



STC Test Report

Date : 2011-12-14

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No. : HM167252

Applicant (HEY001): Heng Yu Electronic Manufacturing Co., Ltd.
Room 3-5, 15/F., Nan Fung Comm'l Centre, 19 Lam Lok Street, Kowloon Bay, Hong Kong

Manufacturer: Heng Ke Electronic Information System (Zhu Hai) Co., Ltd.
Heng Ke Campus, Jin Hai Avenue, San Zao, JinWan District, Zhuhai, Guang Dong, PRC 519040, China.

Description of Sample(s): Submitted sample(s) said to be
Product: 2.4G Wireless USB Dongle
Brand Name: Heng Yu
Model Number: K82G
FCC ID: XENK82GDB

Date Sample(s) Received: 2011-11-22

Date Tested: 2011-12-08 to 2011-12-05

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 and ANSI C63.4:2009 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): ---

Dr. LEE Kam Chuen
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Heng Yu Electronic Manufacturing Co., Ltd.
Room 3-5, 15/F., Nan Fung Comm'l Centre, 19 Lam Lok Street, Kowloon Bay, Hong Kong

Manufacturer

Heng Ke Electronic Information System (Zhu Hai) Co., Ltd.
Heng Ke Campus, Jin Hai Avenue, San Zao, JinWan District, Zhuhai, Guang Dong, PRC
519040, China.

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

Product: 2.4G Wireless USB Dongle
Manufacturer: Heng Yu Electronic Manufacturing Co., Ltd.
Brand Name: Heng Yu
Model Number: K82G
Input Voltage: 5Vd.c. for EUT (from PC)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is USB dongle which receive RF signal by a wireless keyboard (K82G) and the EUT would transmit RF signal back to the keyboard after received RF signal to maintain the communication. The EUT was set to On mode and connected to PC during test.

1.4 Date of Order

2011-11-22

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2011-12-08 to 2011-12-05

1.7 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 Regulations and ANSI C63.4:2009 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
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2009
Test Date:	2011-12-08
Mode of Operation:	Communication mode (connected to PC)

Test Method:

The sample was placed 0.8m 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, rotated about all 3 axis (X, Y & Z) and 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.

Remark: 3 orthogonal axis apply to hand-held device only.

* Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

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Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)

RBW: 10kHz
VBW: 30kHz
Sweep: Auto
Span: Fully capture the emissions being measured
Trace: Max. hold

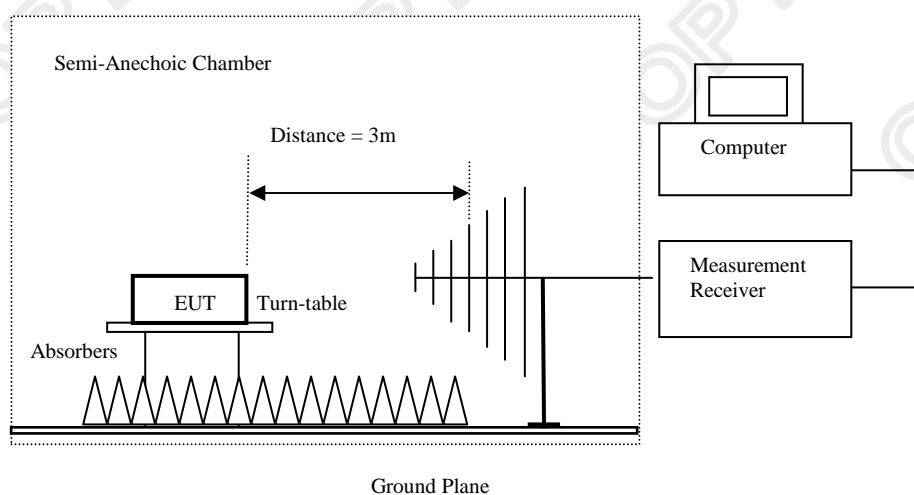
30MHz – 1GHz (QP)

RBW: 120kHz
VBW: 120kHz
Sweep: Auto
Span: Fully capture the emissions being measured
Trace: Max. hold

Above 1GHz (Pk & Av)

RBW: 3MHz
VBW: 3MHz
Sweep: Auto
Span: Fully capture the emissions being measured
Trace: Max. hold

Test Setup:



Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

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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 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Communication mode (connected to PC): PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2433.3	68.9	28.0	96.9	69,984.2	500,000	Horizontal
* 4866.6	12.8	34.5	47.3	231.7	5,000	Horizontal
* 7299.9	8	39.5	47.5	237.1	5,000	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2433.3	48.9	28.0	76.9	6,998.4	50,000	Horizontal
* 4866.6	2.6	34.5	37.1	71.6	5,000	Horizontal
* 7299.9	-1.4	39.5	38.1	80.4	5,000	Horizontal

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Field Strength of Harmonics Emission						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
9733.2					5,000	Horizontal
* 12166.5					5,000	Horizontal
14599.8					5,000	Horizontal
* 17033.1					5,000	Horizontal
* 19466.4					5,000	Horizontal
21899.7					5,000	Horizontal
24333.0					5,000	Horizontal

Field Strength of Harmonics Emission						
Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
9733.2					5,000	Horizontal
* 12166.5					5,000	Horizontal
14599.8					5,000	Horizontal
* 17033.1					5,000	Horizontal
* 19466.4					5,000	Horizontal
21899.7					5,000	Horizontal
24333.0					5,000	Horizontal

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Field strength [microvolts/meter]	Measurement distance [meters]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above960	500	3

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 (connected to PC) (9k – 30MHz): PASS

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit μ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit μ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Communication mode (connected to PC) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions Qusai-Peak Value						
Frequency MHz	Measured Level dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit μ V/m	E-Field Polarity
227.10	15.6	12.9	28.5	7.3	46.0	Horizontal
240.00	17.5	13.4	30.9	2.9	46.0	Horizontal
287.70	12.7	14.8	27.5	18.8	46.0	Horizontal
397.40	13.1	18.3	31.4	4.5	46.0	Horizontal
680.40	5.6	23.9	29.5	6.4	46.0	Horizontal
806.50	11.6	24.9	36.5	9.8	46.0	Horizontal

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Results of Communication mode (connected to PC) (Above 1000MHz): PASS

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit μ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit μ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

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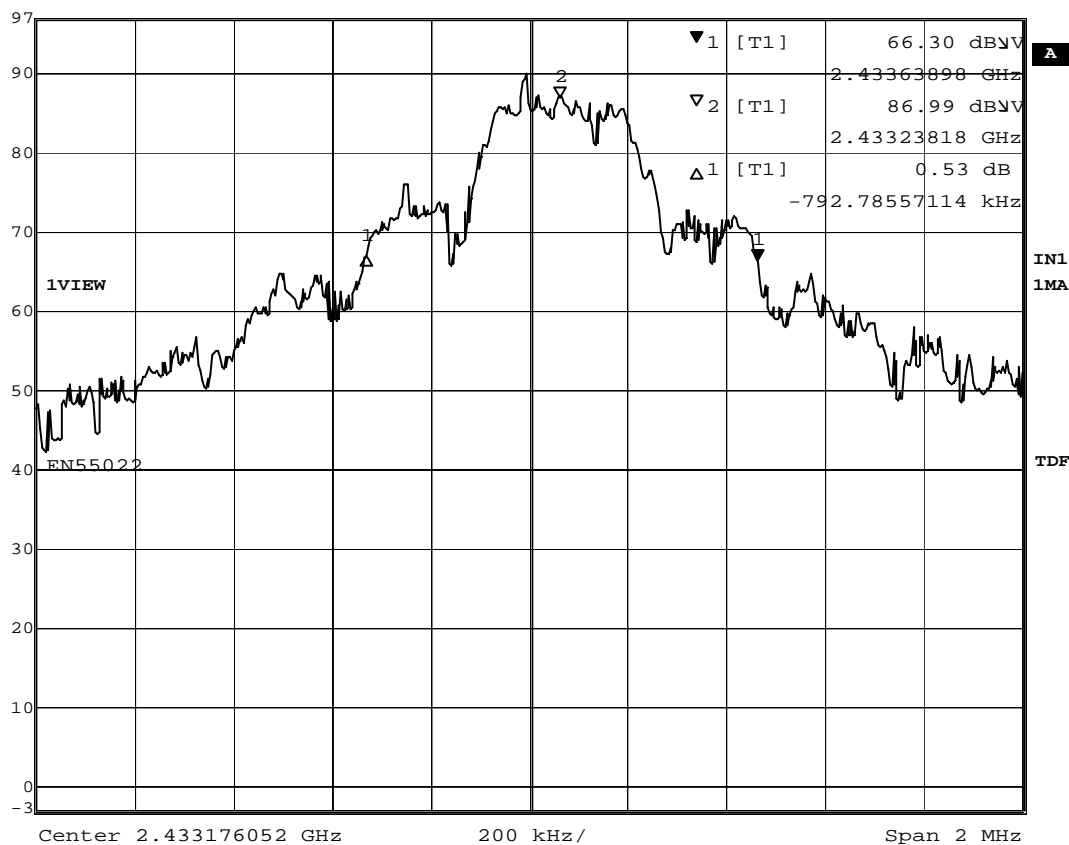
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]
2433.6	792.8

20dB Bandwidth of Fundamental Emission

	Marker 1 [T1]	RBW	30 kHz	RF Att	20 dB
Ref Lvl	66.30 dBV	VBW	300 kHz		
97 dBV	2.43363898 GHz	SWT	6 ms	Unit	dBV



Date: 8.DEC.2011 16:42:12

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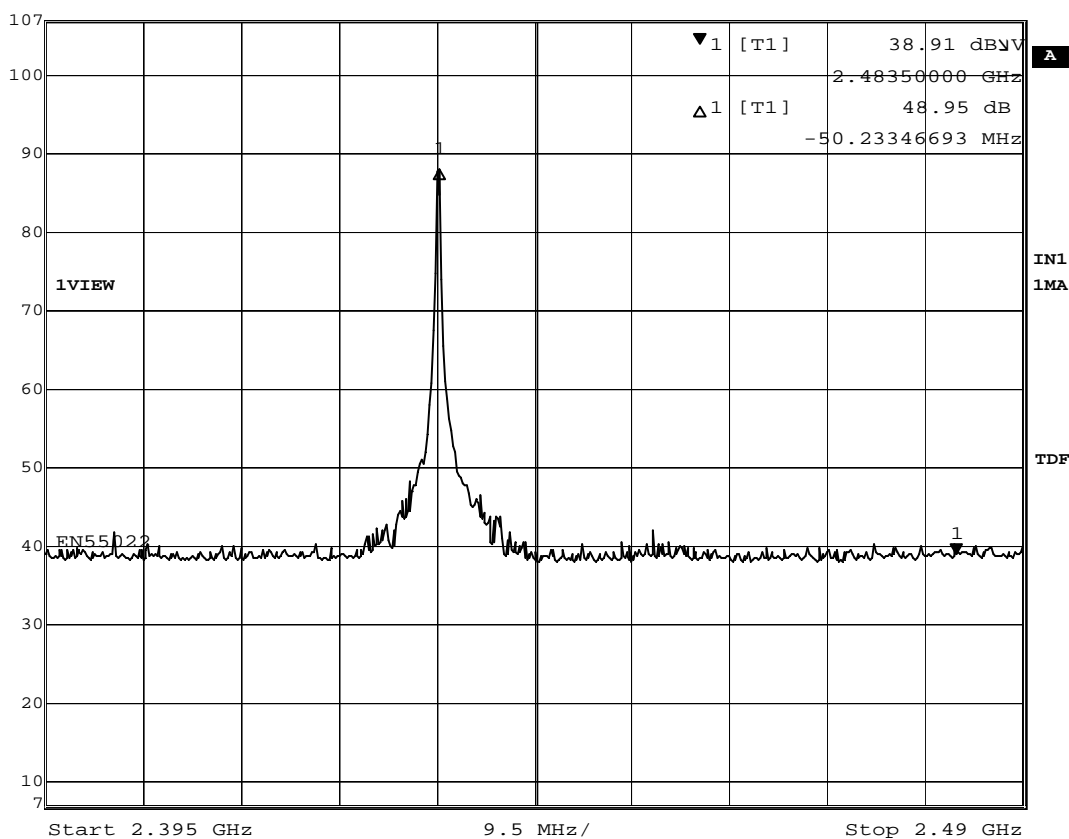
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49.0dB reduction at upper band edge

Marker 1 [T1]	RBW	100 kHz	RF Att	20 dB
Ref Lvl	38.91 dB μ V	VBW	100 kHz	
107 dB μ V	2.48350000 GHz	SWT	24 ms	Unit dB μ V



Date: 8.DEC.2011 16:59:05

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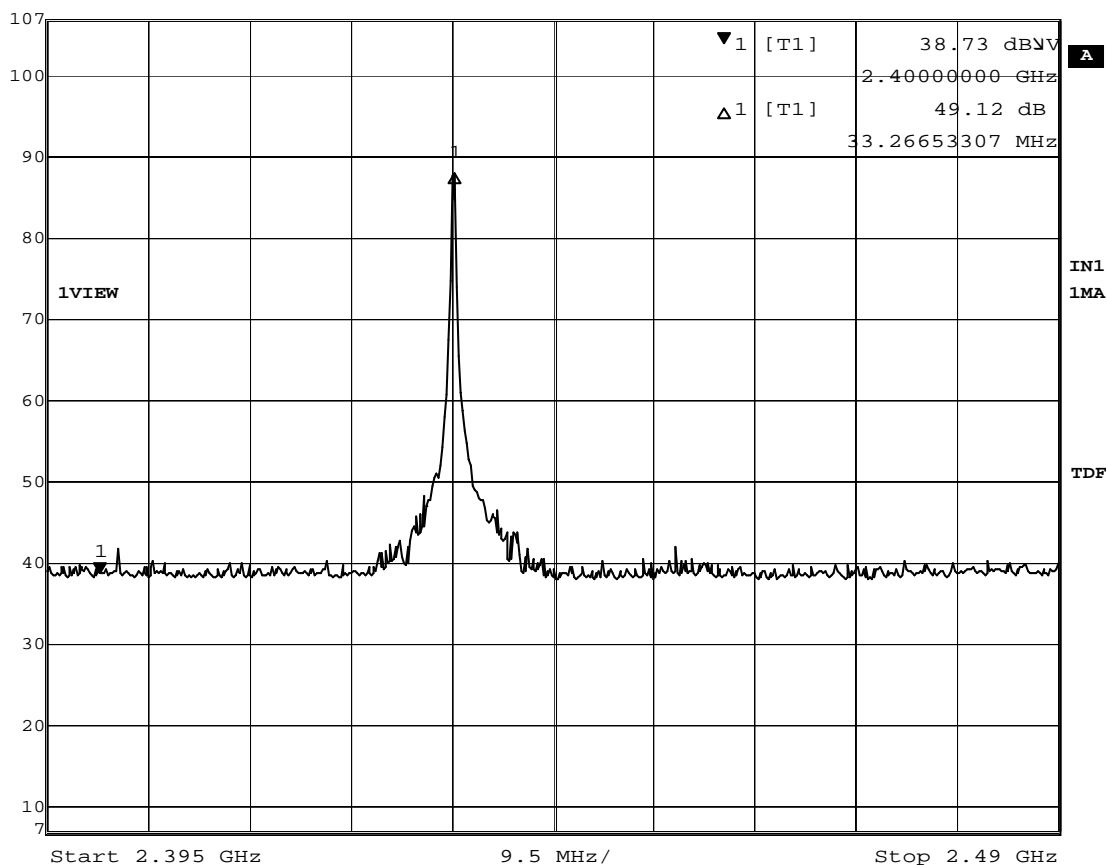
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49.1dB reduction at lower band edge

Marker 1 [T1]	RBW	100 kHz	RF Att	20 dB
Ref Lvl	38.73 dBV	VBW	100 kHz	
107 dBV	2.4000000 GHz	SWT	24 ms	Unit dBV



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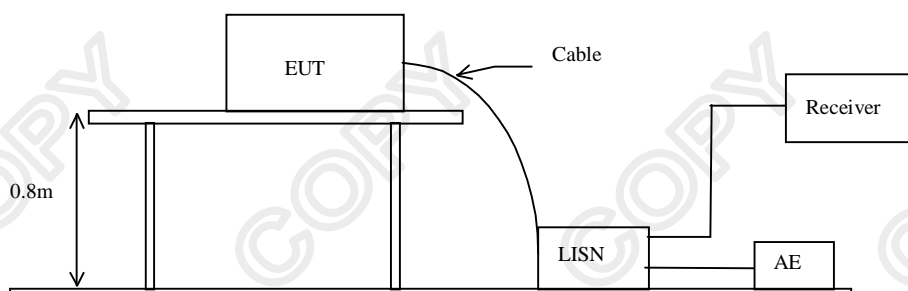
3.2.6 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207
Test Method: ANSI C63.4:2009
Test Date: 2011-01-17
Mode of Operation: Tx mode / On mode (connected to PC)

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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Limit for Conducted Emissions (FCC 47 CFR 15.207):

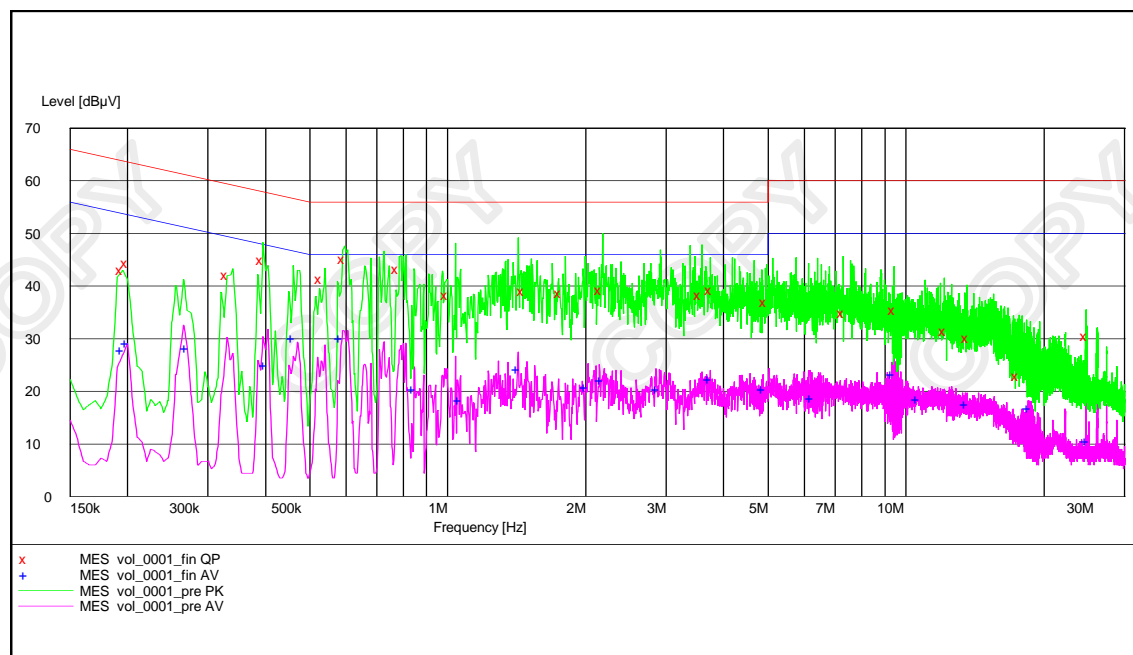
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Tx mode: PASS

Please refer to the following diagram for individual results.



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Results of Tx mode: PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.195	43.0	64.0	-*-	-*-
Live	0.200	44.4	64.0	29.1	54.0
Live	0.270	-*-	-*-	28.2	51.0
Live	0.330	42.2	60.0	-*-	-*-
Live	0.395	44.9	58.0	-*-	-*-
Live	0.400	-*-	-*-	25.0	48.0
Live	0.530	41.3	56.0	-*-	-*-
Live	0.585	-*-	-*-	30.2	46.0
Live	0.595	45.1	56.0	-*-	-*-
Live	0.780	43.2	56.0	-*-	-*-
Live	1.065	-*-	-*-	18.4	46.0
Live	1.425	-*-	-*-	24.3	46.0
Live	1.765	38.8	56.0	-*-	-*-
Live	2.165	-*-	-*-	22.2	46.0
Live	3.765	39.2	56.0	-*-	-*-
Live	4.950	36.9	56.0	-*-	-*-
Live	9.445	35.4	60.0	-*-	-*-
Live	10.600	-*-	-*-	18.6	50.0
Live	13.540	-*-	-*-	17.6	50.0
Live	13.660	30.1	60.0	-*-	-*-
Live	17.565	22.9	60.0	-*-	-*-
Live	18.620	-*-	-*-	16.8	50.0
Live	24.780	30.5	60.0	-*-	-*-
Live	24.835	-*-	-*-	10.6	50.0

To be continues...

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Results of Tx mode: PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Neutral	0.195	-*-	-*-	27.8	54.0
Neutral	0.460	-*-	-*-	30.2	47.0
Neutral	0.845	-*-	-*-	20.5	46.0
Neutral	1.000	38.2	56.0	-*-	-*-
Neutral	1.465	39.0	56.0	-*-	-*-
Neutral	2.005	-*-	-*-	20.9	46.0
Neutral	2.160	39.3	56.0	-*-	-*-
Neutral	2.870	-*-	-*-	20.5	46.0
Neutral	3.560	38.4	56.0	-*-	-*-
Neutral	3.735	-*-	-*-	22.3	46.0
Neutral	4.895	-*-	-*-	20.4	46.0
Neutral	6.235	-*-	-*-	18.7	50.0
Neutral	7.305	35.0	60.0	-*-	-*-
Neutral	9.375	-*-	-*-	23.3	50.0
Neutral	12.200	31.4	60.0	-*-	-*-

Remarks:

Calculated measurement uncertainty : 3.97dB

-*- Emission(s) that is far below the corresponding limit line.

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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM276	Broadband Horn Antenna	A-INFOMW	JXTXLB-10180-SF	J2031090903007	2010/08/21	2013/08/21
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2011/10/25	2012/10/25
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2010/02/09	2012/02/09
EM229	EMI Test Receiver	R&S	ESIB40	100248	2011/04/26	2012/04/26
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2010/09/07	2012/09/07

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM119	LISN	R & S	ESH3-Z5	846695/030	2011/01/07	2012/01/07
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2011/04/26	2012/04/26
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2011/01/24	2012/01/24
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2011/01/23	2012/01/23

Remarks:-

CM Corrective Maintenance

N/A Not Applicable

TBD To Be Determined

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Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	DELL COMPUTER	DMC	N/A	N/A
2	DELL MONITOR	E551C	ARSCM356N	RESOLUTION:800x600(DURING TESTING) 1.0M UNSHIEDED POWER CORD CONNECTED TO THE COMPUTER 2.8M SHIELDED CABLE CONNECTED TO THE COMPUTER
3	DELL KEYBOARD	SK-8110	N/A	1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER
4	DELL MOUSE	N/A	N/A	2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER
5	PARALLEL PRINTER	HP930c	N/A	1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER

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Appendix C

Duty Cycle Correction During 100msec

Each function key sends a different series of characters, but each packet period (100msec) never exceeded a series of 7 long (0.45msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (7x0.45msec) per 100msec duty cycle. Figure A through B shows the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = $20\text{Log}((7 \times 0.45\text{ms})/100\text{ms}) = -30\text{dB}$

Duty Cycle Correction = -20dB, if the calculation duty cycle correction $> -20\text{dB}$.

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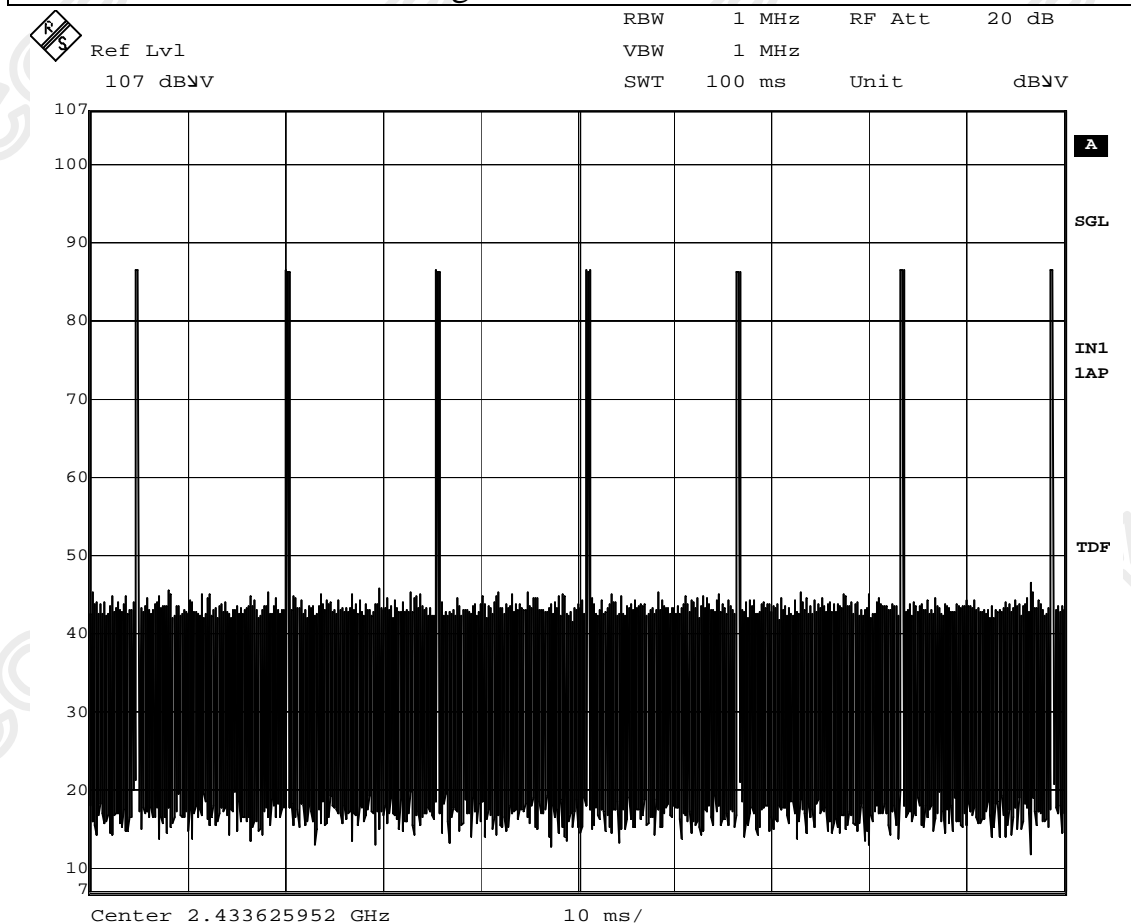
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The following figures [Figure A to Figure B] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]



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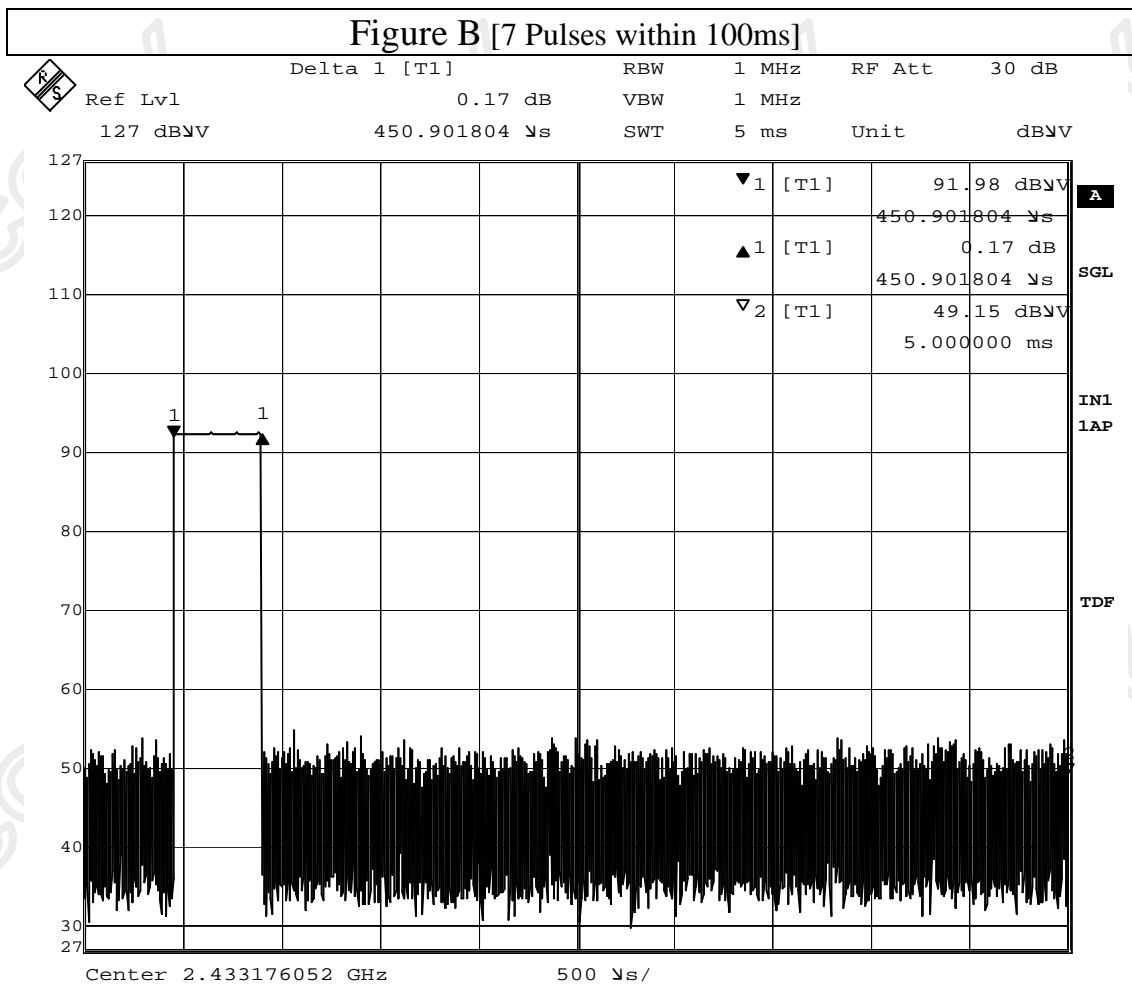
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Figure B [7 Pulses within 100ms]



Date: 8.DEC.2011 16:47:21

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Appendix D

Photographs of EUT

Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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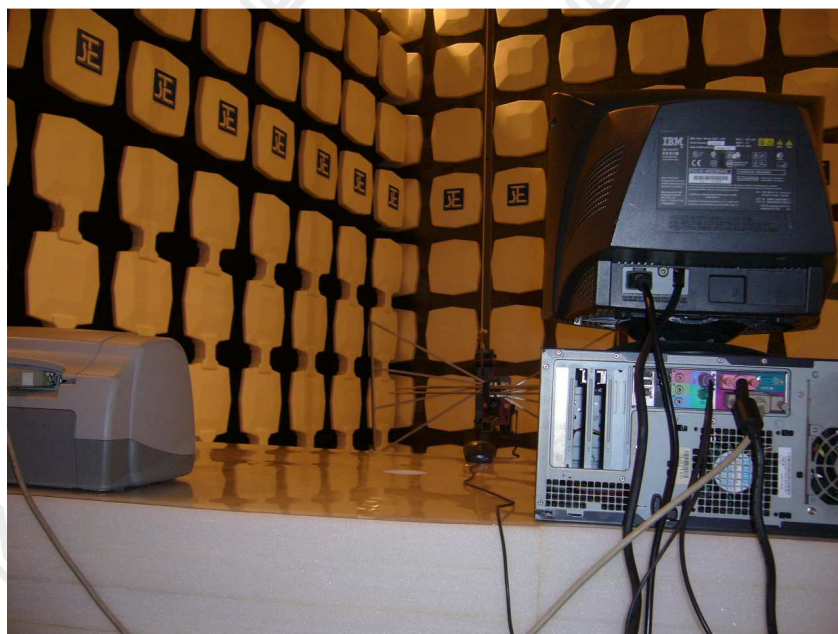
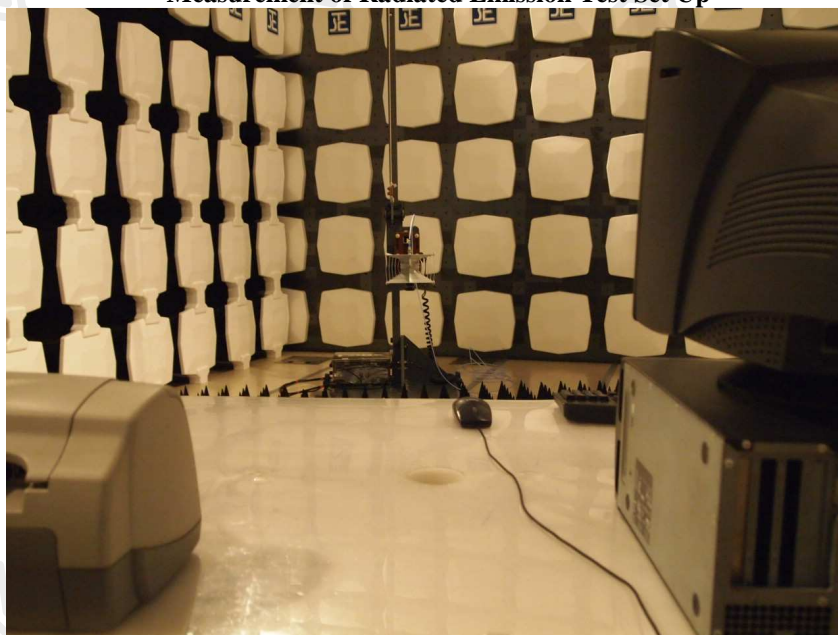
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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Photographs of EUT

Measurement of Conducted Emission Test Set Up



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

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