EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011 EMC MEASUREMENT AND TEST REPORT FOR

Teknatool International Limited

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	MOD	DEL:		
DVR16XX、	DVR18XX、	DVR20XX、	DVR22XX	

This Report Concerns: Original Report	Equipment Type: DVR Headstock
Test Engineer	Alessorm
Test Date:	Apr 5, 2016
Reviewed By	Alessorom
Approved By	Je me broken
Prepared By	Teknatool International Limited

Apr 5, 2016

Photos of the sample









I - DESCRIPTION

I.1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The Teknatool International Limited Model: DVR 1644(DVR GALAXI) or the "EUT" as referred to in this report is a **DVR Headstock.** The difference table of the DVR 1644(DVR GALAXI) (Tested model) and In addition models of DVR16XX、DVR18XX、DVR20XX、DVR22XX for power and size only.

Note: The test data is only valid for the test sample. There is possible deviation from the original test data for other products.

1.2 Objective

The following declaration of conformity report of **DVR Headstock** is prepared on behalf of Teknatool International Limited in accordance with EN 61000-6-4:2007+A1:2011 specification for emission requirements applies to electrical and electronic apparatus intended for use in the industrial environment.

The objective of the manufacturer is to demonstrate compliance with EN 61000-6-4:2007+A1:2011 specification for emission requirements applies to electrical and electronic apparatus intended for use in the industrial environment and EN 61000-6-2: 2005 generic standards-immunity for Industrial environments.

1.5 Equipment Onder	Test (LOT) List and Details
Manufacturer:	Laizhou Planet Machinery Co. Ltd
Description:	DVR Headstock
Model:	DVR 1644(DVR GALAXI)
Serial Number:	N/A

1.3 Equipment Under Test (EUT) List and Details

1.4 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	Approved
N/A	N/A	N/A	N/A	N/A

1.5 Interference Ports and List and Details

Cable Description	Length (m)	From	То
AC Power Supply	N/A	AC Power	EUT

I. 2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user) The EUT was tested in the normal operating mode to represent the worst case results during the final qualification test

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use

2.3 Special Accessories

N/A

2.4 Schematics/Block Diagram

See MD & LVD TCF

2.5 Equipment Modifications

No modifications to the EUT were necessary to comply with the applicable limits

II - EMISSION TEST DATA AND RESULTS

II. 1 - GENERAL INFORMATION

1.1 Objective

Currently, EN 61000-6-4:2007+A1:2011 specification for emission requirements applies to electrical and electronic apparatus intended for use in the industrial environment. Due to the standard applicability of the EUT, the four (4) tests were as follows:

- Radiated electromagnetic disturbance test in accordance with EN 61000-6-4:2007+A1:2011
- 2. Disturbance voltage test in accordance with EN 61000-6-4:2007+A1:2011
- 3. Harmonic current test in accordance with EN 61000-3-2: 2006+A2:2009
- 4. Voltage fluctuations and flicker test in accordance with EN 61000-3-3: 2008

In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards. Maintenance of compliance is the responsibility of the manufacturer.

Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different Video Phone, harnessing and/or I/O cable changes, etc.)

1.2 Test Methodology

All measurements contained in this report were conducted with CISPR 16 and CISPR 11 specification for radio disturbance and immunity apparatus and methods and electronic equipment in the range of 9 kHz to 40 GHz, specification for emission requirements applies to electrical and electronic apparatus intended for use in the industrial environment. All radiated and conducted emissions measurement was performed. The radiated testing was performed at an antenna-to-EUT distance of 3 Meters. And the EUT was placed on the 80cm non-metallic circle table.

II. 2 - RADIATED ELECTROMAGNETIC DISTURBANCE TEST

2.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are EMI receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability

2.2 EUT Setup

The radiated electromagnetic disturbance tests were performed in the 3 meters anechoic Chamber, using the setup accordance with the CISPR16. The specification used was the EN 61000-6-4:2007+A1:2011 limits

The spacing between the peripherals was 10 cm

The external I/O cables were draped along the test table and bundled, when necessary

2.3 EMI Receiver Setup

According to EN 61000-6-4:2007+A1:2011 rules, measurements are made with a QP measuring receiver in the frequency range 30M to 1000M

During the radiated electromagnetic disturbance test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
Video Bandwidth	120 kHz

2.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	
R/S	EMI Receiver	ESCS30	13-01-06-0001	
SCHAFFNER	Antenna	GBL6112B	/	

2.5 Test Procedure

During the radiated electromagnetic disturbance test, the power cords of the PC was connected the switch power supply

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within 1.4 dB V of specified limitations), and are distinguished with a "**Qp**" in the data table

The EUT was in the normal (native) operating mode during the final qualification test to represent the worst case results.

2.6 Corrected Amplitude & Margin Calculation

The corrected amplitude is calculated by adding the antenna factor and cable factor. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB V means the emission is 7dB V below the maximum limit for EN 61000-6-4:2007+A1:2011. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - EN 61000-6-4:2007+A1:2011 Limit

2.7 Summary of Test Results

According to the data in section 2.8, the EUT complied with the EN 61000-6-4:2007+A1:2011 standards had the worst margin of:

Model: DVR 1644(DVR GALAXI)

-4.20 dB at 53.500000 MHz in the Vertical polarization for normal operating mode, 30 to1000MHz

2.8 Radiated Emissions Test Data of Model : DVR 1644(DVR GALAXI)

Final test data for normal operating mode, 30 to 1000 MHz, 10 meters

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation H/V
53.511000	45.83	8.82	50.00	-4.20	144.00	110.00	VERTICAL
44.197100	48.21	11.10	50.00	-1.80	100.00	89.00	VERTICAL
107.947200	35.81	13.50	50.00	-14.00	100.00	247.00	VERTICAL
138.680600	31.55	13.80	50.00	-18.60	114.00	264.00	VERTICAL

2.9 The Curve of Radiated Emissions Test



II. 3 - DISTURBANCE VOLTAGE TEST

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, and Artificial Mains Network (AMN)

The best estimate of the uncertainty of any conducted emissions measurement deviate +1.4 dB

3.2 EUT Setup

The measurement was performed at the shielded room. Using the same setup per EN 61000-6-4:2007+A1:2011 measurement procedures

A 220 VAC/50Hz power source was connected to the EUT



3.3 EMI Receiver Setup

During the disturbance voltage test, the EMI receiver was set with the following configurations:

Start Frequency	0.15 MHz
Stop Frequency	30 MHz
Sweep Speed	Auto
Video Bandwidth	120 kHz

3.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number
R/S	EMI Receiver	ESCS30	13-01-06-0001
R/S	AMN	ESH2-Z5	17-72-01-0001
R/S	AMN	ESH3-Z5	17-72-02-0001

3.5 Test Procedure

During the disturbance voltage test, the EUT power cord was connected to the auxiliary outlet of the AMN and all other support equipment power cords connected to the auxiliary outlet of another AMN

Maximizing procedure was also performed on the highest emissions to ensure EUT compliance using all installation combination

The peak readings are collected, the test house and similar was accepted when all disturbance data lower than limits of Average, "QP" and "AVE" reading will be adopted in reverse, All data were recorded in the Quasi-peak and Average readings

The EUT was tested in the operating mode during the final test to represent the worst case results. Therefore, this configuration was used for final test data recorded in the table listed in section 3.7.1

3.6 Summary of Test Results

According to the data in section 3.7.1, the EUT complied with the EN 61000-6-4:2007+A1:2011

disturbance voltage test (at main terminal) margin, with the worst margin reading of: **Model:** DVR 1644(DVR GALAXI)

-3.5 dB at 8.506500 MHz in the Neutral at "QP" mode with the power of 220V AC/50Hz

3.7 Terminal Disturbance Voltage Test Data of Model : DVR 1644(DVR GALAXI)

3.7.1 Test Data for Normal Mode with the power of 220V AC/50Hz, 0.15 - 30 MHz

TERMINAL DISTURBANCE VOLTAGE TEST DATA			EN 61000-6	-4: 2007	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHZ	dBmV	QP/Ave/Peak	Line/Neutral	dBmV	dB
8.516500	56.10	QP	Neutral	60.00	-3.50
0.236000	55.30	QP	Neutral	66.00	-10.40
0.584130	48.20	QP	Neutral	60.00	-11.40
10.871520	47.70	QP	Neutral	60.00	-12.00
9.952500	60.70	QP	Line	73.00	-12.30
0.181500	61.20	QP	Line	79.00	-17.70
0.231500	61.30	QP	Line	79.00	-17.80
0.487500	58.10	QP	Line	79.00	-20.90

3.7.2 The Curve of Disturbance Voltage Test (at the main terminals)

At Line Curve



At Neutral Curve



II. 4 - HARMONIC CURRENT TEST (EN 61000-3-2: 2006+A2:2009)

4.1 Application of Harmonic Current Emission

Compliance to these standards ensures that tested equipment will not generate harmonic currents at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems Audio amplifier which draws a supply current which varies by less than 15% of the maximum current which input signals between no signal and rated source shall be tested with no input signal

4.2 Measurement Data

Model:	DVR 1644(DVR GALAXI)	
Fundamental Voltage:	220V	
Amperes:	28.7A rms	
Frequency:	50HZ	

Note: For detailed test data, refer to the following pages:

Harmonics - Class - A per Ed. 2.2 (2004-11) (Run time) incl. inter-harmonics
EUT: Testedby:EUT:Testedby:Test category: Class-A per Ed. 2.2 (2004-11) (European limits)Test Margin: 100Test date: Apr 5, 2016Start time: 17:34:11End time: 17:37:15Test duration (min): 3Data file name: DVR 1644(DVR GALAXI).cts_dataComment: CommentContament

Customer: Customer information



Test result: Pass Worst harmonic was #15 with 34,44% of the limit

Current Test Result Summary (Run time)

EUT:				Testedby:
Test category:	Class-A per Ed. 2.2	2 (2004-11) (Europe	ean limits)	Test Margin: 100
Test date: Apr	5, 2016	Start time: 17:34:1	1	End time: 17:37:15
Test duration (min): 3	Data file name:	DVR 1644([OVR GALAXI).cts_data
Comment: Cor	nment			
Customer: Cus	tomer information	1		
Test Result: Pa	ss Source qualifica	tion: Normal		
THC(A): 0.37	I-THD(%): 70.72	POHC(A): 0.032	POHC Lir	nit(A): 0.251
Highest param	eter values during	test:		
	V_RMS (Vo	lts): 219.90 Fr	equency (Hz): 50.00
	I_Peak (Am	ps): 0.705 I_	_RMS (Amps	s): 1.000
	I_Fund (Am	ps): 0.722	Crest Facto	or: 0.821

More Details See the T ollowingPages:

Harm#	Harms(avg) 1	00% Limit	%of Limit H	arms(max) 15	0% Limit	%of Limit	Status
2	0.030	1.080	2.71	0.083	1.620	5.12	Pass
3	0.162	2.310	7.10	0.162	3.460	4.70	Pass
4	0.027	0.430	6.70	0.080	0.644	12.33	Pass
5	0.167	1.147	14.60	0.170	1.720	9.86	Pass
6	0.026	0.300	9.10	0.073	0.450	16.18	Pass
7	0.154	0.760	19.80	0.156	1.155	13.40	Pass
8	0.025	0.230	11.10	0.065	0.345	18.75	Pass
9	0.136	0.400	34.00	0.138	0.600	23.00	Pass
10	0.023	0.184	12.70	0.058	0.276	20.94	Pass
11	0.116	0.330	35.20	0.119	0.495	23.95	Pass
12	0.021	0.153	13.50	0.051	0.230	22.28	Pass
13	0.095	0.210	45.60	0.097	0.314	31.12	Pass
14	0.018	0.130	13.50	0.046	0.197	23.24	Pass
15	0.075	0.150	50.10	0.078	0.225	34.44	Pass
16	0.015	0.115	12.80	0.040	0.173	23.39	Pass
17	0.055	0.132	42.00	0.058	0.199	29.03	Pass
18	0.012	0.102	11.70	0.035	0.153	22.70	Pass
19	0.038	0.118	31.90	0.040	0.178	22.46	Pass
20	0.009	0.092	10.30	0.029	0.138	20.88	Pass
21	0.023	0.107	21.40	0.025	0.161	15.50	Pass
22	0.007	0.084	8.90	0.023	0.125	18.22	Pass
23	0.011	0.098	11.40	0.013	0.147	9.07	Pass
24	0.006	0.077	7.90	0.017	0.115	14.97	Pass
25	0.004	0.090	4.80	0.007	0.135	5.18	Pass
26	0.005	0.071	7.30	0.013	0.106	11.97	Pass
27	0.006	0.083	7.20	0.010	0.125	7.60	Pass
28	0.005	0.066	7.00	0.011	0.099	10.70	Pass
29	0.009	0.078	11.20	0.011	0.116	9.91	Pass
30	0.004	0.061	6.90	0.010	0.092	11.36	Pass
31	0.009	0.073	13.10	0.011	0.109	10.54	Pass
32	0.004	0.058	6.70	0.010	0.086	11.55	Pass
33	0.009	0.068	12.80	0.010	0.102	9.99	Pass
34	0.003	0.054	6.20	0.009	0.081	11.06	Pass
35	0.007	0.064	10.80	0.008	0.096	8.24	Pass
36	0.003	0.051	5.90	0.008	0.077	9.88	Pass
37	0.005	0.061	7.90	0.006	0.091	6.17	Pass
38	0.003	0.048	5.20	0.006	0.073	8.36	Pass
39	0.003	0.058	4.50	0.004	0.087	4.11	Pass
40	0.002	0.046	4.60	0.005	0.069	7.13	Pass

Voltage Source Verification Data (Run time)

EUT:				Testedby:			
Test category: Cla	ass-A per Ed. 2.2	2 (2004-11) (European limits)	Test Margin: 100			
Test date: Apr 5, 2	2016	Start time: 1	L7:34:11	End time: 17:37:15			
Test duration (mi	n): 3	Data file r	name: DVR 1644(E	OVR GALAXI).cts_data			
Comment: Comm	nent						
Customer: Custor	mer information)					
Test Result: Pass		Sourc	Source qualification: Normal				
Highest paramete	er values during	test:					
	V_RMS (Volts)	: 219.90	Frequency	(Hz): 50.00			
	I_Peak (Amps)	: 0.705	I_RMS (An	nps): 1.000			
	I_Fund (Amps)	: 0.723	Crest Fa	ctor: 0.821			

More Details See the followingPages:

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.257	0.460	56.06	OK
3	0.445	2.060	21.46	OK
4	0.448	0.460	97.50	OK
5	0.106	0.920	11.60	OK
6	0.173	0.470	37.61	OK
7	0.112	0.690	16.19	OK
8	0.270	0.460	58.72	OK
9	0.119	0.460	25.92	OK
10	0.209	0.460	45.37	OK
11	0.092	0.230	39.65	OK
12	0.155	0.230	67.32	OK
13	0.097	0.230	42.17	OK
14	0.066	0.230	28.86	OK
15	0.068	0.230	29.67	OK
16	0.087	0.230	38.41	OK
17	0.068	0.230	30.03	OK
18	0.085	0.230	37.04	OK
19	0.048	0.230	21.10	OK
20	0.077	0.230	33.51	OK
21	0.043	0.230	18.26	OK
22	0.046	0.230	20.02	OK
23	0.019	0.230	8.47	OK
24	0.037	0.230	16.29	OK
25	0.019	0.230	8.09	OK
26	0.051	0.230	22.22	OK
27	0.016	0.230	6.85	OK
28	0.040	0.230	17.23	OK
29	0.025	0.230	11.04	OK
30	0.038	0.230	16.38	OK
31	0.024	0.230	10.26	OK
32	0.026	0.230	11.51	OK
33	0.018	0.230	7.75	OK
34	0.027	0.230	11.70	OK
35	0.050	0.230	21.91	OK
36	0.057	0.230	24.92	OK
37	0.058	0.230	25.15	OK
38	0.022	0.230	9.50	OK
39	0.011	0.230	4.72	OK
40	0.026	0.230	11.30	OK

II. 5 - VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3: 2008)

5.1 Application of Voltage Fluctuations and Flicker Test

Compliance to these standards ensures that tested equipment will not generate flickers and voltage change at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems Audio

amplifier which draws a supply current which varies by less than 15% of the maximum current which input signals between no signal and rated source shall be tested with no input signal

5.2 Measurement Data

Model:	DVR 1644(DVR GALAXI)
Fundamental Voltage:	220V
Amperes:	28.7A rms
Frequency:	50HZ

Note: For detailed test data, refer to the following pages:

Flicker Test Summary per EN /IEC61000-3-3 (Run time)EUT:Testedby:Test category: Class-A per Ed. 2.2 (2004-11) (European limits)Test Margin: 100Test date: Apr 5, 2016Start time: 17:34:11End time: 17:37:15Test duration (min): 3Data file name: DVR 1644(DVR GALAXI).cts_dataComment: CommentCustomer: Customer informationTest Result: Pass

Status: Test Completed European Limits





QH-40006880

Highest dt (%):	0.26	Test limit (%):	3.20	Pass
Time (mS) > dt:	0.00	Test limit (mS):	500.00	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.15	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.150	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.070	Test limit:	0.640	Pass

Parameter values recorded during the test: Vrms at the end of test (Volt): 219.65

III - IMMUNITY TEST DATA AND RESULTS

III.1 - GENERAL INFORMATION

1.1 Objective

Currently, EN 61000-6-2: 2005 generic standards-immunity for Industrial environments. Due to the standard applicability of the EUT, the six (6) tests as following:

1. Electrostatic discharge immunity (ESD) in accordance with EN 61000-4-2

2.Radiated electromagnetic field immunity in accordance with EN 61000-4-3

3. Electrical fast transient t/burst immunity in accordance with EN 61000-4-4

4.Surge immunity in accordance with EN 61000-4-5

5.Radio-frequency continuous conducted immunity in accordance with EN 61000-4-6

6.Voltage dips/interruptions immunity test in accordance with EN 61000-4-11

Data has been collected, reduced, and analyzed within this report in accordance with CISPR 14;Immunity requires the following as specific performance criteria

A. The apparatusshall continue to operate as intended during and after the test. The manufacturerspecifiessome minimum performancelevel. The performancelevel may be specified by the manufactureras a permissibleloss of performance

B. The apparatusshall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performancelevels during the test, but must recover. Again some minimal performance defined by the manufacture. No change in operating state or loss or data is permitted

C. Temporaryloss of function is allowed. Operationof the EUT may stop as long as it is eitherautomaticallyreset or can be manually restored by operationof the controls In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment t complies with the appropriate technical standards Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been

maintained (i.e., printed circuit board layout changes, different battery, harnessing and/or I/O cable changes, etc.)

1.2 Test Methodology

All measurements contained in this report were conducted with EN 61000-6-2:2005 generic standards-immunity for Industrial environments, electric tools and similar apparatus Immunity Standard. All measurements were performed by Teknatool International Limited

III. 2 - MEASUREMENT INSTRUMENTATION

2.1 Electrostatic Discharge Test System

A schaffner NSG 435 ESD tester is used for testing. It is capable of applying electrostatic Discharges in both contact discharge modes to 8 kV and air discharge modes to 15 kV in both positive and negative polarities. This is in accordance with EN 61000-4-2 EMC standard

2.1.1 Electrostatic Discharge Test System Measurements Uncertainty

The measurements uncertainty with a 95 % confidences factor has determined that the applied voltage has a maximum variance of +/- 5% of stated applied value

2.2 Electromagnetic Field Test System

HP 8648C signal generators and an Amplifier Research 50W1000A power amplifier with an Amplifier Research V-2980 directional coupler are used to provide a signal at the appropriate power and frequency to an EMCO 3142 biocenology antenna to obtain the required electromagnetic field at the position of the EUT in accordance with the EN 61000-4-3 basic EMC publication. The field was monitored by both Amplifier Research field probe and field monitor, model, FP2000 and FM2000, respectively according the EN 61000-4-3 standards

2.2.1 Electromagnetic Field Test System Measurements Uncertainty

The measurements uncertainty with a 95 % confidences factor has determined that the applied field has an expanded uncertainty value of 1.97. This yields an uncertainty of 0.15V (rms) into applied filed levels

2.3 Electrical Fast Transient/Burst Test System

A schaffner UCS 500M tester is used for all testing. It is capable of applying fast transients to the AC line at any phase angle with respect to the AC line voltage wave form and to attached cables via a capacitive coupling clamp in accordance with the EN 61000-4-4 basic EMC publication

2.3.1 Electrical Fast Transient/Burst Test System Measurement Uncertainty

The measurement uncertainty with a 95 % confidence factor has determined that the applied field has an expanded uncertainty value of 1.97

2.4 Surge Immunity Test

An EM Test UCS 500-M Immunity test system is used for all testing. Both positive and negative polarities of voltage up to 2kV were applied to the AC input lines. The coupling network defined in the standard was used

2.4.1 Surge Immunity Test Measurements t Uncertainty

The measurements uncertainty with a 95 % confidence factor has determined that the applied surge is within5% of stated value

2.5 Radio-Frequency Continuous Conducted Test Measurements Uncertainty

A PVM power amplifier 6000 and a PVM signal generators 3000 are used for the testing. The EUT was subjected to 3 V rms, AM modulated (1 kHz sine wave at 80% depth), conducted signals from 0.15 MHz to 80 MHz, CDN coupling and de-coupling networks were utilized to inject the signal onto the power line using the 6.2.2 method. The clamp injection method of 6.2.3 was used to inject the signal onto the I/O lines

2.5.1 Radio-Frequency Continuous Conducted Test Measurements Uncertainty

The measurements t uncertainty with a 95 % confidences factor has determined that the applied voltage level is within 0.25 V of stated value

2.6 Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

An EM Test UCS 500-M Immunity test system is used for all testing. The test level was as described in EN 61000-4-11, section 5, titled "Test Levels"

2.6.1 Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests,

Measurements t Uncertainty The measurements t uncertainty with a 95 % confidences factor has determined that the applied voltage level is within 0.25 V of stated value

2.7 Equipments t Test Table

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipments t shall be placed on an insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground references plane in conformance with this requirement

For tabletop equipments, a 1.6 by 0.8 meter metal sheet Horizontal Coupling Plane (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohm resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5 millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used

EN 61000-4-4 specify that a tabletop EUT be placed on a non-conducting table 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on an insulating support approximately 10 centimeters above a ground plane.

During the EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, and EN 61000-4-11 tests, the EUT is positioned on a table over a ground reference plane in conformance with this requirement.

2.8 Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications.

Extensive engineering effort has been made to ensure test data reliability through quality control and regular equipment calibration schedules. However, the application of radio frequency fields and voltages are not without an unavoidable level of uncertainty. These include inaccuracies in antenna factors, chamber imperfections and possible test generator output uncertainties.

III. 3 - TEST PROCEDURES

3.1 EUT and Cable Placement

The EUT was located at the center of the test table. The standards require that interconnecting cables to be connected to available ports of the unit and that the placement of the unit and the attached cables simulate a typical installation so far as to be practical

3.2 Application of Electrostatic Discharge Immunity Test

The test is conducted in the following order: air discharge, direct contact discharge. The electrostatic discharge test levels are set and discharges for the different test modes are set appropriately. The electrostatic discharge is applied to the conductive surface of the computer in which the EUT is enclosed, and along all seams and control surfaces on the computer. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded

3.3 Application of RF-Electromagnetic Field Immunity Test

The electromagnetic field is established at the front edge of the EUT. The frequency range is swept from 80 to 1000 MHz using a power level necessary to obtain a 3 volt/meter and 80% amplitude of 1 kHz sine wave modulated field strength is directed at the EUT. The test is performed with the most susceptible side of the EUT facing the field-generating antenna. If an error is detected, the field is reduced until the error is not repeatable; the field is then manually increased until the error begins to

occur. This threshold level, the frequency and the error created are noted before continuing

3.4 Application of Electrical Fast Transients Immunity Test

The EUT is arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.). A metal ground plane 2.4 meters by 2.0 meter is placed between the floor and the table and is connected to the earth by a 2.0 meters ground rod. The ground rod is connected to the test facility's electrical earth

3.5 Application of Surge Immunity Test

The EUT is setup as described in EN 61000-4-5 and the test should be performed according to the test plan

3.6 Application of Radio-Frequency Continuous Conducted Immunity Test

Injected current tests are carried out according to the basic standard EN 61000-4-6, and according to the EN 61000-6-2:2005.Test conditions and testing arrangements, especially for measurements from 0.15 MHz to 80 MHz, shall be clearly specified in the test report

3.7 Application of Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

The EUT is setup according to the EN 61000-4-11 and the test shall be done as the procedure described in the standard

3.8 Deviations from the Standard

No deviations from EN 61000-6-2:2005 were made when performing the tests described in this report

III. 4 - TEST DATA4.1 Environmental Conditions

Temperature	28℃
Humidity	67
ATM Pressure	1033 mBr

4.2 Electrostatic Discharge Immunity (EN 61000-4-2)

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test	Test Levels									
Points	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV		
Front Side	/	/	/	/	/	/	В	В		
Back Side	/	/	/	/	/	/	В	В		
Left Side	/	/	/	/	/	/	В	В		
Right Side	/	/	/	/	/	/	В	В		

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test		Test Levels									
Points	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV	-15kV	+15k V	
Front Side	/	/	В	В	/	/	/	/	/	/	
Back Side	/	/	В	В	/	/	/	/	/	/	
Left Side	/	/	В	В	/	/	/	/	/	/	
Right Side	/	1	В	В	1	/	1	1	1	1	

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

EN 61000-4-2 Test		Test Levels									
Points	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV	-15kV	+15k V	
Front Side	В	В	В	В	/	/	1	/	/	1	
Back Side	В	В	В	В	/	/	/	/	/	/	
Left Side	В	В	В	В	/	/	/	/	/	/	
Right Side	В	В	В	В	/	/	/	/	/	/	

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2 Test	Test Levels										
Points	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV	-15kV	+15k V	
Front Side	В	В	В	В	/	/	/	/	/	/	
Back Side	В	В	В	В	/	1	/	/	/	/	
Left Side	В	В	В	В	/	1	/	/	/	/	
Right Side	В	В	В	В	1	/	/	1	/	/	

4.3 RF-Electromagnetic Field Immunity Test (EN 61000-4-3)

Frequency Range(MHz)	ncy /IHz) Front (10 V/m)		Rear (1	10 V/m)	Left Side	e(10 V/m)	Right Side(10 V/m)		
80-1000	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	
	А	A	A	A	A	A	A	Α	

4.4 Electrical Fast Transient/Burst Immunity Test (EN 61000-4-4)

EN 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply Power Line of EUT	L1	/	/	/	/	В	В	/	/
	L2	/	/	/	/	В	В	/	/
	Earth	/	/	/	/	В	В	/	/
	L1+L2	/	/	/	/	В	В	/	/
	L1 + Earth	/	/	/	/	В	В	/	/
	L2 + Earth	/	/	/	/	В	В	/	/
	L1+L2+Earth	/	/	/	/	В	В	/	/
Signal Ports		/	/	/	/	/	/	/	/

4.5 Surge Immunity (EN 61000-4-5)

Table 1: Surge Power Supply

Leve I	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N, L-PE, N-PE	/	/
2	1kV	±	L-N	В	/
3	2kV	±	L-PE, N-PE	В	/
4	4kV	±	L-N, L-PE, N-PE	/	/

Table 2: Shielded I/O Circuit and Lines (NO)

Leve I	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N, L-PE, N-PE	/	/
2	1kV	±	L-N, L-PE, N-PE	/	/
3	2kV	±	L-N, L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

Table 3: Unshielded I/O Circuits and Lines (NO)

Leve I	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N, L-PE, N-PE	1	/
2	1kV	±	L-N, L-PE, N-PE	/	/
3	2kV	±	L-N, L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

4.6 Radio Frequency Continuous Conducted Immunity Test (EN 61000-4-6)

Power Supply:220VAC/50Hz

Modulation: Amplitude, 80%, 1 kHz sine wave

Severity Level: 3Vr.m.s

Frequency range: 150 kHz - 80 MHz, 150Ωsource impedance

Level	Voltage Level (e.m.f.) U₀	Pass	Fail
1	1	/	/
2	3	/	/
3	10	Α	/
Х	Special	/	/

4.7 Voltage Dips/Interruptions Immunity (EN 61000-4-11)

Table 1: Voltage Dips/Interruptions Test

Level	U2	td	Phase Angle	N	Pass	Fail
1	>95%	10ms	0/90/180/270	3	В	/
2	30%	500ms	0/90/180/270	3	С	/

Table 2: Voltage Variation Test (NO)

Voltage	Duration Time	Rising Time	Falling Time	Event	Pass	Fail
V1=250V	T1=3s	1.0s	1.0s	5	N/A	/
V2=125V	T2=3s	1.0s	1.0s	5	N/A	/
V3=60V	T3=3s	1.0s	1.0s	5	N/A	/

III.5 - TEST RESULTS

The following tests were performed on the Teknatool International Limited Model: DVR 1644(DVR GALAXI). The actual test results are contained within the test data section of this report.

5.1 EN 61000-4-2 Electrostatic Discharge Immunity Test

The EUT is subjected to the electrostatic discharge tests required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-2

The EUT continued to perform as intended during and after the application of the ESD. Test setup photographs presented in description of the product 1.1

5.2 EN 61000-4-3 RF-Electromagnetic Field Immunity Test

The EUT is subjected to a 3-volt/meter, 80% Amplitude, 1 kHz Sine wave field as required by required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-3 The EUT continued to perform as intended during and after the application of the RF-electromagnetic field Test setup photographs presented in description of the product 1.1

5.3 EN 61000-4-4 Electrical Fast Transient/Burst Immunity Test

The EUT is subjected to the electrical fast transient tests required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-4

The EUT continued to perform as intended during and after the application of the EFT. Test setup photographs presented in description of the product 1.1

5.4 EN 61000-4-5 Surge Immunity Test

The EUT is subjected to the surge tests required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-5

The EUT continued to perform as intended during and after the application of the surge. Test setup photographs presented in description of the product 1.1

5.5 EN 61000-4-6 Radio-frequency continuous conducted immunity test

The EUT is subjected to the Radio-frequency continuous conducted immunity tests required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-6 The EUT continued to perform as intended during and after the application of the Radio-frequency continuous conducted immunity Test setup photographs presented in description of the product 1.1

5.6 EN 61000-4-11 Voltage Dips/Interruptions Immunity Test

The EUT is subjected to the electrical fast transient tests required by EN 61000-6-2:2005 and all lower levels specified in EN 61000-4-11

The EUT continued to perform as intended during and after the application of the voltage dips/interruptions Test setup photographs presented in description of the product 1.1

PRODUCT LABELING

CE Mark Label Specification

Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT



-----End of this report-----

EC Declaration of conformity

Council Directive 2014/30/EU on Electromagnetic Compatibility

Teknatool International Limited

7D Dallan Place, Rosedale, Auckland, 0632, NZ

Certify that the product described is in conformity with the Directive 2014/30/EU as amended

Product Name :

DVR Headstock

Model:

DVR16XX、 DVR18XX、 DVR20XX、 DVR22XX

The product has been assessed by the application of the following standards:

EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011

Issue place and date

Company stamp and Signature of authorized personnel

QH-40006880