



(주)재신정보

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EN50160 Compliance Report - **FAIL**

Day 2012-01-02

"Characteristics of Voltage at a Network User's Supply Terminals: Limits and Values"

JSDATA Test

중앙로알오피스텔 18층 전기품질 측정

중앙로알오피스텔관리회사

서초동 1355-8번지

서초구

서울특별시

www.jsdata.co.kr

3-phase 4-wire Wye/Star

220.00V 60Hz

Summary of Results
EN50160 Compliance
2012-01-02

EN50160 Pass-Fail Requirements Table

EN50160 Section	Power Quality Parameter	EN50160 Compliance	Remarks
4.2.1	Power Frequency	PASS	
4.2.2	Supply Voltage Variations	PASS	
4.2.3	Flicker Severity	PASS	
4.2.4	Voltage Unbalance	FAIL	Exceeds Limits (결선 잘못했을 경우)
4.2.5	Harmonic Voltages	FAIL	L1 harmonics exceed limits

EN50160 Additional Information Table

EN50160 Section	Power Quality Parameter	Remarks
4.2.6	Interharmonic Voltages	Data only
4.2.7	Mains Signaling	Not measured
4.3.1	Interruptions	
4.3.2	Dips	
4.3.3	Swells	
4.3.4	Transient overvoltages	

Note 1: During 2012-01-02 measurements were made 100.00% of the time

Note 2: Low Voltage Systems (< 1 kV) limits were used.

Note 3: Flagged data was excluded from this report.

Instrument used: PQube® (www.PQube.com)
 Manufacturer: Power Standards Lab, U.S.A.
 PQube ID: JSDATA Test
 Location: JSDATA 사무실
 Serial number: P004001
 Firmware revision: 2.0.0 2771
 Calibration Certificate: <http://www.PowerStandards.com/CalibCerts/P004001.pdf>
 Report Software: PQube Report Writer 2.1.2.0
 Author of Report: (주)재신정보
 Name: JSI_Seoch0, Seoul

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Photo 1 -

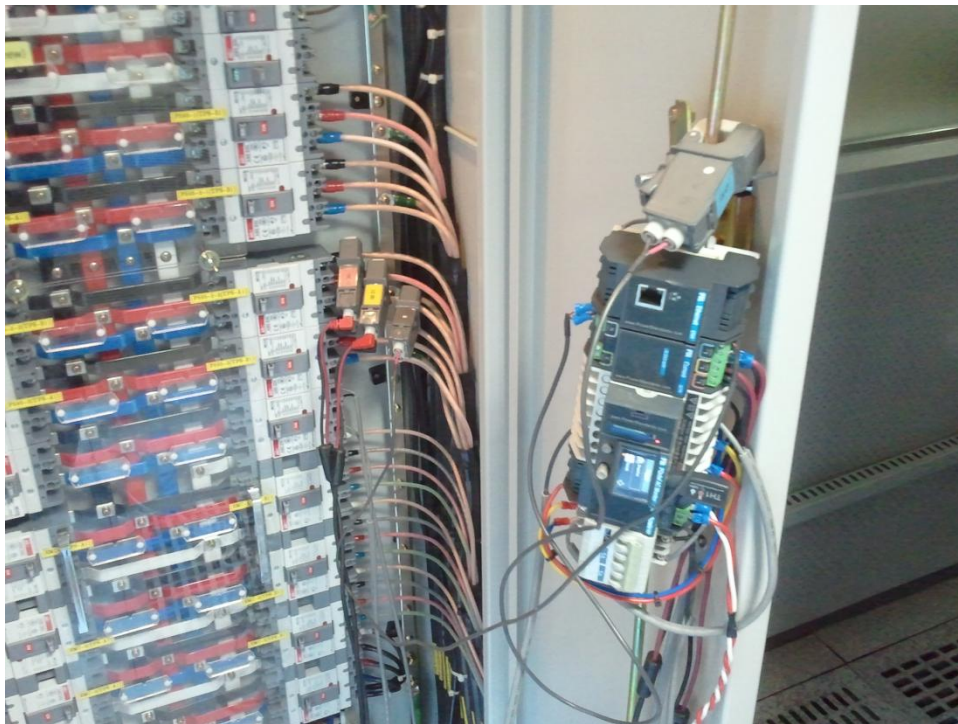


Photo 2 -

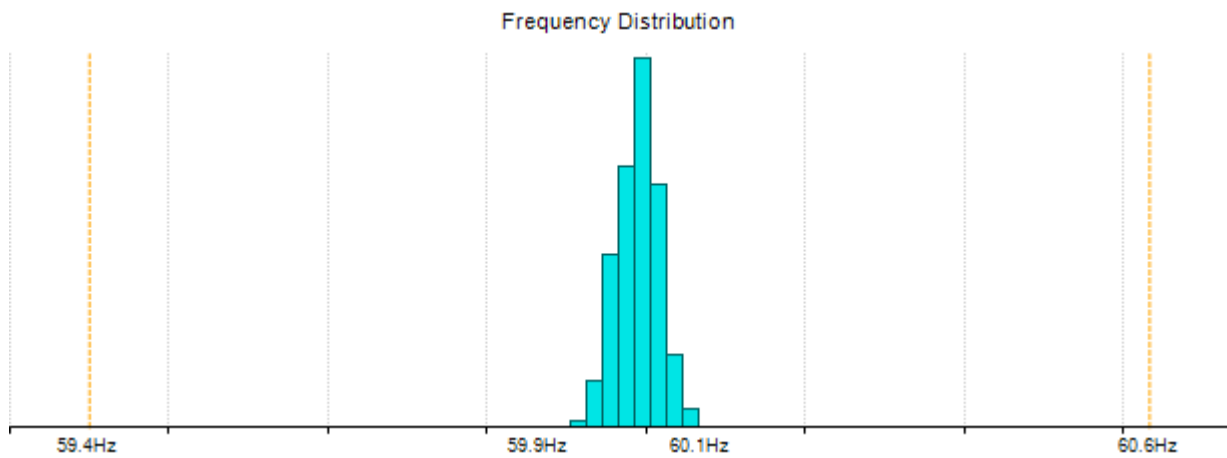
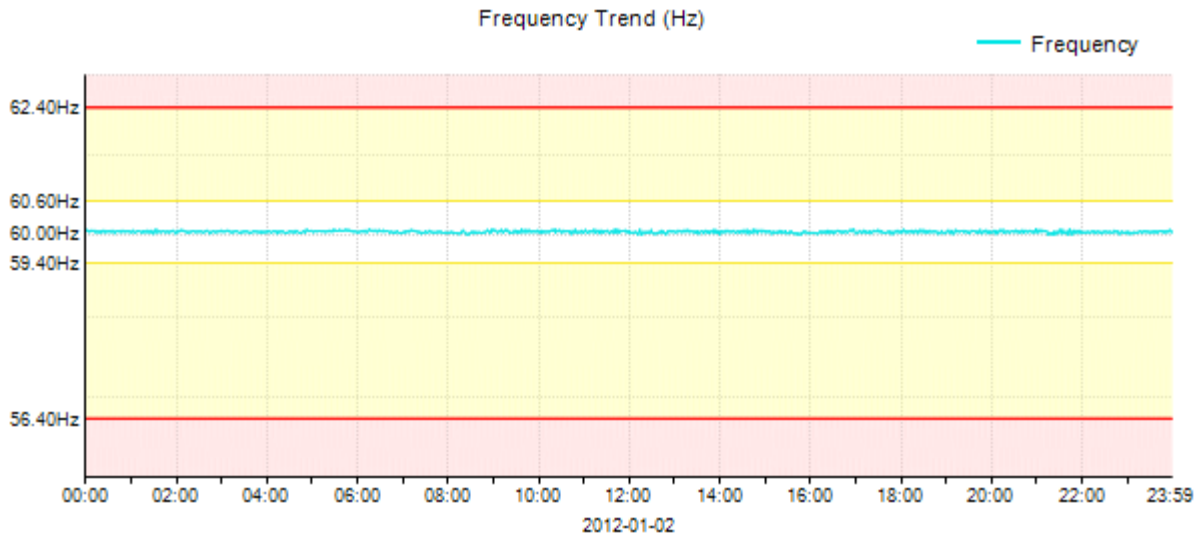
EN50160 4.2.1: Power Frequency

Nominal Frequency: 60.00Hz

Parameter definition: Mean value of the fundamental frequency measured over 10 seconds

Limitation: For systems with a synchronous connection to an interconnected system

EN50160 Requirement	Measured frequency	Result
99.5% of day: 59.40 Hz - 60.60 Hz	59.97 Hz~60.03 Hz	PASS
100% of day: 56.40 Hz - 62.40 Hz	59.97 Hz~60.03 Hz	PASS



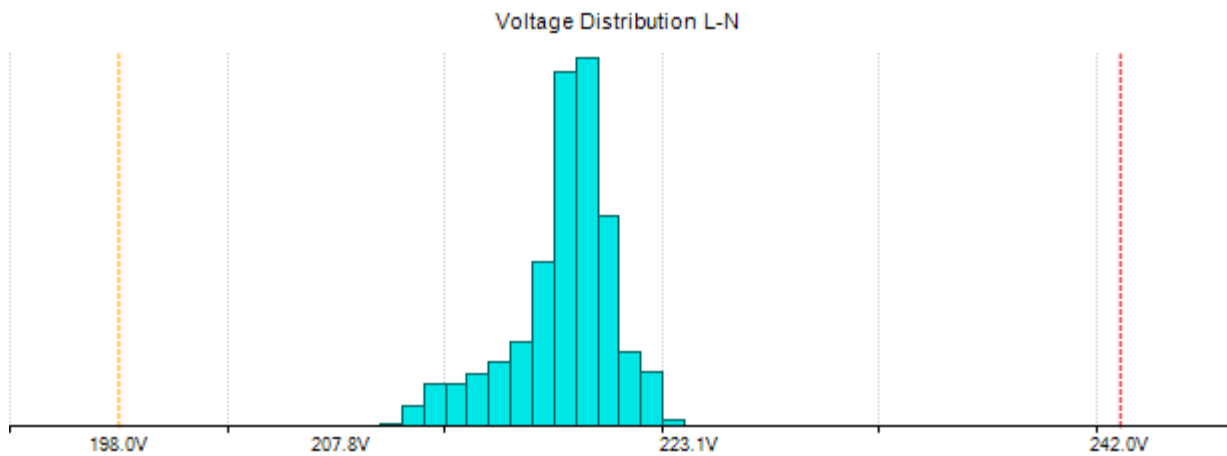
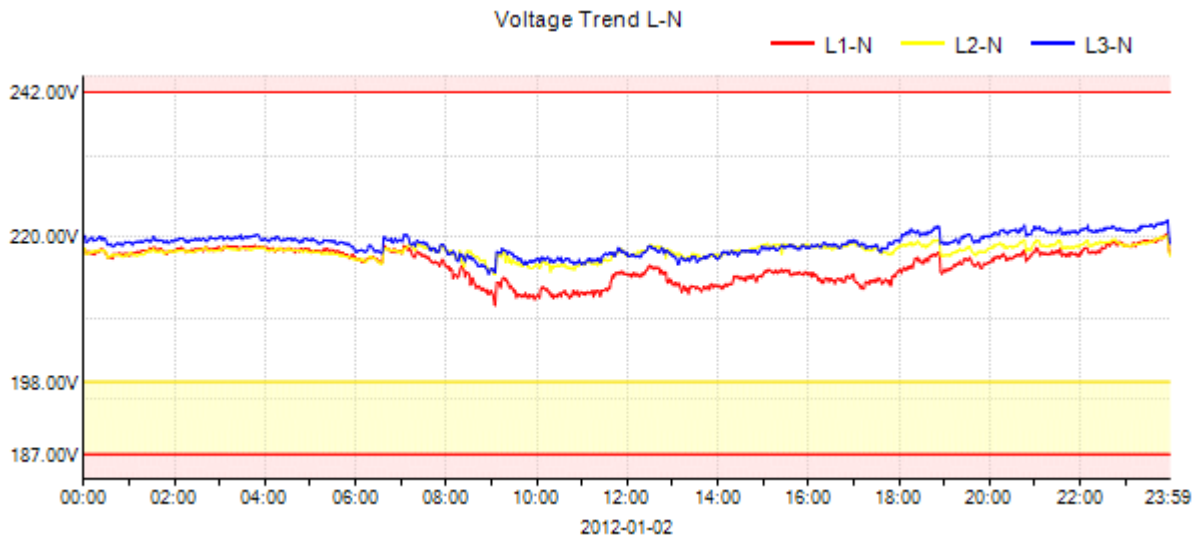
EN50160 4.2.2: Supply Voltage Variations

Nominal Voltage: 220.00V L-N / 380.00V L-L

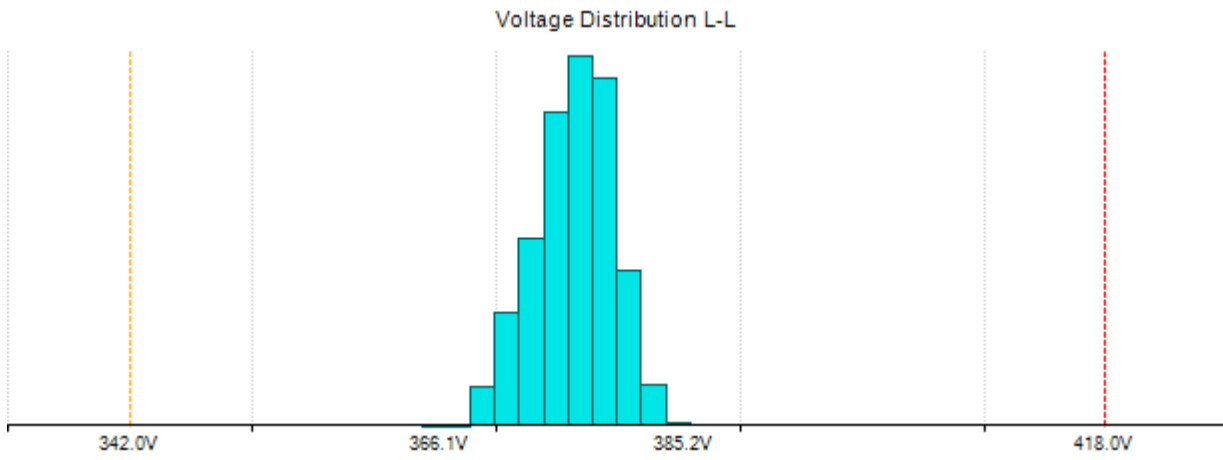
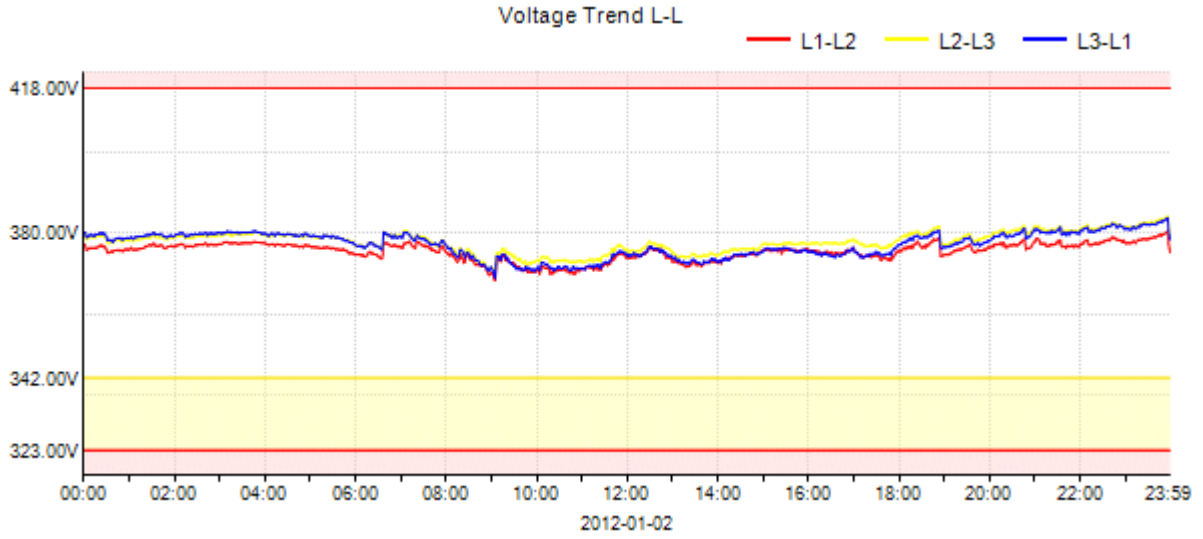
Parameter definition: 10 minute mean RMS value of the supply voltage

Limitation: For systems with a synchronous connection to an interconnected system

EN50160 Requirement	Measured L1 Voltage	Measured L2 Voltage	Measured L3 Voltage	Result
95% of day: 198.00V - 242.00V	211.49V~219.01V	215.74V~219.17V	216.36V~221.29V	PASS
100% of day: 187.00V - 242.00V	210.96V~219.64V	215.28V~219.80V	215.07V~221.97V	PASS



JSDATA Test - Day 2012-01-02

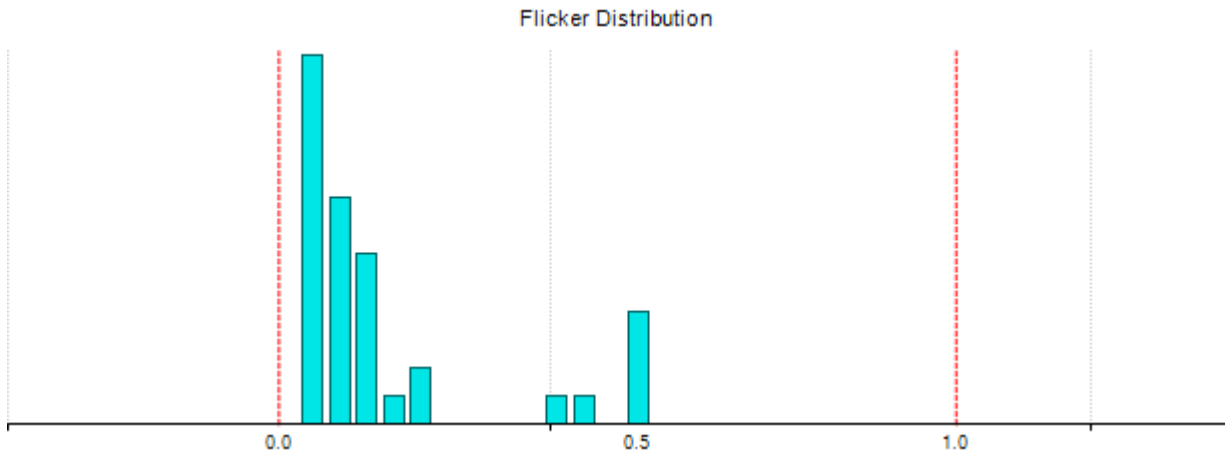
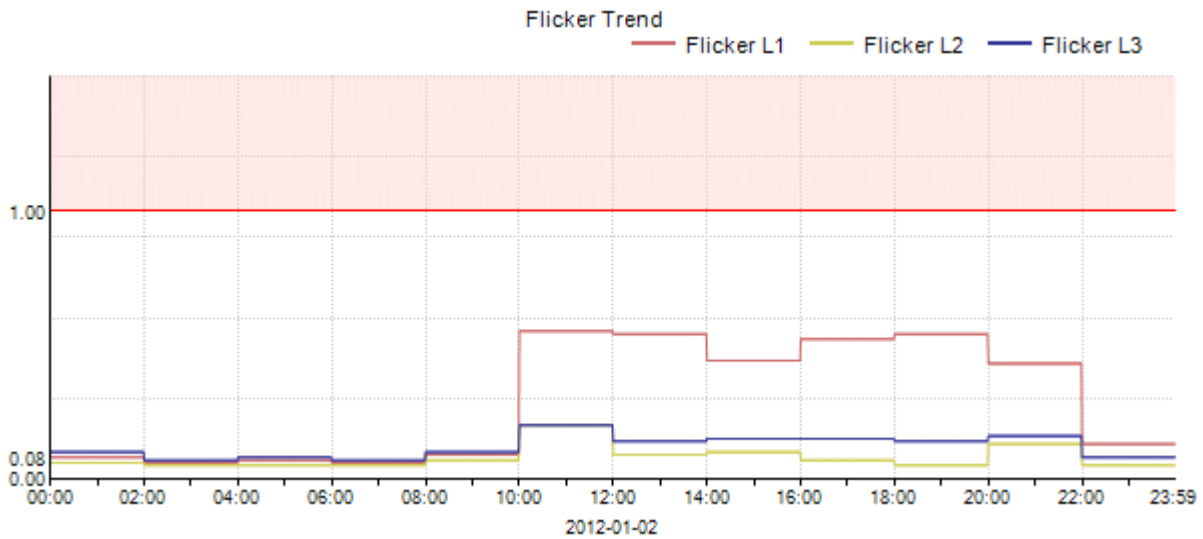


EN50160 4.2.3: Flicker Severity

Parameter definition: Long term flicker severity Plt (2 hour intervals)

Limitation: Under normal operating conditions

EN50160 Requirement	Measured L1 Plt	Measured L2 Plt	Measured L3 Plt	Result
95% of day: $Plt \leq 1$	0.55	0.20	0.20	PASS

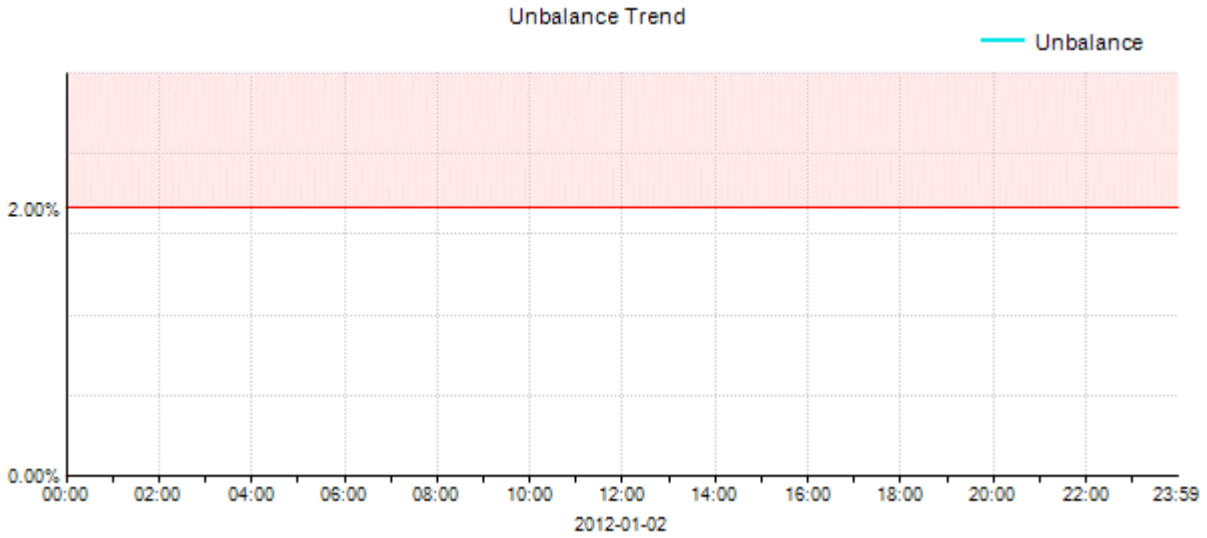


EN50160 4.2.4: Voltage Unbalance

Parameter definition: 10 minute mean RMS values of the negative sequence ratio u_2

Limitation: Under normal operating conditions

EN50160 Requirement	Measured Unbalance u_2	Result
95% of day: 0% ~ 2% u_2	999.90%	FAIL



EN50160 4.2.5: Harmonic Voltages

Parameter definition: 10 minute mean RMS values of each individual harmonic voltage

Limitation: Under normal operating conditions

L1-N Harmonics Table

Odd Harmonics								Even Harmonics			
Not multiples of 3				Multiples of 3							
Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result
H5	6.0%	2.415%	PASS	H3	5.0%	4.045%	PASS	H2	2.0%	0.062%	PASS
H7	5.0%	1.277%	PASS	H9	1.5%	1.375%	PASS	H4	1.0%	0.080%	PASS
H11	3.5%	1.557%	PASS	H15	0.5%	0.912%	FAIL	H6	0.5%	0.059%	PASS
H13	3.0%	1.345%	PASS	H21	0.5%	0.368%	PASS	H8	0.5%	0.043%	PASS
H17	2.0%	1.063%	PASS					H10	0.5%	0.035%	PASS
H19	1.5%	0.477%	PASS					H12	0.5%	0.038%	PASS
H23	1.5%	0.142%	PASS					H14	0.5%	0.038%	PASS
H25	1.5%	0.155%	PASS					H16	0.5%	0.039%	PASS
								H18	0.5%	0.043%	PASS
								H20	0.5%	0.028%	PASS
								H22	0.5%	0.029%	PASS

L2-N Harmonics Table

Odd Harmonics								Even Harmonics			
Not multiples of 3				Multiples of 3							
Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result
H5	6.0%	1.516%	PASS	H3	5.0%	2.499%	PASS	H2	2.0%	0.089%	PASS
H7	5.0%	1.305%	PASS	H9	1.5%	1.252%	PASS	H4	1.0%	0.137%	PASS
H11	3.5%	1.373%	PASS	H15	0.5%	0.764%	FAIL	H6	0.5%	0.115%	PASS
H13	3.0%	0.855%	PASS	H21	0.5%	0.385%	PASS	H8	0.5%	0.072%	PASS
H17	2.0%	0.977%	PASS					H10	0.5%	0.044%	PASS
H19	1.5%	0.442%	PASS					H12	0.5%	0.073%	PASS
H23	1.5%	0.206%	PASS					H14	0.5%	0.108%	PASS
H25	1.5%	0.157%	PASS					H16	0.5%	0.145%	PASS
								H18	0.5%	0.069%	PASS
								H20	0.5%	0.063%	PASS
								H22	0.5%	0.044%	PASS

L3-N Harmonics Table

Odd Harmonics								Even Harmonics			
Not multiples of 3				Multiples of 3							
Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result	Order h	EN50160 limit	95% value	Result
H5	6.0%	1.647%	PASS	H3	5.0%	3.022%	PASS	H2	2.0%	0.056%	PASS
H7	5.0%	1.702%	PASS	H9	1.5%	1.126%	PASS	H4	1.0%	0.071%	PASS
H11	3.5%	1.494%	PASS	H15	0.5%	0.948%	FAIL	H6	0.5%	0.069%	PASS
H13	3.0%	0.792%	PASS	H21	0.5%	0.452%	PASS	H8	0.5%	0.061%	PASS
H17	2.0%	1.075%	PASS					H10	0.5%	0.070%	PASS
H19	1.5%	0.620%	PASS					H12	0.5%	0.099%	PASS
H23	1.5%	0.154%	PASS					H14	0.5%	0.127%	PASS
H25	1.5%	0.109%	PASS					H16	0.5%	0.116%	PASS
								H18	0.5%	0.074%	PASS
								H20	0.5%	0.053%	PASS
								H22	0.5%	0.049%	PASS

EN50160 4.2.6: Interharmonic Voltages

Parameter definition: 10 minute mean RMS values of each interharmonic voltage group.

Limitation: Levels are under consideration in EN50160, but there are no limits at present.

L1-N Interharmonics Table

Odd Interharmonics								Even Interharmonics			
Not multiples of 3				Multiples of 3							
Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value
IH5	0.029%	0.038%	0.045%	IH3	0.031%	0.043%	0.064%	IH2	0.029%	0.037%	0.049%
IH7	0.029%	0.036%	0.040%	IH9	0.028%	0.036%	0.041%	IH4	0.030%	0.042%	0.054%
IH11	0.028%	0.036%	0.051%	IH15	0.029%	0.038%	0.045%	IH6	0.029%	0.038%	0.044%
IH13	0.029%	0.038%	0.044%	IH21	0.030%	0.043%	0.052%	IH8	0.028%	0.037%	0.041%
IH17	0.029%	0.038%	0.045%					IH10	0.028%	0.035%	0.043%
IH19	0.029%	0.038%	0.050%					IH12	0.029%	0.038%	0.048%
IH23	0.031%	0.041%	0.057%					IH14	0.029%	0.038%	0.055%
								IH16	0.028%	0.036%	0.041%
								IH18	0.029%	0.039%	0.047%
								IH20	0.029%	0.036%	0.053%
								IH22	0.029%	0.041%	0.051%

L2-N Interharmonics Table

Odd Interharmonics								Even Interharmonics			
Not multiples of 3				Multiples of 3							
Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value
IH5	0.029%	0.041%	0.050%	IH3	0.030%	0.040%	0.054%	IH2	0.029%	0.041%	0.051%
IH7	0.029%	0.038%	0.052%	IH9	0.029%	0.038%	0.049%	IH4	0.030%	0.040%	0.057%
IH11	0.028%	0.035%	0.049%	IH15	0.030%	0.037%	0.048%	IH6	0.030%	0.040%	0.053%
IH13	0.030%	0.039%	0.043%	IH21	0.031%	0.043%	0.056%	IH8	0.029%	0.038%	0.043%
IH17	0.030%	0.039%	0.046%					IH10	0.028%	0.038%	0.043%
IH19	0.031%	0.043%	0.054%					IH12	0.030%	0.040%	0.063%
IH23	0.031%	0.041%	0.050%					IH14	0.029%	0.039%	0.045%
								IH16	0.029%	0.038%	0.040%
								IH18	0.029%	0.039%	0.046%
								IH20	0.030%	0.042%	0.048%
								IH22	0.030%	0.041%	0.049%

L3-N Interharmonics Table

Odd Interharmonics								Even Interharmonics			
Not multiples of 3				Multiples of 3							
Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value	Order h	Average value	95% value	Max value
IH5	0.029%	0.040%	0.053%	IH3	0.030%	0.041%	0.047%	IH2	0.029%	0.037%	0.045%
IH7	0.029%	0.039%	0.052%	IH9	0.029%	0.037%	0.071%	IH4	0.030%	0.041%	0.050%
IH11	0.030%	0.038%	0.098%	IH15	0.033%	0.044%	0.122%	IH6	0.030%	0.039%	0.047%
IH13	0.032%	0.042%	0.121%	IH21	0.030%	0.039%	0.051%	IH8	0.028%	0.036%	0.057%
IH17	0.030%	0.039%	0.093%					IH10	0.028%	0.036%	0.052%
IH19	0.029%	0.038%	0.055%					IH12	0.031%	0.042%	0.062%
IH23	0.031%	0.040%	0.049%					IH14	0.030%	0.044%	0.073%
								IH16	0.030%	0.040%	0.061%
								IH18	0.029%	0.037%	0.049%
								IH20	0.029%	0.039%	0.049%
								IH22	0.029%	0.036%	0.051%

EN50160 4.3.1: Interruptions

No interruptions during 2012-01-02

EN50160 4.3.2: Dips

No dips during 2012-01-02

EN50160 4.3.3: Swells

No swells during 2012-01-02

EN50160 4.3.4: Transient overvoltages

No transients during 2012-01-02

Conclusions
EN50160 Compliance
2012-01-02

EN50160 Pass-Fail Requirements Table

EN50160 Section	Power Quality Parameter	EN50160 Compliance	Remarks
4.2.1	Power Frequency	PASS	
4.2.2	Supply Voltage Variations	PASS	
4.2.3	Flicker Severity	PASS	
4.2.4	Voltage Unbalance	FAIL	Exceeds Limits
4.2.5	Harmonic Voltages	FAIL	L1 harmonics exceed limits

EN50160 Additional Information Table

EN50160 Section	Power Quality Parameter	Remarks
4.2.6	Interharmonic Voltages	Data only
4.2.7	Mains Signaling	Not measured
4.3.1	Interruptions	
4.3.2	Dips	
4.3.3	Swells	
4.3.4	Transient overvoltages	

- Note 1: During 2012-01-02 measurements were made 100.00% of the time
 Note 2: Low Voltage Systems (< 1 kV) limits were used.
 Note 3: Flagged data was excluded from this report.

Instrument used: PQube® (www.PQube.com)
 Manufacturer: Power Standards Lab, U.S.A.
 PQube ID: JSDATA Test
 Location: JSDATA 사무실
 Serial number: P004001
 Firmware revision: 2.0.0 2771
 Calibration Certificate: <http://www.PowerStandards.com/CalibCerts/P004001.pdf>
 Report Software: PQube Report Writer 2.1.2.0
 Author of Report: (주)재신정보
 Name: JSI_Seochu, Seoul

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