

Project No. : **LBE20133583**

CCTV camera **SCO-2040RP**

EMC TEST REPORT

Project No.	LBE20133583	Revision No.	None
Applicant	Name of organization	Samsung TECHWIN Co., Ltd.	
	Address	28, Seongju-dong Changwon-si, Gyeongsangsam-do, Rep of Korea	
	Date of application	June 21, 2013	
EUT Equipment Under Test	Kind of product	CCTV camera	
	Model No.	SCO-2040RP	
		Variant Model	None
	Manufacturer	Attach the next page	
	New / Alternative / Permissive change information	*) New	
Applied Standards		AS/NZS CISPR22 : 2009	
Test Period		June 24, 2013~ June 24, 2013	
Issued date		June 28, 2013	
Test result : Complied The equipment under test has found to be compliant with the applied standards. (Refer to the attached test result for more detail.)			
Tested by : Tong Gao 		Reviewed by : Zhongyuan Gao 	
The test results in this report only apply to the tested sample. This report must not be reproduced, except in full, without written permission from CSQAL.			
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Project No. : **LBE20133583**

CCTV camera **SCO-2040RP**

Factories :

1. Samsung TECHWIN Co.,Ltd.
2. Tianjin Samsung TECHWIN Opto-Electronics Display Co., Ltd

Factories Address :

1. 28, Seongju-dong Changwon-si, Gyeongsangsam-do, Rep of Korea
2. No.11 Weiliu Rd. Micro-Electronic Industrial Park,Jingang Rd.Tianjin,300385 China

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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result	Remarks
☒	Conducted Disturbance	AS/NZS CISPR22:2009	Complied	Meets Class A Limit
☒	Radiated Disturbance		Complied	Meets Class A Limit

2. General Information

2.1 Test facility

CSQAL is LOCATED ON Block D, 17-19 ,MIP Fourth Road, Jingang Highway, Tianjin China
All testing are performed in Semi-anechoic chambers conforming to the site attenuation
Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

CSQAL is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	FCC(Federal Communications Commission)	Number: 745469
	Korea Communications Commission Radio Research Agency	Accredited : KR0148
	KC (Korean Testing Laboratory)	KTL-002/SMT
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	Member No: 271
	NVLAP(National Voluntary Laboratory Accreditation Program)	CODE: 500036-0
	CNAS (China National Accreditation Service for Conformity Assessment)	L5281

3. Test Setup configuration

3.1 Test peripherals

The peripherals which were interconnected to the EUT during the test are as follows:

Item	Model No.	Serial No.	Manufacturer	Note
CCTV camera	SCO-2040RP	-	Samsung	EUT
AC Adapter	-	-	-	FOR EUT

3.2 EUT operating mode(s)

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	CCTV camera operating
-	-

3.3 Details of Sampling

Customer selected, single unit.

3.4 Cable description

The type(s) of cables which were connected to the ports (of the EUT) are as follows:

No.	From the port of EUT	To	Length[m]	Shielded[Y/N]
1	DC in	DC adapter	1.5	Yes
2	Video out	75 ohm termination	1.5	Yes

3.5 EUT Description

The following features describe EUT represented by this report:

Highest Frequency: 27MHz

System:PAL

Test Voltage:240V 50Hz

Item		Details	
		NTSC	PAL
Electrical			
Input Voltage		DC 12V	
Power Consumption		3W	
Video			
Imaging Device		1/3" CMOS	
Active Pixels		976x496	
Scanning System		Interlace	
Synchronization		Internal	
Frequency		H: 15,734 Hz	H: 15,625
		V: 59.94 Hz	V: 50 Hz
Horizontal Resolution		650TVL	
Min. Illumination		OLux (IR-LED)	
S/N Ratio (Y Signal)		48dB	
Lens			
SCO-2040R/2030R	Focus Length	8mm/6mm	
	Max.Aperture Ratio	2	
	Angular Field of View	D: 46	
SCD-2021R	Focus Length	3.6mm	
	Max.Aperture Ratio	2	
	Angular Field of View	D: 98	
		H: 80	
		V: 60	
Operational			
Shutter Mode		Auto(Rolling Shutter)	
Gain Control		Auto	
White Balance		Auto (3200°K~6500°K)	
Digital Noise Reduction		Auto	
Day & Night		MECHA IR CUT FILTER	
IR Distance			
SCO-2040R/2030R		25m	
SCD-2021R		20m	
Environmental			
Operating Temperature/Humidity		-10°C ~ +50°C (-4°F ~+122°F) / 20% ~ 85%RH (TEST SPEC : -30°C ~ +60	
IP Grade		IP66	
Mechanical			
SCO-2040R/2030R	Dimension (W x H x D)	L180.7*W69*H62	
	Weight	249g	
SCD-2021R	Dimension (W x H x D)	L92*W92*H73	
	Weight	278g	
Storage Temperature/Humidity		-20°C ~ +60°C (-4°F ~+122°F) / 20% ~ 85%RH (TEST SPEC : -30°C ~ +60	

3.6 Description of the EUT exercising method

The EUT exercise program used during EMI and Immunity (EMS) testing was CSQAL standardized test program. The program is camera operating.

3.7 Performance Criteria

During and/or after immunity testing, the EUT was monitored to the following performance criterion.

Criterion	Operating mode(s)	Description
A	1	No noticeable degradation or loss of function is allowed during the test. The EUT shall continue to operate as intended without operator intervention. The product conforms with the requirements of clause 7.1 of EN55024:2010 The product conforms with the requirements of Annex B.2 of EN55024:2010 The product conforms with the requirements of Annex C of EN55024:2010
B	1	No noticeable degradation or loss of function is allowed after the test. The EUT shall continue to operate as intended without operator intervention. During the test, no degradation of performance is allowed. No change of operating state or stored data is allowed to persist after the test. The product conforms with the requirements of clause 7.1 of EN55024:2010 The product conforms with the requirements of Annex B.2 of EN55024:2010 The product conforms with the requirements of Annex C of EN55024:2010.
C	1	Loss of function is allowed, provided that the function is self recoverable or can be restored by the operation of the controls by the user. The product conforms with the requirements of clause 7.1 of EN55024:2010. The product conforms with the requirements of Annex B.2 of EN55024:2010 The product conforms with the requirements of Annex C of EN55024:2010.

3.8 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

3.8.1 Emission

Test type		Measurement uncertainty (C.L. 95%, k = 2)
Conducted Disturbance	Main terminal	2.8 dB
Radiated Disturbance	Horizontal	4.96 dB
	Vertical	4.62 dB

4. Results of individual test

4.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

The EUT measured in accordance with the methods described in standards.

Limits for conducted disturbance at the mains ports of class A ITE

Frequency range Limits MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60

Note 1: 1 μV is regarded as 0 dB.
 Note 2: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector at the same frequency is unnecessary.
 Note 3: The lower limit shall apply at the transition frequency.

Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports for class A equipment

Frequency range Limits MHz	Voltage limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Quasi-peak	Quasi-peak	Average
0,15 to 0,50	97 to 87	84 to 74	53 to 43	40 to 30
0,50 to 30	87	74	43	30

Note 1: 1 μV is regarded as 0 dB. 1 μA is regarded as 0dB.
 Note 2: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.
 Note 3: If the average limit is met in a measurement with quasi-peak detector receiver, the measurement with average detector receiver at the same frequency is unnecessary.
 Note 4: The conversion factor between voltage limits and current limits is $20 \log_{10} 150/I = 44$ dB.

If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 seconds at each measurement frequency, the highest reading shall be recorded, with the exception of any brief isolated high reading (which shall be ignored).

4.1.1 Test instrumentation

Test instrumentations which were used in the Conducted disturbance test are as follows;

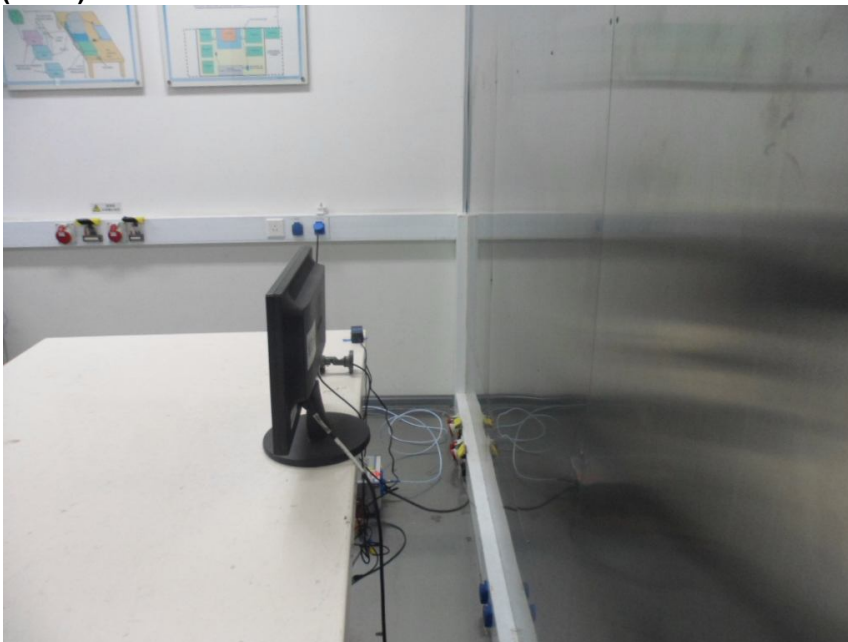
Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EP5CE	TOYO	V 4.7.10	N/A	N/A
Measuring receiver	ESCI	R&S	101027	2013.03.02	12
Artificial mains network	ENV216	R&S	101122	2012.08.23	12
Artificial mains network	ENV216	R&S	101059	2012.08.23	12
ISN	ISN T800	TESEQ	28602	2012.08.23	12
ISN	ISN T8-CAT6	TESEQ	27286	2013.03.02	12

4.1.2 Photograph of the test Configuration

(Front)



(Rear)

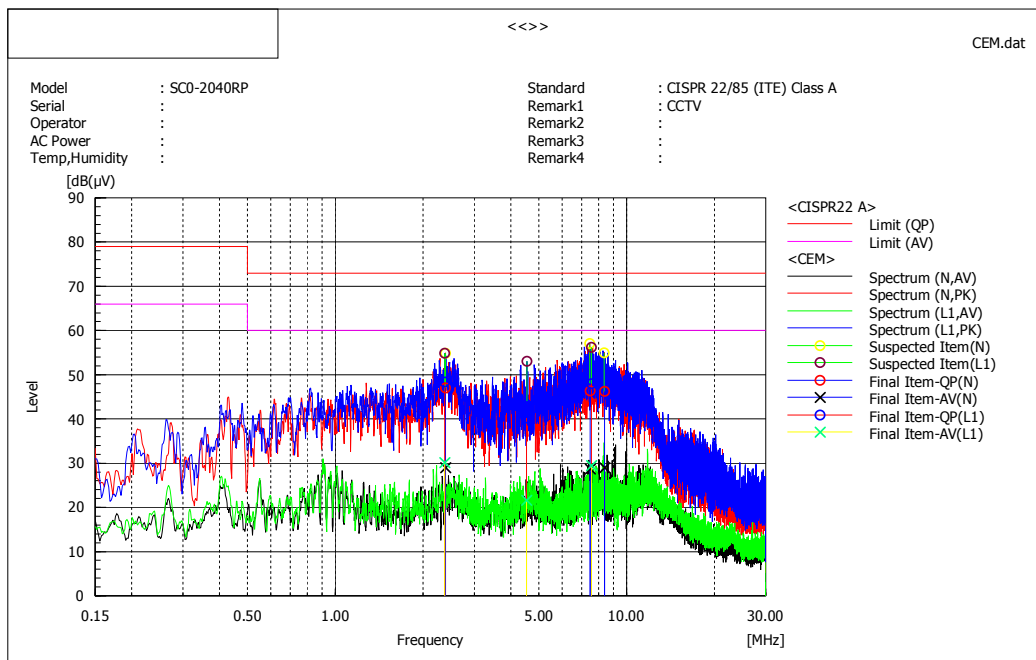


4.1.3 Test result

Test date	2013.06.24		Test engineer		Tong Gao	
Climate condition	Ambient temperature	24 °C	Relative humidity	35%	Atmospheric pressure	100.5kPa
	Shielded Room #2					
Test place	Shielded Room #2					

4.1.4 Test data

■ Operating Mode: CCTV camera operating



Final Result

--- N Phase ---											
No.	Frequency	Reading QP	Reading AV	c. f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB]	
1	7.48634	36.6	18.9	9.8	46.4	28.7	73.0	60.0	26.6	31.3	
2	2.39204	37.3	19.3	9.7	47.0	29.0	73.0	60.0	26.0	31.0	
3	8.39606	36.5	19.2	9.8	46.3	29.0	73.0	60.0	26.7	31.0	
--- L1 Phase ---											
No.	Frequency	Reading QP	Reading AV	c. f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB(μ V)]	[dB]	[dB]	
1	7.57338	38.2	19.7	9.8	48.0	29.5	73.0	60.0	25.0	30.5	
2	2.3731	38.7	20.5	9.7	48.4	30.2	73.0	60.0	24.6	29.8	
3	4.52521	30.5	11.9	9.7	40.2	21.6	73.0	60.0	32.8	38.4	

Note) Result (Quasi-Peak and/or Average) = Reading (Quasi-Peak and/or Average) +
c.f (LISN Insertion Loss + Cable Loss)

Margin = Limit – Level (Quasi-Peak and/or Average)

4.2 Radiated disturbance (30MHz to 1GHz)

Of those disturbances above ($L - 20$ dB), where L is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.

Measurements were performed at an antenna to EUT distance of 10 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Including the worst-case data points for each tested configuration.

Limits for radiated disturbance of ITE at a measuring distance of 10 m

Frequency range Limits MHz	Quasi-peak Limits dB(μV/m)	
	Class A	Class B
30 to 230	40	30
230 to 1000	47	37
Note 1: The lower limit shall apply at the transition frequency.		
Note 2: Additional provisions may be required for cases where interference occurs.		
Note 3: 1 μV/m is regarded as 0 dB.		

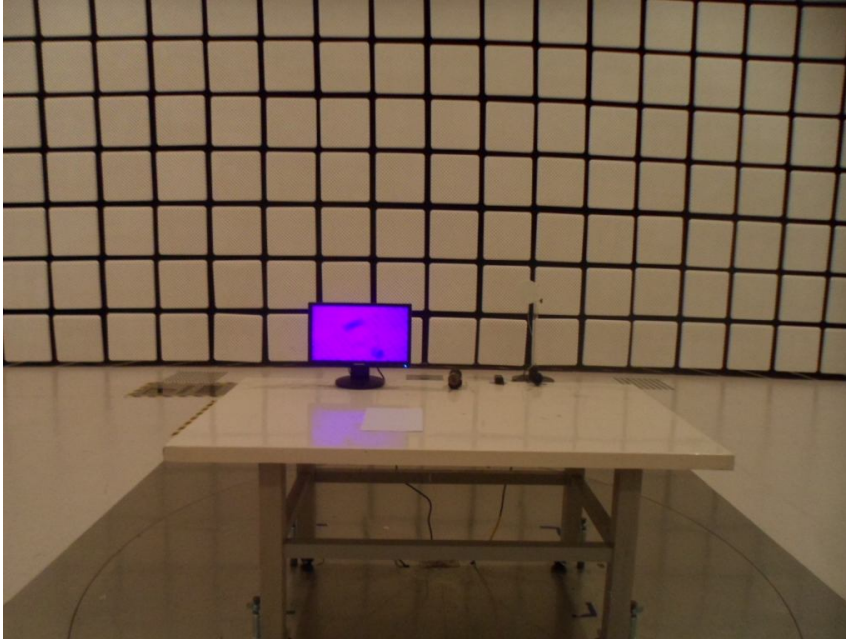
4.2.1 Test instrumentation

Test instrumentations which were used in the Radiated disturbance are as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EP5/RE	TOYO	V 4.7.10	N/A	N/A
Bi-log Antenna	CBL6112D	TESEQ	30997	2013.04.03	24
Bi-log Antenna	CBL6112D	TESEQ	30999	2013.04.03	24
EMI Receiver	ESU26	R&S	100244	2013.03.02	12
EMI Receiver	ESCI	R&S	101024	2013.03.02	12
EMI Receiver	ESCI	R&S	101032	2013.03.02	12
AMPLIFIER	310N	SONOMA	300913	2012.08.23	12
AMPLIFIER	310N	SONOMA	300914	2012.08.23	12
Ant Mast	MA4000	INN CO	-	N/A	N/A
Ant Mast	MA4000	INN CO	-	N/A	N/A
Mast Controller	CO2000	INN CO	-	N/A	N/A
RF Selector	NS4900N	TOYO	-	N/A	N/A
RF Selector	NS4900N	TOYO	-	N/A	N/A

4.2.2 Photograph of the test Configuration

(Front)



(Rear)

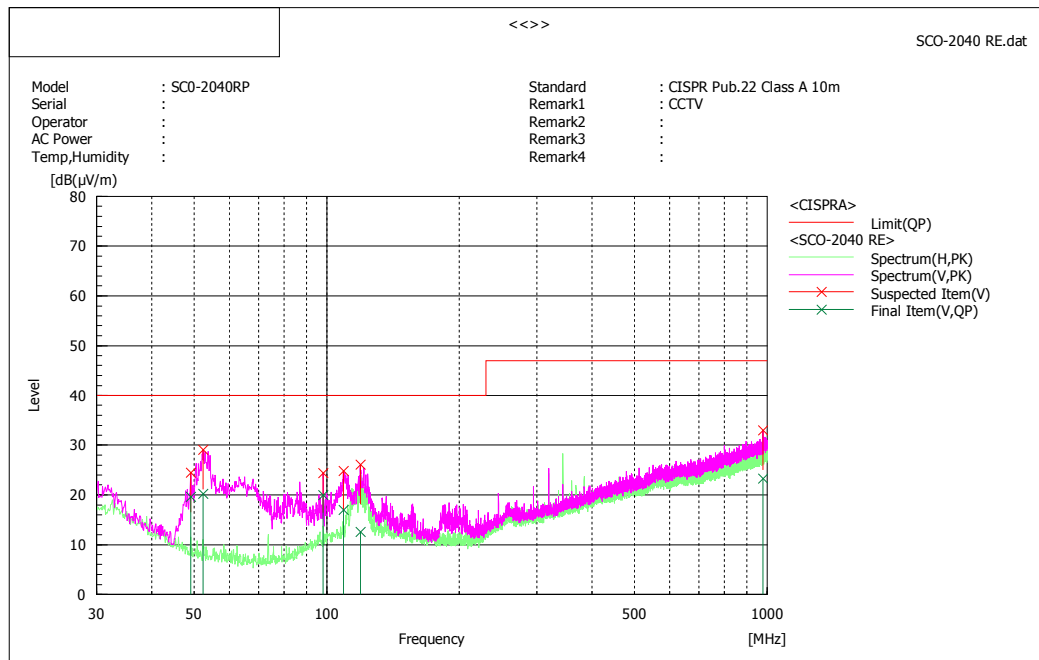


4.2.3 Test results

Test date	2013.06.24		Test engineer		Tong Gao	
Climate condition	Ambient temperature	24 °C	Relative humidity	36%	Atmospheric pressure	100.4 kPa
	10m Semi-Anechoic Chamber					
Test place	10m Semi-Anechoic Chamber					

4.2.4 Test data

■ Operating Mode: CCTV Camera Operating



Final Result

No.	Frequency (P)	Reading QP	c. f	Result QP	Limit QP	Margin QP	Height	Angle	System
	[MHz]	[dB(μ V)]	[dB(1/m)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB]	[cm]	[°]	
1	52.310	V 39.4	-19.1	20.3	40.0	19.7	100.0	359.9	2
2	119.119	V 26.3	-13.7	12.6	40.0	27.4	100.0	120.5	2
3	978.539	V 20.7	2.6	23.3	47.0	23.7	100.0	315.4	2
4	109.055	V 30.9	-13.9	17.0	40.0	23.0	100.0	256.4	2
5	49.036	V 37.9	-18.2	19.7	40.0	20.3	100.0	27.8	2
6	98.142	V 35.5	-15.5	20.0	40.0	20.0	100.0	333.7	2

Note) Receiving antenna polarization : Horizontal and/or Vertical

Test Distance : 10m, Antenna Height : 1 to 4 meters

Result (Quasi-Peak) = Reading QP + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin QP (Quasi-Peak) = Limit - Level QP

Appendix A – EUT photography

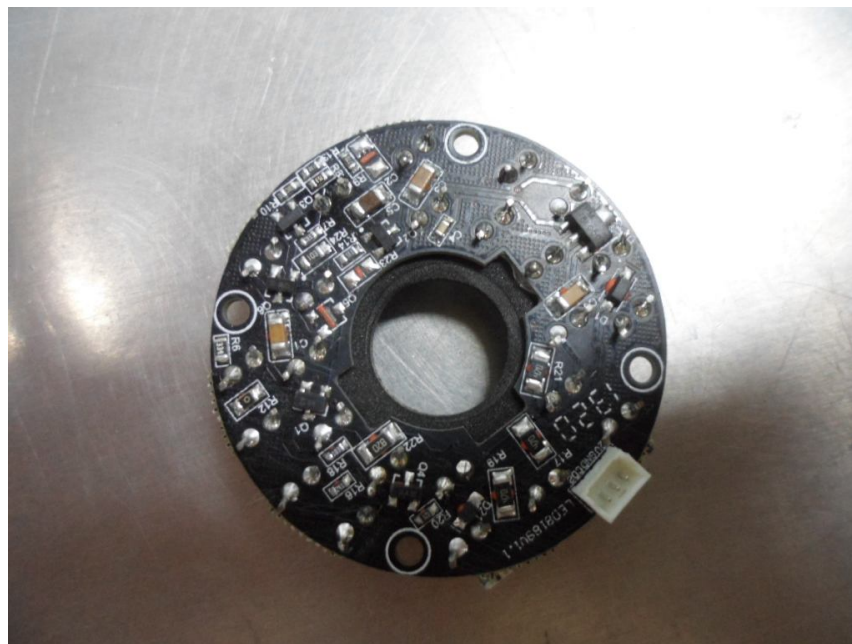
(Front)



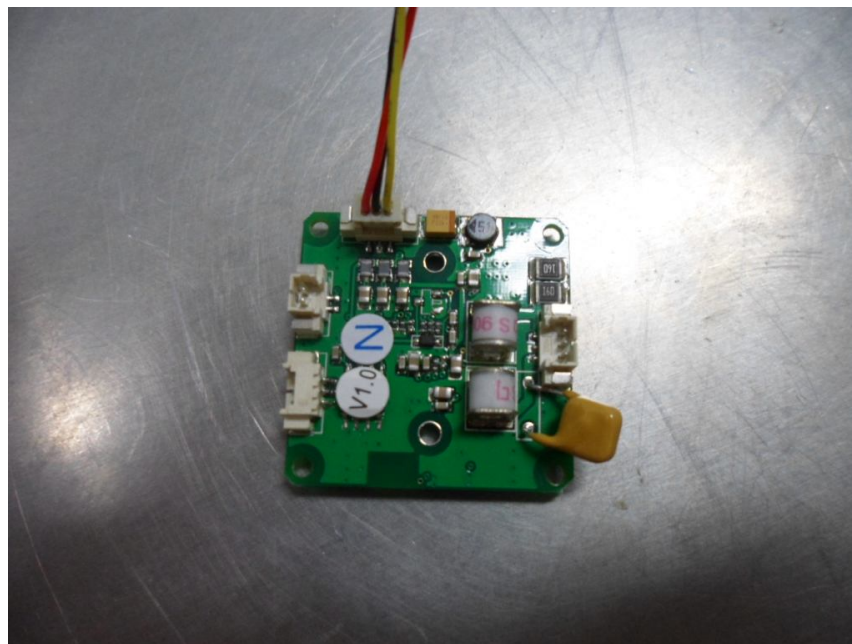
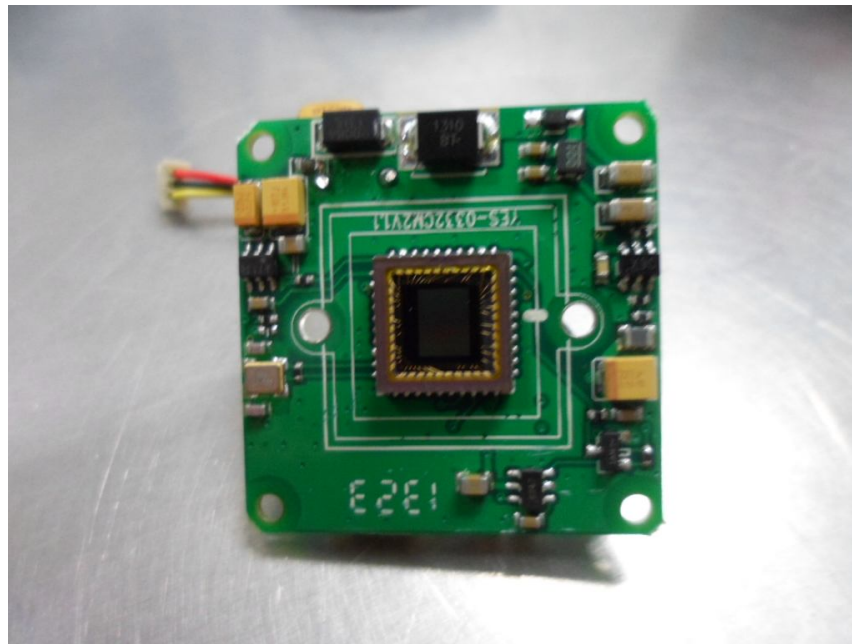
(Rear)



(LED Board)



(Main Board)



Appendix B – Measurement uncertainty budget

■ Conducted disturbance Measurement of Conducted Disturbance using LISN (Site:CSQAL ITE)

Measurements made on a site that conforms to the requirements of CISPR 22

The mathematical model for the measurement process is assumed to be:

3/2/2013
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$$C_{DL} = R_I + L_C + L_{AMN} + dV_{SW} + dV_{PA} + dV_{PR} + dV_{NF} + dZ + F_{STEP} + dM + R_S + R_{EUT}$$

where:

Symbol	Quantity	Units	Comment
C_{DL}	Disturbance Level	dBμV	This is the result of the measurement (measurand).
R_I	Receiver Reading	dBμV	Value is read from the receiver. The uncertainty is function of the least significant digit in the display readout or the Marker function on an analyser.
L_C	Attenuation AMN-Receiver	dB	Attenuation of connection between artificial mains network (LISN) and the receiver
L_{AMN}	LISN Voltage division factor	dB	Artificial Mains Network (LISN) Voltage division factor (Insertion Loss)
dV_{SW}	Receiver Sine Wave	dB	Receiver error due to Sine Wave Voltage
dV_{PA}	Receiver Pulse Amplitude	dB	Receiver error due to Pulse amplitude response
dV_{PR}	Receiver Pulse repetition	dB	Receiver error due to Pulse Repetition response
dV_{NF}	Noise Floor Proximity	dB	Error due to signal to noise ratio reducing
dZ	LISN Impedance	dB	The LISN impedance is specified as a range of acceptability, this budget uses the nominal impedance variation as a triangular distribution. This implies that the nominal impedance is achieved throughout the frequency range and only a small chance of encountering the particular combinations of frequency, LISN impedance, and EUT impedance needed to produce those extremes.
F_{STEP}	Frequency step error	dB	If using an automated receiver there is an error depending on the frequency step size with respect to the measurement bandwidth. This can be found by applying a signal to the generator and adjusting the frequency of the signal to + and - half the step size and noting the amplitude change on the receiver
dM	Mismatch	dB	No correction is made for mismatch between the receiver and the LISN plus cable. The uncertainty is derived from a combination of the reflection coefficient magnitudes.
R_S	Measurement System Repeatability	dB	The repeatability of the measurement system is determined by obtaining the standard deviation of a series of repeated readings on a stable EUT (eg a noise source). It should include typical variations that will occur in normal testing in this example 10 readings were
R_{EUT}	Repeatability of EUT	dB	This will only need to be considered if the measured result is close to the specification limit to the extent that variations due to the EUT may affect compliance.

Conducted Disturbances from 150kHz to 30 MHz using 50Ohm/50uH LISN									
Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	c_i	$u_i(y)$	$u_i(y)^2$	v_i or v_{eff}	$u_i(y)^4/v_i$
R_I	Receiver Reading	0.01	rectangular	1.732	1	0.01	0.000	∞	0
L_C	Attenuation AMN-Receiver	0.21	normal 2	2.000	1	0.11	0.012	∞	0
L_{AMN}	LISN Voltage division factor	0.80	normal 2	2.000	1	0.40	0.160	∞	0
dV_{SW}	Receiver Sine Wave	1.00	normal 2	2.000	1	0.50	0.250	∞	0
dV_{PA}	Receiver Pulse Amplitude	1.27	rectangular	1.732	1	0.73	0.538	∞	0
dV_{PR}	Receiver Pulse repetition	1.37	rectangular	1.732	1	0.79	0.626	∞	0
dV_{NF}	Noise Floor Proximity	0.00	rectangular	1.732	1	0.00	0.000	∞	0
dZ	LISN Impedance	0.37	triangular	2.449	1	0.15	0.023	∞	0
F_{STEP}	Frequency step error	0.02	rectangular	1.732	1	0.01	0.000	∞	0
M	Mismatch	-0.05	U-shaped	1.414	1	-0.04	0.001	∞	0
	Receiver VRC =	0.04	-						0
	LISN+Cable VRC =	0.16	-						0
R_S	Measurement System Repeatability	0.08	normal 1	1.000	1	0.08	0.007	9	5.79561E-06
R_{EUT}	Repeatability of EUT	0.63	normal 1	1.000	1	0.63	0.397		0
$u_i(y)$	Combined Standard Uncertainty		normal			1.42	2.013	699398.0145	5.79561E-06
$U(y)$	Expanded Uncertainty		normal k=	2.00		2.8		699398.0145	

■ Radiated disturbance(10M)

Measurement of Radiated Field Strength (Site: CSQAL)

Measurements made on an open site that conforms to the requirements of CISPR 22

Issue 18 March 2013

The mathematical model for the measurement process is assumed to be:

$$F_S = R_I + dV_{sw} + dV_{pa} + dV_{pr} + dV_{nf} + A_F + C_L + A_D + A_H + A_P + A_I + S_I + D_V + F_{step} + M + R_S + R_{EUT}$$

where:

Symbol	Quantity	Units	Comment
F_S	Field Strength	dBμV/m	This is the result of the measurement (measurand).
	Ambient Signals	dBμV/m	The uncertainty due to ambient signals is not included in this budget because it is very level dependent. The effect of ambient signals must be considered in the measurement procedure and step taken to deal with likely errors as directed in CISPR16.
R_I	Receiver Indication	dBμV	Value is read from the receiver. The uncertainty is function of the least significant digit in the display readout or the Marker function on an analyser.
dV_{sw}	Receiver Sine Wave	dB	Receiver error due to Sine Wave Voltage - the figure for total error for the receiver from manufacturer's data has been used.
dV_{pa}	Receiver Pulse Amplitude	dB	Receiver error due to Pulse amplitude response - The receiver has been shown to meet the requirements of CISPR 16-1-1 by calibration, so a rectangular distribution half width of 1.5dB has been taken.
dV_{pr}	Receiver Pulse repetition	dB	Receiver error due to Pulse Repetition response - The receiver has been shown to meet the requirements of CISPR 16-1-1 by calibration, so a rectangular distribution half width of 1.5dB has been taken.
dV_{nf}	Noise Floor Proximity	dB	Error due to signal to noise ratio reducing
A_F	Antenna Factor Calibration	dB/m	The antenna factor is obtained from the calibration certificate, as is the uncertainty and probability distribution.
C_L	Cable Loss	dB	Uncertainty of measurement of cable loss
A_D	Antenna Directivity	dB	No correction is made for errors due to antenna directivity. The uncertainty should be based on prior knowledge of the polar pattern of the generic type of antenna. This uncertainty will vary with antenna type and measurement distance. Up to 3dB is possible for vertical polarisation at 3m distance.
A_H	Antenna Factor Height Dependence	dB	No correction is made for errors in the antenna factor due to variations in its height above the ground plane. The uncertainty is derived from theoretical and practical experience of experts in antenna calibrations and will vary with antenna type. The probability distribution is assumed to be rectangular. The effect is seen in Horizontal polarisation and can be as high as 2dB
A_P	Antenna Phase Centre Variation	dB	No correction is made for antenna phase centre variation. The uncertainty is derived from theoretical and practical experience of experts in antenna calibrations. The probability distribution is assumed to be rectangular.
A_I	Antenna Factor Frequency Interpolation	dB	No correction is made for any difference between the antenna factor at the frequency being measured and the nearest calibration frequency. The uncertainty will depend on the interval of calibration points over the frequency range and the rate of change of antenna factor with frequency. The probability distribution is assumed to be rectangular.
A_I	Antenna Factor Frequency Interpolation	dB	No correction is made for any difference between the antenna factor at the frequency being measured and the nearest calibration frequency. The uncertainty will depend on the interval of calibration points over the frequency range and the rate of change of antenna factor with frequency. The probability distribution is assumed to be rectangular.
D_{cross}	Antenna Cross polarisation	dB	Assumed to be negligible for a biconical antenna (low freq bilog). For log periodic (high freq bilog) some allowance has been made.
D_{bal}	Antenna Balance	dB	Balance of the antenna.
S_I	Site Imperfections	dB	No corrections are made for site imperfections. The value for the tolerance allowed is used.
D_V	Measurement Distance Variation	dB	No correction is made for errors in the measurement distance (between antenna and EUT). The uncertainty in received signal strength in dB is obtained from an estimate of the uncertainty in the measurement distance and based on path loss. For emissions close to the limit the distance is adjusted to be 10 +/- 0.05m.
F_{step}	Frequency step error	dB	Final measurements are only made after a partial scan around an emission has been made to find the frequency of the emission as accurately as possible, so zero is used.
M	Mismatch	dB	No correction is made for mismatch between the receiver and the antenna plus cable. The uncertainty is derived from a combination of the reflection coefficient magnitudes.
R_S	Measurement System Repeatability	dB	The repeatability of the measurement system is determined by obtaining the standard deviation of a series of repeated readings on a stable EUT (eg a noise source). It should include typical variations that will occur in normal testing in this example 10 readings were made.
R_{EUT}	Repeatability of EUT	dB	This will only need to be considered if the measured result is close to the specification limit to the extent that variations due to the EUT may affect compliance.

- Horizontal

1. Radiated Field Strength 30 dBmV/m to 60 dBmV/m (Bilog antenna 30 MHz to 1000MHz - Horizontal Polarisation at 10 m, Mast)									
Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	c_i	$u_i(y)$	$u_i(y)^2$	v_i or v_{eff}	$u_i(y)^4$
R_I	Receiver Indication	0.01	rectangular	1.732	1	0.01	0.000	∞	0
1 dV_{sw}	Receiver Sine Wave	0.90	normal 2	2.000	1	0.45	0.203	∞	0
2 dV_{pa}	Receiver Pulse Amplitude	1.50	rectangular	1.732	1	0.87	0.750	∞	0
3 dV_{pr}	Receiver Pulse repetition	1.40	rectangular	1.732	1	0.81	0.653	∞	0
dV_{nf}	Noise Floor Proximity	0.00	normal 2	2.000	1	0.00	0.000	∞	0
A_F	Antenna Factor Calibration	1.20	normal 2	2.000	1	0.60	0.360	∞	0
C_L	Cable Loss	0.21	normal 2	2.000	1	0.11	0.012	∞	0
A_B	Antenna Directivity	0.72	rectangular	1.732	1	0.42	0.173	∞	0
A_H	Antenna Factor Height Dependence	0.50	rectangular	1.732	1	0.29	0.083	∞	0
A_P	Antenna Phase Centre Variation	0.29	rectangular	1.732	1	0.17	0.028	∞	0
A_I	Antenna Factor Frequency Interpolation	1.20	rectangular	1.732	1	0.69	0.480	∞	0
D_{cross}	Antenna Cross Polarisation	0.00	rectangular	1.732	1	0.00	0.000	∞	0
$Dbal$	Antenna balance	0.25	rectangular	1.732	1	0.14	0.021	∞	0
S_I	Site Imperfections	2.30	triangular	2.449	1	0.94	0.882	∞	0
D_V	Measurement Distance Variation	2.29	rectangular	1.732	1	1.32	1.748	∞	0
F_{step}	Frequency step error	0.00	rectangular	1.732	1	0.00	0.000	∞	0
M	Mismatch	-0.09	U-shaped	1.414	1	-0.07	0.004	∞	0
	Receiver VRC 0.03		-						
	Preamp output + Cable VRC 0.32		-						
M	Mismatch	-1.24	U-shaped	1.414	1	-0.87	0.764	∞	0
	Preamp input VRC 0.40								
	Antenna +Cable VRC 0.33								
R_S	Measurement System Repeatability	0.01	normal 1	1.000	1	0.01	0.000	9	6.53086E-10
R_{EUT}	Repeatability of EUT	0.00	normal 1	1.000	1	0.00	0.000		0
$u_c(F_S)$	Combined Standard Uncertainty		normal			2.48	6.161	58115235791	6.53086E-10
$U(F_S)$	Expanded Uncertainty		normal $k=2.00$			4.96		58115235791	

- Vertical

1. Radiated Field Strength 30 dBmV/m to 60 dBmV/m (Bilog antenna 30 MHz to 1000MHz - Vertical Polarisation at 10 m, Mast)									
Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	c_i	$u_i(y)$	$u_i(y)^2$	v_i or v_{eff}	$u_i(y)^4$
R_I	Receiver Indication	0.01	rectangular	1.732	1	0.01	0.000	∞	0
1 dV_{sw}	Receiver Sine Wave	1.00	normal 2	2.000	1	0.50	0.250	∞	0
2 dV_{pa}	Receiver Pulse Amplitude	1.40	rectangular	1.732	1	0.81	0.653	∞	0
3 dV_{pr}	Receiver Pulse repetition	1.40	rectangular	1.732	1	0.81	0.653	∞	0
dV_{nf}	Noise Floor Proximity	0.00	normal 2	2.000	1	0.00	0.000	∞	0
A_F	Antenna Factor Calibration	1.20	normal 2	2.000	1	0.60	0.360	∞	0
C_L	Cable Loss	0.21	normal 2	2.000	1	0.11	0.012	∞	0
A_B	Antenna Directivity	0.47	rectangular	1.732	1	0.27	0.074	∞	0
A_H	Antenna Factor Height Dependence	0.50	rectangular	1.732	1	0.29	0.083	∞	0
A_P	Antenna Phase Centre Variation	-1.28	rectangular	1.732	1	-0.74	0.546	∞	0
A_I	Antenna Factor Frequency Interpolation	1.28	rectangular	1.732	1	0.74	0.546	∞	0
D_{cross}	Antenna Cross Polarisation	0.00	rectangular	1.732	1	0.00	0.000	∞	0
$Dbal$	Antenna balance	0.25	rectangular	1.732	1	0.14	0.021	∞	0
S_I	Site Imperfections	2.80	triangular	2.449	1	1.14	1.307	∞	0
D_V	Measurement Distance Variation	0.43	rectangular	1.732	1	0.25	0.062	∞	0
F_{step}	Frequency step error	0.00	rectangular	1.732	1	0.00	0.000	∞	0
M	Mismatch	-0.05	U-shaped	1.414	1	-0.04	0.001	∞	0
	Receiver VRC 0.02		-						
	Preamp output + Cable VRC 0.32		-						
M	Mismatch	-1.24	U-shaped	1.414	1	-0.87	0.764	∞	0
	Preamp input VRC 0.40								
	Antenna +Cable VRC 0.33								
R_S	Measurement System Repeatability	0.01	normal 1	1.000	1	0.01	0.000	9	2.53717E-09
R_{EUT}	Repeatability of EUT	0.00	normal 1	1.000	1	0.00	0.000		0
$u_c(F_S)$	Combined Standard Uncertainty		normal			2.31	5.332	11207071222	2.53717E-09
$U(F_S)$	Expanded Uncertainty		normal $k=2.00$			4.62		11207071222	