67-15233 34th Ave.
Surrey, BC V3S 2T7
604-637-2167
info@triarchytech.com

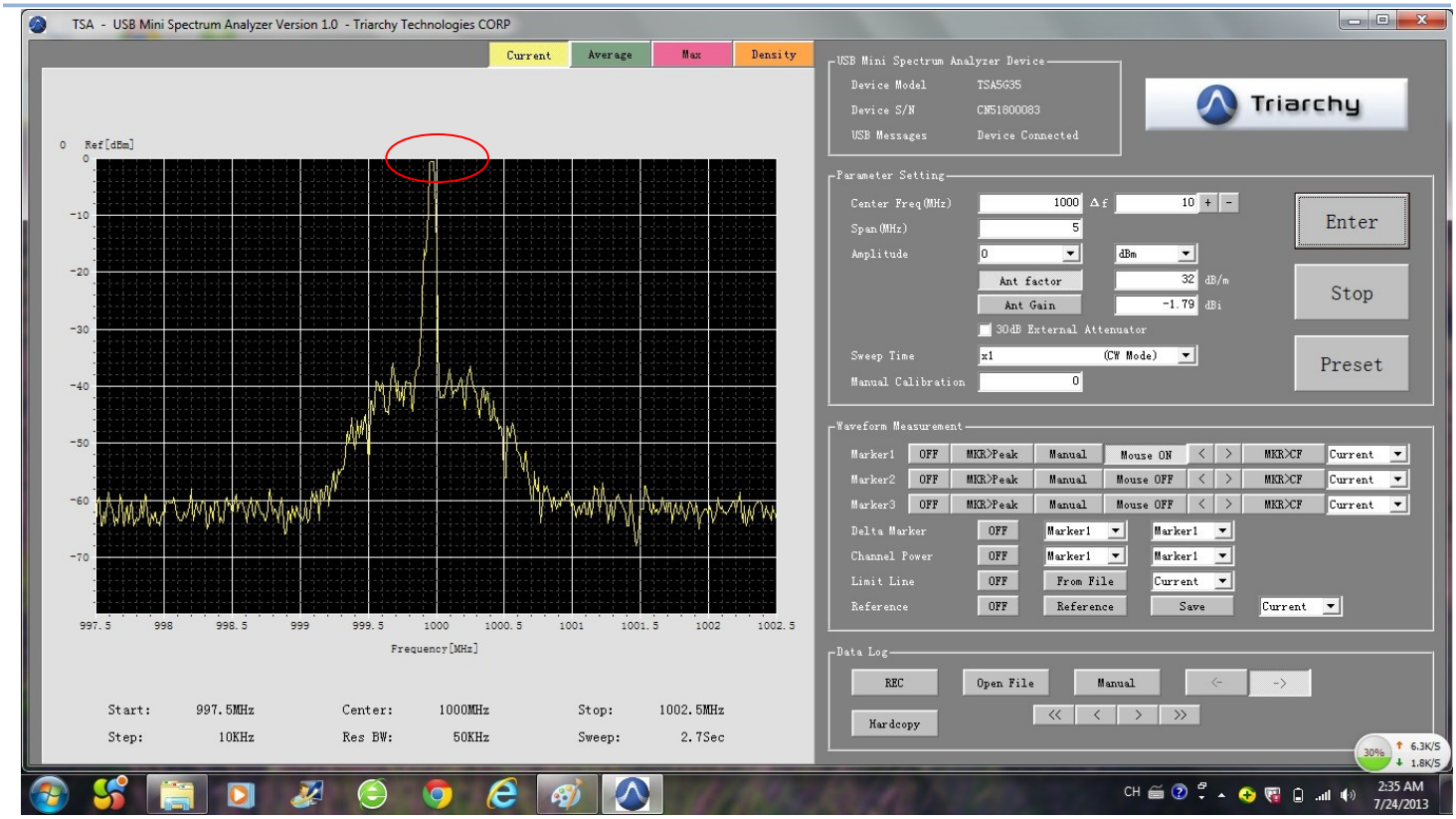

Figure 10 Spectrum Display with Signal Default value

2.2 Frequency Setting

The center frequency is entered into ***Center-freq(MHz)*** input. Then the ***TSAxGx*** will scan from center_freq - span/2 to center_freq + span/2. The display window will show the signal spectrum after clicking the ENTER button. The valid center frequency range is from 1 MHz to 5350 MHz for TSA5G35 model. If TSA program is connected to another model such as TSA12G5, the frequency range will be 4.9GHz to 13.5GHz, please check each model datasheet for detail.

Frequency setting also has step setting function, setup step value, click + or – to implement next measurement, and it didn't need to click the ENTER key.

2.3 SPAN Setting

The SPAN value can be input by user. SPAN values range will be 1~1000MHz, unit is MHz, and only integer value.

The TSA5G35 has two bands, low band is from 1 to 850 MHz and high band from 850 MHz to 5350 MHz. The 850 MHz frequency is the band edge. When SPAN is set at 101 MHz to 1000 MHz, SPAN range cannot cross over the band edge, so that, 1000 MHz SPAN cannot work at low band.

When SPAN setting is from 1 MHz to 100 MHz, the span range can cross over the 850 MHz band edge.

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info@triarchytech.com

For example, if SPAN is set to 500 MHz, the frequency is set at 600 MHz; the SPAN range will be from 350 MHz to 850 MHz. If the frequency is set to 700 MHz, the SPAN range is still keep at 350MHz, the TSA will pop up the warning message to remind the user to enter a proper value for the span.

TSA6G1, TSA8G1 and TSA12G5 has band 1 and band 2, Band1 of TSA6G1 and TSA8G1 has same function of TSA5G35, it still need to take care of 850MHz band edge issue.

The SPAN setting can not cross over the band1 and band2 in the TSA6G1, TSA8G1 and TSA12G5.

2.4 Amplitude Setting

The amplitude setting will depend on the signal level to be measured. If the signal is small, the 30 dB attenuator dones't need to be added, the reference level will be from -60 dBm to 0 dBm at 10 dB step. If the large signal is to be measured, the 30 dB attenuator will need to be added, and to mark ***external ATT (30 dB)*** at TSA panel. The reference level will be from -30 dBm to 30dBm at 10 dB step.

The reference level in the band 2 in TSA6G1 and TSA8G1 will shift 20dB, please check the datasheet.

The reference level in the TSA12G5 without external ATT will be 40dB range, please check the datasheet for detail.

The amplitude the unit can be set to dBm, dBuv, dBm, dBuv/m, dBm/m2.

When you select dBuv/m, and dbm/m2. It means to use USB spectrum analyzer to measure the field strength, it will be related to the antenna parameter: antenna factor or antenna gain. You shall input antenna parameter. These parameters are related to the frequency, you shall choice proper parameter at your application band.

2.5 Sweep Time Setting

When the sweep time is slow, the ***TSA5G35*** will do oversampling. The oversampling time interval will be 3us. The sweep time needs to be selected based on what kind of signal will be measured.

If the signal to be measured is continuous wave (CW), select x1 (CW Mode).

If the signal to be measured is continuous modulation signal, select x1.5 (Burst Mode)

If the signal to be measured is packet data signal, select x2(Burst Mode) or x4(Burst Mode), or larger.

2.6 Trace Selection

The current trace, average trace, max trace, and density of the measured signal can be turned on or off individually by clicking on the corresponding button on the screen as shown in ***Figure 11***, which shows that current trace and density are turned on. Average trace, and max trace are turn off

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info@triarchytech.com

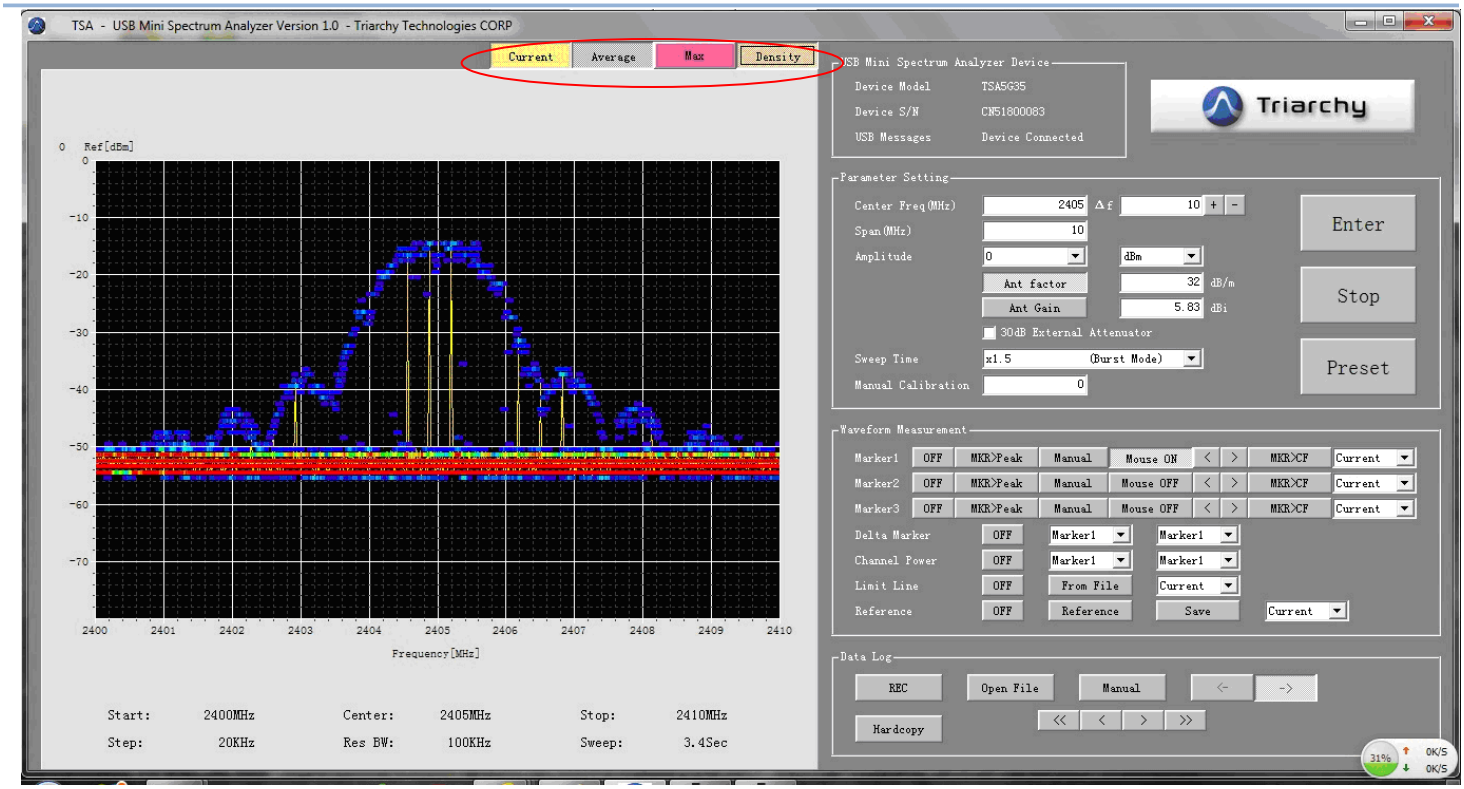

Figure 11 Current Trace and Density Trace are Turned on

2.7 Current Trace

The current trace is to display the real time signal spectrum, and the default display will be current trace. The current trace will be updated with each scan over the frequency range. When the input signal is changed, the current trace will change immediately. When the device is used to measure the modulated signal and packet signal, you need to increase the sweep time to get a better spectrum waveform.

2.8 Average Trace

The average trace is adopted 16 points of moving average algorithm. It can reduce the signal noise when measuring CW signal. It will conjecture the signal repeat rate for modulated or packet signal measurement, if the average trace is very low comparing to the max trace, it means the signal repeat rate is very low.

2.9 Max Trace

The max trace will hold the maximum signal level with each scan. Max trace can be used to measure the modulated signals, and random signals. The max trace will show envelop of modulated signals. When you do an EMC test, you can use the max trace to pick up the max signal.

67-15233 34th Ave.
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2.10 Density Measurement

The density image will show the modulated signal with the detailed signal energy distribution, even when two signals are overlapped, you can still watch and find the two signals from the density image. It is very useful to analyze the modulated signal.

Since density measurement will use up a lot PC computing resource, the default option for density measurement is off. For a low performance PC, turning on this option may cause PC to respond slowly.

2.11 Manual Calibration

Input one value, the waveform will be up and down to follow the input value.

If external attenuator is used (not 30dB), Manual calibration will be compensated the attenuation value.

If connection cable have large insertion loss, Manual calibration will be compensated the attenuation value.

Manual calibration is temporarily solution for customer to adjust signal level. It shall put into “0” when you don’t use this feature.

3. Measurement Support Features

There are measurement support features, including ***Marker, Delta marker, Channel power, Limit line***, ***Reference trace***, ***Recording***, and ***Image Hardcopy***.

3.1 Select Measurement Curve

When selecting ***Measurement*** functions, you shall choose which curve to be measured. There are ***Current***, ***Average*** and ***Max*** curves, please select one in ***Select Curves*** window. The ***Select Curve*** windows are located last item of each function in the waveform measure.

3.2 Marker

Three are total three marker can be used:

ON/OFF, turn on and turn off the marker

MKR>PEAK, force the marker to max signal point after marker is turn on.

Manual/Auto, setting will continue to trace the marker to peak point, and Manual one time searches the peak point after click the MKR>PRAK.

Mouser On/Off, if mouse on is selected, marker will be moving by mouse cursor, mouse cursor must be located at curve, and click it, then the marker can be moved, it is easy way to move the marker. There are total three Mouse On/Off keys; only one key can be turn on.

< left moving key, click it, marker will left moving.

67-15233 34th Ave.
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604-637-2167
info@triarchytech.com

> Right moving key, click it, marker will right moving.

MRK>CF, click it, the marker will be used as center frequency to do new measurement.

Figure 12 shows the marker function.

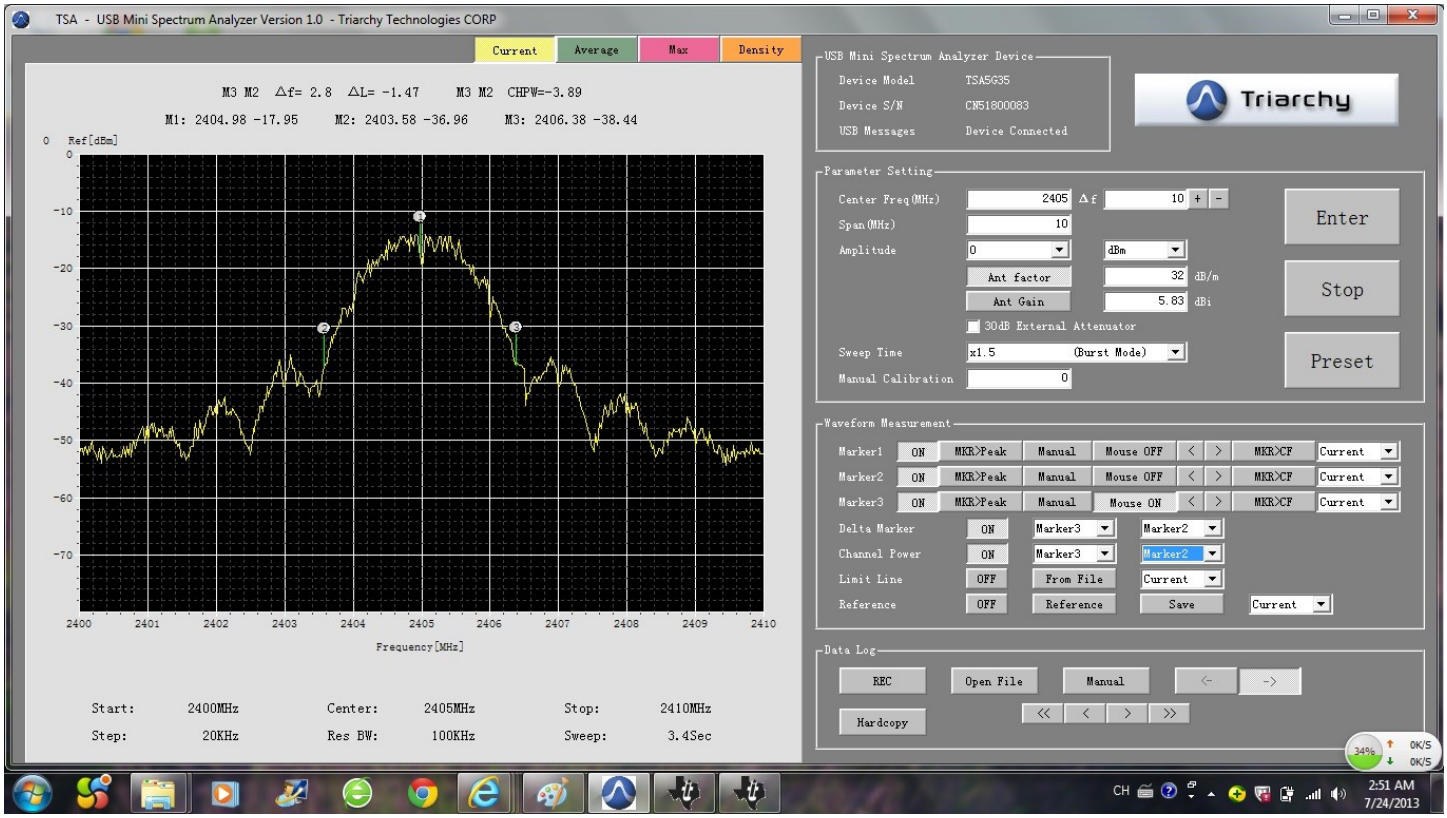

Figure 12 Marker, Delta Marker, Channel power

3.3 Delta maker

First, it needs to turn on more than two markers. Moving the marker to the proper the location.

Select two markers to do Delta marker function.

A lot parameter can be measured by properly setting the maker position such as BW, dBc,

3.4 Channel power

Select two points of markers to do channel power calculation, it is more useful to measure the modulation signal.

67-15233 34th Ave.
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604-637-2167
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You can measure the main channel power; also can measure the adjacent channel power by setting different marker location. Then you can calculate the ACPR (adjacent channel power ratio)

3.5 Limit line

The limit line will be used in the production line, if the signal larger than limit line, it will show PASS, if the signal is smaller than limit line, it will show FAIL.

The limit line will load from Excel file which will define the limit line template, it will be total 501 point data at first column of excel file; customer can define any kind of template by writing the Excel data. The file will save at **C:\Users\Username\Documents\Triarchy Tech\TSA Spectrum Analyzer\REF**

3.6 Reference

The reference function will capture any waveform as reference image to shown on the display. The reference also can be saved as file. The limit line function can load this file and show up. The reference can be used for comparing the measurement. Please see ***Figure 13.*** The reference curve is Zigbee signal with continually modulation, and current is shown the burst modulation of Zigbee signal.

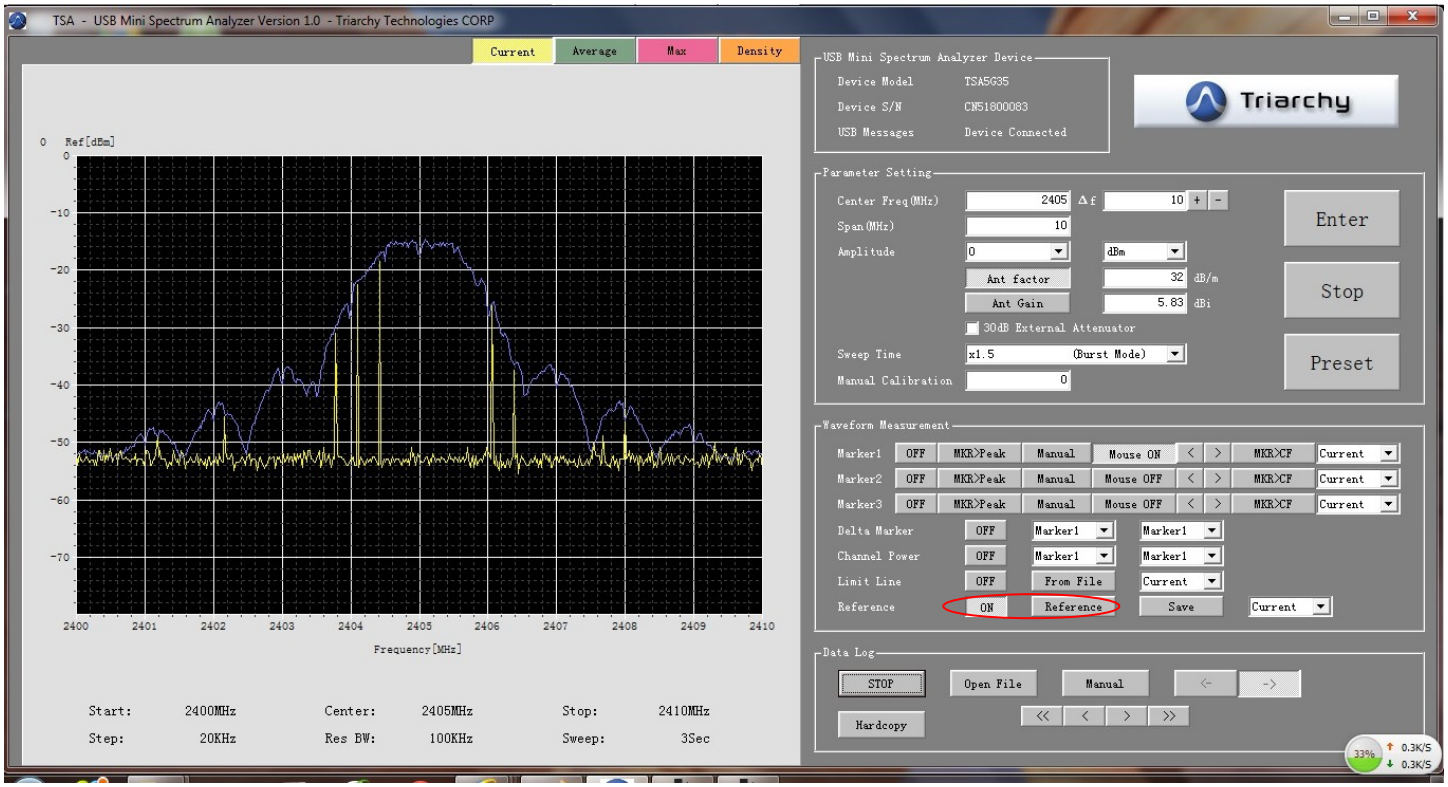

Figure 13 Reference on Display

67-15233 34th Ave.
Surrey, BC V3S 2T7
604-637-2167
info@triarchytech.com

3.7 Hardcopy

Xlick the hardcopy key, the waveform image and data will be hardcopy into HARDCOPY folder **C:\Users\UserName\Documents\Triarchy Tech\TSA Spectrum Analyzer\HARDCOPY**. There are total four files generated, one is JPG image file, and three Excel data file which related to the current, Average and MAX.

3.8 Recording

Click the REC key the waveform can be recording, the record information will be saved as file at **C:\Users\UserName\Documents\Triarchy Tech\TSA Spectrum Analyzer\HARDCOPY**

Click stop to save the record file and stop the recording.

The record can be reviewed by loading file.

The record has two modes to review: Manual and Auto.

Manual: click < or > to move one frame to view. Click << or >> to move block of frame to view.

Auto: -> is normal play, <- is back play.

3.9 Display moving

Right click the mouse key when mouse cursor in the display area, then moving the roll on the mouse, the waveform of display can be scrolled up and down.

67-15233 34th Ave.
Surrey, BC V3S 2T7
604-637-2167
info@triarchytech.com

4. Declaration of Conformity

4.1 For model TSA6G1, TSA5G35 and TSA4G1

We

Triarchy Technologies Corp

67-15233 34th AVE Surrey BC V3S 2T7 Canada

declare that

TSA6G1, TSA5G35, TSA4G1 USB mini Spectrum Analyzer

In accordance with the following directives:

2004/108/EC The Electromagnetic Compatibility Directives

has been designed and manufactured to the following specifications:

Emissions:

EN 61326-1:2006/CISPR11:2009	Radiated Emissions	Class B

Immunity:

EN 61326-1:2006/EN61000-4-2	Electrostatic Discharge
EN 61326-1:2006/EN61000-4-3	Radiated Immunity
EN 61326-1:2006/EN61000-4-4	Electrical Fast Transients
EN 61326-1:2006/EN61000-4-6	Conducted Immunity