APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0528

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Toshiba International Corporation

Manufacturer's Technical Representative: Tiffany Tye

Mailing Address: 13131 West Little York Road, Houston, TX 77041

Telephone: (855) 803-7087 Email: tiffany.tye@toshiba.com

Product Information

Product Name: UPS and Batteries

Product Type: UPS

Product Model Number: G9000 and G2020 Uninterruptible Power Systems

General Description: UPS with carbon steel enclosures and Si & SiC power modules.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: Manwill Engineering LLC

Contact Person: Derek Manwill

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102 Email: derek@manwillSE.com

Title: President

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: MANWILL ENGINEERING LLC

Name: Derek Manwill California License Number: S6266

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102 Email: derek@manwillse.com

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)

Contact Person: Jeremy Lange

Mailing Address: 11034 Indian Trail, Dallas TX 75229-3513

Telephone: (972) 247-9657 Email: Jeremy@etldallas.com

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.16 (SDS=1.54, z/h=1), 0.90 (SDS=2.00, z/h=0)

S_{DS} (Design spectral response acceleration at short period, g) = 1.54 (z/h=1), 2.00 (z/h=0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 04/06/2028

Date: 4/6/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = See Above z/h = See Above

Condition of Approval (if applicable):

ATTACHMENT 1: CERTIFIED COMPONENTS

SPECIAL SEISMIC CERTIFICATION

TABLE 1

DOCUMENT NO.: 17011CR2.0

MANUFACTURER: TOSHIBA INTERNATIONAL CORPORATION

PRODUCT FAMILY: G9000 AND G2020 UNINTERRUPTIBLE POWER SYSTEMS

MODEL NUMBER	DIMENSIONS (in)			MAX. WT. (lb)	DESCRIPTION / NOTES	BASIS
	DEPTH	WIDTH	HEIGHT			
G9000 Uninterruptible Power Systems						
T9XS3S10KS6XSN2 (100kVA)	32.7	27.6	78.7	772		EXTRAP
T9XS3S10KS6XSN (100kVA)	32.8	27.6	78.7	866	Si power modules	**UUT 1**
T9XS3S16KS6XSN2 (160kVA)	32.7	27.6	78.7	860		INTERP
T9XS3S16KS6XSN (160kVA)	32.7	35.4	78.7	1200		INTERP
T9XS3S22KS6XSN2 (225kVA)	32.7	35.4	78.7	1080		INTERP
T9XS3S22KS6XSN (225kVA)	32.7	35.4	78.7	1250		INTERP
T9XS3S30KS6XSN (300kVA)	32.8	51.2	78.7	2260		INTERP
T9XS3S50KS6XSN (500kVA)	32.8	70.9	78.7	3300		INTERP
T9XS3S65KS6XSN (650kVA)	32.8	90.6	78.7	4062		INTERP
T9XS3S75KS6XSN (750kVA)	32.8	90.6	78.7	4062	Si power modules	**UUT 2**
G2020 Uninterruptible Power Systems						
T200H0500KWWW (500kVA)	33.5	59.1	78.7	2756		INTERP
T200H0750KWWW (750kVA)	33.5	81.6	78.7	3565	SiC power module	**UUT 3**

MOUNTING:	Rigid floor mounted.	**SEISMIC LEVELS:**	S_{DS} = 1.54g for z/h = 1 S_{DS} = 2.00g for z/h = 0	I_P = 1.5

NOTES:

Product Construction: Carbon steel cabinet. The G9000 and G2020 have similar construction, configuration, and mounting.
Options/Subcomponents: The G9000 and G2020 have the same configuration, manufacturers, and materials of subcomponents, except for the material of the power modules. The G9000 uses silicon (Si) for the power modules, while the G2020 uses silicon carbide (SiC); the configuration is similar and the manufacturers are the same for the power modules.
Note 1. X in 3rd digit of G9000 model number denotes main controller generation: 0 for Generation 1, 1 for Generation 2. Generation 1 tested in UUT 1 and UUT 2; Generation 2 tested in UUT 3.

ATTACHMENT 2: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

DOCUMENT NO.: 17011CR2.0

UUT 1 - G9000 100kVA

MANUFACTURER:	TOSHIBA INTERNATIONAL CORPORATION					
MODEL NUMBER:	T90S3S10KS6XSN (100kVA)					
UNIT FUNCTION:	UNINTERRUPTIBLE POWER SYSTEM					
SERIAL NUMBER:	08-7E445120012					
DIMENSIONS (in)			**WEIGHT (lb)**	**RES. FREQ. (Hz)**		
DEPTH	**WIDTH**	**HEIGHT**		**F-B**	**S-S**	**V**
32.8	27.6	78.7	866	7.9	5.0	18.9
CODE & CRITERIA:	2019 CBC			ICC-ES AC156		
TEST LABORATORY:	ENVIRONMENTAL TESTING LABORATORY					
REPORT & DATE:	SQ37-1010-1			September 28, 2010		
S_{DS} (g)	**z/h**	**A_{FLX-H} (g)**	**A_{RIG-H} (g)**	**A_{FLX-V} (g)**	**A_{RIG-V} (g)**	
1.54	**1**	**2.46**	**1.85**	**1.34**	**0.54**	
2.00	**0**					

IMPORTANCE FACTOR, I_P = 1.5
Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

MOUNTING:	Rigid floor mounted using (4) 1/2" ASTM A307 bolts.
CONSTRUCTION:	NEMA 1 carbon steel enclosure, Si power modules.
SUBCOMPONENTS:	Subcomponents uniquely identified by model number.
TESTING NOTES:	No 45-degree performed on uniaxial. Therefore, values have been adjusted down by a factor of 1.3 for orthogonality.

UUT 2 - G9000 750kVA

MANUFACTURER:	TOSHIBA INTERNATIONAL CORPORATION					
MODEL NUMBER:	T90S3S75KS6XSN (750kVA)					
UNIT FUNCTION:	UNINTERRUPTIBLE POWER SYSTEM					
SERIAL NUMBER:	09-7E415710081					
DIMENSIONS (in)			**WEIGHT (lb)**	**RES. FREQ. (Hz)**		
DEPTH	**WIDTH**	**HEIGHT**		**F-B**	**S-S**	**V**
32.8	90.6	78.7	4062	5.8	5.4	5.7
CODE & CRITERIA:	2019 CBC			ICC-ES AC156		
TEST LABORATORY:	ENVIRONMENTAL TESTING LABORATORY					
REPORT & DATE:	SQ37-1010-1			September 29, 2010		
S_{DS} (g)	**z/h**	**A_{FLX-H} (g)**	**A_{RIG-H} (g)**	**A_{FLX-V} (g)**	**A_{RIG-V} (g)**	
1.54	**1**	**2.46**	**1.85**	**1.34**	**0.54**	
2.00	**0**					

IMPORTANCE FACTOR, I_P = 1.5
Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

MOUNTING:	Rigid floor mounted using (10) 5/8" ASTM A307 bolts.
CONSTRUCTION:	NEMA 1 carbon steel enclosure, Si power modules.
SUBCOMPONENTS:	Subcomponents uniquely identified by model number.
TESTING NOTES:	No 45-degree performed on uniaxial. Therefore, values have been adjusted down by a factor of 1.3 for orthogonality. LCD display will be secured with screws instead of friction clip to ensure separation of display parts does not occur. Enhancements will be incorporated into production units.

UUT 3 - G2020 750kVA

MANUFACTURER:	TOSHIBA INTERNATIONAL CORPORATION
MODEL NUMBER:	T200H0750KWWW (750kVA)
UNIT FUNCTION:	UNINTERRUPTIBLE POWER SYSTEM
SERIAL NUMBER:	17530069

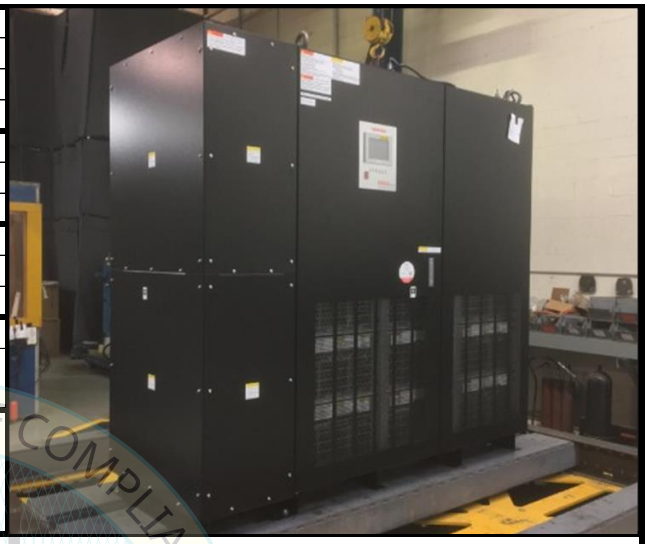
DIMENSIONS (in)			WEIGHT	RES. FREQ. (Hz)		
DEPTH	WIDTH	HEIGHT	(lb)	F-B	S-S	V
33.5	81.6	78.7	3565	5.6	9.1	17.3

CODE & CRITERIA:	2019 CBC	ICC-ES AC156	
TEST LABORATORY:	ENVIRONMENTAL TESTING LABORATORY		
REPORT & DATE:	17011TR1.1	May 31, 2017	

S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
2.00	1	3.20	2.40	1.34	0.54
2.00	0				

IMPORTANCE FACTOR, I_P = 1.5

Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.



MOUNTING:	Rigid floor mounted using (6) 5/8" Grade 8 bolts.
CONSTRUCTION:	NEMA 1 carbon steel enclosure, SiC power modules.
SUBCOMPONENTS:	Subcomponents uniquely identified by model number.
TESTING NOTES:	Upper latch assembly modified to ensure door closure. Enhancements will be incorporated into production units.

ATTACHMENT 3: MODEL NOMENCLATURE

SPECIAL SEISMIC CERTIFICATION

DOCUMENT NO.: 17011CR2.0

G9000

DIGIT:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAMPLE:	T	9	0	S	3	S	1	0	K	S	6	X	S	N	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DIGIT	DIGIT DESCRIPTION	CODES	DEFINITIONS
1-2	Product line	T9	G9000 Series
3	Controller Generation	0	Generation 1
		1	Generation 2
4	Input/Output Voltage	S	480V 3-Phase/3-Wire + Gnd
5	Phase Input/Output	3	Three Phase Input/Output
6	Input/Output Voltage	S	480V 3-Phase/3-Wire + Gnd
7-9	kVA Rating	10K	100kVA
		16K	160kVA
		22K	225kVA
		30K	300kVA
		50K	500kVA
		65K	650kVA
		75K	750kVA
10	Alternate Input	S	480V 3-Phase/3-Wire
11	Output Frequency	6	60Hz
12	Maintenance Bypass Option	X	Not Included
13	Options 1 Model	S	Single Module (Standard)
14	UPS Type	N	New Unit
		R	Refurbished
15	Enhanced Model	-	Generation 1 Model
		2	Enhanced Model (Generation 2)

G2020

DIGIT:	1	2	3	4	5	6	7	8	9	10	11	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAMPLE:	T	2	0	0	H	0	7	5	0	K	W	W	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DIGIT	DIGIT DESCRIPTION	CODES	DEFINITIONS
1-3	Product line	T20	G2020 Series
4	Revision Number	0	0
5	Phase/Frequency	H	3 Phase in/3 Phase Out 60 Hz
6-10	kVA Rating	0500K	500kVA
		0750K	750kVA
11	Input Voltage	W	480V
12	Output Voltage	W	480V
13	Bypass Voltage	W	480V