FCC CERTIFICATION REPORT

Test Report No. : E1/2014/70052

Applicant	**: Toshiba Co., Semiconductor & Storage**
Address	**: 2-5-1, Kasama, Sakae-Ku, Yokohama 247-8585, Japan**
Manufacture	**: Toshiba Co., Semiconductor & Storage**
Address	**: 2-5-1, Kasama, Sakae-Ku, Yokohama 247-8585, Japan**

Equipment Under Test (EUT) :

Product Name	**: FlashAir**
Brand Name	**: N/A**
Model No.	**: WLSDTHNSWAAC**
Added Model(s)	**: N/A**
FCC ID No	**: ZVZP42350FA3**
IC ID	**: 9906A-P42350FA3**

Standards	**:** FCC Part 15:2013, Subpart B, Class B Canada ICES-003 Issue 5(Aug. 2012)
Date of Receipt	**: Jul. 28, 2014**
Date of Test	**: Jul. 28 ~ Aug. 13, 2014**
Date of Issue	**: Sep. 04, 2014**

Test Result :	**PASS**

In the configuration tested, the EUT complied with the standards specified above.

Remarks :

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report shall not be reproduced except in full, without the written approval of the laboratory. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Tested By:	Vicky Chao	***Date***	Sep. 04, 2014
	Vicky Chao(Engineer)		
Approved By	Victor Wen	***Date***	Sep. 04, 2014
	Victor Wen(Assistant Manager)		

Version

Version No.	Description	Date
00	Original report	Sep. 04, 2014

Contents

1. General Information

1.1 Applicant & Manufacturer Information

Applicant	: Toshiba Co., Semiconductor & Storage
Address of Applicant	: 2-5-1, Kasama, Sakae-Ku, Yokohama 247-8585, Japan
Manufacturer	: Toshiba Co., Semiconductor & Storage
Address of Manufacturer	: 2-5-1, Kasama, Sakae-Ku, Yokohama 247-8585, Japan

1.2 General Description of EUT

Product Name	: FlashAir
Brand Name	: N/A
Model No.	: WLSDTHNSWAAC
Added Model(s)	: N/A
Model Difference	: N/A

1.3 Details of EUT

Power Supply	: From PC System
Modes/Function	: SD R/W
Worst case	: SD R/W
Maximum Clock Frequency	: 2472 MHz
Adapter	: N/A

1.4 Operation Procedure

1. Set up EUT with support units and turn on the power of all equipments.
2. Pre-test the EUT in all modes by each mode, then figure out the worst case.
3. Operate EUT under normal operation pattern.

1.5 Description of Support Units

PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
PRINTER	HP	Deskjet 2000	CN33K19J3R
MOUSE	Logitech	M-U0026	1310HS02PYD8
NB (by clicent)	TOSHIBA	PORTEGE R930 Series	PT-330N-0C703V
NB Adaptor (by clicent)	TOSHIBA	PA3714U-1ACA	G71C000AE412

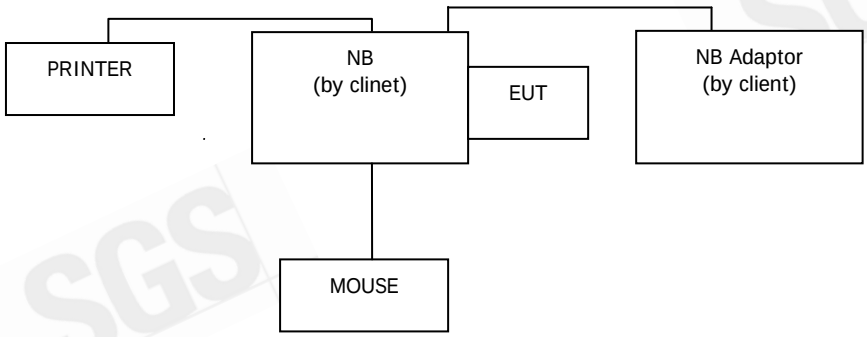
1.6 Modification List

No modification was made by SGS Taiwan Electronics & Communication Laboratory.

1.7 Cable List

Cable Type	Length	Shielding/Non-shielding
N/A	N/A	N/A

1.8 Test Set-Up Configuration



1.9 Measurment Procedure

Conducted Emission Testing was performed according to ANSI C63.4:2009 in a shielded room with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded room wall.

Radiated Emission Testing was performed according to ANSI C63.4:2009 at the 10m semi-anechoic chamber. The EUT was placed on a 0.8m high table along with the peripherals. The turn table was placed 10m distance from the antenna. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for production of maximum emission.

The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Maximum emission levels are then reported.

1.10 Standards Applicable for Testing

Tests to be carried out under FCC Part 15, Subpart B

Test Standards	Status
FCC Part 15, Subpart B	Applicable
Deviation from Standard	No deviation

1.11 Summary of Results

Highest Emission					
Standard	**Test Type**	**Result**	**Phase/Pol.**	**Frequency(MHz)**	**Margin(dB)**
FCC Part 15 Subpart B Class B / CISPR 22 Class B Canada ICES-003 Issue 5(Aug. 2012)	Conducted Emission	PASS	Line	0.1980	-14.64(QP)
			Neutral	0.1820	-15.96(QP)
	Radiated Emission	PASS	Ver.	32.2700	-6.81(QP)

2. EMISSION

2.1 Test Results

	Results
Conducted Emission	**Pass**
Radiated Emission	**Pass**

2.2 Frequency Range

Conducted Emission : 150 kHz - 30 MHz

Radiated Emission : See below table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

2.3 Limits of Conducted and Radiated Emission

2.3.1 Limits of Conducted Emission for FCC Part 15, Subpart B/CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi - peak	Average	Quasi - peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note : (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.
(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected there to, shall not exceed the level of field strengths specified above.

2.3.2 Limits of Radiated Emissions for FCC Part 15, Subpart B/CISPR 22

FCC Limit:

- Detector Function : Quasi – Peak

FREQUENCY (MHz)	Class A (at 10m) dBuV/m	Class B (at 3m) dBuV/m
30~88	39	40
88~216	43.5	43.5
216~960	46.44	46
Above 960	49.54	54

- Detector Function : Peak , Average

FREQUENCY (MHz)	Class A (dBuV) (at 3m)		Class B (dBuV) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	79.3	59.3	73.9	53.9

CISPR Limit:

- Detector Function : Quasi – Peak

FREQUENCY (MHz)	Class A (at 10m) dBuV/m	Class B (at 10m) dBuV/m
30-230	40	30
230-1000	47	37

- Detector Function : Peak , Average – Class A

Frequency range GHz	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 to 3	56	76
3 to 6	60	80

- Detector Function : Peak , Average – Class B

Frequency range GHz	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 to 3	50	70
3 to 6	54	74

Note : The lower limit applies at the transition frequency.

2.4.Test of Conducted Emission

2.4.1 Test Equipments

SGS Conducted Emission Test Site No. A					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESCI 3	101311	Jun. 20, 2014	Jun. 19, 2015
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	Feb. 07, 2014	Feb. 06, 2015
LISN	Schwarzbeck	NSLK 8127	8127-648	Jun. 10, 2014	Jun. 09, 2015
Pulse Limiter	Narda S.T.S.	PMM PL01	1110X30602	Nov. 26, 2012	Nov. 25, 2014
LISN	Rolf-Heine	NNB-2/16Z	99012	Mar. 26, 2014	Mar. 25, 2015
ISN	TESEQ	ISN T800	34384	Mar. 06, 2014	Mar. 05, 2015
ISN	TESEQ	ISN ST08	36271	Oct. 02, 2013	Oct. 01, 2014
ISN	TESEQ	ISN PLT	32616	Oct. 11, 2013	Oct. 10, 2014
RF Current Probe	Schwarzbeck	SW 9605	SW 9605-138	Oct. 02, 2013	Oct. 01, 2014
Capacitive Voltage Probe	Schwarzbeck	CVP 9222	9222-031	Oct. 02, 2013	Oct. 01, 2014
DC LISN	Schwarzbeck	NNBM 8124	8124-564	Nov. 07, 2013	Nov. 06, 2014
DC LISN	Schwarzbeck	NNBM 8124	8124-565	Nov. 07, 2013	Nov. 06, 2014
High Voltage Probe	Schwarzbeck	TK 9420	TK 9420-5223	Mar. 07, 2014	Mar. 06, 2015
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

2.4.2 Test Site

SGS Taiwan LTD. Electronics & Communication Laboratory
No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan333

2.4.3 Operating Environment

Temperature : 23 degree C Humidity : 61 %RH
Atmospheric Pressure : 992 mBar

2.4.4 Measurement Uncertainty of Conducted Emission

Expanded uncertainty (K=2) of conducted emission is 2.20 dB.

2.4.5 Measurement Level Calculation

Factor = LISN insertion loss + Cable loss
Measurement Level = Reading Level + Factor

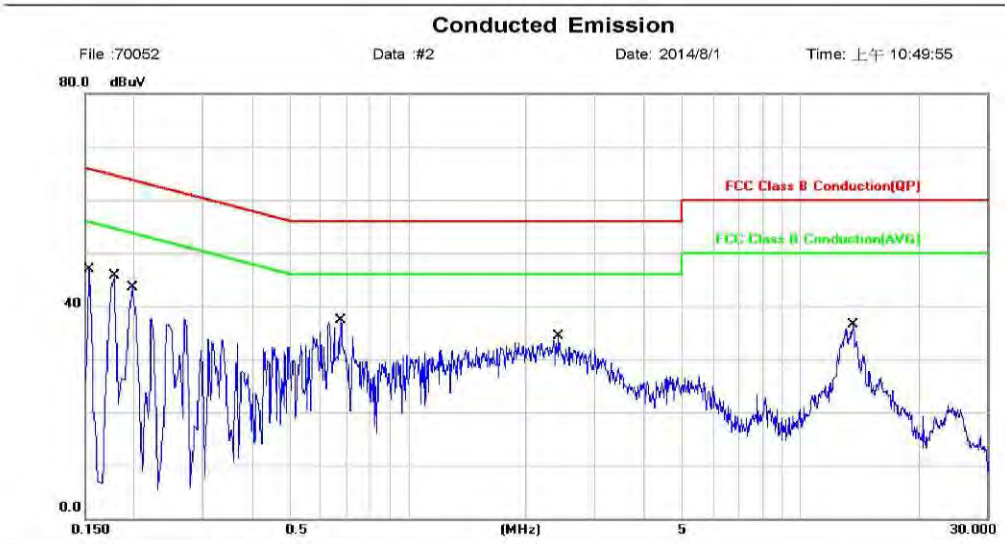
2.4.6 Measurement Data:

L

Site : Conduction Room
Limit: FCC Class B Conduction(QP)
Mode: SD R/W
Note: 32GB

Phase: L1
Power: From System

Temperature: 23 ℃
Humidity: 61 %



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1540	42.20	0.09	42.29	65.78	-23.49	QP	
2		0.1540	15.80	0.09	15.89	55.78	-39.89	AVG	
3		0.1780	44.30	0.09	44.39	64.58	-20.19	QP	
4		0.1780	23.50	0.09	23.59	54.58	-30.99	AVG	
5	*	0.1980	48.97	0.08	49.05	63.69	-14.64	QP	
6		0.1980	33.31	0.08	33.39	53.69	-20.30	AVG	
7		0.6740	32.00	0.30	32.30	56.00	-23.70	QP	
8		0.6740	21.12	0.30	21.42	46.00	-24.58	AVG	
9		2.4340	34.30	0.59	34.89	56.00	-21.11	QP	
10		2.4340	23.65	0.59	24.24	46.00	-21.76	AVG	
11		13.6660	37.85	0.61	38.46	60.00	-21.54	QP	
12		13.6660	28.09	0.61	28.70	50.00	-21.30	AVG	

*:Maximum data x:Over limit !:over margin

File :70052\Data :#2 Page: 1

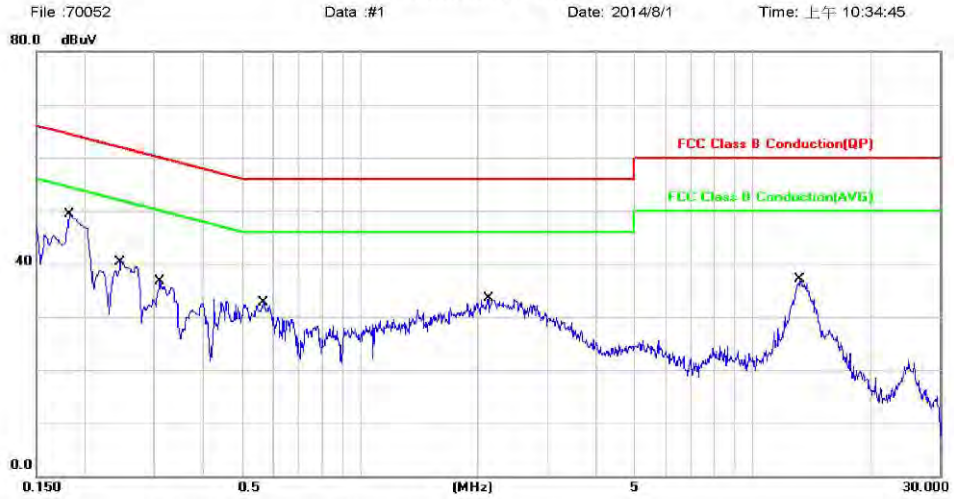
N

Site : Conduction Room
Limit: FCC Class B Conduction(QP)
Mode: SD R/W
Note: 32GB

Phase: N
Power: From System

Temperature: 23 ℃
Humidity: 61 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1820	48.33	0.10	48.43	64.39	-15.96	QP	
2		0.1820	29.43	0.10	29.53	54.39	-24.86	AVG	
3		0.2460	42.09	0.11	42.20	61.89	-19.69	QP	
4		0.2460	25.75	0.11	25.86	51.89	-26.03	AVG	
5		0.3100	37.13	0.14	37.27	59.97	-22.70	QP	
6		0.3100	23.00	0.14	23.14	49.97	-26.83	AVG	
7		0.5700	37.33	0.26	37.59	56.00	-18.41	QP	
8		0.5700	23.19	0.26	23.45	46.00	-22.55	AVG	
9		2.1260	35.10	0.58	35.68	56.00	-20.32	QP	
10		2.1260	23.40	0.58	23.98	46.00	-22.02	AVG	
11		13.2180	37.46	0.64	38.10	60.00	-21.90	QP	
12		13.2180	27.53	0.64	28.17	50.00	-21.83	AVG	

*:Maximum data x:Over limit !:over margin

File :70052\Data :#1 *Page: 1*

2.5 Test of Radiated Emission

2.5.1 Test Instruments

Below 1GHz

SGS 966 Chamber No. A					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESCI 7	100950	Jan. 11, 2014	Jan. 10, 2015
Broadband Antenna	SCHWAZBECK	VULB9168	9168-297	Jun. 03, 2014	Jun. 02, 2015
Biconical Antenna	Schwarzbeck	VHBB 9124	9124-560	Feb. 07, 2014	Feb. 06, 2015
Log-Periodic Antenna	Schwarzbeck	UHALP 9108 A	UHALP 9108-A 0990	Feb. 07, 2014	Feb. 06, 2015
Pre Amplifier	HP	8447D	1937A02834	Nov. 26, 2013	Nov. 25, 2014
Coaxial Cable	JUNFLOW	MWX221-NMSNMS	J0778929	Apr. 23, 2014	Apr. 22, 2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104PEA	30255/4PEA	Apr. 23, 2014	Apr. 22, 2015
DC LISN	Schwarzbeck	NNBM 8124	8124-564	Nov. 07, 2013	Nov. 06, 2014
DC LISN	Schwarzbeck	NNBM 8124	8124-565	Nov. 07, 2013	Nov. 06, 2014
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site NSA	SGS	966 Chamber A	SAC-A	Feb. 28, 2014	Feb. 27, 2015
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

Above 1GHz

SGS 966 Chamber No. A					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	R&S	FSV 40	101058	Jan. 13, 2014	Jan. 12, 2015
EMI Test Receiver	R&S	ESCI 7	100950	Jan. 11, 2014	Jan. 10, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	BBHA9120D803	Jan. 24, 2014	Jan. 23, 2015
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170-184	Jan. 23, 2014	Jan. 22, 2015
Horn Antenna	ETS-Lindgren	3160-09	00117911	Jan. 22, 2014	Jan. 21, 2015
Horn Antenna	ETS-Lindgren	3160-10	00117783	Jan. 22, 2014	Jan. 21, 2015
Pre Amplifier	EMC Instruments	EMC051825	980152	Dec. 24, 2013	Dec. 23, 2014
Pre Amplifier	R&S	SCU-18	10203	Mar. 26, 2014	Mar. 25, 2015
Pre Amplifier	R&S	SCU-26	100780	Mar. 26, 2014	Mar. 25, 2015
Pre Amplifier	R&S	SCU-40	100356	Mar. 26, 2014	Mar. 25, 2015
Pre Amplifier	EMC Instruments	EMC184045	980135	Jan. 24, 2014	Jan. 23, 2015
Coaxial Cable	JUNFLOW	MWX221-NMSNMS	J0778929	Apr. 23, 2014	Apr. 22, 2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104PEA	30255/4PEA	Apr. 23, 2014	Apr. 22, 2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	MY 2152/2	Jun. 06, 2014	Jun. 05, 2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	MY 2153/2	Jun. 06, 2014	Jun. 05, 2015
Communication Tester	R&S	CMW500	131121	Jan.16, 2014	Jan.15, 2015
Communication Tester	Anritsu	MT8820C	6201107337	Apr. 23,2014	Apr. 22,2015
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site VSWR	SGS	966 Chamber A	SAC-A	Jan. 18, 2014	Jan. 17, 2015
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

2.5.2 Test Site

SGS Taiwan LTD. Electronics & Communication Laboratory
No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan333

2.5.3 Operating Environment

Temperature : 22.2 degree C Humidity : 59 %RH
Atmospheric Pressure : 996 mBar

2.5.4 Measurement Uncertainty of Radiated Emission

Expanded uncertainty (k=2) of radiated emission measurement is 4.16 dB. (30-1000MHz)
Expanded uncertainty (k=2) of radiated emission measurement is 5.02 dB. (1-6GHz)

2.5.5 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain
Measurement Level = Reading Level + Correction Factor

2.5.6 Measurement Data

Below 1GHz

Horizontal Polarization

Site SGS 966 Chamber A
Limit: FCC Class B 3M Radiation
Mode: SD R/W
Note: 32GB

Polarization: *Horizontal*
Power: From System
Distance:

Temperature: 22.2 ℃
Humidity: 59 %

Radiated Emission

File :E1-2014-70052 Data :#4 Date: 2014/8/7 Time: 下午 07:59:48

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		32.2500	36.13	-13.92	22.21	40.00	-17.79	QP	
2	*	89.2500	49.33	-19.40	29.93	43.50	-13.57	QP	
3		119.2800	39.96	-15.49	24.47	43.50	-19.03	QP	
4		239.3000	43.24	-14.66	28.58	46.00	-17.42	QP	
5		354.9800	39.49	-11.26	28.23	46.00	-17.77	QP	
6		390.7000	39.73	-11.06	28.67	46.00	-17.33	QP	

*:Maximum data x:Over limit !:over margin

File :E1-2014-70052\Data :#4 *Page: 1*

Vertical Polarization

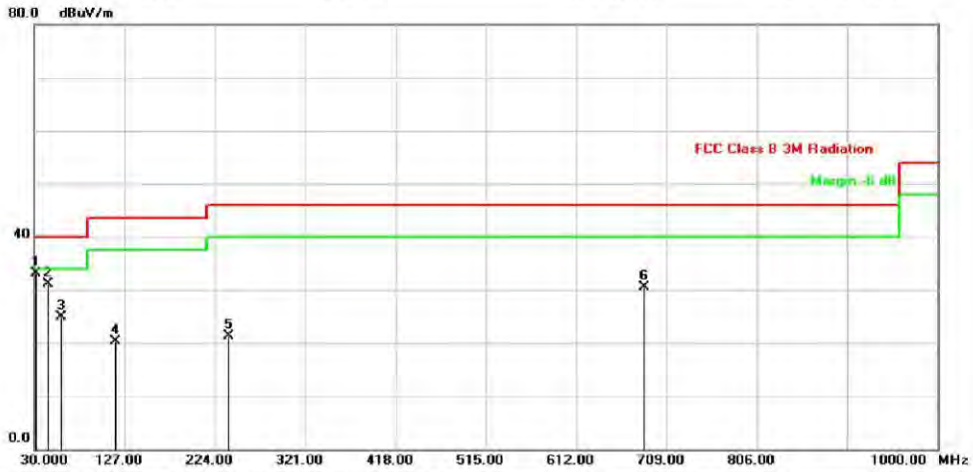
Site SGS 966 Chamber A
Limit: FCC Class B 3M Radiation
Mode: SD R/W
Note: 32GB

Polarization: *Vertical*
Power: From System
Distance:

Temperature: 22.2 ℃
Humidity: 59 %

Radiated Emission

File :E1-2014-70052 Data :#3 Date: 2014/8/7 Time: 下午 07:46:10



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	32.2700	47.11	-13.92	33.19	40.00	-6.81	QP	
2		44.2700	44.02	-12.98	31.04	40.00	-8.96	QP	
3		59.2500	38.75	-13.86	24.89	40.00	-15.11	QP	
4		117.8000	35.89	-15.64	20.25	43.50	-23.25	QP	
5		239.3000	35.98	-14.66	21.32	46.00	-24.68	QP	
6		685.5000	35.55	-5.02	30.53	46.00	-15.47	QP	

*:Maximum data x:Over limit !:over margin

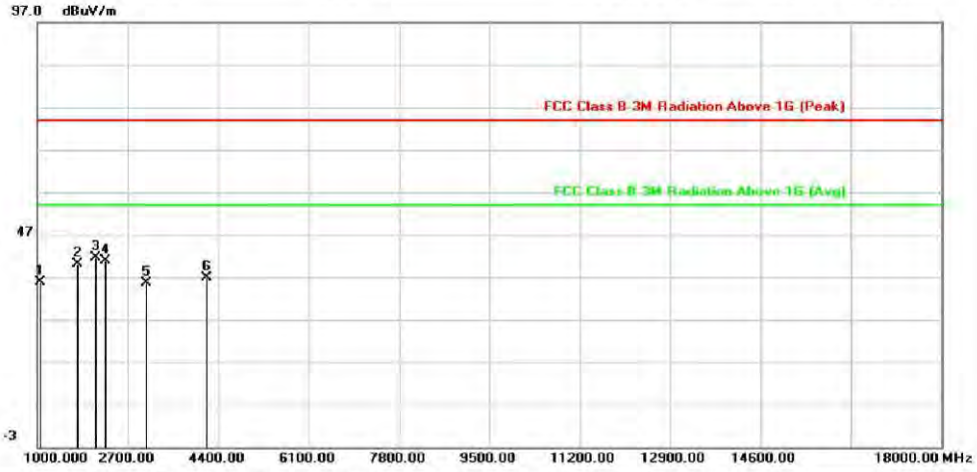
File :E1-2014-70052\Data :#3 *Page: 1*

Above 1GHz
Horizontal Polarization

Site SGS 966 Chamber A | Polarization: *Horizontal* | Temperature: 22.2 ℃
Limit: FCC Class B 3M Radiation Above 1G (Peak) | Power: From System | Humidity: 59 %
Mode: SD R/W | Distance:
Note: 32GB

Radiated Emission

File :E1-2014-70052 Data :#8 Date: 2014/8/10 Time: 下午 12:40:23



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1051.000	54.17	-18.22	35.95	74.00	-38.05	peak	
2		1748.000	55.55	-15.47	40.08	74.00	-33.92	peak	
3	*	2088.000	55.91	-14.38	41.53	74.00	-32.47	peak	
4		2275.000	54.57	-13.74	40.83	74.00	-33.17	peak	
5		3057.000	47.34	-11.76	35.58	74.00	-38.42	peak	
6		4179.000	46.28	-9.38	36.90	74.00	-37.10	peak	

*:Maximum data x:Over limit !:over margin

File :E1-2014-70052\Data :#8 *Page: 1*

Vertical Polarization

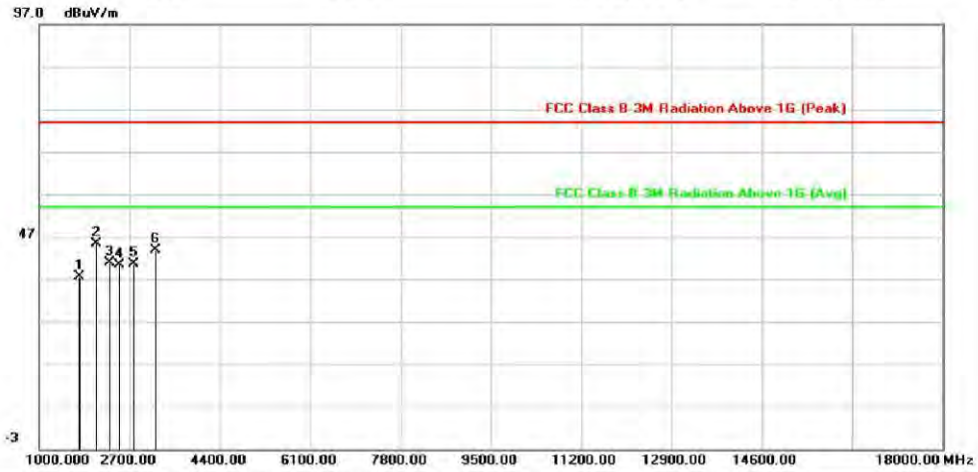
Site SGS 966 Chamber A
Limit: FCC Class B 3M Radiation Above 1G (Peak)
Mode: SD R/W
Note: 32GB

Polarization: *Vertical*
Power: From System
Distance:

Temperature: 22.2 ℃
Humidity: 59 %

Radiated Emission

File :E1-2014-70052 Data :#7 Date: 2014/8/10 Time: 下午 12:38:33



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1748.000	53.11	-15.47	37.64	74.00	-36.36	peak	
2	*	2071.000	59.80	-14.43	45.37	74.00	-28.63	peak	
3		2326.000	54.48	-13.57	40.91	74.00	-33.09	peak	
4		2513.000	53.38	-12.95	40.43	74.00	-33.57	peak	
5		2768.000	52.90	-12.31	40.59	74.00	-33.41	peak	
6		3193.000	55.64	-11.81	43.83	74.00	-30.17	peak	

*:Maximum data x:Over limit !:over margin

File :E1-2014-70052\Data :#7 *Page: 1*