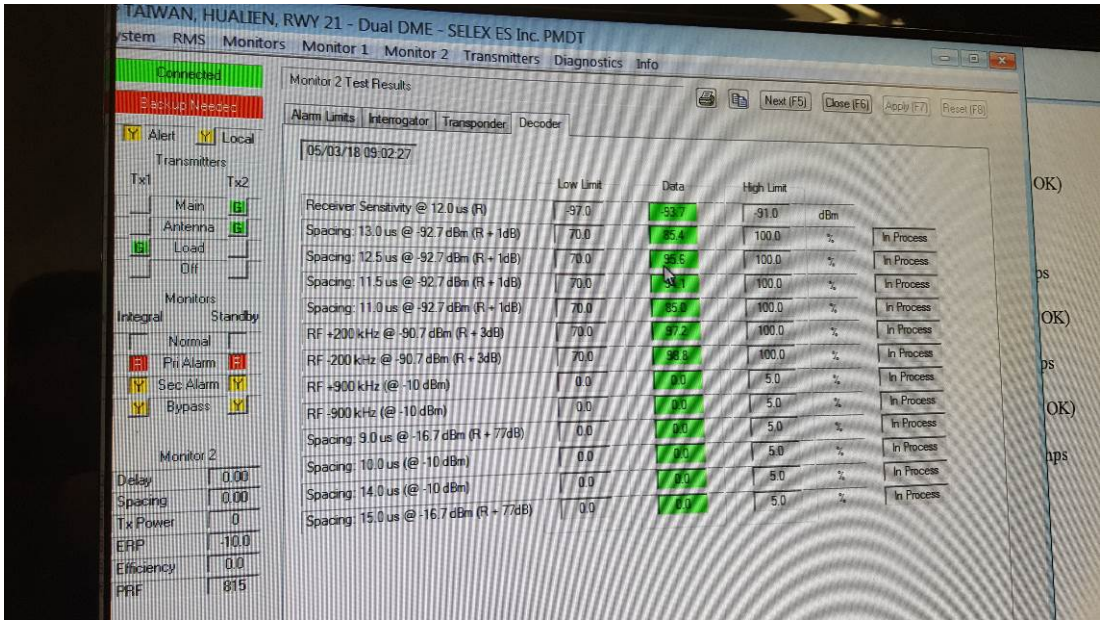

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 1 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:59:11
Low Limit Data High Limit
First Pulse Width 3.0 3.3 4.0 us
First Pulse Rise Time 1.5 2.5 3.0 us
First Pulse Decay Time 1.5 2.2 3.0 us
Second Pulse Width 3.0 3.3 4.0 us
Second Pulse Rise Time 1.5 2.1 3.0 us
Second Pulse Decay Time 1.5 2.2 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Ident 1340 1350 1360 Hz
Equalization Pulses 90.0 93.8 110.0 us
RTC #1 Dead Time Gate 55 59 65 us
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 2
Delay 50.03
Spacing 11.99
Tx Power 104
ERP 0.1
Efficiency 100.0
PRF 1632
05/03/18 08:59:10

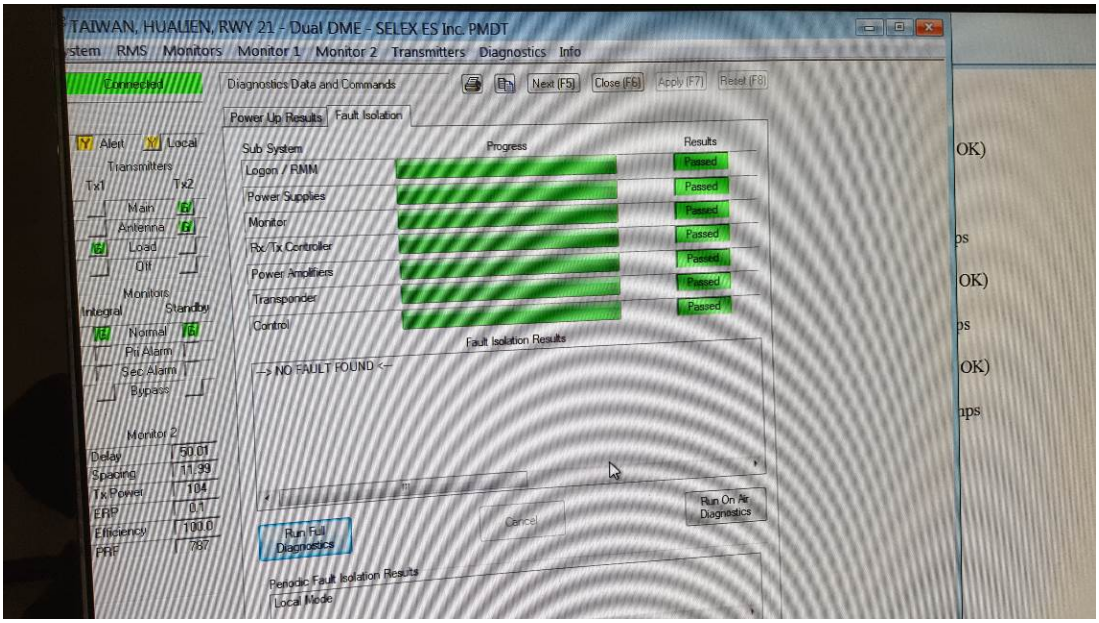

TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Monitor 2 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 08:59:23
Low Limit Data High Limit
First Pulse Width 3.0 3.3 4.0 us
First Pulse Rise Time 1.5 2.4 3.0 us
First Pulse Decay Time 1.5 2.2 3.0 us
Second Pulse Width 3.0 3.3 4.0 us
Second Pulse Rise Time 1.5 2.4 3.0 us
Second Pulse Decay Time 1.5 2.2 3.0 us
Pulse Amplitude Difference -0.5 0.0 0.5 dB
Ident 1340 1350 1360 Hz
Equalization Pulses 90.0 99.9 110.0 us
RTC #2 Dead Time Gate 55 59 65 us
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Off
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 2
Delay 50.03
Spacing 11.99
Tx Power 104
ERP 0.1
Efficiency 100.0
PRF 799
05/03/18 08:59:22


TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Back up Needed
Monitor 1 Test Results
Next (F5)
Close (F6)
Apply (F7)
Reset (F8)
Alarm Limits
Interrogator
Transponder
Decoder
05/03/18 09:00:04
Low Limit
Data
High Limit
Receiver Sensitivity @ 12.0 us (R)
Spacing: 13.0 us @ -93.6 dBm (R + 1dB)
Spacing: 12.5 us @ -93.6 dBm (R + 1dB)
Spacing: 11.5 us @ -93.6 dBm (R + 1dB)
Spacing: 11.0 us @ -93.6 dBm (R + 1dB)
RF +200 kHz @ -91.6 dBm (R + 3dB)
RF -200 kHz @ -91.6 dBm (R + 3dB)
RF +900 kHz (@ -10 dBm)
RF -900 kHz (@ -10 dBm)
Spacing: 9.0 us @ -17.6 dBm (R + 77dB)
Spacing: 10.0 us (@ -10 dBm)
Spacing: 14.0 us (@ -10 dBm)
Spacing: 15.0 us @ -17.6 dBm (R + 77dB)
Updated
Alert
Local
Transmitters
Tx1
Tx2
Main
Antenna
Load
Off
Monitors
Integral
Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay
Spacing
Tx Power
ERP
Efficiency
PRF
05/03/18 09:00:05


TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Back up Needed
Monitor 2 Test Results
Next (F5)
Close (F6)
Apply (F7)
Reset (F8)
Alarm Limits
Interrogator
Transponder
Decoder
05/03/18 09:01:51
Low Limit
Data
High Limit
Receiver Sensitivity @ 12.0 us (R)
Spacing: 13.0 us @ -93.3 dBm (R + 1dB)
Spacing: 12.5 us @ -93.3 dBm (R + 1dB)
Spacing: 11.5 us @ -93.3 dBm (R + 1dB)
Spacing: 11.0 us @ -93.3 dBm (R + 1dB)
RF +200 kHz @ -91.3 dBm (R + 3dB)
RF -200 kHz @ -91.3 dBm (R + 3dB)
RF +900 kHz (@ -10 dBm)
RF -900 kHz (@ -10 dBm)
Spacing: 9.0 us @ -17.3 dBm (R + 77dB)
Spacing: 10.0 us (@ -10 dBm)
Spacing: 14.0 us (@ -10 dBm)
Spacing: 15.0 us @ -17.3 dBm (R + 77dB)
Updated
Alert
Local
Transmitters
Tx1
Tx2
Main
Antenna
Load
Off
Monitors
Integral
Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 1
Delay
Spacing
Tx Power
ERP
Efficiency
PRF


TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Back up Needed
Monitor 1 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 09:02:12
Low Limit Data High Limit
Receiver Sensitivity @ 12.0 us (R) -97.0 -94.4 -91.0 dBm
Spacing: 13.0 us @ -93.4 dBm (R + 1dB) 70.0 80.7 100.0 % In Process
Spacing: 12.5 us @ -93.4 dBm (R + 1dB) 70.0 92.5 100.0 % In Process
Spacing: 11.5 us @ -93.4 dBm (R + 1dB) 70.0 89.4 100.0 % In Process
Spacing: 11.0 us @ -93.4 dBm (R + 1dB) 70.0 91.2 100.0 % In Process
RF +200 kHz @ -91.4 dBm (R + 3dB) 70.0 95.8 100.0 % In Process
RF -200 kHz @ -91.4 dBm (R + 3dB) 70.0 97.6 100.0 % In Process
RF +900 kHz (@ -10 dBm) 0.0 0.0 5.0 % In Process
RF -900 kHz (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 9.0 us @ -17.4 dBm (R + 7dB) 0.0 0.0 5.0 % In Process
Spacing: 10.0 us (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 14.0 us (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 15.0 us @ -17.4 dBm (R + 7dB) 0.0 0.0 5.0 % In Process
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Dif
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 2
Delay 0.00
Spacing 0.00
Tx Power 0
ERP -10.0
Efficiency 0.0
PRF 1193


TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Back up Needed
Monitor 2 Test Results
Next (F5) Close (F6) Apply (F7) Reset (F8)
Alarm Limits Interrogator Transponder Decoder
05/03/18 09:02:27
Low Limit Data High Limit
Receiver Sensitivity @ 12.0 us (R) -97.0 -93.7 -91.0 dBm
Spacing: 13.0 us @ -92.7 dBm (R + 1dB) 70.0 85.4 100.0 % In Process
Spacing: 12.5 us @ -92.7 dBm (R + 1dB) 70.0 95.6 100.0 % In Process
Spacing: 11.5 us @ -92.7 dBm (R + 1dB) 70.0 94.1 100.0 % In Process
Spacing: 11.0 us @ -92.7 dBm (R + 1dB) 70.0 85.9 100.0 % In Process
RF +200 kHz @ -90.7 dBm (R + 3dB) 70.0 97.2 100.0 % In Process
RF -200 kHz @ -90.7 dBm (R + 3dB) 70.0 98.8 100.0 % In Process
RF +900 kHz (@ -10 dBm) 0.0 0.0 5.0 % In Process
RF -900 kHz (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 9.0 us @ -16.7 dBm (R + 7dB) 0.0 0.0 5.0 % In Process
Spacing: 10.0 us (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 14.0 us (@ -10 dBm) 0.0 0.0 5.0 % In Process
Spacing: 15.0 us @ -16.7 dBm (R + 7dB) 0.0 0.0 5.0 % In Process
Alert Local
Transmitters
Tx1 Tx2
Main
Antenna
Load
Dif
Monitors
Integral Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 2
Delay 0.00
Spacing 0.00
Tx Power 0
ERP -10.0
Efficiency 0.0
PRF 815


TAIWAN, HUALIEN, RWY 21 - Dual DME - SELEX ES Inc. PMDT
stem RMS Monitors Monitor 1 Monitor 2 Transmitters Diagnostics Info
Connected
Diagnostics Data and Commands
Next (F5)
Close (F6)
Apply (F7)
Reset (F8)
Power Up Results
Fault Isolation
Alert
Local
Transmitters
Tx1
Tx2
Main
Antenna
Load
Off
Monitors
Integral
Standby
Normal
Pri Alarm
Sec Alarm
Bypass
Monitor 2
Delay
50.01
Spacing
11.99
Tx Power
104
ERP
0.1
Efficiency
100.0
PRF
787
Sub System
Progress
Results
Logon / RMM
Power Supplies
Monitor
Rx/Tx Controller
Power Amplifiers
Transponder
Control
Passed
Fault Isolation Results
--s NO FAULT FOUND <--
Run Full Diagnostics
Cancel
Run On Air Diagnostics
Periodic Fault Isolation Results
Local Mode