PREPARED BY:		**PRELIMINARY**
APPROVALS:		REVISION: 1.0
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	CONEXANT™	PAGE 1 OF 18
Project: GSM	PROPRIETARY INFORMATION NO DISSEMINATION OR USE ALLOWED WITHOUT PRIOR WRITTEN PERMISSION	TYPE OF DOCUMENT: Engineering Design

ACOUSTIC TEST MEANS

Version 1.0

1.Overview:

In order to pass the acoustic test of the FTA, you must adjust the following acoustic parameters , which are included in the pubparam.c file . In the following list,you will see the relationship between the parameters in the pubparam.c file and the items you will pass in the FTA.

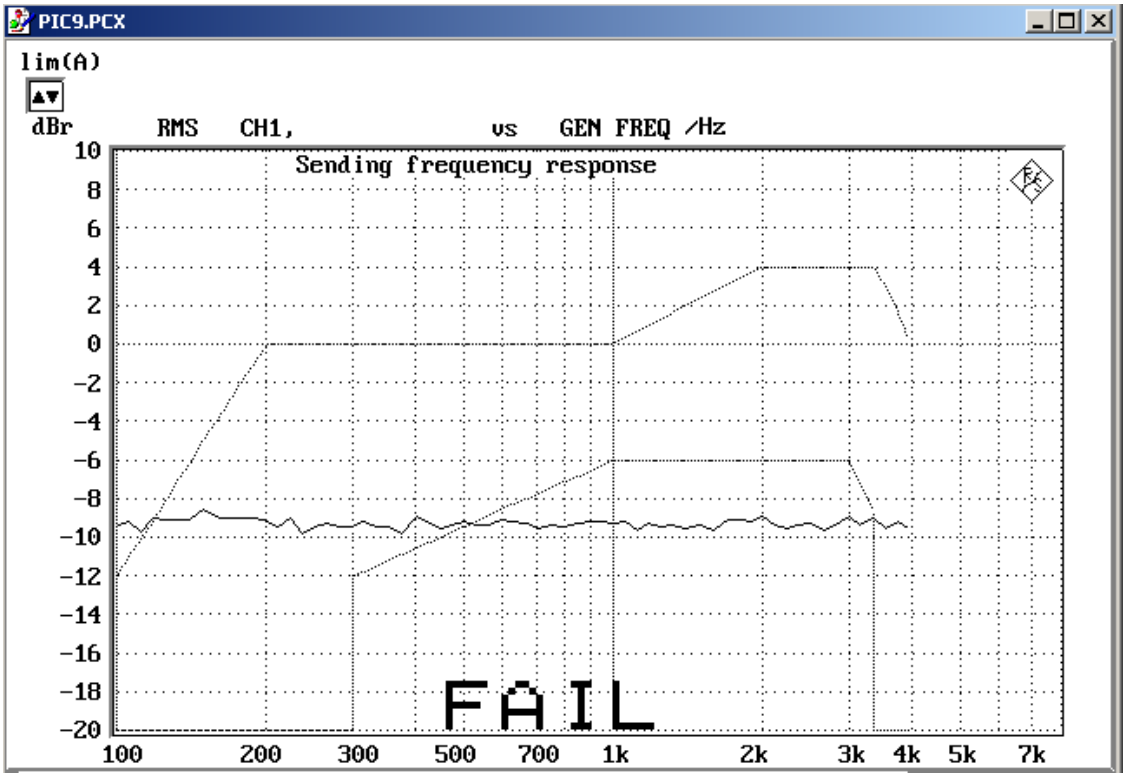
The Acoustic Items	The parameters
30.1(Sending Sensitivity/Frequency Response)	Hardware RC parameter guarantee
30.2(Sending Loudness Rating)	MicGainHandSet
30.3(Receiving Sensitivity/Frequency Response)	DSPRxFilterCoeffHandSet
30.4(Receiving Loudness Rating) norm	VolumeTableHandSet
30.4(Receiving Loudness Rating) max	VolumeTableHandSet
30.5.1(Side Tone Masking Rating)	SideToneAttenHandSet
30.6.1(Echo Loss)	Hardware guarantee
30.6.2(Stability Margin)	Hardware guarantee
30.7.1(Sending Distortion)	MicGainHandSet

Take notice: The version of the Skyworks Lab Test Studio is 3.4.2,which have the proper acoustic tools .

2. The Specification of the Acoustic test:

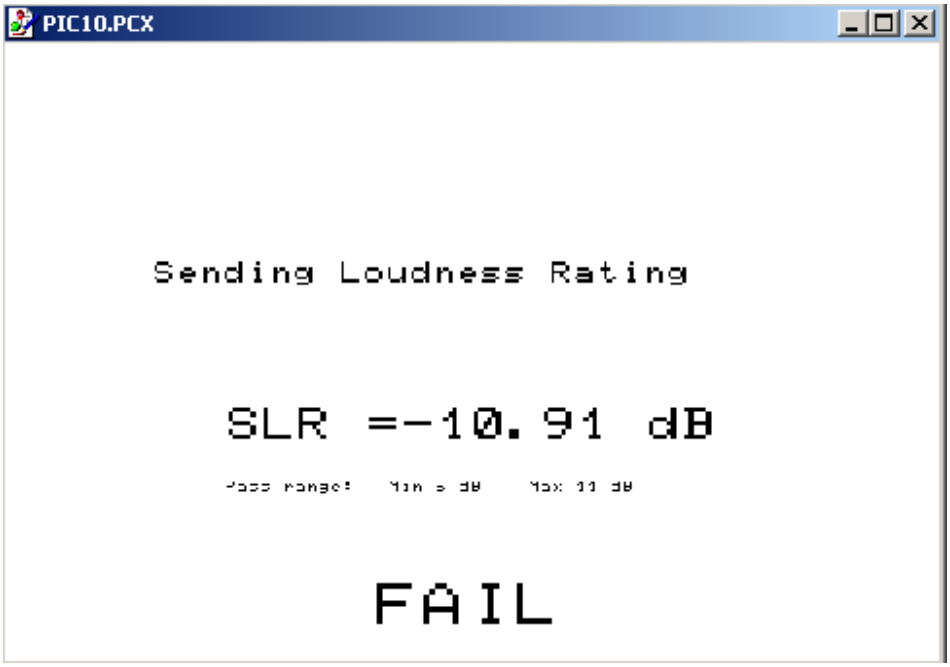
1, 30.1(Sending Sensitivity/Frequency Response)

If you use the reference design of the microphone external RC circuit , and the route of the MIC_ IN_M,MIC_IN_P is right, this item is no difficult to pass this item. You need not adjust anything. This item is guaranteed by the hardware design. But you will test this items repeat, because the test parameters is not in effect all the time. When the drawing below appeared and failed , the error phenomena is not right, because the test parameters is not in effect at this time, you will try it again.



2, 30.2(Sending Loudness Rating)

This items is relative with the MicGainHandSet parameter included in the pubparam.c file. The pass range is between the 5db and 11db. When the drawing below appears and failed, do not worry about it , because the test parameter is not in effect this time. You can try it again. When the SLR number is larger than 11db,you can increase the value number of the MicGainHandSet parameter and vice versa .The reference value is 4 or 5.

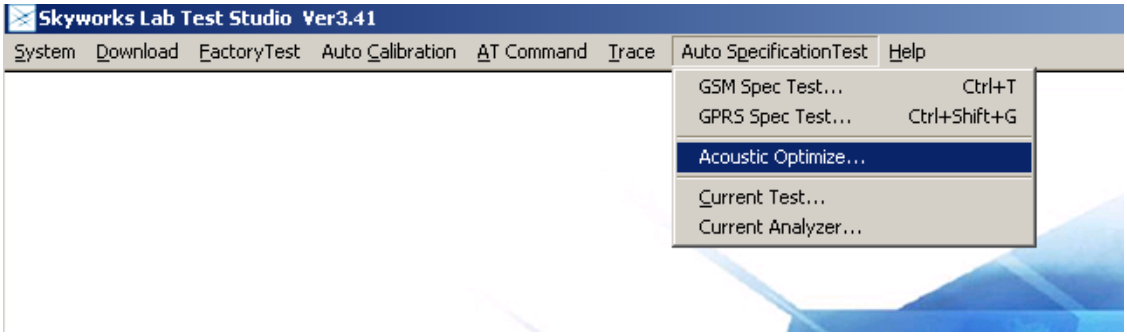


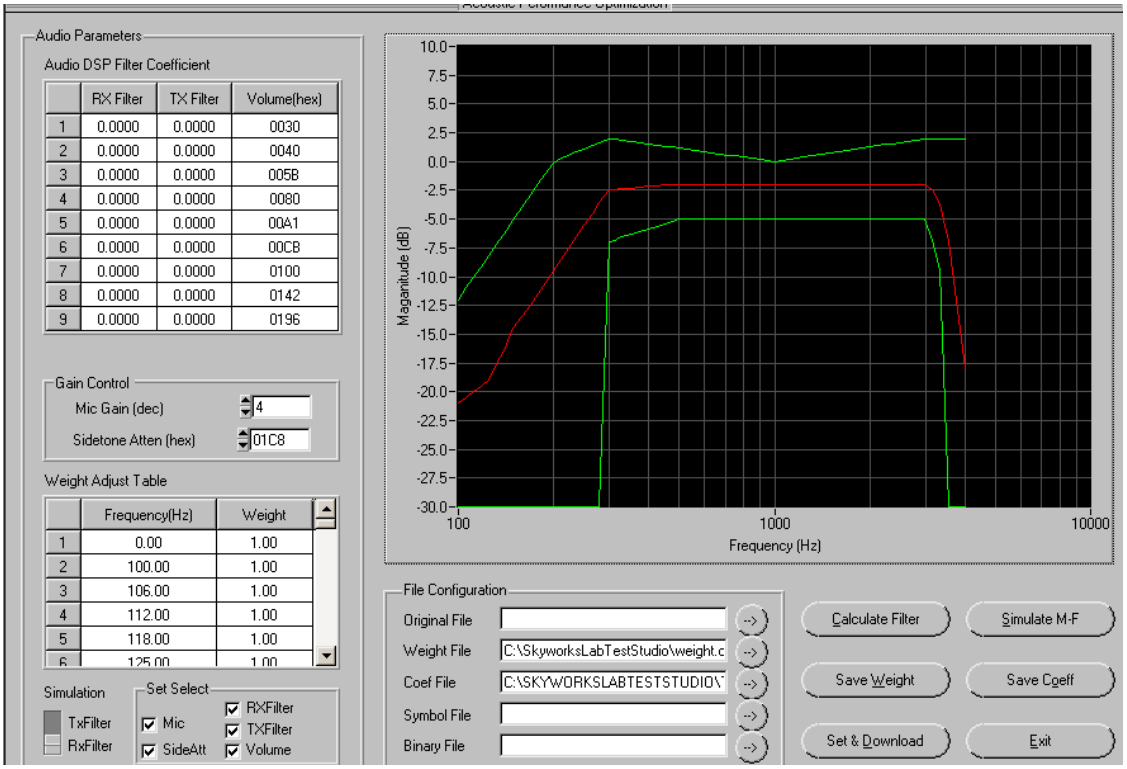
3,30.3(Receiving Sensitivity/Frequency Response)

This items is relative with the DSPRxFilterCoeffHandSet parameter included in the pubparam.c file . You will adjust the nine parameters of this array. You can use the acoustic tools included in the SkyworksLabTestStudio. You can follow the procedures illuminated below.
1,You can set up this DSPRxFilterCoeffHandSet parameter like below and test:
const UINT16 DSPRxFilterCoeffHandSet[NUM_FILTER_COEFFICIENTS] = {
0x0, 0x0,0x0,0x0,0x0,0x0,0x0, 0x0,0x0,0x7FFF}.

2, After the 30.3 item testing, you will get a *.trc file this time in the UPL16.You must copy and back up this *.trc file, because this file will be used by this acoustic tools.

3,Then you will run the SkyworksLabTestStudio software, and activate the acoustic optimic item in the autospecification test menu. A acoustic performance optimization interface will appear.





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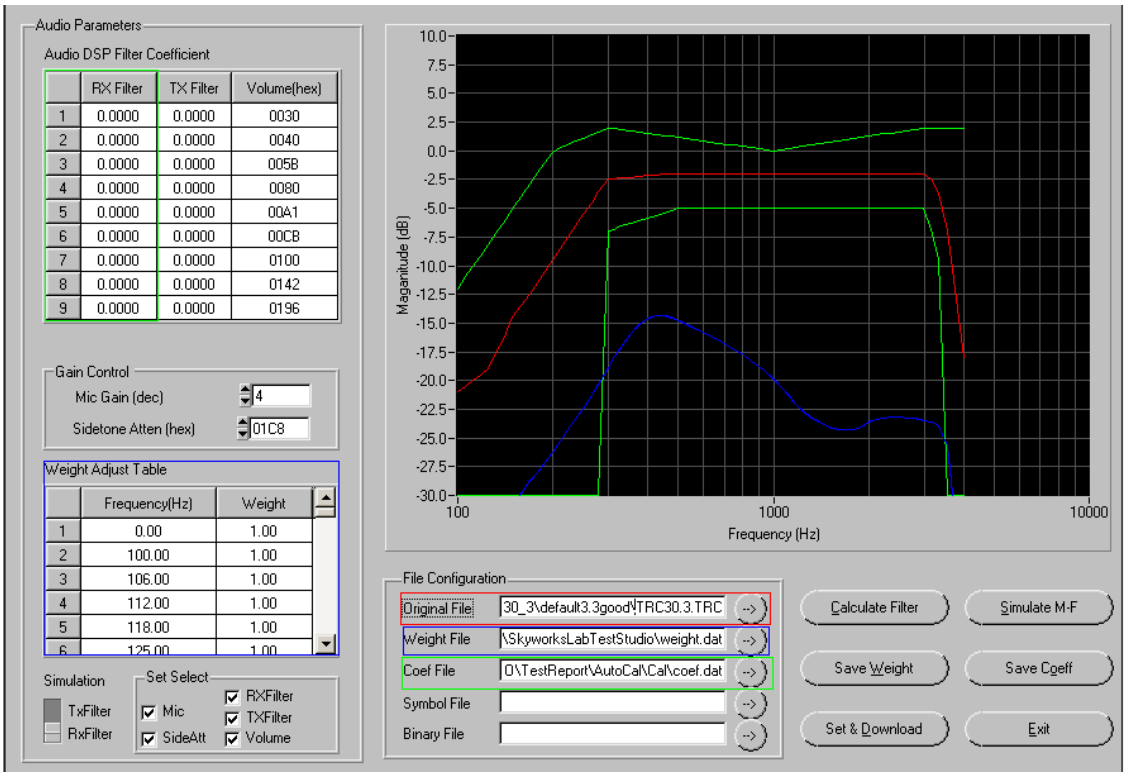
4,You will input the *.trc file in the original file item red labeled. And when you input the *.trc file, you will see a new blue line appearing in the diagram on the right top direction of the drawing .And the same time , the two items labeled blue , weight file and weight adjust table is relative .This weight adjust table content is used in the computing RX Filter coefficient procedure .The two items labeled green ,coef file and the Audio DSP filter coefficient RX Filter is relative. This coefficient is the compute result.



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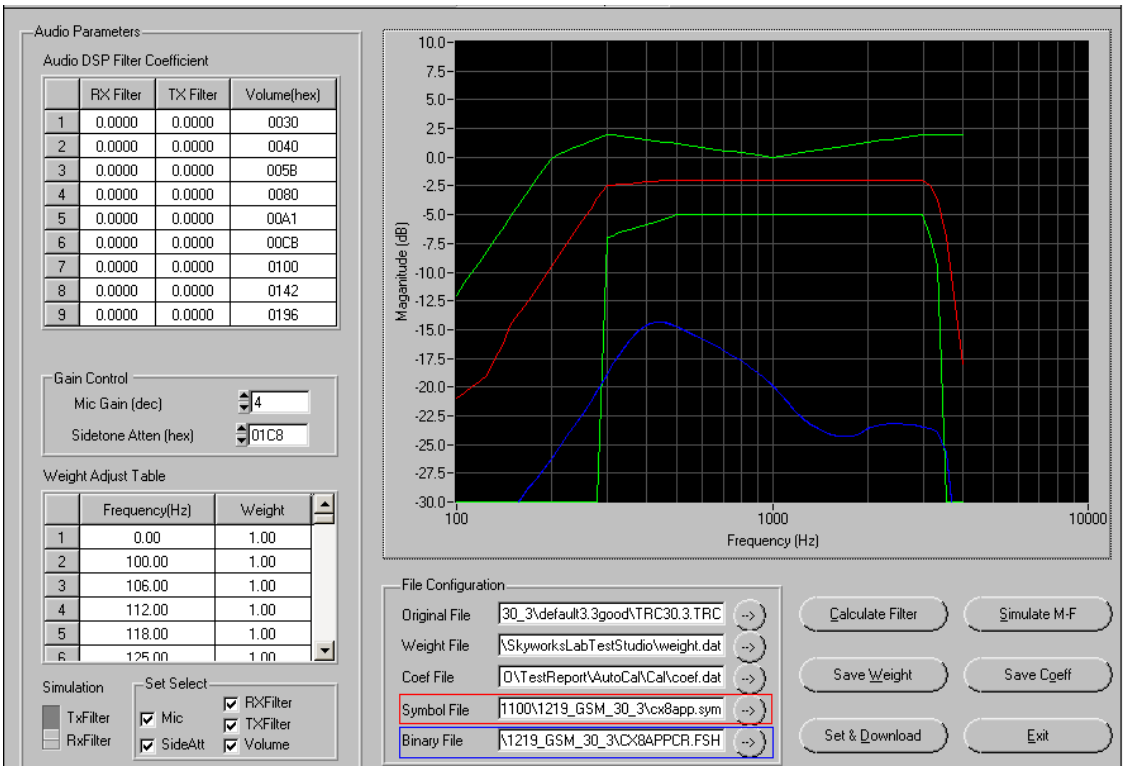
5,In the following drawing , the item symbol file labeled red is the *. Sym file, the item binary file labeled blue is the *.fsh which are the result of the software compiling and linking.



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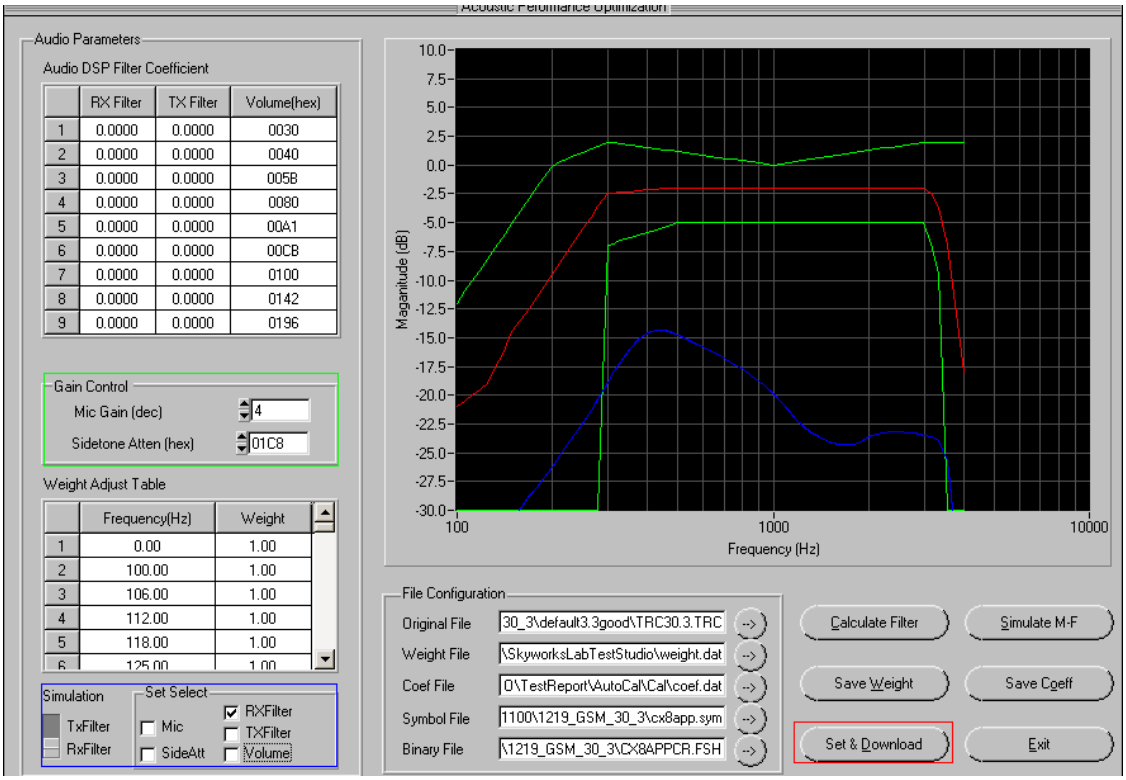
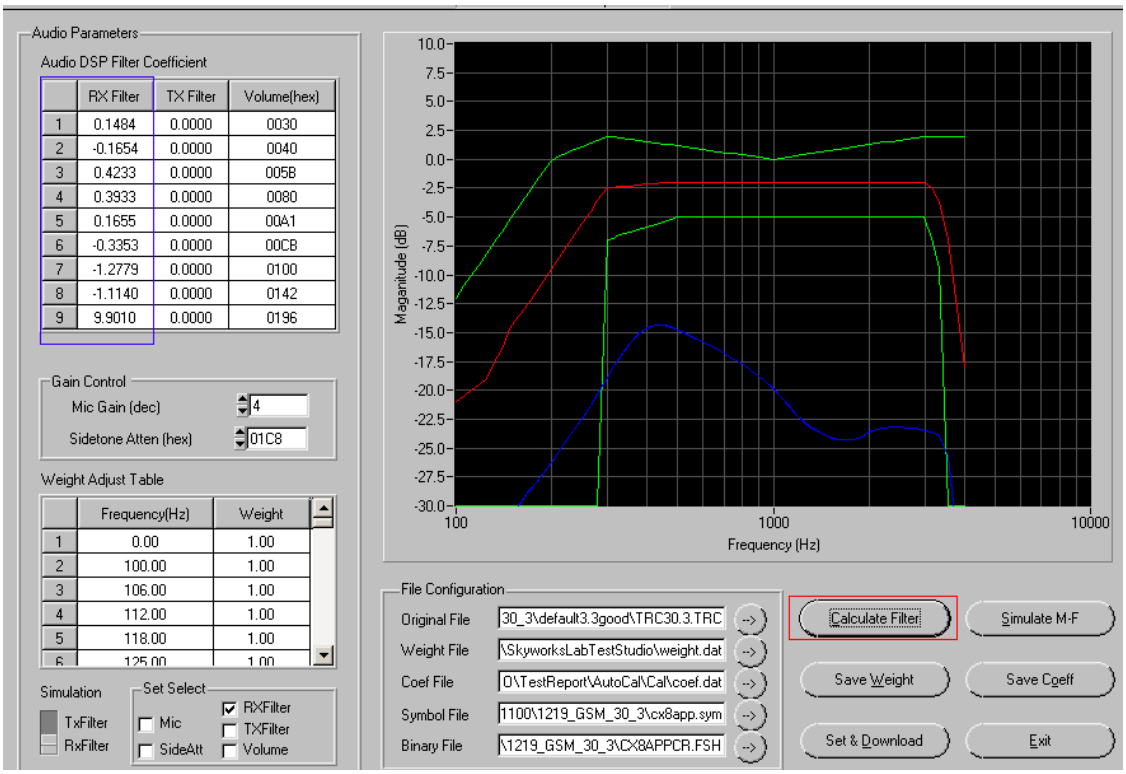
6,When you only adjust the RXFilter parameter, you only select the RXFilter item in the area labeled blue line . So when you press the button Set&Download labeled red line , only the DSPRxFilterCoeffHandSet parameter will be changed . If you want to adjust another parameter , you will select the other item in the area label blue line , for example, Mic, SideAtt, whose value can be set up in the area labeled green.



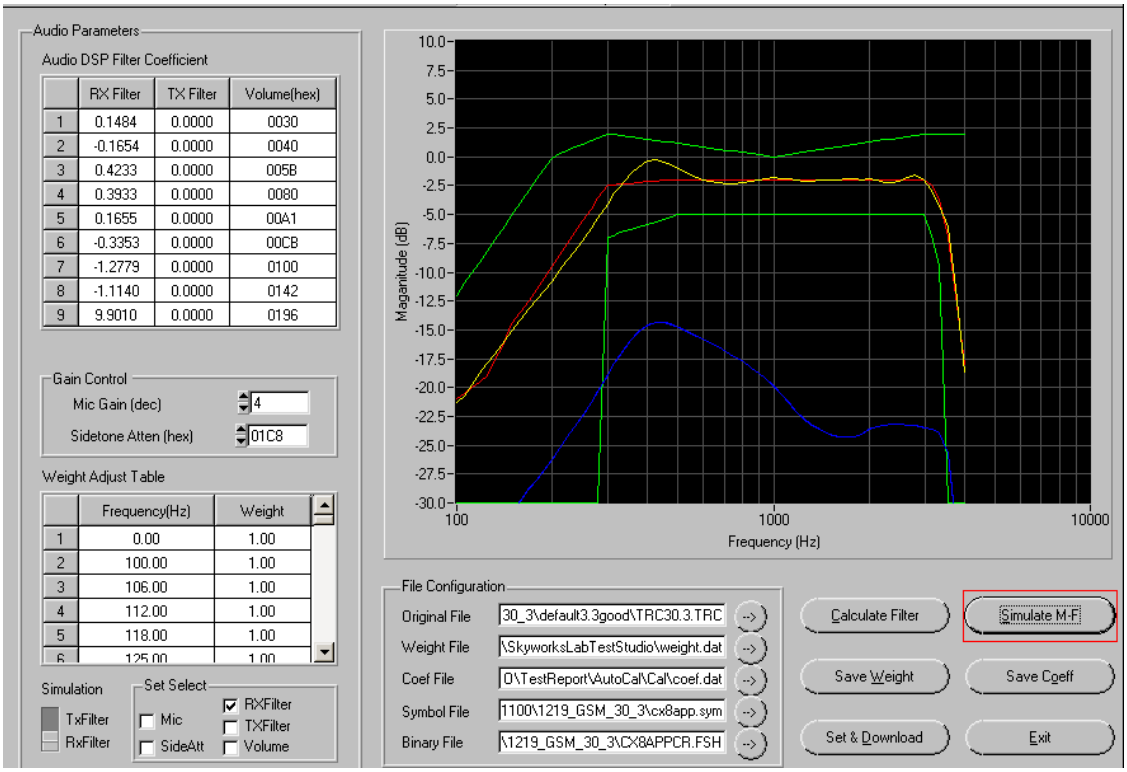
PRELIMINARY

7,Then you will press the Calculate Filter button labeled red line , the compute result of the RX Filter will appear in the area labeled blue line.



PRELIMINARY

8,Then you will press the Simulate M-F labeled red line , a yellow simulate line will appear on the right top part of the drawing.



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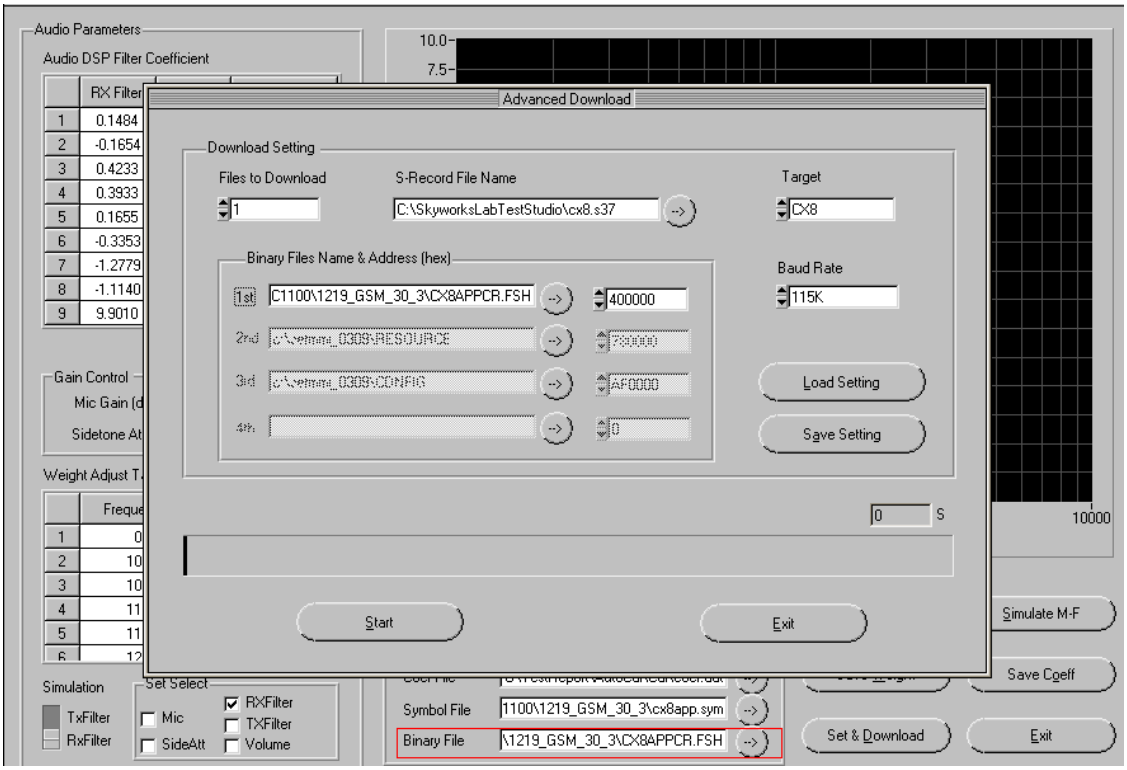
9,Then you will press the Set&Download button , so the new setup parameter will be set in the new binary file , a download interface will appear , will be ready to download the binary file which is designated in the binary file item labeled red line whose RXFilter parameters of the binary have been adjusted to the computing result by this tools. You will be ready to download this software.



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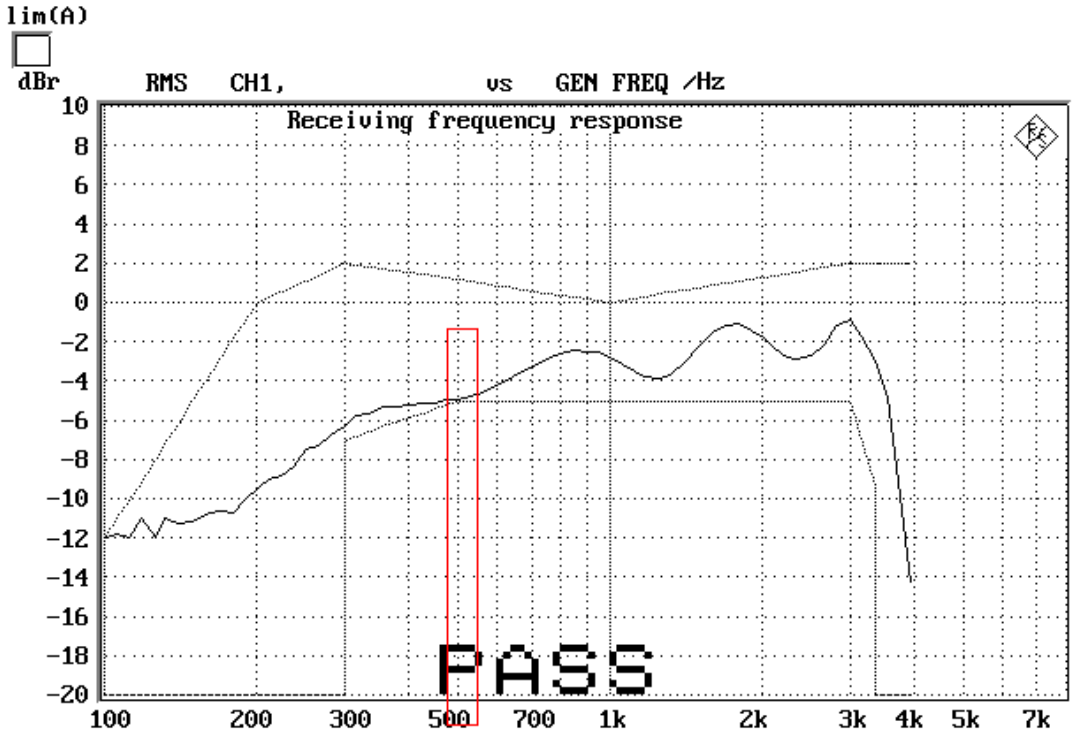
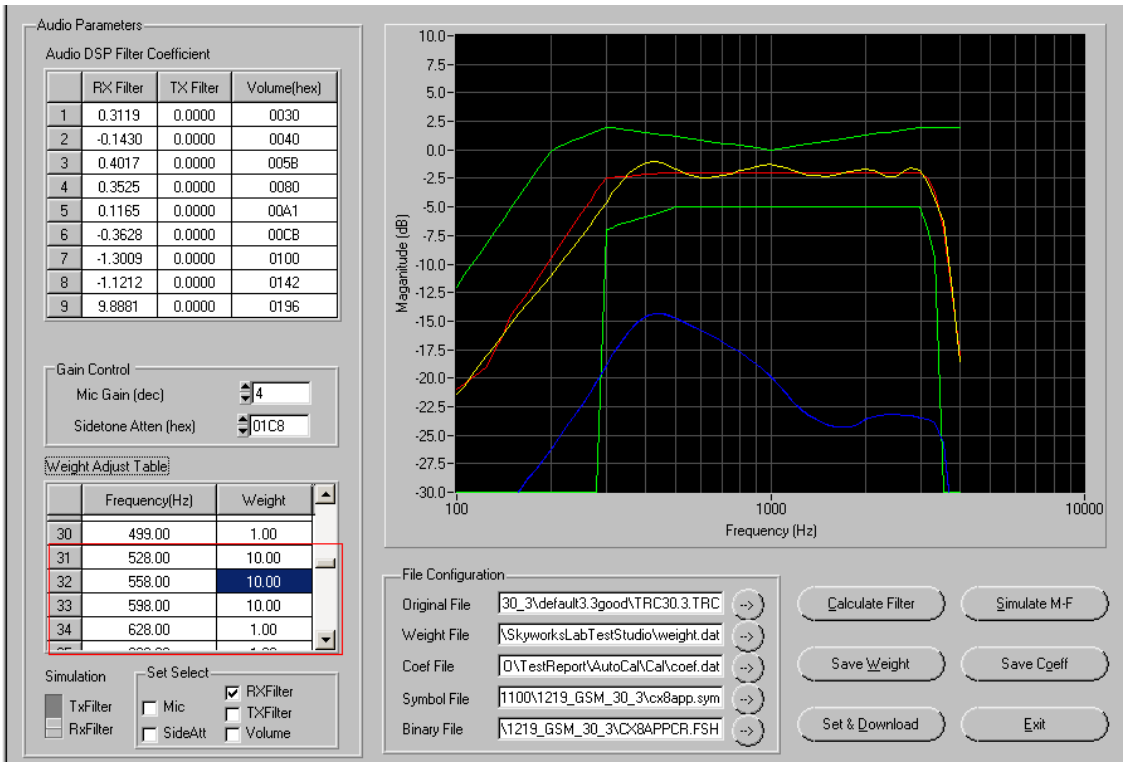
10,After downloading the new software into handset, you will pass the 30.3 item again. You will get another *.pcx picture displayed below. In a general way you will pass the 30.3 item like this. But sometimes, you want to get a better test result . For example , in the below drawing, in the 500hz frequency segment ,the response labeled red line is lower.

You can adjust the value of the weight adjust table, and following the above procedure , and computing a new result, simulating again ,downloading again, and testing again, you will get a better test result.



11,You will adjust the values of the weight adjust table, whose frequency is nearby the 500hz. In the conditions above , you will increase the value of the frequency nearby the 500hz,for example ,change to 10 in the area labeled red line. In a general way, the weight value of all the audio frequency is 1.You can increase the value and decrease the value.



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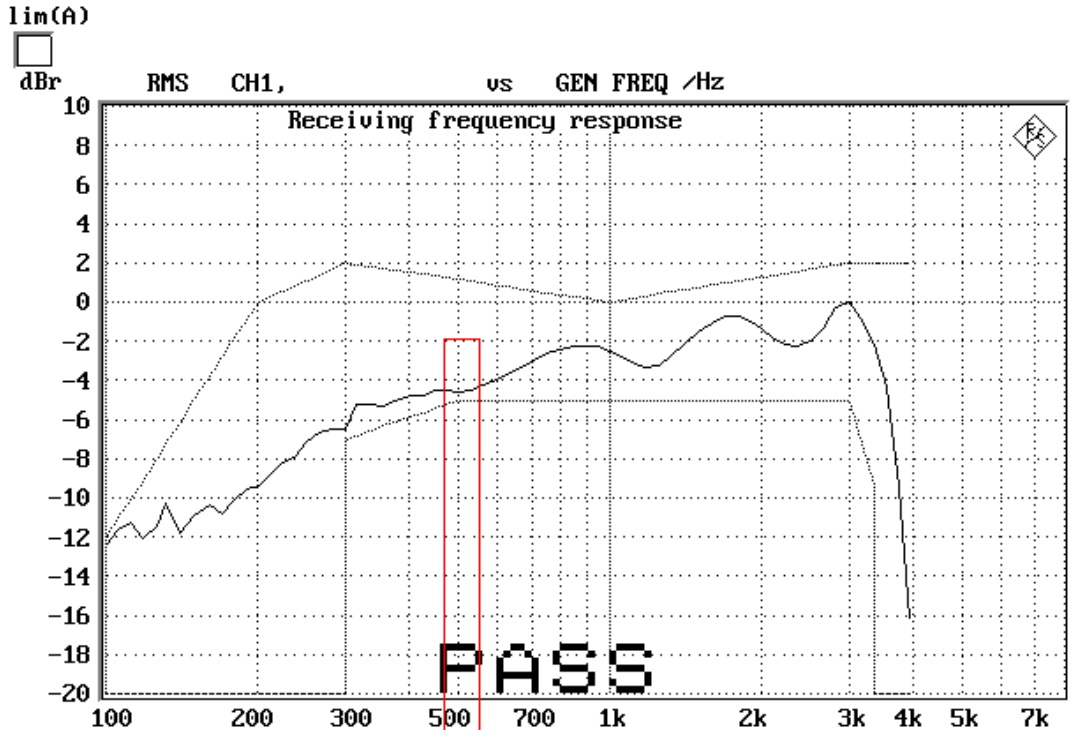
After downloading the new RXFilter parameter , and test the 30.3 item , you will get another better test result.



With the aid of the acoustic tools, you will adjust a set of proper parameters to pass the 30.3 item.

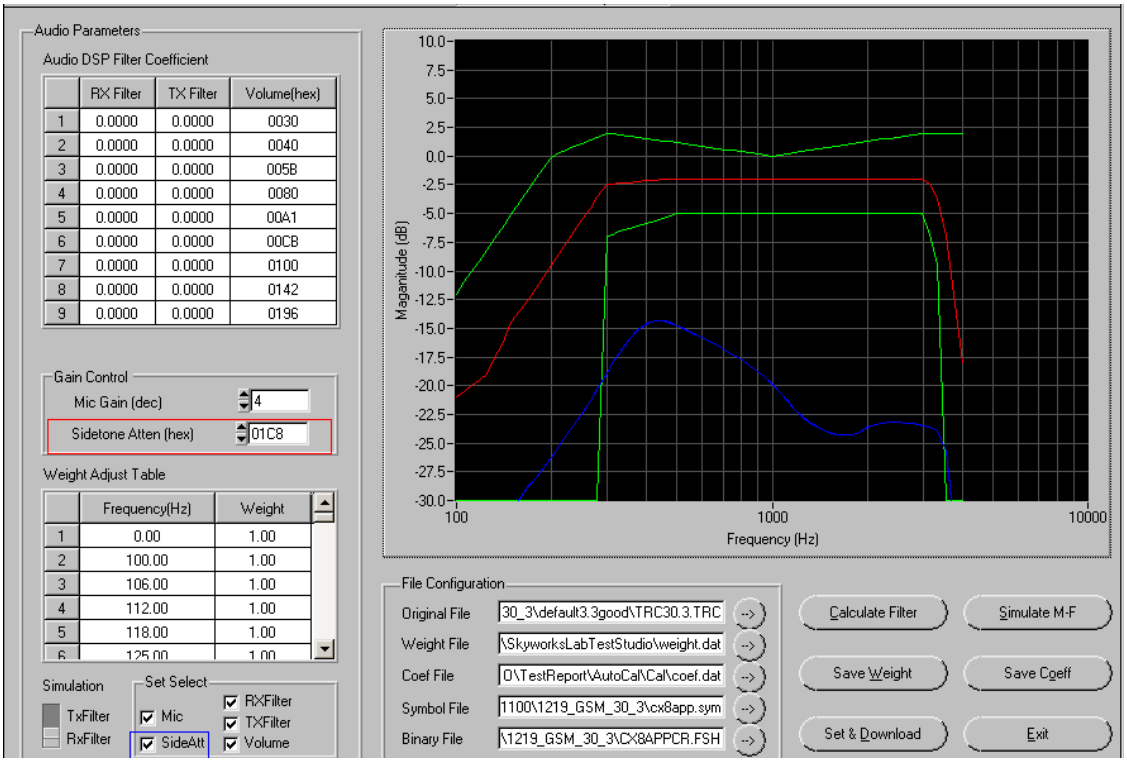
4,30.4(Receiving Loudness Rating) norm and max,

The 30.4 item is relative with the parameters VolumeTableHandSet. The default value of the VolumeTableHandSet is as bellows:
const UINT16 VolumeTableHandSet[RHW_NUM_VOLUMES] =
{ 0x30, 0x40, 0x5B, 0x80,0xA1,0xCB, 0x100, 0x142, }
When you are passing this item, you will adjust some certain value in the array list on the basis of the test result.

The max RLR value is at least –13db,the norm RLR value is from –1db to 5db.If the test result is smaller than the –1db.You will decrease the value of the receive, not increase the value , and vice versa.

5,30.5.1(Side Tone Masking Rating)

The 30.5.1 item is relative with the parameter SideToneAttenHandSet. The default value of the SideToneAttenHandSet is at 0x1c8.The STMR is from 8db to 18db.If the test result value is larger than 18db,you will increase the value of the SideToneAttenHandSet inch by inch, not decrease the value , and vice versa.
You can directly adjust this parameter in the audio tools as showed below.
You will adjust the value in the area SidetoneAtten(hex) label red line. And the same time, the SideAtt in the area labeled blue line must be pitched on.

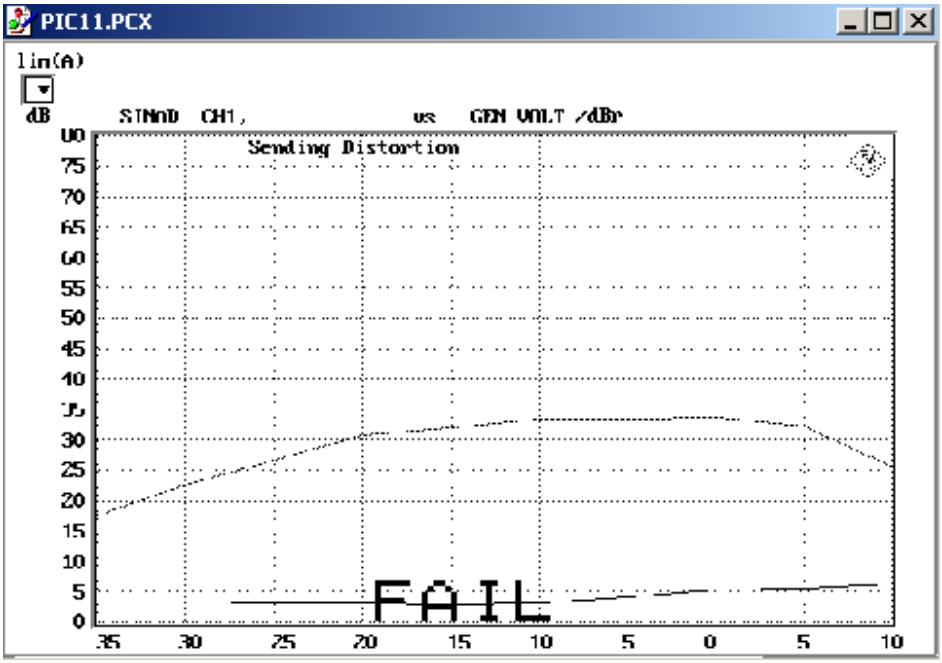


6,30.6.1(Echo Loss) 30.6.2(Stability Margin)

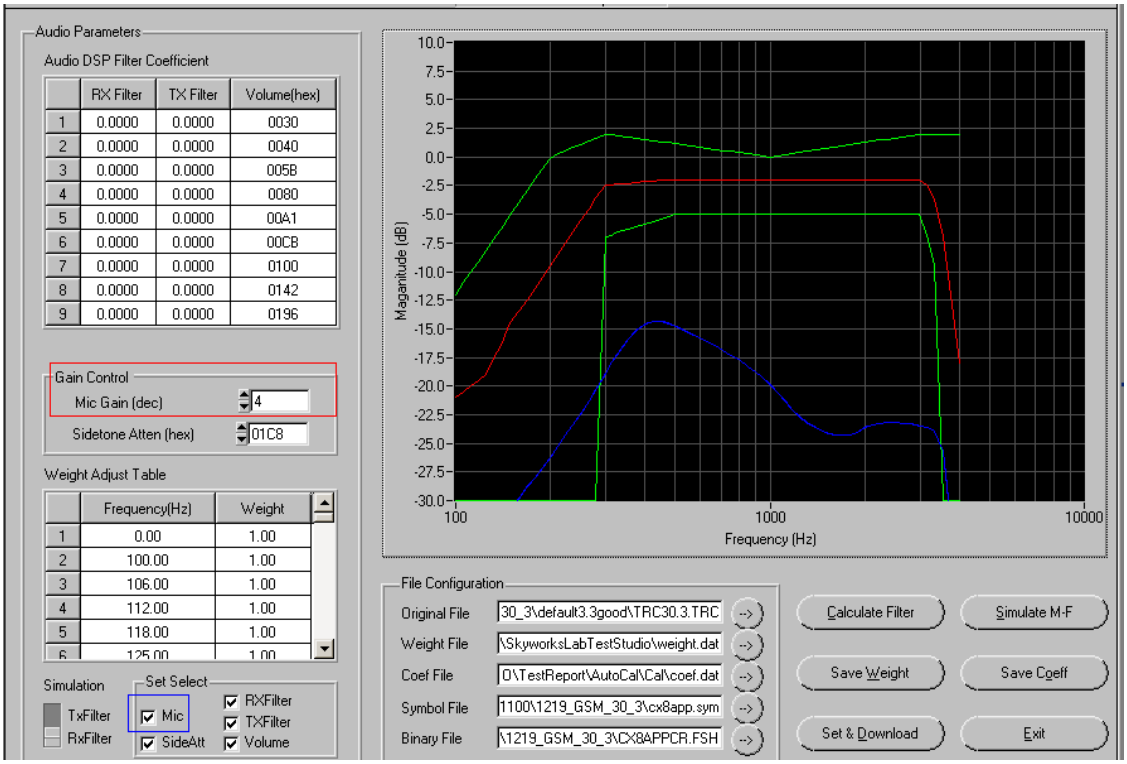
The two items are guaranteed by the handset hardware design. We need not adjust anything. In a general way we will pass these two items successfully.

7,30.7.1(Sending Distortion)

The item is relative with the MicGainHandSet parameter included in the pubparam.c file. When the following drawing appeared and failed, do not worry about it , because the test parameters is not in effect this time. You can try it again. When the curve is lower than the standard curve, you can decrease the value number of the MicGainHandSet parameter and vice versa. The reference value of the MicGainHandSet parameter is 4 or 5.



You can directly adjust this parameter in the audio tools as showed below.
You will adjust the value in the area Mic Gain(Dec) label red line. And the same time,the Mic in the area labeled blue line must be pitched on.



3.Important Notices

Some parts you must take notices:

1,The electric connection of the DAI cable is right or not , that means , the DAI_RESET,DAI_IN, DAI_OUT, DAI_CLK,GND signals of the handset is exactly connected to the DAI interface board. If not right, NO DAI clock error information will appear.

2,The plasticene use , the plasticene must wrap around the receiver of the handset and the electric ear very strictly. if not wrap better, will influence the 30.3,30.4 test items which is relative with the receiver performance .Because if not wrap better , some frequency of the sound will be leaked out .And the same time ,the receive will be rightly placed on the top of the electric ear.

3,You can adjust the distance between the microphone hole and the electric mouth through adjust the location of the handset or the rotating angel of the flip handset. This will slightly influence the 30.2,30.7.1 test items which are relative with the microphone performance.