



STC Test Report

Date : 2012-09-13

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No. : HM167829

Applicant (CKT001):

CKICOM TECHNOLOGY LTD.

Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan,
Hong Kong.

Manufacturer:

CKICOM TECHNOLOGY LTD.

Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan,
Hong Kong.

Description of Sample(s):

Submitted sample(s) said to be

Product: Networking Device

Brand Name: Carease

Model Number: R-138z

FCC ID: YQKCEIIPR-138Z

Date Sample(s) Received: 2012-08-16

Date Tested: 2012-08-28 to 2012-09-03

Investigation Requested:

Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2011 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.

The Hong Kong Standards and Testing Centre Ltd.

10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong

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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

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Applicant Details

Applicant

CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

Manufacturer

CKICOM TECHNOLOGY LTD.
Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

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1.3 Equipment Under Test [EUT]

Description of Sample

Submitted sample(s) said to be

Product: Networking Device

Manufacturer: CKICOM TECHNOLOGY LTD.

Flat F 4/F Universal Ind. Ctr. 19-21 Shan Mei St, Fotan, Hong Kong.

Brand Name: Carease

Model Number: R-138Z

Rating: 117V a.c.

The AC/DC Adaptor used for the tests was provided by the applicant with the following details: Two pins (Live / Neutral) only adaptor, Model Number: ALT-0500720U01-F, Input: 100-240V a.c. 50/60Hz 5.5W, Output: 5V d.c. 720mA max.

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a CKICOM TECHNOLOGY LTD., Networking Device. The EUT is a 433MHz transmitter, the EUT will transmit a set of RF signal when the button is pressed, the transmission is also able to be controlled by PC through a USB cable.

1.4 Date of Order

2012-08-16

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2012-08-28 to 2012-09-03

1.7 Country of Origin

Hong Kong

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2011 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			
			Pass	Failed	N/A	
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input 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 (30 – 1000MHz)

Test Requirement:	FCC 47CFR 15.231a
Test Method:	ANSI C63.4:2009
Test Date:	2012-08-29
Mode of Operation:	Tx on mode / On 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, 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 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

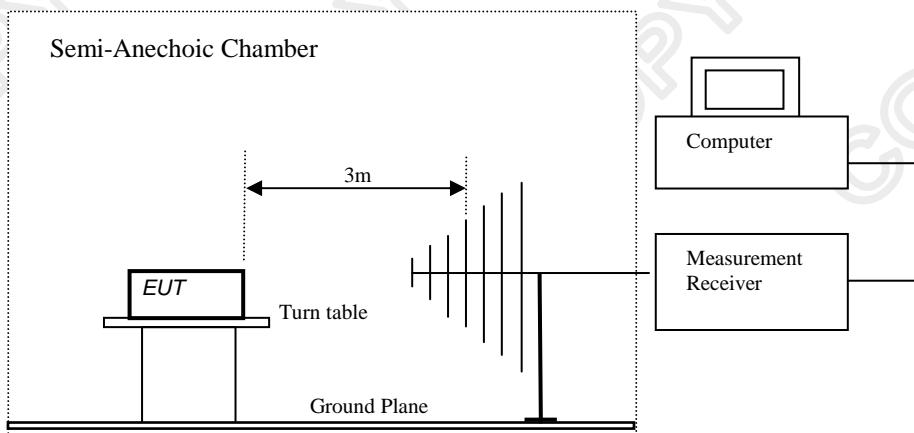
30MHz – 1GHz (QP)

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:



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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [μ V/m]	Field Strength of Spurious Emission [Average] [μ V/m]
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750 *	125 to 375 *
174-260	3,750	375
260-470	3,750 to 12,500 *	375 to 1,250 *
Above 470	12,500	1,250

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μ V/m at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Results:

Field Strength of Fundamental Emissions						
Peak Value						
Frequency MHz	Measured Level @ 3m dB μ V/m	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @ 3m μ V/m	E-Field Polarity
434.0	73.4	19.0	92.4	41686.9	110,000.1	Vertical
868.0	20.8	26.6	47.4	234.4	11,000.0	Vertical

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @ 3m dB μ V/m	Correction Factor dB/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @ 3m μ V/m	E-Field Polarity
1302.0	< 1.0	27.0	< 28.0	< 25.1	500.0	Vertical
1736.0	< 1.0	32.2	< 33.2	< 45.7	11,000.0	Vertical
2170.0	< 1.0	38.8	< 39.8	< 97.7	11,000.0	Vertical
2604.0	< 1.0	17.4	< 18.4	< 8.3	11,000.0	Vertical
3038.0	< 1.0	17.2	< 18.2	< 8.1	11,000.0	Vertical
3472.0	< 1.0	18.8	< 19.8	< 9.8	11,000.0	Vertical
3906.0	< 1.0	19.7	< 20.7	< 10.8	5,000.0	Vertical
4340.0	< 1.0	20.6	< 21.6	< 12.0	5,000.0	Vertical

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Results:

Field Strength of Fundamental Emissions						
Average Value						
Frequency	Measured Level @ 3m	Correction Factor	Field Strength	Field Strength	Limit @ 3m	E-Field Polarity
MHz	dB μ V/m	dB/m	dB μ V/m	μ V/m	μ V/m	
*	434.0	60.6	19.0	79.6	9549.9	11,000.0 Vertical
	868.0	11.7	26.6	38.3	82.2	11,000.0 Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level @ 3m	Correction Factor	Field Strength	Field Strength	Limit @ 3m	E-Field Polarity
MHz	dB μ V/m	dB/m	dB μ V/m	μ V/m	μ V/m	
+	1302.0	< 21.1	27.0	< 48.1	< 254.1	500.0 Vertical
	1736.0	< 1.0	32.2	< 33.2	< 45.7	1,100.0 Vertical
	2170.0	< 1.0	38.8	< 39.8	< 97.7	1,100.0 Vertical
	2604.0	< 1.0	17.4	< 18.4	< 8.3	1,100.0 Vertical
	3038.0	< 1.0	17.2	< 18.2	< 8.1	1,100.0 Vertical
	3472.0	< 1.0	18.8	< 19.8	< 9.8	500.0 Vertical
+	3906.0	< 1.0	19.7	< 20.7	< 10.8	500.0 Vertical
+	4340.0	< 1.0	20.6	< 21.6	< 12.0	1,100.0 Vertical

Remarks:

*: Adjusted by Duty Cycle = -12.8dB

FCC Limit for Average Measurement = $41.6667(434.0\text{MHz})-7083.3333=11,000.00\mu\text{V/m}$

+: 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 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 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 Tx on mode (9k – 30MHz): PASS

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

Results of Tx on mode (30MHz – 1000MHz): PASS

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

Results of Tx on mode (1000MHz): PASS

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

Results of Tx on mode (Above 1000MHz): PASS

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	μ V/m	μ V/m	
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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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 On mode connected to PC (9k – 30MHz): PASS

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

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

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
MHz	Level	Factor	Strength	Strength		Polarity
dB μ V	dB/m	dB μ V/m	dB μ V/m	μ V/m	μ V/m	
48.0	22.1	9.2	31.3	36.7	100.0	Vertical
60.0	25.0	7.4	32.4	41.7	100.0	Vertical
72.0	24.6	7.5	32.1	40.3	100.0	Vertical
144.0	21.7	9.0	30.7	34.3	150.0	Vertical
504.7	8.5	20.8	29.3	29.2	200.0	Vertical
896.3	3.3	27.1	30.4	33.1	200.0	Vertical

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

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

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

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
MHz	Level	Factor	Strength	Strength	μV/m	Polarity
dB μ V dB/m dB μ V/m μV/m μV/m						
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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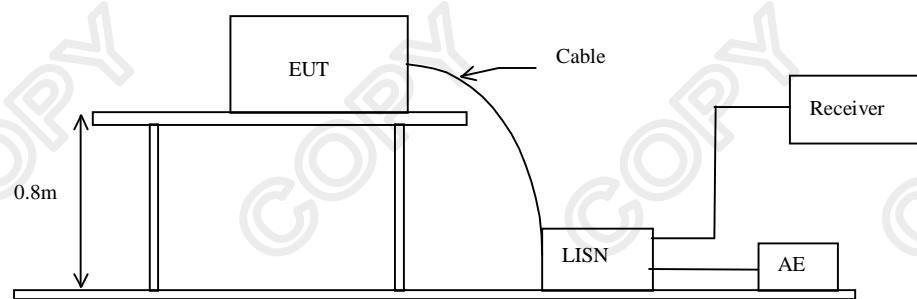
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2012-08-28
Rating:	120V _{a.c.} 60Hz
Mode of Operation:	On mode connected to PC

Test Method:

The test was performed in accordance with ANSI C63.4: 2009, 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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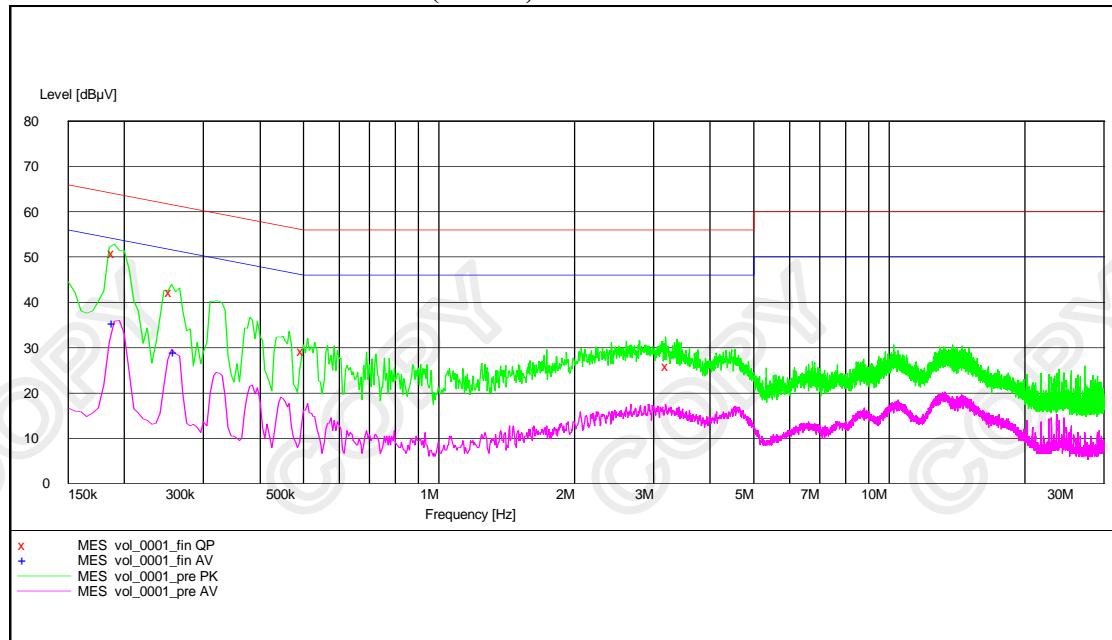
Limit for Conducted Emissions (FCC 47 CFR 15.207):

[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 On mode connected to PC (PC side): Pass



Conductor	Frequency	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live or Neutral	MHz				
Live	0.190	50.8	64.0	-*-	-*-
Neutral	0.190	-*-	-*-	35.5	54.0
Neutral	0.255	42.3	62.0	-*-	-*-
Neutral	0.260	-*-	-*-	28.9	51.0
Neutral	0.500	29.2	56.0	-*-	-*-
Neutral	3.225	25.9	56.0	-*-	-*-

Remarks:

Calculated measurement uncertainty : 3.97dB

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

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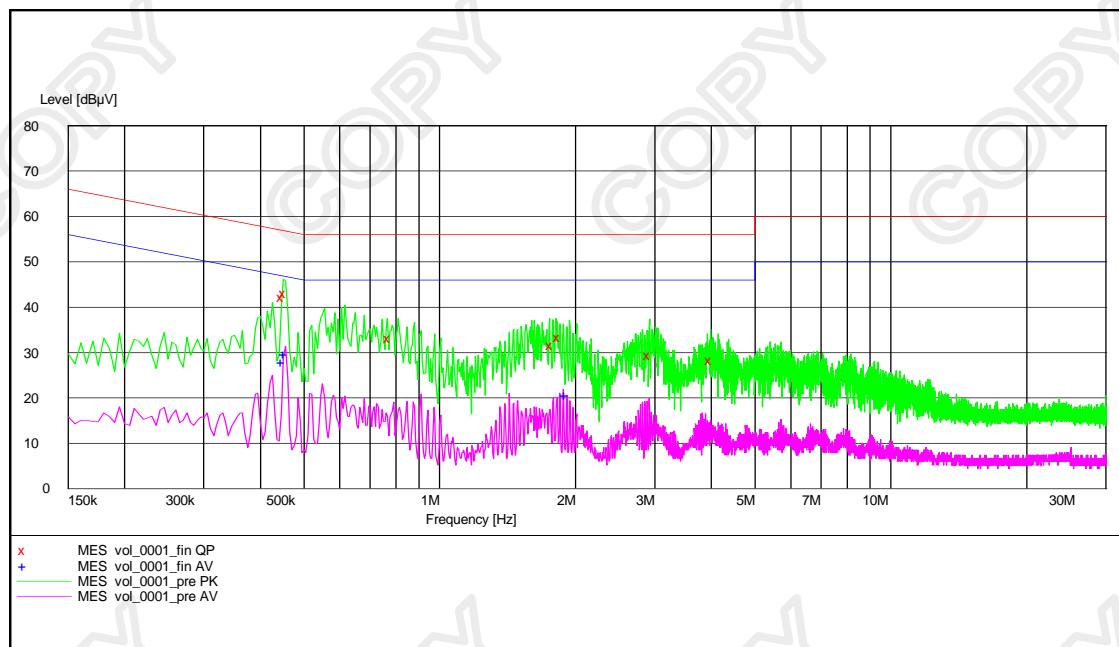
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Results of On mode connected to PC (EUT side): Pass



Conductor	Frequency	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live or Neutral	MHz				
Live	0.450	42.1	57.0	27.9	47.0
Live	1.910	-*-	-*-	20.5	46.0
Neutral	0.455	43.0	57.0	29.6	47.0
Neutral	0.775	33.2	56.0	-*-	-*-
Neutral	1.775	31.7	56.0	-*-	-*-
Neutral	1.840	33.3	56.0	-*-	-*-
Neutral	2.920	29.4	56.0	-*-	-*-
Neutral	4.000	28.2	56.0	-*-	-*-

Remarks:

Calculated measurement uncertainty : 3.97dB

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

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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231a
Test Method:	ANSI C63.4:2009 (Section 13.1.7)
Test Date:	2012-09-03
Mode of Operation:	Tx on 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.

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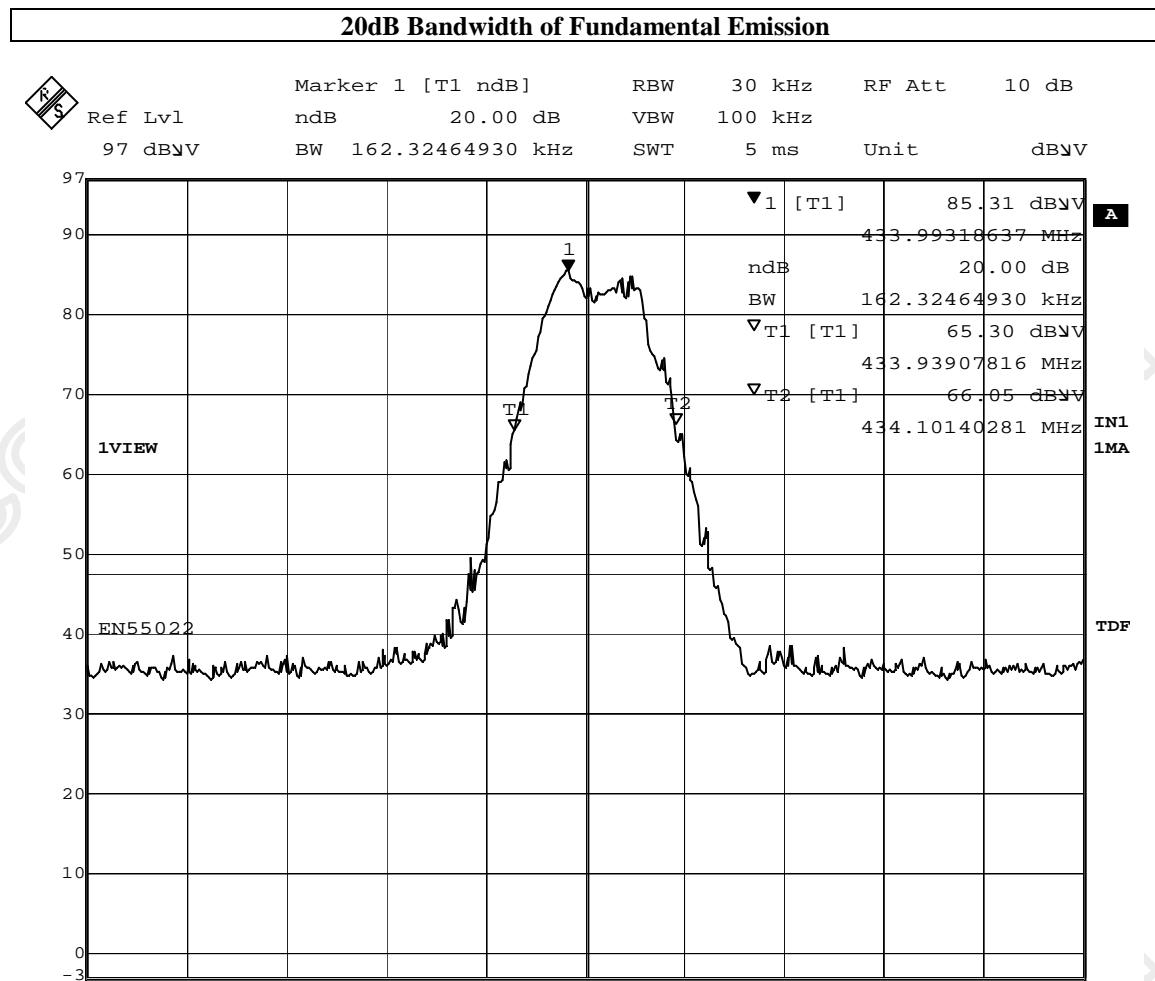
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Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits * [kHz]
433.99	162.32	1084.9

*: FCC Limit for Bandwidth measurement
 $= (0.25\%)(\text{Center Frequency})$
 $= (0.0025)(433.99)$
 $= 1084.9\text{kHz}$





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List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2012/01/25	2014/01/25
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-LINDGREN	FACT-3	--	2011/10/25	2012/10/25
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	2010/10/06	2012/10/06
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2012/05/03	2013/05/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2011/09/14	2013/09/14

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2012/05/16	2013/05/16
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2012/05/03	2013/05/03
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2012/01/27	2013/01/27
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2012/01/27	2013/01/27

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 UNSHIEDDED 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

Remarks:-

CM Corrective Maintenance
 N/A Not Applicable or Not Available
 TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec [FCC 47CFR 15.231(a)]

The transmitter periodically sends a different series of characters, but each packet period (100msec) never exceeds a series of 6 pulses (3.81msec). Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (6x3.81) per 100msec=22.86% duty cycle. Figure A shows the characteristics of the pulses train for one of these functions.

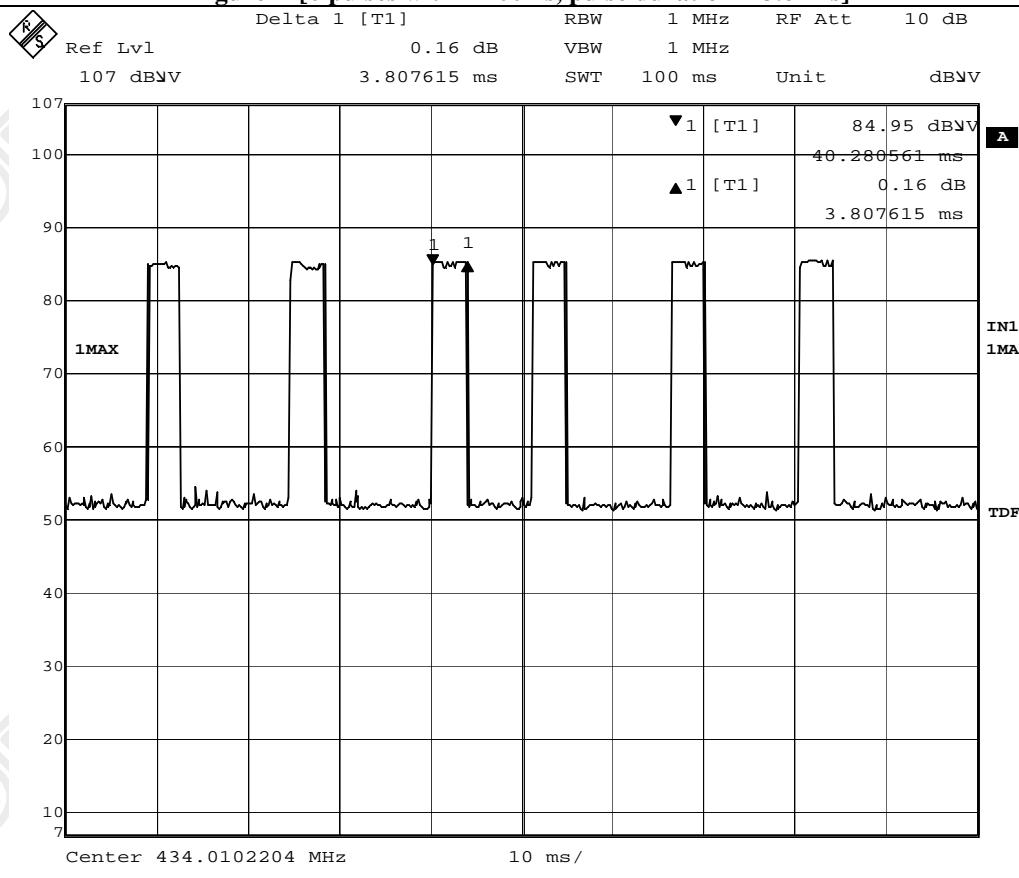
Remarks:

Duty Cycle Correction = $20\log(0.2286) = -12.8\text{dB}$

Duty Cycle Correction = -20dB, if the calculation duty cycle correction >-20dB

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

Figure A [6 pulses within 100ms, pulse duration = 3.81ms]



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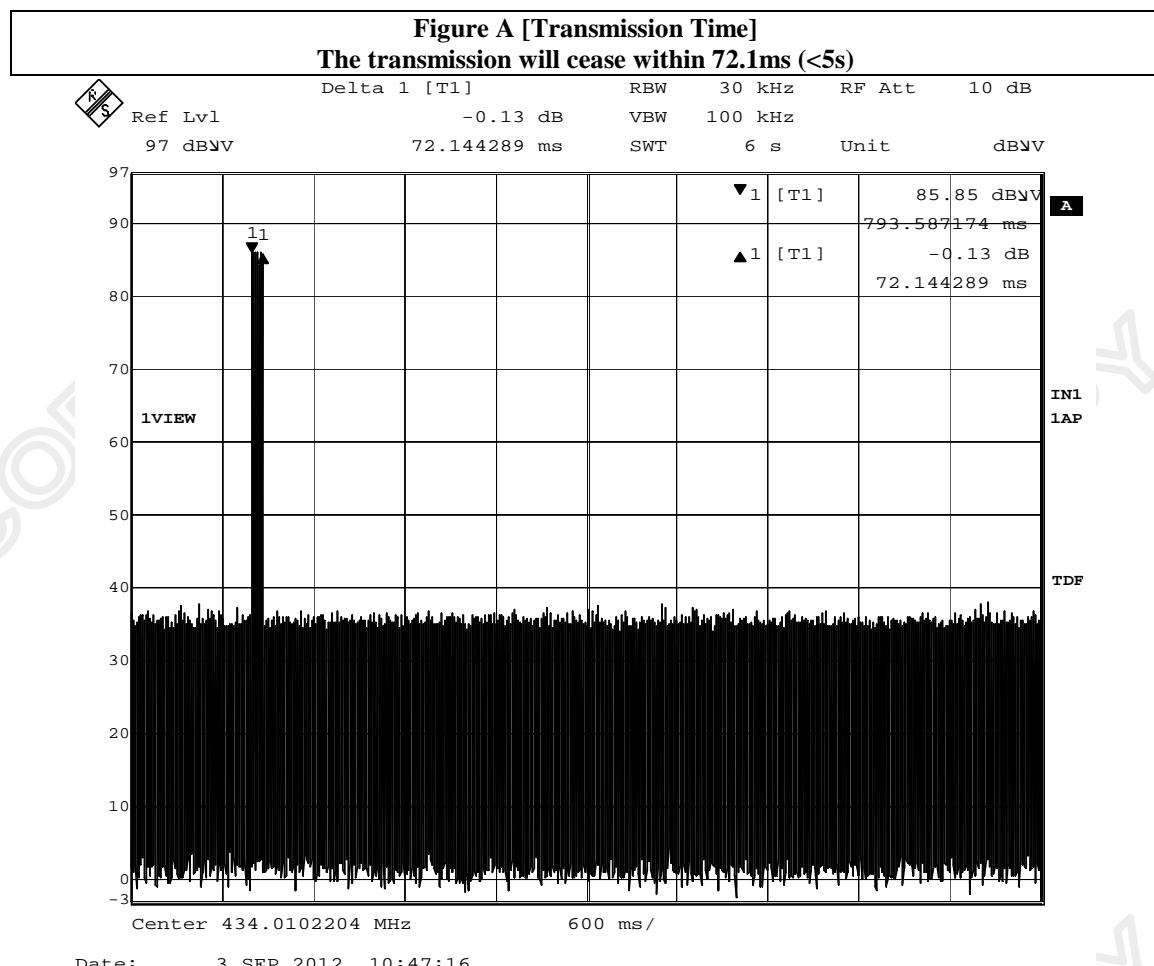
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Appendix C

Manual Operation [FCC 47CFR 15.231(a)]

The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.

Figure A



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Appendix D

Photographs of EUT

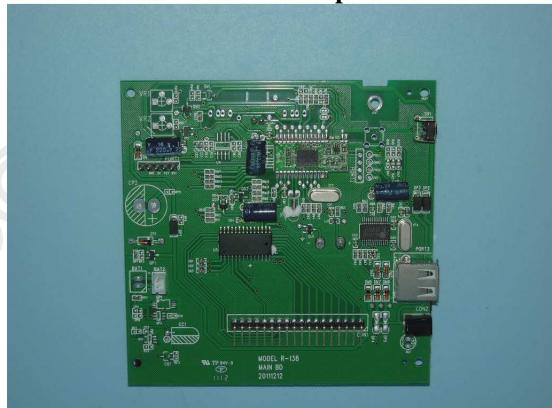
Front View of the product



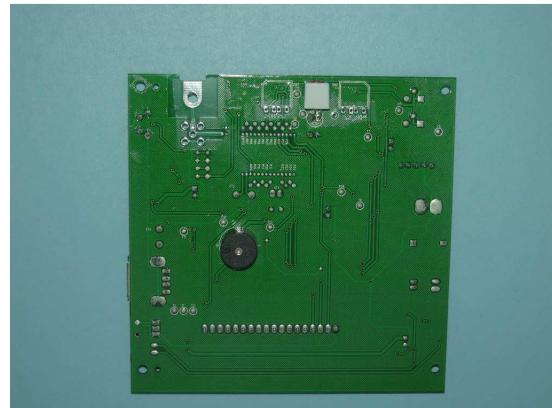
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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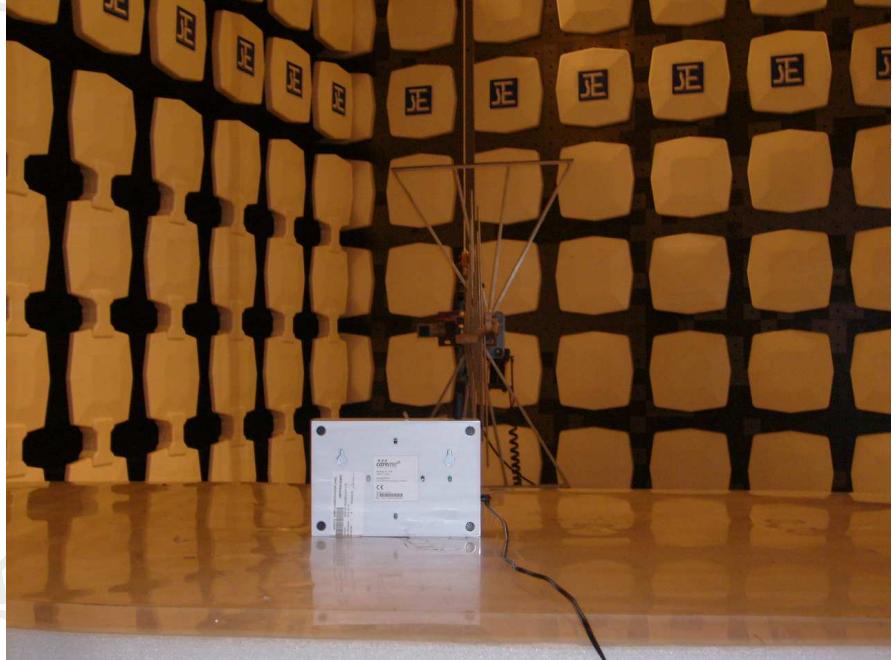
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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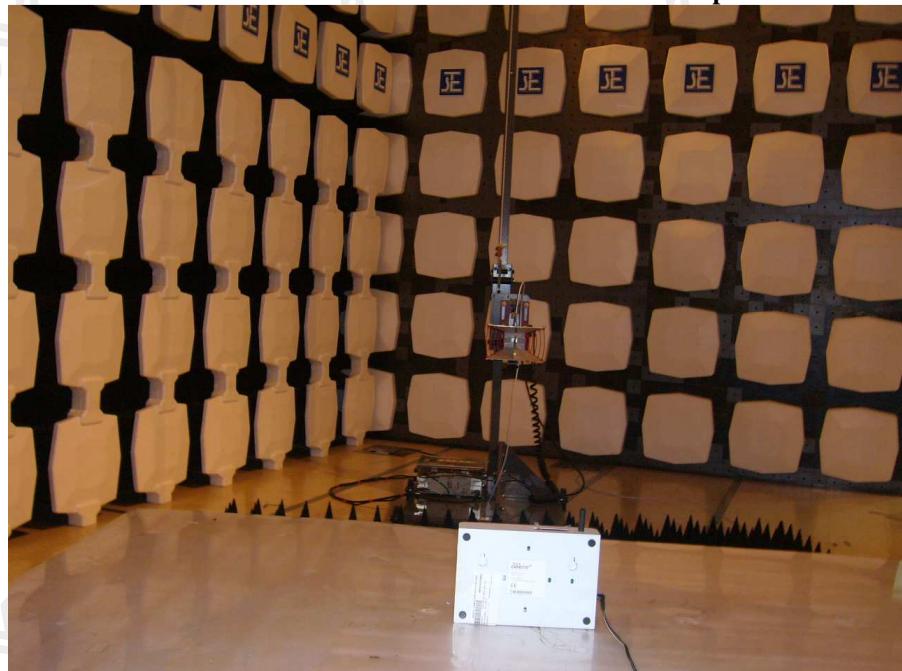
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Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



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Measurement of Conducted Emission Test Set Up



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