ALIGNMENT PROCEDURE

MODEL: HH38WX-ST

REVISION: _____

DATE : _____

PREPARED BY:_____

CHECKED BY: _____

APPROVED BY: _____

TOTAL PAGES:

HH38WX-ST ALIGNMENT INSTRUCTION

1.0 TEST CONDITION:

1.1. STANDARD DC POWER:	EXT.DC	13.8VDC
1.2. MEASUREMENT CHANNEL:	CB	CH19 (27.185MHz)
	WX	CH3 (162.475MHz)
1.3. STANDARD AUDIO LOADING:	CB/WX	16 Ω
1.4. ANTENNA IMPEDANCE:	CB/WX	50 Ω
1.5. STANDARD REF. MODULATION:	CB	30% (AM)
	WX	± 3KHz (FM)
1.6. STANDARD REF. AUDIO OUTPUT:	CB/WX	0.05W

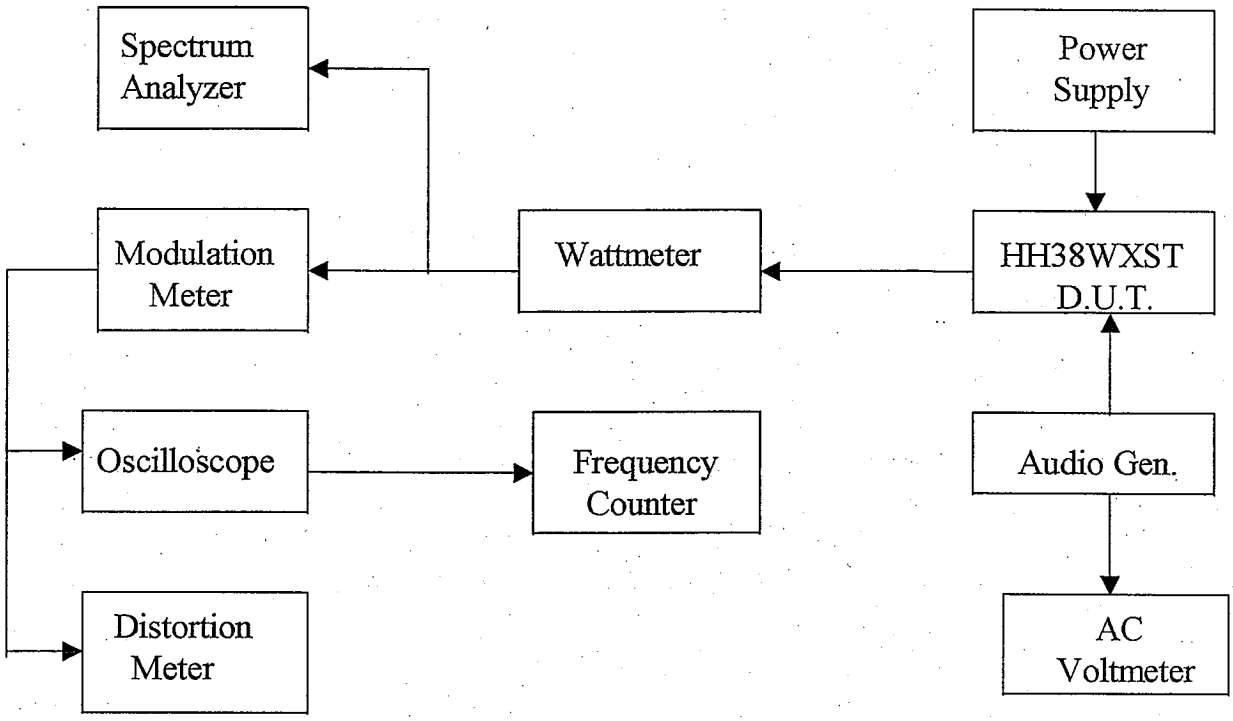
1.7. FREQUENCY TABLE

L BAND		CB BAND		U BAND		WX BAND	
CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)	CH NO.	FREQ. (MHz)
01	26.515	01	26.965	01	27.415	1	162.550
02	26.525	02	26.975	02	27.425	2	162.400
03	26.535	03	26.985	03	27.435	3	162.475
04	26.555	04	27.005	04	27.455	4	162.425
05	26.565	05	27.015	05	27.465	5	162.450
06	26.575	06	27.025	06	27.475	6	162.500
07	26.585	07	27.035	07	27.485	7	162.525
08	26.605	08	27.055	08	27.505	8	161.650
09	26.615	09	27.065	09	27.515	9	161.775
10	26.625	10	27.075	10	27.525	0	163.275
11	26.635	11	27.085	11	27.535		
12	26.655	12	27.105	12	27.555		
13	26.665	13	27.115	13	27.565		
14	26.675	14	27.125	14	27.575		
15	26.685	15	27.135	15	27.585		
16	26.705	16	27.155	16	27.605		
17	26.715	17	27.165	17	27.615		
18	26.725	18	27.175	18	27.625		
19	26.735	19	27.185	19	27.635		
20	26.755	20	27.205	20	27.655		
21	26.765	21	27.215	21	27.665		
22	26.775	22	27.225	22	27.675		
23	26.805	23	27.255	23	27.705		
24	26.785	24	27.235	24	27.685		
25	26.795	25	27.245	25	27.695		
26	26.815	26	27.265	26	27.715		
27	26.825	27	27.275	27	27.725		
28	26.835	28	27.285	28	27.735		
29	26.845	29	27.295	29	27.745		
30	26.855	30	27.305	30	27.755		
31	26.865	31	27.315	31	27.765		
32	26.875	32	27.325	32	27.775		
33	26.885	33	27.335	33	27.785		
34	26.895	34	27.345	34	27.795		
35	26.905	35	27.355	35	27.805		
36	26.915	36	27.365	36	27.815		
37	26.925	37	27.375	37	27.825		
38	26.935	38	27.385	38	27.835		
39	26.945	39	27.395	39	27.845		
40	26.955	40	27.405	40	27.855		

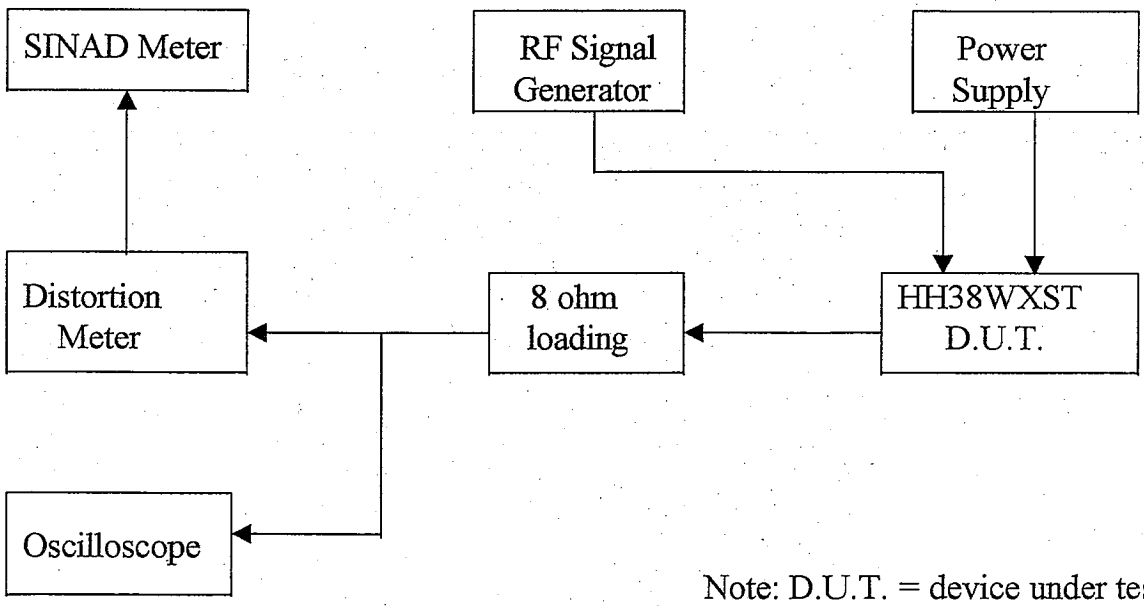
1.8. TEST MODE: Entering by simultaneously pressing the channel UP and DOWN keys, then turn on the DC power. All icons will be displayed on the LCD panel for visual checking. Following 6 CB-channel, in cycling sequence, can be directly accessed by pressing the "FUNC" and then the "LIGHT" keys:
Normal band CH1 → CH19 → CH22 → CH40 → U band CH40 → L band CH1.

1.9. TEST EQUIPMENT SETUP AS BELOW:

A. TX test equipment setup:



B. RX test equipment setup:



Note: D.U.T. = device under test

2.0 ALIGNMENT

2.1 LCD BOARD

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. LCD icons checking	MCU entered test mode. Keep pressing the UP and DOWN keys together.	Check all icons displayed. See attached LCD drawing.
2. MCU clock frequency	Connect a 5pf capacitor to TP301	Adjust **VC301** to 4.5MHz ± 5Hz at the frequency counter.

2.2 MAIN BOARD

2.2.1 VCO ALIGNMENT

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. CB VCO Voltage	1. Connect a digital multi-meter to TP1. 2. CB RX mode, L BAND: CH1.	Adjust **L10** for 1.5 ± 0.1 V. Check U band:CH40 ≤ 5.0V.
	3. CB TX mode	Check L band CH1 ≥ 1.2V Check U band CH40 ≤ 5.0V.
2. WX VCO Voltage	1.Connect a digital multi-meter to TP1. 2.WX mode CH08.	Adjust **L1** TO 1.5 ± 0.1V. Check CH 0 ≤ 3.0V.

2.2.2 WX RECEIVER

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. Audio output level	1.Set WX mode, CH03. 2.Output of signal generator thru a 0.01μF to TP3. 3.RF Gen. set 10.695MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1mV. 4.Set volume control to the middle position.	Adjust **L9** for maximum audio output & minimum distortion at the distortion meter.(audio o/p = 0.05W, Distortion less than 5%)
2. WX sensitivity	1.Output of signal generator to antenna input terminal. 2. RF Gen. set 162.475MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1μV. 3. WX set CH03.	1.Adjust **L4** and **L3** for more than 12dB at the SINAD meter. 2.Repeat as needed. Check all channels sens. must met D.T.S.

2.2.3 CB Receiver Alignment

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. Audio output level	1. CB RX mode. 2. ST to OFF 3. Output of signal generator thru 0.01uF to TP3. 4. RF Gen. set 10.695MHz, Fmod= 1KHz, AM= 30%, level: 1mV.	1. Set volume control to maximum position. 2. Audio power output shall be more than 0.4 Watts. 3. Set audio o/p for 0.05W, Distortion less than 3.0%.
2. RX sensitivity	1. Set normal band CH19. 2. Output of signal generator to antenna input terminal. 3. RF Gen. set 27.185MHz, fm: 1kHz, AM= 30%, RF level: 1μV.	1. Adjust **L8, L6** and **L5** for more than 12dB at the SINAD meter. 2. Repeat as needed. 3. Check **L** band CH1 and **U** band CH40.
3. SQUELCH control (Tight Squelch)	1. Set normal band CH19. 2.Output of signal generator to the antenna input terminal. 3. RF Gen. set 27.185 MHz , Fmod= 1KHz, AM= 30%, RF level: 2500 μV. 4. Rotate the Squelch control to fully clockwise position	1.Slowly turn **VR3** to a position that the audio output waveform at the oscilloscope just appears from no output. 2.Must open at 3500uV. 3.Must not open at 1000uV.
4. Signal meter display	1. Set normal band CH19. 2. Output of signal generator to antenna input terminal. RF Gen. set 27.185MHz, no modulation, RF level: 100 μV.	1. Adjust **VR7** for "9" displayed on the signal meter of LCD panel. 2. Increase RF level by 30dB. The signal meter should be displayed at "+30" position.
5. Sound Tracker (ST must be on) a) S/N b) Audio Gain	1. Set normal band CH19. 2. RF Gen. set 27.185MHz,30% modulation 3. S/N @ RF level 1.0uV @ RF level 1000uV 4. Audio Gain @ 100uV 50% Mod.	1. S/N: 1.0uV ≥ 15dB. 1000uV ≥ 50dB. 2. ST audio output change 2-8dB from OFF to ON.

2.2.4 CB Transmitter Alignment

TEST ITEM	TEST CONDITION & PROCEDURE	PURPOSE
1. TP4 Alignment	1. Channel set normal band CH 19. 2. Set TX PWR SAVE mode. Connect the TP4 (Q33 C) thru a 10pF capacitor to the oscilloscope. 3. L15 (C97) short to ground.	1. Adjust **L11** and **L12** for maximum RF output waveform at the scope. (Freq. = 27.185MHz) 2. Repeat as needed.
2. TX Carrier output power	1. Channel set normal band CH 19. 2. Set TX to High power mode. 3. Connect an RF wattmeter to the antenna socket.	1. Adjust **VR5** for 3.8-4.0 watts RF output power. 2. Check U & L band TX power: ≥3.5 Watts. 3. Set TX to Low power mode. 4. Check TX power output for 1.0 ± 0.3W.
3. TX Carrier frequency	1. Channel set CH 19. 2. Set TX Hi power mode.	Check TX frequency for 27.185MHz ± 200Hz at the frequency counter.
4. TX Signal meter	1. Connect an RF wattmeter to the antenna socket 2. . No modulation. 3. Set TX Low power mode.	Adjust **VR6** for "1" displayed at the TX signal meter of the LCD panel.
	4. Set TX High power mode.	Check signal meter should be displayed at "4" position.
5. MAXIMUM Modulation (AMC control)	1. Set TX High power mode. Output of AF generator to MIC jack, @ 1000Hz, 80mV .	1. Adjust **VR4** for 84-86% modulation. 2. Distortion less than 5.0% at 80% modulation. 3. Check CH1,CH40.
6. Occupied band width, (OBW)	1. Set TX High power mode 2. Set modulation frequency 2500 Hz.	The frequency spectrum of the harmonics should be at least 2 dB better than the limits of the FCC specification.