



## Test Report

Product Name	CAMINO-101 Class B AIS Transponder
Model No.	CAMINO-101

Applicant	Alltek Marine Electronics Corp.
Address	7F, No.605, Ruei Guang Rd., Neihu, Taipei, Taiwan, 114 R.O.C.

Date of Receipt	Sep. 29, 2009
Issued Date	Apr. 15, 2010
Report No.	103371R-RFCEP03V01
Report Version	V1.0

The Test Results relate only to the samples tested.

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# Test Report Certification

Issued Date: Apr. 15, 2010

Report No.: 103371R-RFCEP03V01



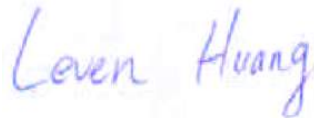
Accredited by DNV, Nemko and NIST (NVLAP)

Product Name	CAMINO-101 Class B AIS Transponder
Applicant	Alltek Marine Electronics Corp.
Address	7F, No.605, Ruei Guang Rd., Neihu, Taipei, Taiwan, 114 R.O.C.
Manufacturer	Alltek Marine Electronics Corp.
Model No.	CAMINO-101
EUT Rated Voltage	DC 10~28V
EUT Test Voltage	DC 24V
Trade Name	AMEC
Applicable Standard	ETSI EN 301 843-1:V1.2.1 (2004.06) ETSI EN 301 843-2:V1.2.1 (2004.06)
Test Result	Complied

The test results relate only to the samples tested.

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Documented By :



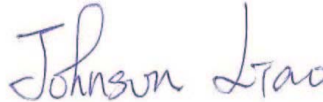
(Adm. Specialist / Leven Huang)



Testing Laboratory

0914

Tested By :



(Engineer / Johnson Liao)



Approved By :



( Manager / Vincent Lin )



## TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. EUT Description.....	5
1.2. Tested System Details.....	6
1.3. Configuration of tested System .....	7
1.4. EUT Exercise Software .....	7
1.5. Test Facility .....	8
<b>2. Conducted Emission.....</b>	<b>9</b>
2.1. Test Equipmen .....	9
2.2. Test Setup .....	9
2.3. Limits .....	10
2.4. Test Procedure .....	10
2.5. Test Specification .....	11
2.6. Uncertainty .....	11
2.7. Test Result .....	11
<b>3. Radiated Emission.....</b>	<b>12</b>
3.1. Test Equipment.....	12
3.2. Test Setup .....	12
3.3. Limits .....	13
3.4. Test Procedure .....	13
3.5. Test Specification .....	14
3.6. Uncertainty .....	14
3.7. Test Result .....	14
<b>4. Electrostatic Discharge (ESD) .....</b>	<b>15</b>
4.1. Test Equipment.....	15
4.2. Test Setup .....	15
4.3. Test Level .....	15
4.4. Test Procedure .....	16
4.5. Test Specification .....	16
4.6. Uncertainty .....	16
4.7. Test Result .....	16
<b>5. Radiated Susceptibility (RS).....</b>	<b>17</b>
5.1. Test Equipment.....	17
5.2. Test Setup .....	17
5.3. Test Level .....	17
5.4. Test Procedure .....	18
5.5. Test Specification .....	18
5.6. Uncertainty .....	18
5.7. Test Result .....	18
<b>6. Electrical Fast Transient/Burst (EFT/B) .....</b>	<b>19</b>
6.1. Test Equipment.....	19
6.2. Test Setup .....	19
6.3. Test Level .....	20
6.4. Test Procedure .....	20
6.5. Test Specification .....	20
6.6. Uncertainty .....	20
6.7. Test Result .....	20
<b>7. Conducted Susceptibility (CS).....</b>	<b>21</b>
7.1. Test Equipment.....	21
7.2. Test Setup .....	21
7.3. Test Level .....	21
7.4. Test Procedure .....	22

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7.5.	Test Specification .....	23
7.6.	Uncertainty .....	23
7.7.	Test Result .....	23
<b>8.</b>	<b>EMC Reduction Method During Compliance Testing .....</b>	<b>24</b>
<b>9.</b>	<b>Test Result .....</b>	<b>25</b>
9.1.	Test Data of Conducted Emission .....	26
9.2.	Test Data of Radiated Emission .....	27
9.3.	Test Data of Electrostatic Discharge .....	30
9.4.	Test Data of Radiated Susceptibility .....	31
9.5.	Test Data of Electrical Fast Transient.....	33
9.6.	Test Data of Conducted Susceptibility .....	34
Attachment 1:	EUT Test Photographs	
Attachment 2:	EUT Detailed Photographs	

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	CAMINO-101 Class B AIS Transponder
Trade Name	AMEC
Model No.	CAMINO-101
Frequency Range	156.025MHz~162.025MHz
Type of Modulation	GMSK / FM
Data Rate	9600bps / per channel
Channel Separation	25KHz
Antenna Type	Dipole
Channel Control	Auto
Antenna Gain	Refer to the table "Antenna List"

NOTE: Hardware: M-PCB-AISCTL01P52 , M-PCB-AISPF03P51 ; Software: Version 1.0

#### Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	AMEC	N/A	2.86 dBi

Note:

1. Quietek verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

EMI Mode	Mode 1: Normal Operation
EMS Mode	Mode 1: Normal Operation

2. The Device have Bluetooth , GPS and VHF function, this test report is for VHF function.

## 1.2. Tested System Details

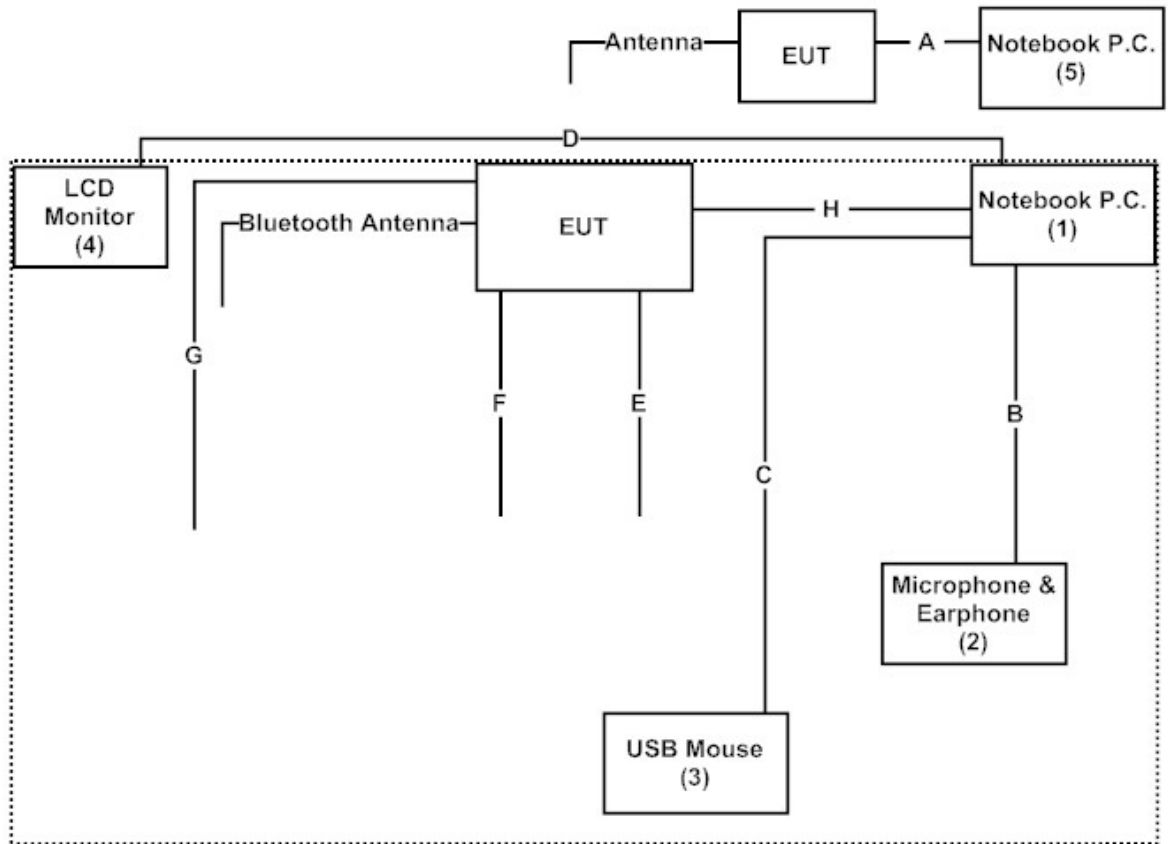
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
(1) Notebook P.C.	DELL	PP04X	C8YYM1S	Non-Shielded, 1.8m
(2) Microphone & Earphone	PCHOME	N/A	N/A	N/A
(3) USB Mouse	Logitech	M-BE58	HCA24311471	N/A
(4) LCD Monitor	CMV	CT-730D	FNC122F57CA1072	Non-Shielded, 1.8m
(5) Notebook P.C.	DELL	D630	00144-023-351-283	Non-Shielded, 1.8m

Signal Cable Type		Signal cable Description
A.	RS-232 Cable	Shielded, 1.2m
B.	Microphone & Earphone Cable	Non-Shielded, 1.6m
C.	USB Cable	Shielded, 1.8m
D.	D-SUB Cable	Shielded, 1.8m, with two ferrite cores bonded.

EUT Cable Type		Signal cable Description
E.	VHF Antenna Cable	Shielded, 10m
F.	NMEA0183 Cable	Shielded, 1.5m
G.	GPS Antenna Cable	Shielded, 10m
H.	RS-232 Cable	Shielded, 1.2m

### 1.3. Configuration of tested System



### 1.4. EUT Exercise Software

- (1) Setup the EUT and Peripherals as shown on 1.3
- (2) Turn on the power of all equipments.
- (3) Enable the VHF function of the EUT.
- (4) The VHF function is used to perform the wireless data transmission.
- (5) Verify that the EUT works properly.

**1.5. Test Facility**

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	IEC 61000-4-2	15-35	20-35
Humidity (%RH)		30-60	50-55
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-5	15-35	20-35
Humidity (%RH)		10-75	50-65
Barometric pressure (mbar)		860-1060	950-1000
Temperature (°C)	IEC 61000-4-4	15-35	20-35
Barometric pressure (mbar)		860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation’s Web Site :

<http://tw.quietek.com/tw/emc/accreditations/accreditations.htm>

The address and introduction of Quietek Corporation’s laboratories can be founded in our Web site :

<http://www.quietek.com/>

Site Description:

Accredited by NVLAP  
NVLAP Lab Code: 200533-0



Accredited by DNV  
Statement No. : 413-99-LAB11



Accredited by Nemko  
Certificate No.: ELA 165



Accredited by TUV Rheinland  
Certificate No.: 10011438-1-2009



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E-Mail : [service@quietek.com](mailto:service@quietek.com)





## 2. Conducted Emission

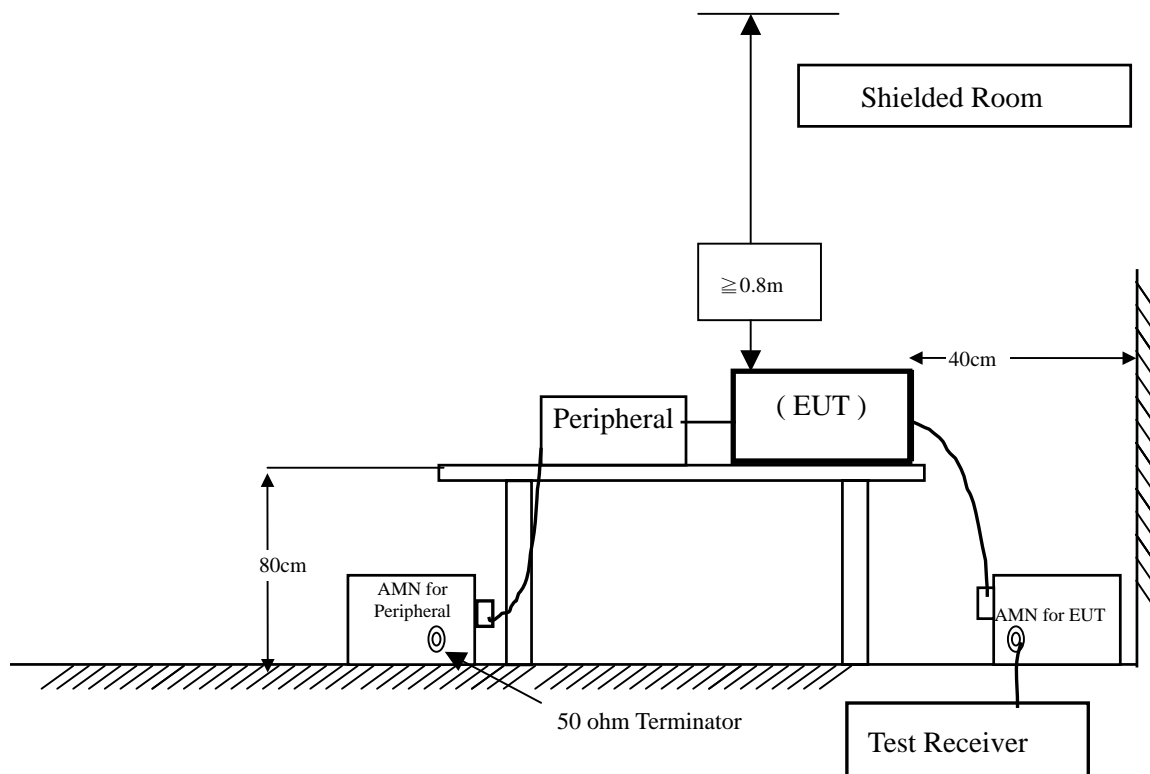
### 2.1. Test Equipmen

The following test equipment are used during the conducted emission test:

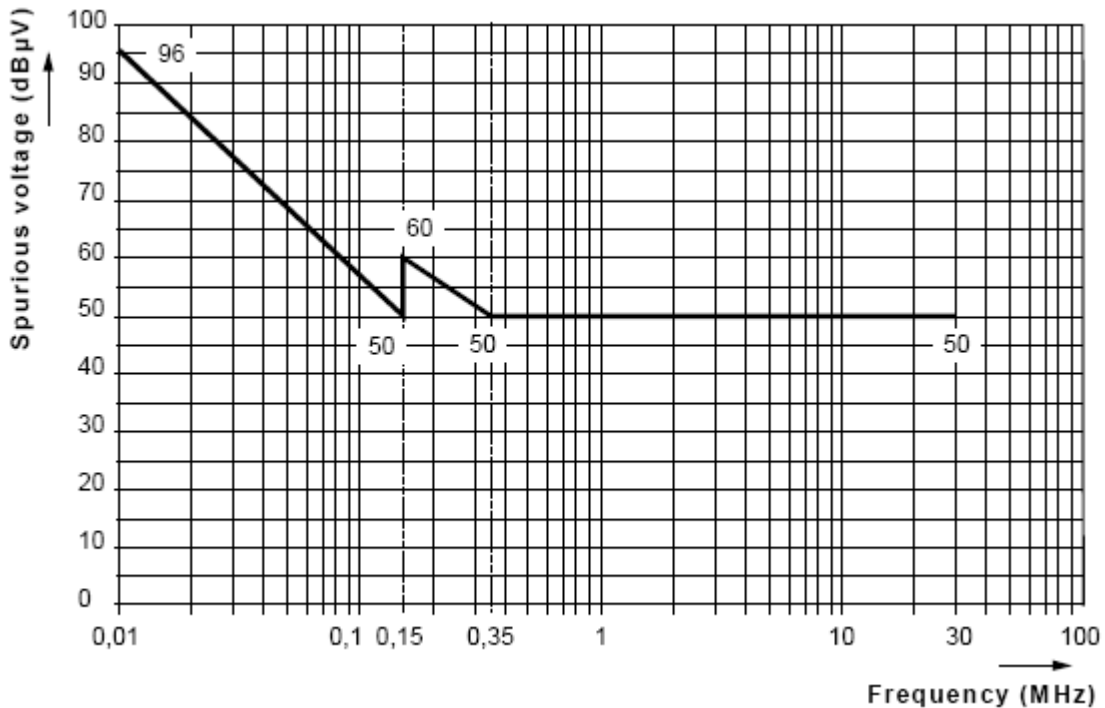
Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2009	
2	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2010	Peripherals
3	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2010	EUT
4	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2010	
5	4-wire ISN	R & S	ENY41 / 837032/001	Feb., 2010	
6	Double 2-Wire ISN	R & S	ENY22 / 835354/008	Feb., 2010	
7	No.1 Shielded Room				

Note: All equipments are calibrated every one year.

### 2.2. Test Setup



**2.3. Limits**



Maximum permissible level (quasi-peak) of conducted EMC emissions into the mains.

**2.4. Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of DC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ETSI EN 301 843-1: V1.2.1 (2004-06) on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at

- 200Hz in the frequency range 10KHz~150KHz and
- 9KHz to 10KHz in the frequency range 150KHz ~30MHz.

## **2.5. Test Specification**

According to ETSI EN 301 843-1: V1.2.1 (2004-06)

## **2.6. Uncertainty**

± 2.26 dB

## **2.7. Test Result**

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 9. The EUT complies the acceptance criterion and passes the test.

### 3. Radiated Emission

#### 3.1. Test Equipment

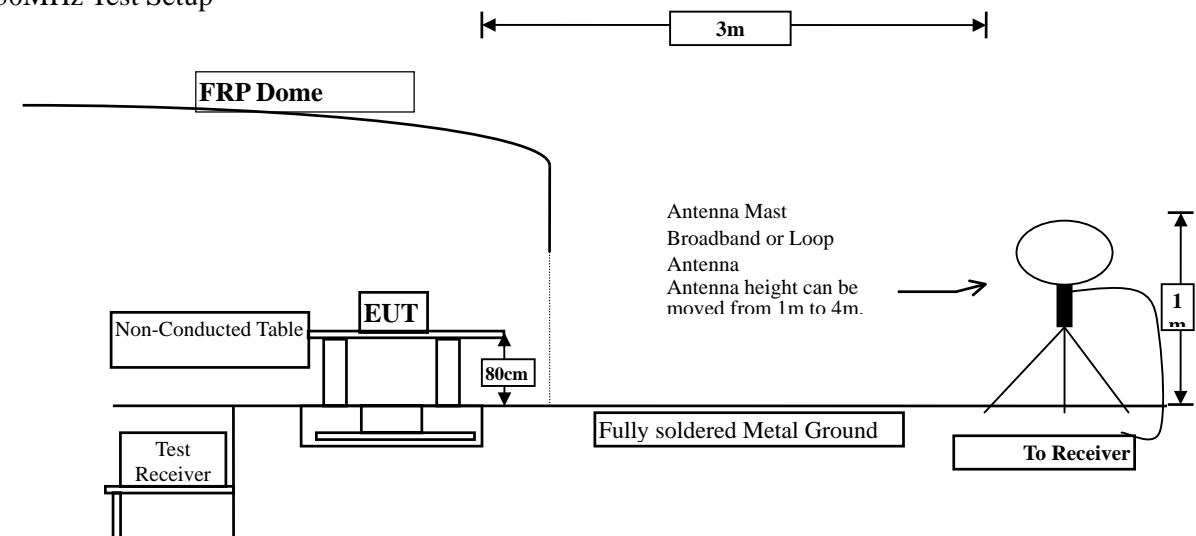
The following test equipment are used during the Radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	July, 2009
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2009
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2009
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Nov., 2009
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	Nov., 2009
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2009
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2009
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	Oct., 2009
	Horn Antenna	ETS	3115 / 0005-6160	July, 2009
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	July, 2009
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2009
	Spectrum Analyzer	Advantest	R3162 / 100803480	May, 2009
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
	Horn Antenna	ETS	3115 / 0005-6160	July, 2009
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009

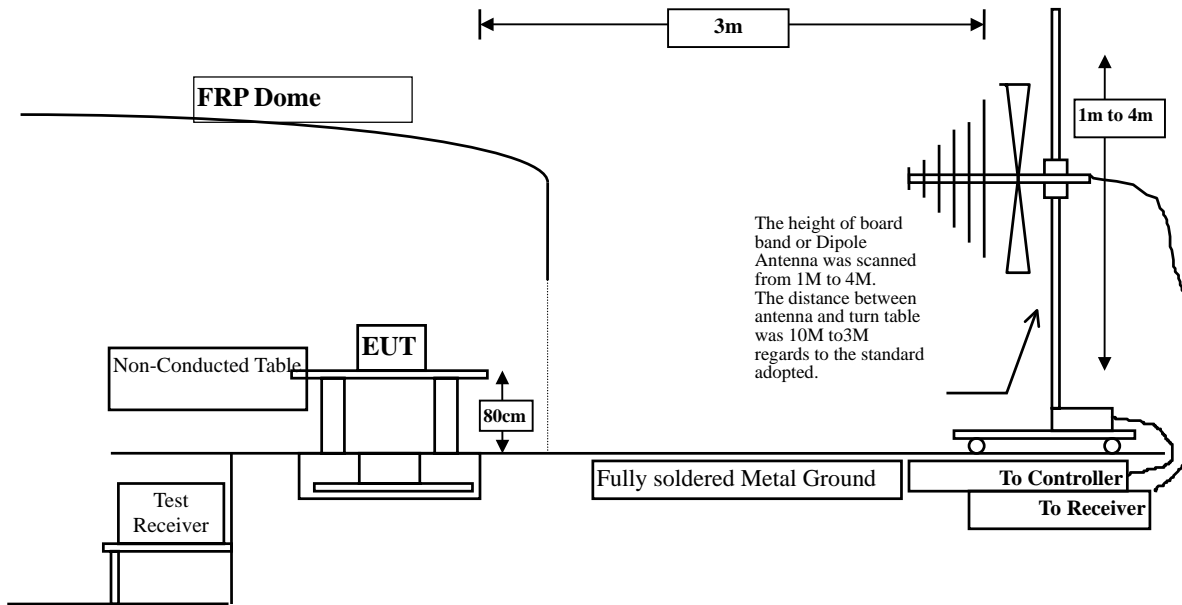
- Note:
1. All equipments are calibrated every one year.
  2. The test instruments marked by "X" are used to measure the final test results.

#### 3.2. Test Setup

Under 30MHz Test Setup



Above 30MHz Test Setup



**3.3. Limits**

Frequency range	Limit (Quasi Peak)	Limit (Peak)	Measuring distance
150kHz to 300kHz	80dBuV/m to 52dBuV/m		3m
300kHz to 30MHz	52dBuV/m to 34dBuV/m		3m
30MHz to 1GHz	54dBuV	Not defined	3m
1GHz to 2GHz	Not defined	54dBuV	3m
156MHz to 165MHz	24dBuV/m	30dBuV	3m

**3.4. Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ETSI EN 301 843-1: V1.2.1 (2004-06) on radiated measurement.

The measuring bandwidth shall be in accordance with table

Frequency range	Measuring bandwidth
30MHz to 2GHz	100kHz to 120kHz
156MHz to 165MHz	9kHz to 10kHz
150kHz to 30MHz	9kHz to 10kHz

### **3.5. Test Specification**

According to ETSI EN 301 843-1: V1.2.1 (2004-06)

### **3.6. Uncertainty**

$\pm 3.8$  dB

### **3.7. Test Result**

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 9. The EUT complies the acceptance criterion and passes the test.

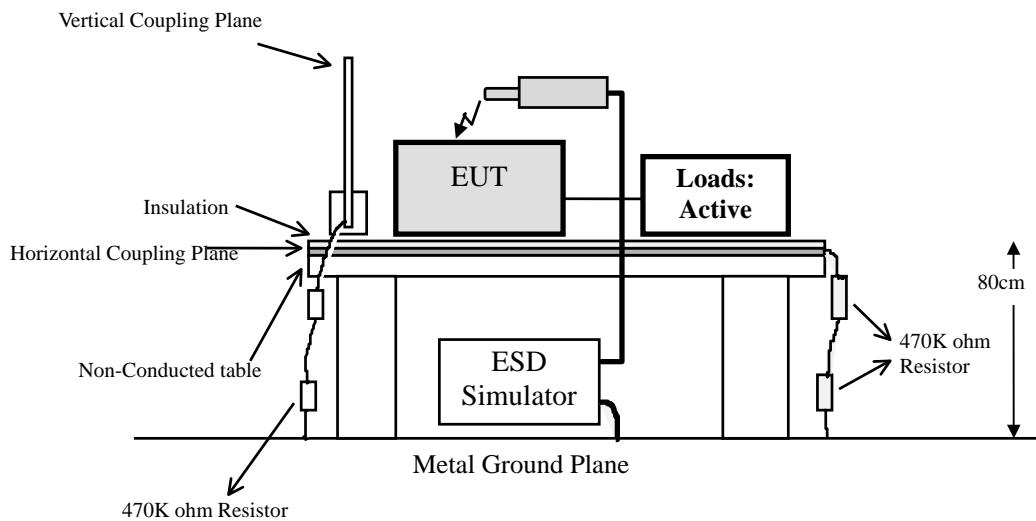
## 4. Electrostatic Discharge (ESD)

### 4.1. Test Equipment

Item	Instrument	Manufacturer	Type No/Serial No.	Last Calibration
1	ESD Simulator System	SCHAFFNER	NSG-438 S/N: 167	June, 2009
2	Horizontal Coupling Plane (HCP)	Quietek	HCP AL50	N/A
3	Vertical Coupling Plane (VCP)	Quietek	VCP AL50	N/A
4	No.3 Shielded Room			

Note: All equipments are calibrated every one year.

### 4.2. Test Setup



### 4.3. Test Level

Item	Environmental Phenomena	Units	Test Specification	Performance Criteria
<b>Enclosure Port</b>				
	Electrostatic Discharge	kV(Charge Voltage)	±8 Air Discharge ±6 Contact Discharge	B

#### 4.4. Test Procedure

Direct application of discharges to the EUT:

Contact discharge was applied only to conductive surfaces of the EUT.

Air discharges were applied only to non-conductive surfaces of the EUT.

During the test, it was performed with single discharges. For the single discharge time between successive single discharges will be keep longer 1 second. It was at least ten single discharges with positive and negative at the same selected point.

The selected point, which was performed with electrostatic discharge, was marked on the red label of the EUT.

Indirect application of discharges to the EUT:

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected point.

Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected point.

#### 4.5. Test Specification

According to EN 61000-4-2 Edition 1.2: 2001-04

#### 4.6. Uncertainty

± 6.003 %

#### 4.7. Test Result

The measurement of the electrostatic discharge was investigated and test result was shown in section 9. The EUT complies the acceptance criterion and passes the test.



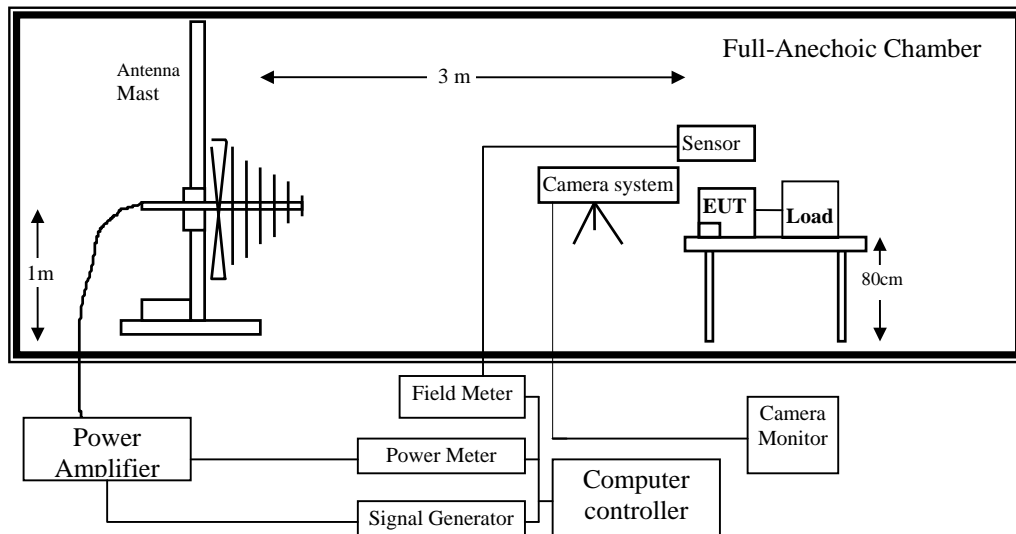
## 5. Radiated Susceptibility (RS)

### 5.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Signal Generator	R & S	SMY02 / 825454/029	Oct., 2009
2	Power Amplifier	A & R	100W10000M7 / A285000010	N/A
3	RF Power Amplifier	OPHIRRF	5022F / 1075	N/A
4	Bilog Antenna	Chase	CBL6112B / 2452	Sep., 2009
5	Power Meter	R & S	NRVD / 100219	Jan., 2010
6	Directional Coupler	A & R	DC6180 / 22735	Jan., 2010
7	No.2 EMC Fully Chamber			

Note: All equipments are calibrated every one year.

### 5.2. Test Setup



### 5.3. Test Level

Item	Environmental Phenomena	Units	Test Specification	Performance Criteria
Enclosure Port				
	Radio-Frequency	MHz	80-1000 1400-2000	A
	Electromagnetic Field	V/m(Un-modulated, rms)	3	
	Amplitude Modulated	% AM (400Hz)	80	

#### 5.4. Test Procedure

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m Level 2
2. Radiated Signal	AM 80% Modulated with 400Hz sinusoidal audio signal
3. Scanning Frequency	80MHz - 1000MHz, 1400MHz - 2000MHz
4. Dwell Time	3 Seconds
5. Frequency step size $\Delta f$ :	1%
6. The rate of Swept of Frequency	$1.5 \times 10^{-3}$ decades/s

#### 5.5. Test Specification

According to EN 61000-4-3 Edition 3.0: 2006

#### 5.6. Uncertainty

$\pm 6.17 \%$

#### 5.7. Test Result

The measurement of the radiated susceptibility was investigated and test result was shown in section 9. The EUT complies the acceptance criterion and passes the test.

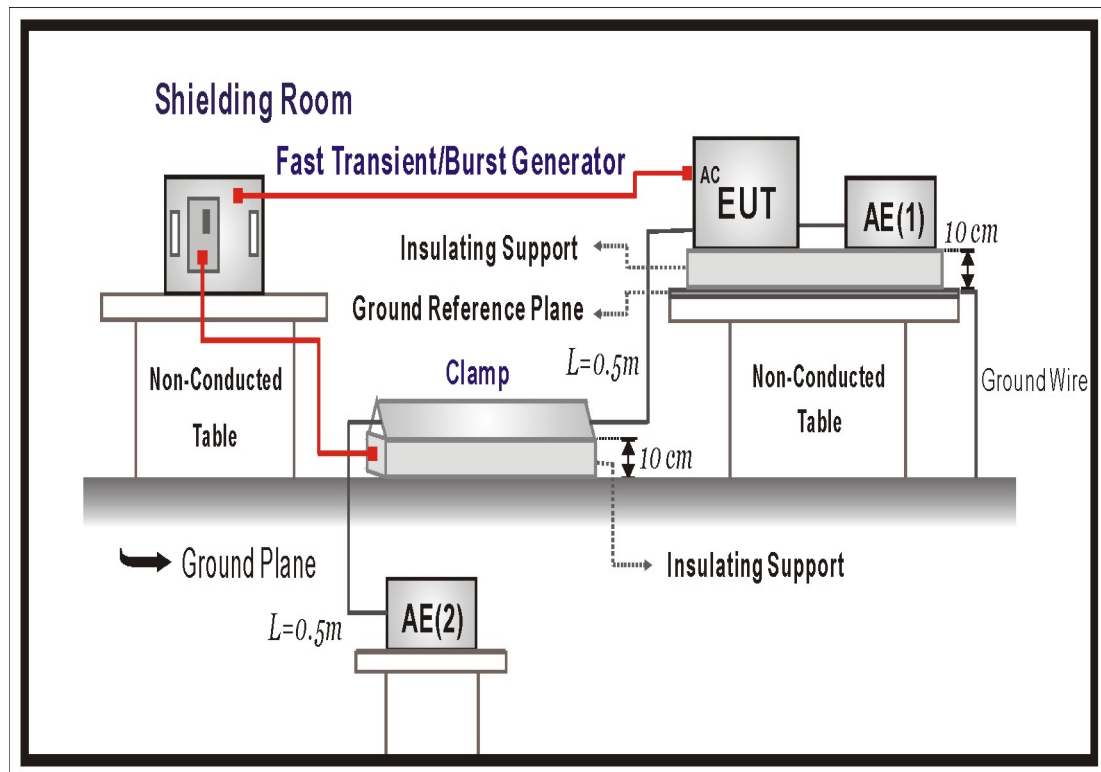
## 6. Electrical Fast Transient/Burst (EFT/B)

### 6.1. Test Equipment

Item	Instrument	Manufacturer	Type No/Serial No.	Last Calibration
1	Fast Transient/Burst Generator	SCHAFFNER	NSG 2050 S/N: 200124-031AR	June, 2009
2	No.3 Shielded Room			

Note: All equipments are calibrated every one year.

### 6.2. Test Setup



### 6.3. Test Level

Item	Environmental Phenomena	Units	Test Specification	Performance Criteria
Ports for signal lines and control lines				
	Fast Transients Common Mode	kV (Peak)	$\pm 1$	B
		Tr/Th ns	5/50	
		Rep. Frequency kHz	5	
Input DC Power Ports				
	Fast Transients Common Mode	kV (Peak)	$\pm 1$	B
		Tr/Th ns	5/50	
		Rep. Frequency kHz	5	
Input AC Power Ports				
	Fast Transients Common Mode	kV (Peak)	$\pm 2$	B
		Tr/Th ns	5/50	
		Rep. Frequency kHz	5	

### 6.4. Test Procedure

The EUT and load are placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m min. and 0.65mm thick min. And projected beyond the EUT by at least 0.1m on all sides.

For Signal Ports and Telecommunication Ports:

The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 1min.

For Input DC and AC Power Ports:

The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal.

Each of the Line and Neutral conductors is impressed with burst noise for 1 min.

The length of power cord between the coupling device and the EUT shall be 1m.

### 6.5. Test Specification

According to EN 61000-4-4: 2004

### 6.6. Uncertainty

$\pm 8.80 \%$

### 6.7. Test Result

The measurement of the Electrical Fast Transient/Burst was investigated and test result was shown in section 9. The EUT complies the acceptance criterion and passes the test.

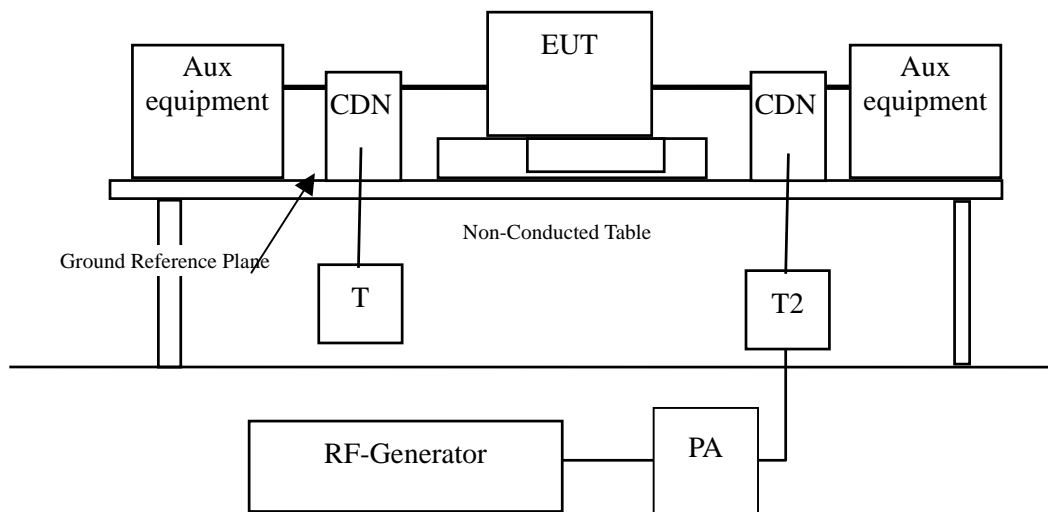
## 7. Conducted Susceptibility (CS)

### 7.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	CS SYSTEM	SCHAFFNER	NSG 2070	March, 2010
2	CDN	SCHAFFNER	CDN M016S / 20822	Dec., 2009
3	CDN	SCHAFFNER	CDN M016S / 20823	Dec., 2009
4	FIXED PAD	SCHAFFNER	INA 2070-1 / 2115	N/A
5	EM Clamp		KEMZ 801 / 21024	March, 2010
6	No.6 Shielded Room			

Note: All equipments are calibrated every one year.

### 7.2. Test Setup



### 7.3. Test Level

Item	Environmental Phenomena	Units	Test Specification	Performance Criteria
AC Input and AC Output & DC Input and DC output Power Ports & Functional Earth Ports				
	Radio-Frequency	MHz	0.15-80	A
	Common Mode.	V (rms, Unmodulated)	3	
	Amplitude Modulated	% AM (1kHz)	80	
		Source Impedance $\Omega$	150	

## 7.4. Test Procedure

The EUT are placed on a table that is 0.8 meter height, and a Ground reference plane on the table, EUT are placed upon table and use a 10cm insulation between the EUT and Ground reference plane.

For Signal Ports and Telecommunication Ports

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and Telecommunication lines of the EUT.

For Input DC and AC Power Ports

The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. And directly couples the disturbances signal into EUT.

Used CDN-M2 for two wires or CDN-M3 for three wires.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	130dBuV(3V) Level 2
2. Radiated Signal	AM 80% Modulated with 400Hz sinusoidal audio signal
3. Scanning Frequency	0.15MHz – 80MHz
4 Dwell Time	3 Seconds
5. Frequency step size $\Delta f$ :	1%
6. The rate of Swept of Frequency	$1.5 \times 10^{-3}$ decades/s

Additionally, a test shall be performed with a test level of 10V rms at the following frequencies;

Condition of Test	Remarks
1. Field Strength	140dBuV(10V) Level 2
2. Radiated Signal	AM 80% Modulated with 400Hz sinusoidal audio signal
3. Scanning Frequency	2MHz , 3MHz , 4MHz , 6.2MHz , 8.2MHz , 12.2MHz , 16.5MHz , 18.8MHz , 22MHz , 25MHz
4 Dwell Time	3 Seconds
5. Frequency step size $\Delta f$ :	1%
6. The rate of Swept of Frequency	$1.5 \times 10^{-3}$ decades/s

### **7.5. Test Specification**

According to 61000-4-6 Edition 2.2: 2006

### **7.6. Uncertainty**

$\pm 6.17 \%$

### **7.7. Test Result**

The measurement of the Conducted Susceptibility was investigated and test result was shown in section 9. The EUT complies the acceptance criterion and passes the test.

## 8. EMC Reduction Method During Compliance Testing

No modification was made during testing.



## 9. Test Result

The test results in the emission and the immunity were performed according to the requirements of measurement standard and process. Quietek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission is listed as below. All the tests were carried out with the EUT in normal operation, which was defined as:

EMI Mode	Mode 1: Normal Operation
EMS Mode	Mode 1: Normal Operation

### 9.1. Test Data of Conducted Emission

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Conducted Emission  
 Test Site : No.1 Shielded Room  
 Test Mode : Mode 1: Normal Operation

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>LINE (+)</b>					
<b>Quasi-Peak</b>					
0.070	0.404	28.020	28.424	-47.862	76.286
0.278	0.282	43.690	43.972	-9.628	53.600
0.555	0.270	35.670	35.940	-14.060	50.000
0.830	0.270	33.330	33.600	-16.400	50.000
1.385	0.270	30.170	30.440	-19.560	50.000
9.705	0.328	16.410	16.738	-33.262	50.000
<b>LINE (-)</b>					
<b>Quasi-Peak</b>					
0.065	0.524	29.890	30.414	-47.515	77.929
0.275	0.256	43.670	43.926	-9.824	53.750
0.415	0.250	35.110	35.360	-14.640	50.000
0.830	0.243	27.150	27.393	-22.607	50.000
16.900	0.603	21.920	22.523	-27.477	50.000
22.435	0.696	26.670	27.366	-22.634	50.000

Note:

1. All Reading Levels are Quasi-Peak value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

## 9.2. Test Data of Radiated Emission

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Normal Operation

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
(Loop Antenna)					
0.696	20.087	20.600	40.687	-11.073	51.760
2.849	19.970	26.700	46.670	-3.785	50.455
3.208	19.959	26.500	46.459	-3.779	50.238
3.505	19.943	23.100	43.043	-7.015	50.058
4.177	19.901	22.200	42.101	-7.549	49.650
5.482	19.838	25.400	45.238	-3.621	48.859

Note:

1. All Reading Levels are Quasi-Peak value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Normal Operation

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
137.206	11.198	18.300	29.499	-24.501	54.000
143.965	10.761	17.000	27.761	-26.239	54.000
160.614	9.975	8.600	18.574	-5.426	24.000
176.689	10.071	13.500	23.571	-30.429	54.000
239.984	12.312	22.300	34.611	-19.389	54.000
257.389	15.423	17.800	33.223	-20.777	54.000
408.691	19.524	14.000	33.524	-20.476	54.000
739.220	25.895	17.000	42.895	-11.105	54.000
<b>Vertical</b>					
140.003	11.668	16.900	28.568	-25.432	54.000
143.986	12.206	27.400	39.606	-14.394	54.000
161.557	9.688	9.100	18.787	-5.213	24.000
190.631	11.378	20.800	32.178	-21.822	54.000
239.761	12.787	28.300	41.088	-12.912	54.000
293.576	14.338	14.800	29.138	-24.862	54.000
739.214	27.691	16.700	44.391	-9.609	54.000

Note:

1. All Reading Levels are Quasi-Peak value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Normal Operation

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		

### Horizontal

#### Peak Detector:

1108.216	-6.365	43.467	37.102	-16.898	54.000
1478.958	-5.066	38.627	33.562	-20.438	54.000
1601.202	-4.997	41.953	36.956	-17.044	54.000

#### Average Detector

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### Vertical

1108.216	-6.365	40.474	34.109	-19.891	54.000
1621.242	-4.959	43.110	38.151	-15.849	54.000
1641.283	-4.913	43.323	38.410	-15.590	54.000

#### Average Detector

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#### Note:

1. All Reading Levels are Peak value.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 9.3. Test Data of Electrostatic Discharge

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Electrostatic Discharge  
 Test Site : No.3 Shielded Room  
 Test Mode : Mode 1: Normal Operation

Item	Amount of Discharge	Voltage	Required Criteria	Complied To Criteria (A, B, C)	Results
Air Discharge	10	+2kV, +4kV, +8kV	B	A	Pass
	10	-2kV, -4kV, -8kV	B	A	Pass
Contact Discharge	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass
Indirect Discharge (HCP)	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass
Indirect Discharge (VCP Front)	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass
Indirect Discharge (VCP Left)	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass
Indirect Discharge (VCP Back)	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass
Indirect Discharge (VCP Right)	25	+2kV,+4kV, +6kV	B	A	Pass
	25	-2kV,-4kV, -6kV	B	A	Pass

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

NR: No Requirement

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
  - EUT stopped operation and could / could not be reset by operator at \_\_\_\_ kV.
  - No false alarms or other malfunctions were observed during or after the test.

#### 9.4. Test Data of Radiated Susceptibility

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Radiated Susceptibility  
 Test Site : No.2 EMC fully Chamber  
 Test Mode : Mode 1: Normal Operation (Transmit)

Frequency (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Required Criteria	Complied To Criteria (A, B, C)	Results
80-1000	Front	H	10	A	A	Pass
80-1000	Front	V	10	A	A	Pass
80-1000	Back	H	10	A	A	Pass
80-1000	Back	V	10	A	A	Pass
80-1000	Left	H	10	A	A	Pass
80-1000	Left	V	10	A	A	Pass
80-1000	Right	H	10	A	A	Pass
80-1000	Right	V	10	A	A	Pass
80-1000	Top	H	10	A	A	Pass
80-1000	Top	V	10	A	A	Pass
80-1000	Down	H	10	A	A	Pass
80-1000	Down	V	10	A	A	Pass
1000-2000	Front	H	10	A	A	Pass
1000-2000	Front	V	10	A	A	Pass
1000-2000	Back	H	10	A	A	Pass
1000-2000	Back	V	10	A	A	Pass
1000-2000	Left	H	10	A	A	Pass
1000-2000	Left	V	10	A	A	Pass
1000-2000	Right	H	10	A	A	Pass
1000-2000	Right	V	10	A	A	Pass
1000-2000	Top	H	10	A	A	Pass
1000-2000	Top	V	10	A	A	Pass
1000-2000	Down	H	10	A	A	Pass
1000-2000	Down	V	10	A	A	Pass

Note:

- The exclusion band=center frequency $\pm$ 50kHz for Transmitter.

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
  - There was no observable degradation in performance.
  - EUT stopped operation and could / could not be reset by operator at \_\_\_\_\_ V/m at frequency \_\_\_\_\_MHz.
  - No false alarms or other malfunctions were observed during or after the test.

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Radiated Susceptibility  
 Test Site : No.2 EMC fully Chamber  
 Test Mode : Mode 1: Normal Operation (Receive)

Frequency (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Required Criteria	Complied To Criteria (A, B, C)	Results
80-1000	Front	H	10	A	A	Pass
80-1000	Front	V	10	A	A	Pass
80-1000	Back	H	10	A	A	Pass
80-1000	Back	V	10	A	A	Pass
80-1000	Left	H	10	A	A	Pass
80-1000	Left	V	10	A	A	Pass
80-1000	Right	H	10	A	A	Pass
80-1000	Right	V	10	A	A	Pass
80-1000	Top	H	10	A	A	Pass
80-1000	Top	V	10	A	A	Pass
80-1000	Down	H	10	A	A	Pass
80-1000	Down	V	10	A	A	Pass
1000-2000	Front	H	10	A	A	Pass
1000-2000	Front	V	10	A	A	Pass
1000-2000	Back	H	10	A	A	Pass
1000-2000	Back	V	10	A	A	Pass
1000-2000	Left	H	10	A	A	Pass
1000-2000	Left	V	10	A	A	Pass
1000-2000	Right	H	10	A	A	Pass
1000-2000	Right	V	10	A	A	Pass
1000-2000	Top	H	10	A	A	Pass
1000-2000	Top	V	10	A	A	Pass
1000-2000	Down	H	10	A	A	Pass
1000-2000	Down	V	10	A	A	Pass

Note:

- The exclusion band=center frequency $\pm$ 50kHz for Transmitter.
- The level of wanted RF signal for EUT in RF input port is 40 dBuV (emf) during the test.

- Meet criteria A: Operate as intended during and after the test  
 Meet criteria B: Operate as intended after the test  
 Meet criteria C: Loss/Error of function  
 Additional Information  
 There was no observable degradation in performance.  
 EUT stopped operation and could / could not be reset by operator at \_\_\_\_\_ V/m at frequency \_\_\_\_\_MHz.  
 No false alarms or other malfunctions were observed during or after the test.



### 9.5. Test Data of Electrical Fast Transient

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Electrical Fast Transient  
 Test Site : No.3 Shielded Room  
 Test Mode : Mode 1: Normal Operation

Inject Line	Polarity	Voltage (kV)	Inject Time (Minute)	Inject Method	Required Criteria	Complied to Criteria	Result
DCIN	±	2kV	3	Direct	B	A	PASS
GPS Antenna	±	1kV	3	Clamp	B	A	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

- Meet criteria A : Operate as intended during and after the test
- Meet criteria B : Operate as intended after the test
- Meet criteria C : Loss/Error of function
- Additional Information
  - EUT stopped operation and could / could not be reset by operator at \_\_\_\_\_ kV of Line \_\_\_\_\_.
- No false alarms or other malfunctions were observed during or after the test.

## 9.6. Test Data of Conducted Susceptibility

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Conducted Susceptibility  
 Test Site : No.2 EMC fully Chamber  
 Test Mode : Mode 1: Normal Operation (Transmit)

Frequency Range (MHz)	Voltage Applied (dBuV(V))	Inject Method	Tested Port of EUT	Required Criteria	Performance Criteria Complied To	Result
0.15~80	130(3V)	CDN	DC IN	A	A	PASS
2	140(10V)	CDN	DC IN	A	A	PASS
3	140(10V)	CDN	DC IN	A	A	PASS
4	140(10V)	CDN	DC IN	A	A	PASS
6.2	140(10V)	CDN	DC IN	A	A	PASS
8.2	140(10V)	CDN	DC IN	A	A	PASS
12.6	140(10V)	CDN	DC IN	A	A	PASS
16.3	140(10V)	CDN	DC IN	A	A	PASS
18.8	140(10V)	CDN	DC IN	A	A	PASS
22	140(10V)	CDN	DC IN	A	A	PASS
25	140(10V)	CDN	DC IN	A	A	PASS
0.15~80	130(3V)	Clamp	ANT IN	A	A	PASS
2	140(10V)	Clamp	ANT IN	A	A	PASS
3	140(10V)	Clamp	ANT IN	A	A	PASS
4	140(10V)	Clamp	ANT IN	A	A	PASS
6.2	140(10V)	Clamp	ANT IN	A	A	PASS
8.2	140(10V)	Clamp	ANT IN	A	A	PASS
12.6	140(10V)	Clamp	ANT IN	A	A	PASS
16.3	140(10V)	Clamp	ANT IN	A	A	PASS
18.8	140(10V)	Clamp	ANT IN	A	A	PASS
22	140(10V)	Clamp	ANT IN	A	A	PASS
25	140(10V)	Clamp	ANT IN	A	A	PASS

Note:

The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
  - EUT stopped operation and could / could not be reset by operator at \_\_\_\_\_ kV of Line \_\_\_\_\_.
  - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Product : CAMINO-101 Class B AIS Transponder  
 Test Item : Conducted Susceptibility  
 Test Site : No.2 EMC fully Chamber  
 Test Mode : Mode 1: Normal Operation (Receive)

Frequency Range (MHz)	Voltage Applied (dBuV(V))	Inject Method	Tested Port of EUT	Required Criteria	Performance Criteria Complied To	Result
0.15~80	130(3V)	CDN	DC IN	A	A	PASS
2	140(10V)	CDN	DC IN	A	A	PASS
3	140(10V)	CDN	DC IN	A	A	PASS
4	140(10V)	CDN	DC IN	A	A	PASS
6.2	140(10V)	CDN	DC IN	A	A	PASS
8.2	140(10V)	CDN	DC IN	A	A	PASS
12.6	140(10V)	CDN	DC IN	A	A	PASS
16.3	140(10V)	CDN	DC IN	A	A	PASS
18.8	140(10V)	CDN	DC IN	A	A	PASS
22	140(10V)	CDN	DC IN	A	A	PASS
25	140(10V)	CDN	DC IN	A	A	PASS
0.15~80	130(3V)	Clamp	ANT IN	A	A	PASS
2	140(10V)	Clamp	ANT IN	A	A	PASS
3	140(10V)	Clamp	ANT IN	A	A	PASS
4	140(10V)	Clamp	ANT IN	A	A	PASS
6.2	140(10V)	Clamp	ANT IN	A	A	PASS
8.2	140(10V)	Clamp	ANT IN	A	A	PASS
12.6	140(10V)	Clamp	ANT IN	A	A	PASS
16.3	140(10V)	Clamp	ANT IN	A	A	PASS
18.8	140(10V)	Clamp	ANT IN	A	A	PASS
22	140(10V)	Clamp	ANT IN	A	A	PASS
25	140(10V)	Clamp	ANT IN	A	A	PASS

Note:

- The testing performed is from lowest level up to the highest level as required by standard, but only highest level is shown on the report.
- The level of wanted RF signal for EUT in RF input port is 40 dBuV (emf) during the test.**
  - Meet criteria A: Operate as intended during and after the test
  - Meet criteria B: Operate as intended after the test
  - Meet criteria C: Loss/Error of function
  - Additional Information
    - EUT stopped operation and could / could not be reset by operator at \_\_\_\_\_ kV of Line \_\_\_\_\_.
    - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

## **Attachment 1: EUT Test Photographs**

**Attachment 1: EUT Test Setup Photographs**

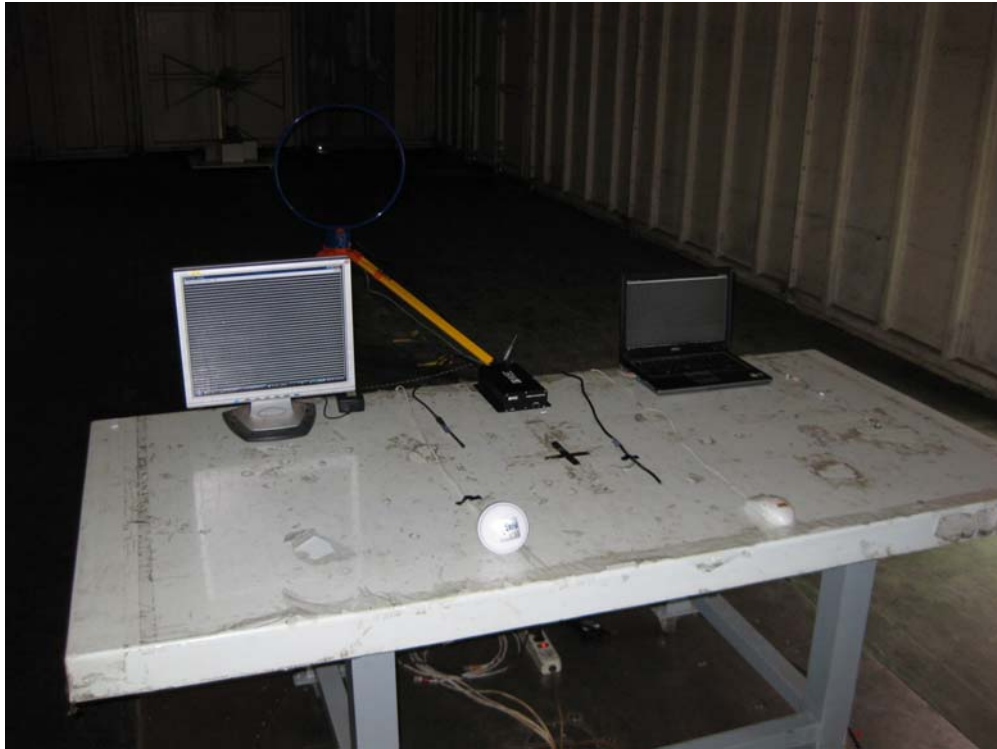
Front View of Conducted Test



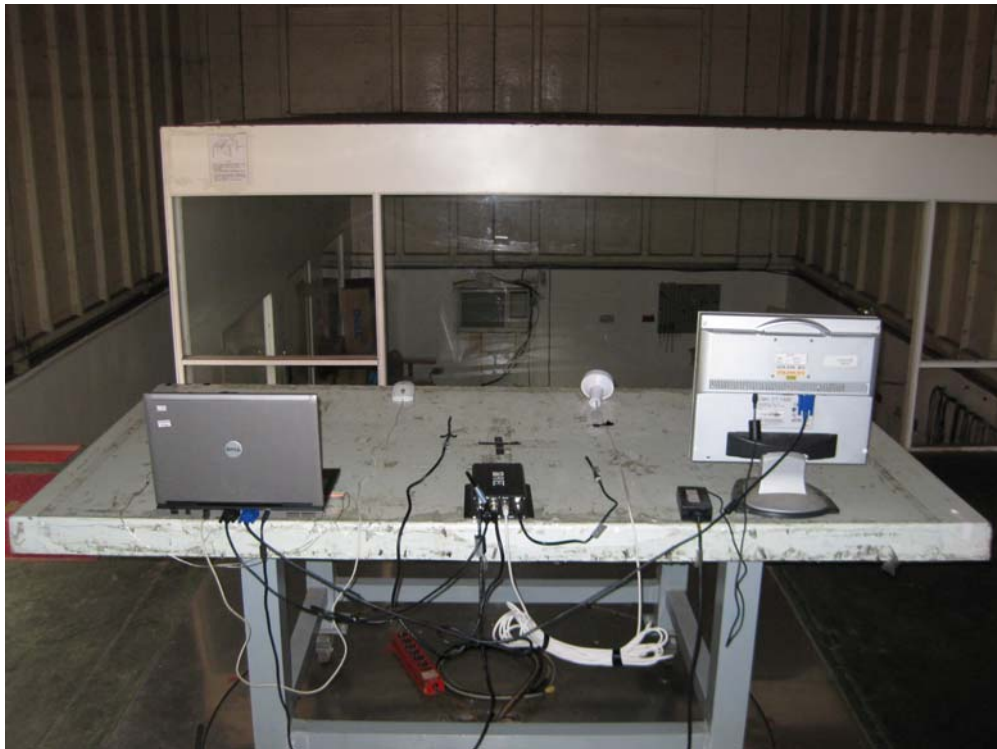
Back View of Conducted Test



Front View of Radiated Test (Loop)



Back View of Radiated Test (Loop)

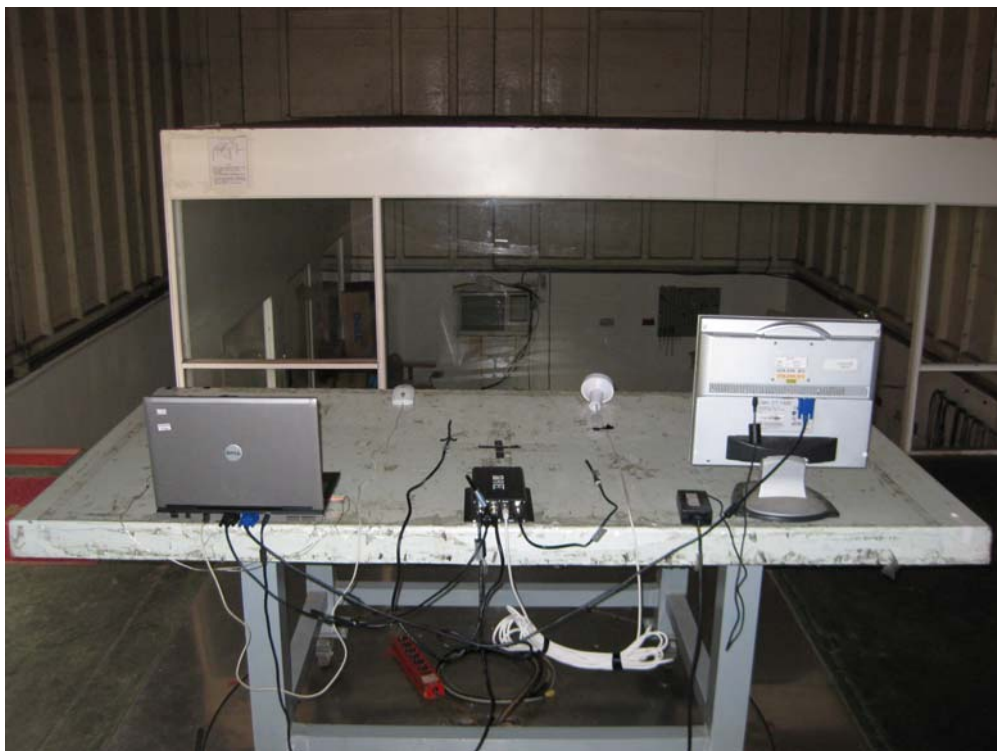




Front View of Radiated Test (Bilog)



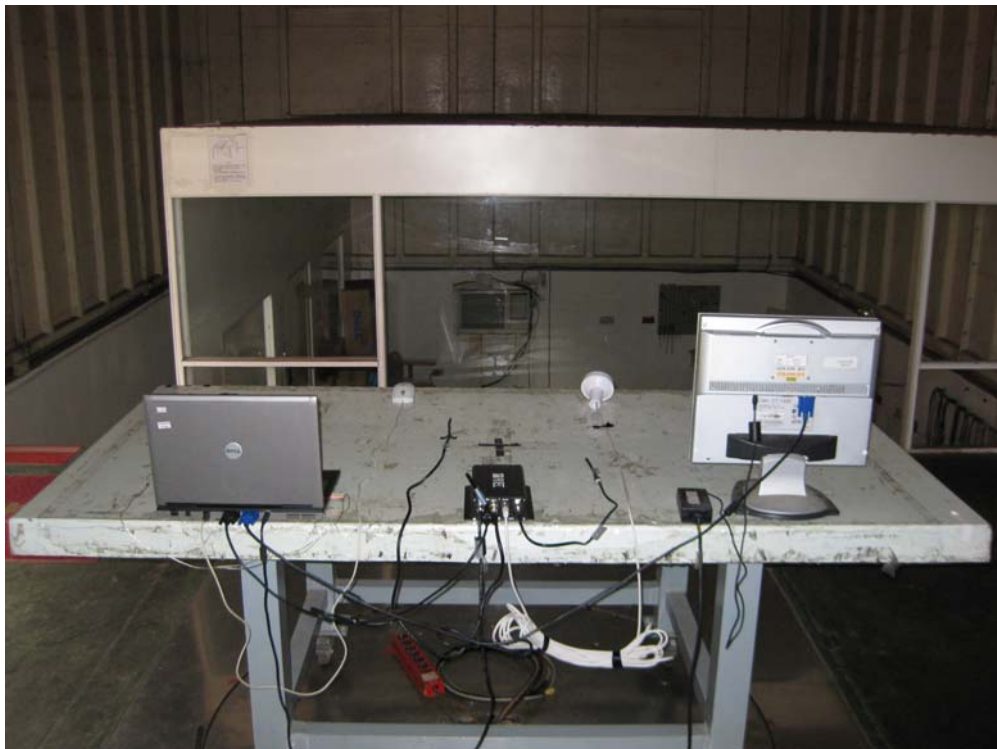
Back View of Radiated Test (Bilog)



Front View of Radiated Test (Horn)



Back View of Radiated Test (Horn)





ESD Test Setup



Radiated Susceptibility Test Setup



EFT/B Test Setup



EFT/B Test Setup-Clamp



Conducted Susceptibility Test Setup



Conducted Susceptibility Test Setup-Clamp



## **Attachment 2: EUT Detailed Photographs**