STC Test Report

Date: 2015-08-04

No.: DM120402

Applicant:	Winspeed Co., LTD 14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District, New Taipei City, Taiwan
Manufacturer:	Winspeed Co., LTD 14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District, New Taipei City, Taiwan
Description of Sample(s):	Submitted sample(s) said to be Product: SPEEDLINK LUCIDIS Wireless Desket Brand Name: Speedlink Model Number: SL-640300-BK-US FCC ID: 2AEDNA16
Date Sample(s) Received:	2015-07-24
Date Tested:	2015-07-25 to 2015-08-01
Investigation Requested:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 and ANSI C63.10: 2013 for FCC Certification.
Conclusion(s):	The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.
Remark(s):	--- (Mouse)

LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited

STC Test Report

CONTENT:

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

1.0 General Details

1.1 Equipment Under Test [EUT]
Description of Sample(s)

Product:	SPEEDLINK LUCIDIS Wireless Deskset
Manufacturer:	Winspeed Co., LTD 14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District, New Taipei City, Taiwan
Brand Name:	Speedlink
Model Number:	SL-640300-BK-US
Rating:	3.0Vd.c. (Powered by “AAA” battery x2)

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a SPEEDLINK LUCIDIS Wireless Deskset. It is a transceiver operating at 2407MHz~2477MHz and the RF signal was modulated by IC.

1.3 Date of Order

2015-07-24

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2015-07-25 to 2015-08-01

1.6 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 Regulations and ANSI C63.10: 2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10: 2013	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.10: 2013	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249 & FCC 47CFR 15.209
Test Method:	ANSI C63.10: 2013
Test Date:	2015-07-25 to 2015-08-01
Mode of Operation:	Communication mode

Test Method:

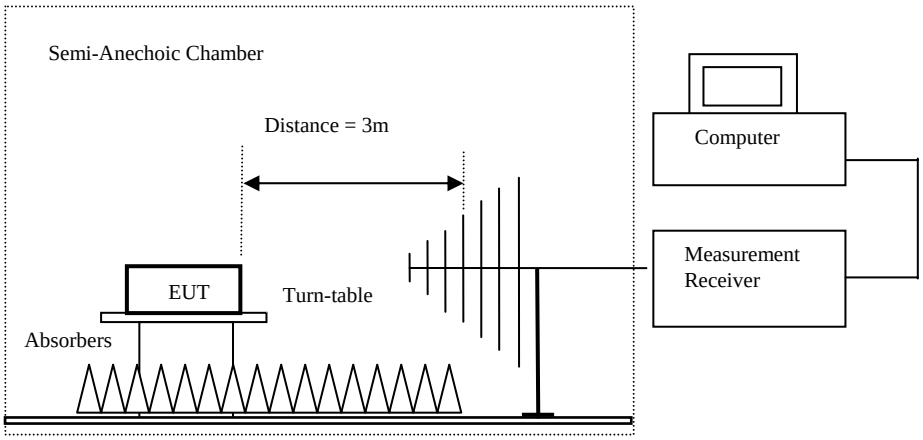
For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*: Semi-anechoic chamber located on the STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	1MHz
	VBW:	1MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Ground Plane

- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Quasi-Peak]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Lowest Frequency Channel-2407 MHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2407.00	43.1	36.8	79.9	9,885.5	500,000	Vertical
2407.00	42.6	36.4	79.0	8,912.5	500,000	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2407.00	28.8	36.8	65.6	1,905.5	50,000	Vertical
2407.00	28.9	36.4	65.3	1,840.8	50,000	Horizontal

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4814.0	3.7	41.5	45.2	182.0	5,000	Vertical
4814.0	3.3	42.4	45.7	192.8	5,000	Horizontal
7221.0	3.3	45.1	48.4	263.0	5,000	Vertical
7221.0	1.8	46.2	48.0	251.2	5,000	Horizontal
9628.0	2.5	48.0	50.5	335.0	5,000	Vertical
9628.0	1.4	48.8	50.2	323.6	5,000	Horizontal

Field Strength of Harmonics Emission Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4814.0	-7.5	41.5	34.0	50.1	500	Vertical
4814.0	-9.9	42.4	32.5	42.2	500	Horizontal
7221.0	-11.0	45.1	34.1	50.7	500	Vertical
7221.0	-9.9	46.2	36.3	65.3	500	Horizontal
9628.0	-9.4	48.0	38.6	85.1	500	Vertical
9628.0	-11.3	48.8	37.5	75.0	500	Horizontal

Results of Tx mode (Middle Frequency Channel- 2437MHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2437.00	42.3	36.8	79.1	9,015.7	500,000	Vertical
2437.00	42.5	36.4	78.9	8,810.5	500,000	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2437.00	28.5	36.8	65.3	1,840.8	50,000	Vertical
2437.00	28.6	36.4	65.0	1,778.3	50,000	Horizontal

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4874.0	3.4	41.6	45.0	177.8	5,000	Vertical
4874.0	2.6	42.5	45.1	179.9	5,000	Horizontal
7311.0	2.3	45.2	47.5	237.1	5,000	Vertical
7311.0	1.5	46.3	47.8	245.5	5,000	Horizontal
9748.0	2.3	48.1	50.4	331.1	5,000	Vertical
9748.0	0.2	48.9	49.1	285.1	5,000	Horizontal

Field Strength of Harmonics Emission Avarage Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4874.0	-8.4	41.6	33.2	45.7	500	Vertical
4874.0	-9.8	42.5	32.7	43.2	500	Horizontal
7311.0	-11.1	45.2	34.1	50.7	500	Vertical
7311.0	-11.7	46.3	34.6	53.7	500	Horizontal
9748.0	-10.5	48.1	37.6	75.9	500	Vertical
9748.0	-12.9	48.9	36.0	63.1	500	Horizontal

Results of Tx mode (Highest Frequency Channel – 2477MHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2477.00	42.5	36.8	79.3	9,225.7	500,000	Vertical
2477.00	42.3	36.4	78.7	8,609.9	500,000	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2477.00	28.7	36.8	65.5	1,883.6	50,000	Vertical
2477.00	28.4	36.4	64.8	1,737.8	50,000	Horizontal

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4954.0	3.8	41.4	45.2	182.0	5,000	Vertical
4954.0	1.4	42.7	44.1	160.3	5,000	Horizontal
7431.0	1.4	45.6	47.0	223.9	5,000	Vertical
7431.0	0.7	46.5	47.2	229.1	5,000	Horizontal
9908.0	0.9	48.6	49.5	298.5	5,000	Vertical
9908.0	0.9	49.7	50.6	338.8	5,000	Horizontal

Field Strength of Harmonics Emission Avarage Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4954.0	-8.9	41.4	32.5	42.2	500	Vertical
4954.0	-10.4	42.7	32.3	41.2	500	Horizontal
7431.0	-11.0	45.6	34.6	53.7	500	Vertical
7431.0	-11.1	46.5	35.4	58.9	500	Horizontal
9908.0	-11.5	48.6	37.1	71.6	500	Vertical
9908.0	-13.0	49.7	36.7	68.4	500	Horizontal

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Calculated measurement uncertainty (9kHz - 30MHz): 3.3dB
(30MHz – 1GHz): 4.6dB
(1GHz - 26GHz): 4.4dB
Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

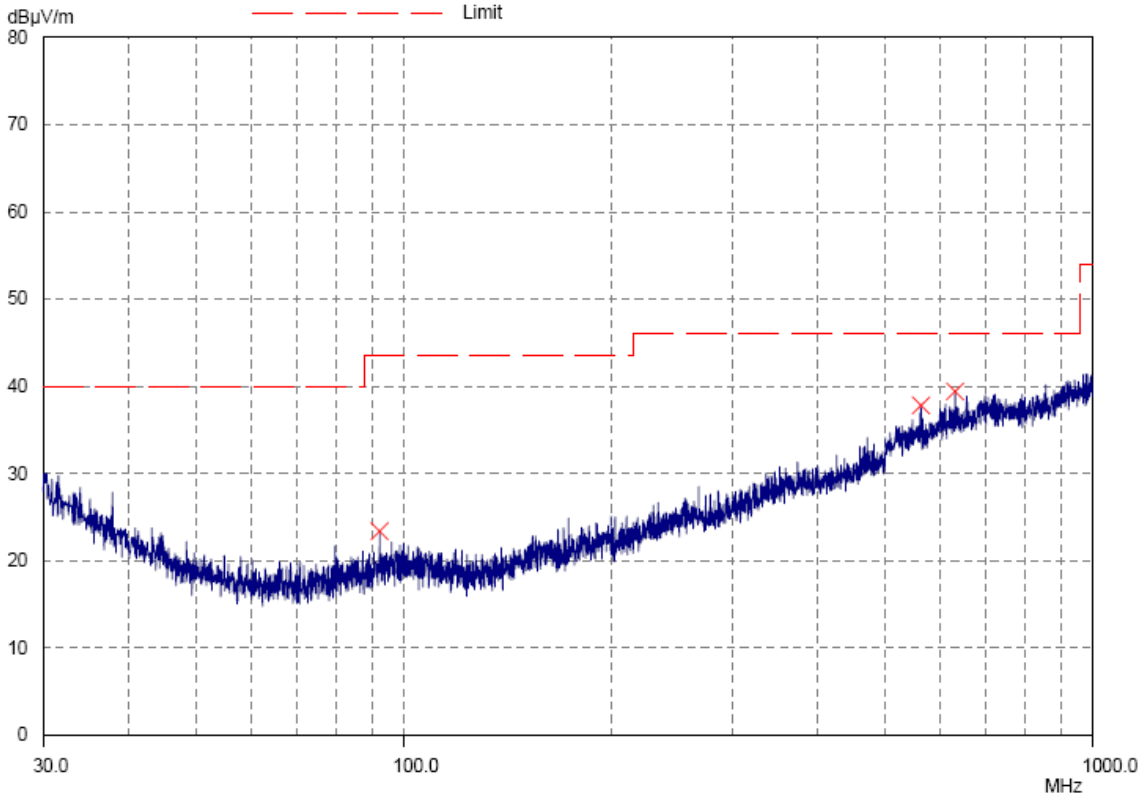
Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Communication mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Results of Communication mode (30MHz – 1GHz): PASS
Horizontal



Results of Communication mode (30MHz – 1GHz): PASS

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBμV/m	Limit @3m dBμV/m	Level @3m μV/m	Limit @3m μV/m
92.3	Horizontal	23.4	43.5	14.8	150
563.9	Horizontal	37.8	46.0	77.6	200
631.9	Horizontal	39.4	46.0	93.3	200

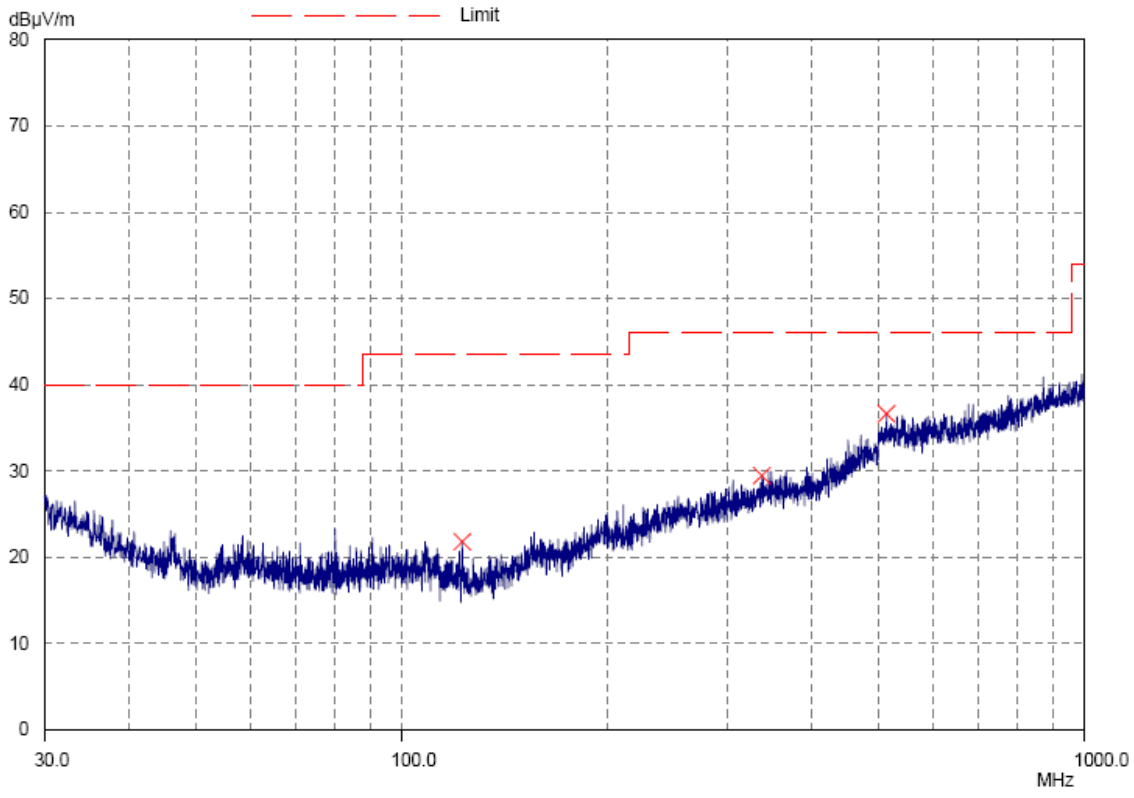
Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Communication mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Results of Communication mode (30MHz – 1GHz): PASS
Vertical



Results of Communication mode (30MHz – 1GHz): PASS

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBμV/m	Limit @3m dBμV/m	Level @3m μV/m	Limit @3m μV/m
122.8	Vertical	21.8	43.5	12.3	150
337.3	Vertical	29.5	46.0	29.9	200
513.6	Vertical	36.6	46.0	67.6	200

Remarks:
Calculated measurement uncertainty (9kHz - 30MHz): 3.3dB
(30MHz – 1GHz): 4.6dB
(1GHz - 26GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.249
Test Method:	ANSI C63.10: 2013
Test Date:	2015-08-01
Mode of Operation:	Tx mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

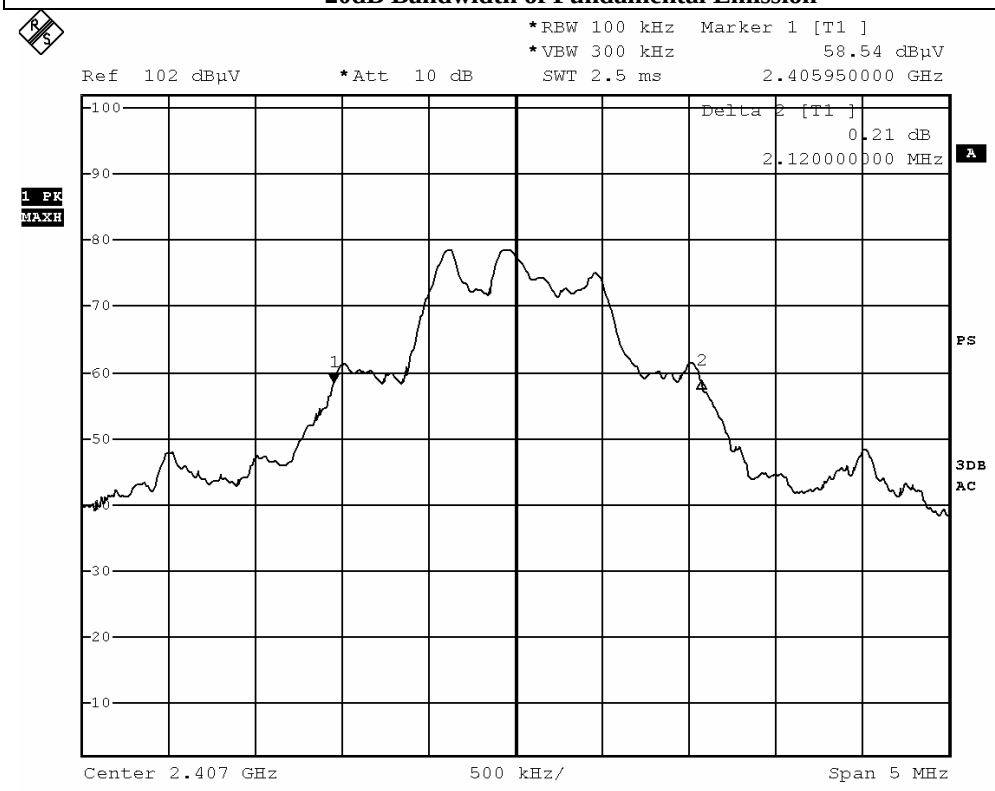
Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Limits for 20dB Bandwidth of Fundamental Emission (Low Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2407	2.12

20dB Bandwidth of Fundamental Emission



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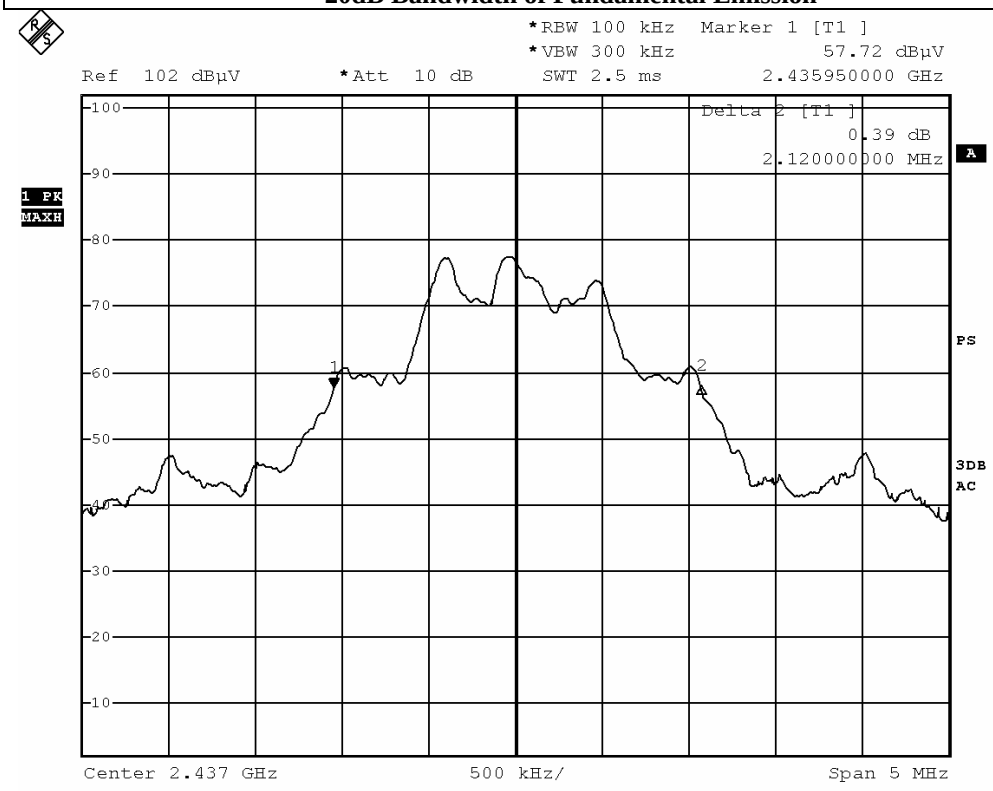
Limits for 20dB Bandwidth of Fundamental Emission (Middle Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2437	2.12

20dB Bandwidth of Fundamental Emission



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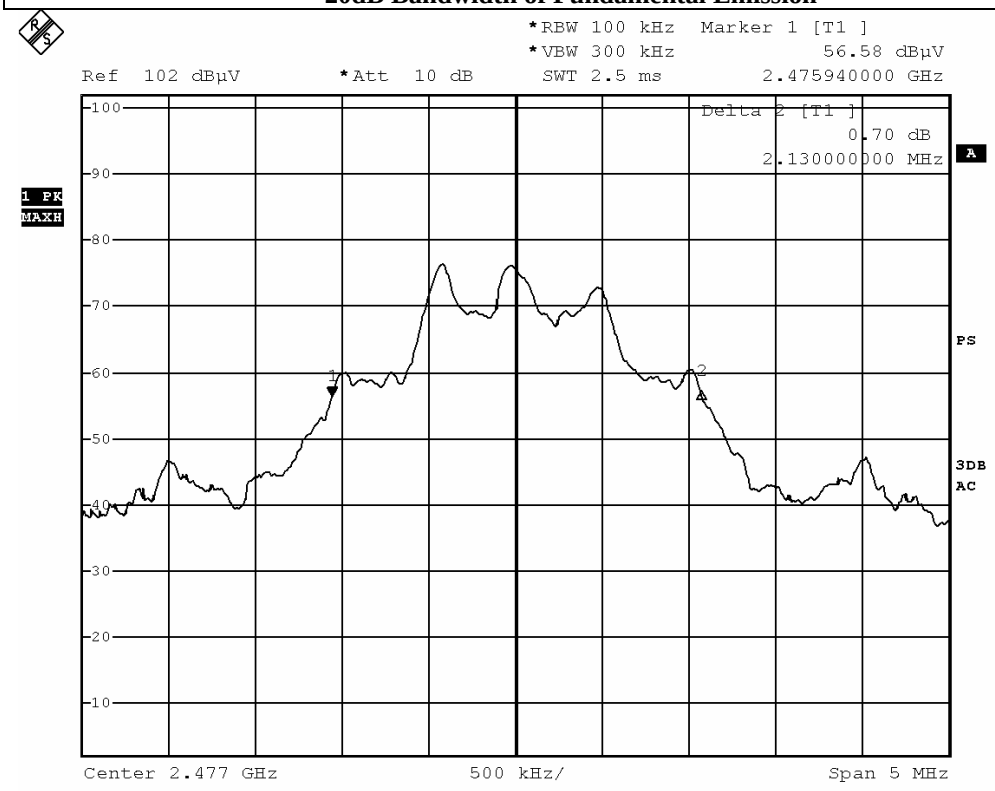
Limits for 20dB Bandwidth of Fundamental Emission (High Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2477	2.13

20dB Bandwidth of Fundamental Emission



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RF Radiated Emissions Measurement:

Limit：
Emissions radiated outside of the specified frequency bands, except t for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §115.209, whichever is the lesser attenuation.

Result： RF Radiated Emissions (1GHz-26GHz) (worse data) (Lowest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
2439.0	4.1	36.8	40.9	74.0	33.1	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
2439.0	-6.6	36.8	30.2	54.0	23.8	Vertical

Result： RF Radiated Emissions (1GHz-26GHz) (worse data) (Highest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
2483.5	4.3	36.4	40.7	74.0	33.3	Horizontal

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
2483.5	-5.6	36.4	30.8	54.0	23.2	Horizontal

Appendix A

List of Measurement Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD004	LISN	ROHDE & SCHWARZ	ESH3-Z5	100102	2015.3.24	2016.3.24
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2015.3.24	2016.3.24
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2015.3.24	2016.3.24
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2015.3.24	2016.3.24
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2015.3.24	2016.3.24
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2014.11.29	2016.11.29
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2014.11.15	2015.11.15
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A	N/A
EMD088	Video Contol Unit	ETS.LINDGREN	Y21953A	2601073	N/A	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A	N/A
EMD102	Intelligent Frequency	Ainuo lnstrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo lnstrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2015.3.24	2016.3.24
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2015.3.24	2016.3.24
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2014.04.28	2016.04.28
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO lnc.	JXTXLB-42-15-C-KF	J2021100721001	2013.04.09	2016.04.09

Remarks:-

N/A Not Applicable or Not Available

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	DELL COMPUTER	DMC	N/A	N/A
2	DELL MONITOR	E177FPB	ARSCM356N	RESOLUTION 1024*768 (DURING TESTING) 1.0M UNSHIEDED POWER VORD CONNECTED TO THE COMPUTER 1.5M SHIELDED CABLE CONNECTED TO THE COMPUTER
3	DELL KEYBOARD	SK-8110	N/A	1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER
4	Dongle	SL-640300-BK	N/A	SPEEDLINK LUCIDIS Wireless Deskset
5	LASER PRINTER	HP LASERJET 1020 PLUS	N/A	1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER

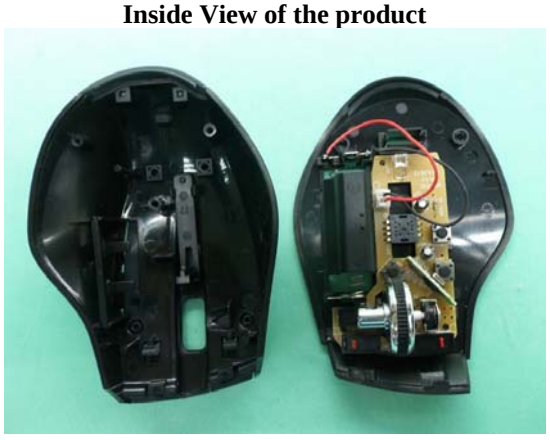
Appendix C

Photographs of EUT

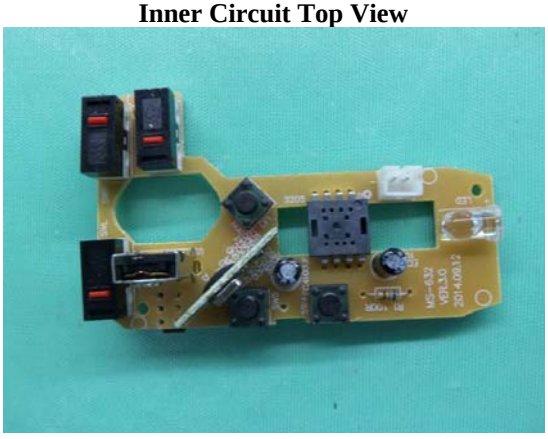
Front View of the product

Rear View of the product

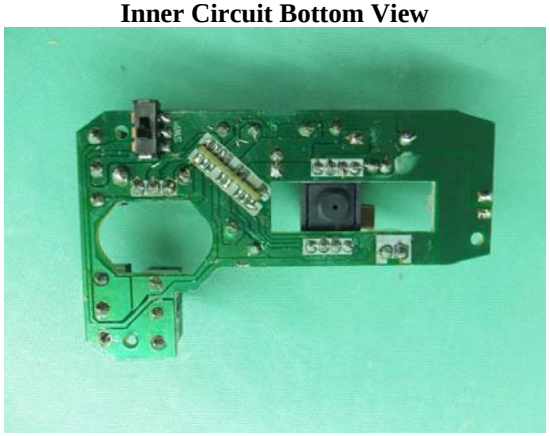
Inside View of the product



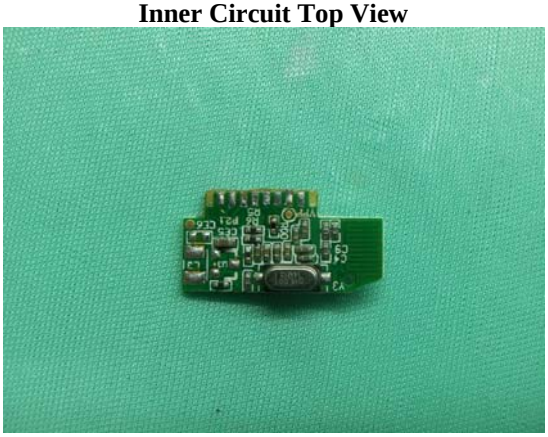
Inner Circuit Top View



Inner Circuit Bottom View

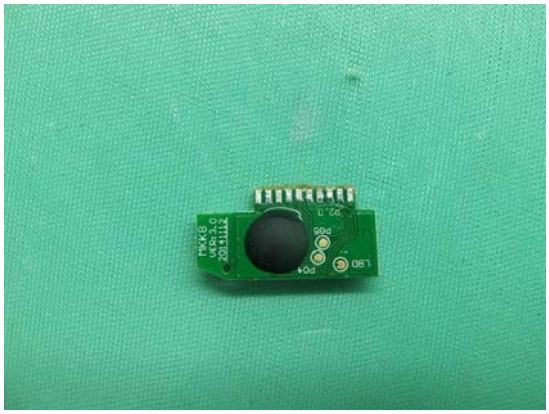


Inner Circuit Top View



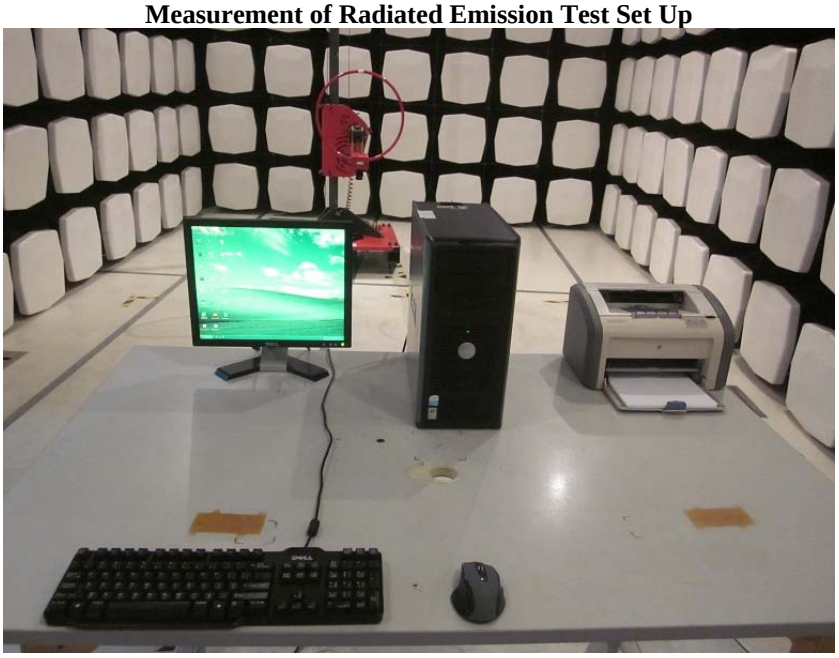
Photographs of EUT

Inner Circuit Bottom View

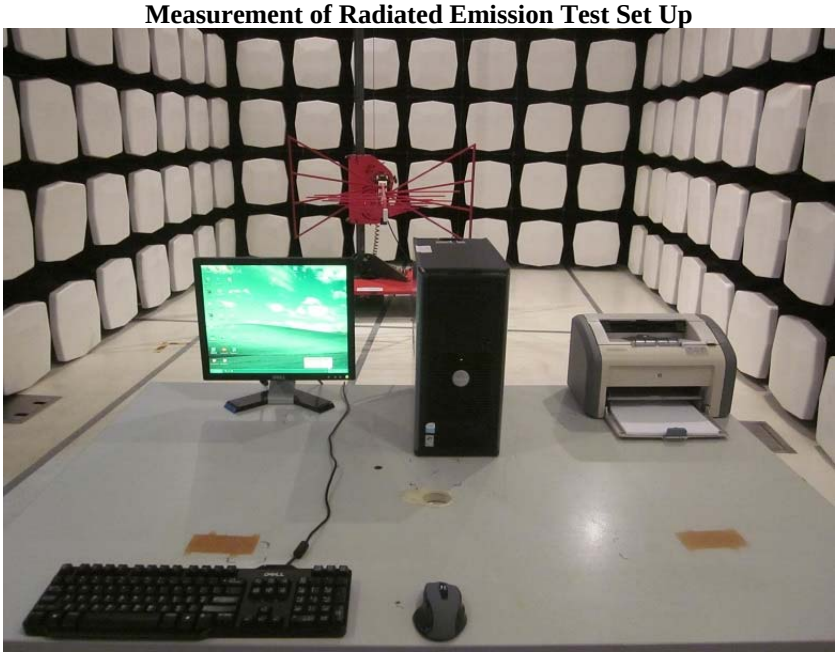


Photographs of EUT

Measurement of Radiated Emission Test Set Up

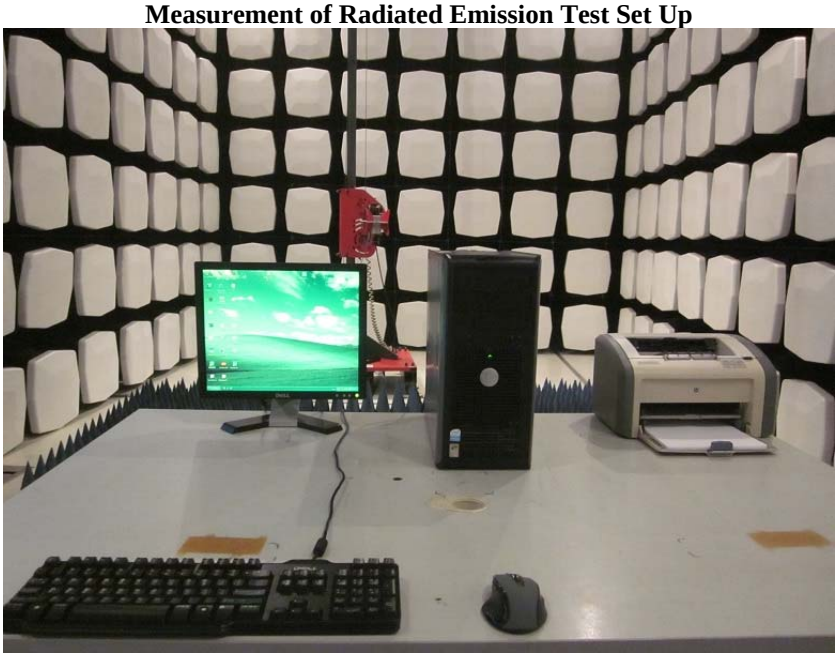


Measurement of Radiated Emission Test Set Up



Photographs of EUT

Measurement of Radiated Emission Test Set Up



******* End of Test Report *******