



STC Test Report

Date : 2008-10-22

Page 1 of 24

No. : HM162621

Applicant (WIC020):

Winbel Co Ltd
9C Fully Industrial Building, 6 Tsun Yip Lane, Kwun Tong
Hong Kong

Manufacturer:

Winbel Co Ltd
9C Fully Industrial Building, 6 Tsun Yip Lane, Kwun Tong
Hong Kong

Description of Samples:

Model Name: Co Co Call Repeater
Brand Name: Co Co Call
Model Number: WM109U7
FCC ID: WDZCOCOCALL500

Date Samples Received:

2008-10-13

Date Tested:

2008-10-14

Investigation Requested:

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 and ANSI C63.4:2003 for FCC Certification.

Conclusions:

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.

Remarks:

Dr. LEE Kam Chuen,
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, Taiipo Industrial Estate, N.T., Hong Kong

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STC Test Report

Date : 2008-10-22

Page 2 of 24

No. : HM162621

CONTENT:

Cover	Page 1 of 24
Content	Page 2-3 of 24
<u>1.0</u>	<u>General Details</u>
1.1	Test Laboratory
1.2	Applicant Details
	Applicant
	HKSTC Code Number for Applicant
	Manufacturer
1.3	Equipment Under Test [EUT]
	Description of EUT operation
1.4	Date of Order
1.5	Submitted Samples
1.6	Test Duration
1.7	Country of Origin
<u>2.0</u>	<u>Technical Details</u>
2.1	Investigations Requested
2.2	Test Standards and Results Summary
<u>3.0</u>	<u>Test Results</u>
3.1	Emission
3.2	Bandwidth Measurement

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STC Test Report

Date : 2008-10-22

Page 3 of 24

No. : HM162621

Appendix A

List of Measurement Equipment

Page 16 of 24

Appendix B

Duty Cycle Correction During 100 msec

Page 17-21 of 24

Appendix C

Periodic Operation

Page 22 of 24

Appendix D

Photographs

Page 23-24 of 24

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STC Test Report

Date : 2008-10-22

Page 4 of 24

No. : HM162621

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**

Winbel Co Ltd
9C Fully Industrial Building, 6 Tsun Yip Lane, Kwun Tong Hong Kong

HKSTC Code Number for Applicant

Manufacturer

Winbel Co Ltd
9C Fully Industrial Building, 6 Tsun Yip Lane, Kwun Tong Hong Kong

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STC Test Report

Date : 2008-10-22

Page 5 of 24

No. : HM162621

1.3 Equipment Under Test [EUT] Description of Sample

Product: Co Co Call Repeater
Manufacturer: Winbel Co Ltd
Brand Name: Co Co Call
Model Number: WM109U7
Rating: 117V.a.c. with jack

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: WM-117-9, Input: 100-240Vd.c. 50-60Hz 0.3A, Output: 9Vd.c. 1.3A

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Winbel Co Ltd., Co Co Call Repeater. The transmitter is a RF trigger transmitter. The EUT start to transmit once, after triggered by a RF signal and cease with 5 second.

Repeater is a device that is intended to re-radiate an input signal; and the repeater (FCC ID: WDZCOCOCALL500) only can use with caller (FCC ID: WDZCOCOCALL300) together; the repeater channel frequency selection can not change the frequency. It is for change the coding only.

1.4 Date of Order

2008-10-13

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2008-10-14

1.7 Country of Origin

Japan

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STC Test Report

Date : 2008-10-22

Page 6 of 24

No. : HM162621

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2007 and ANSI C63.4:2003 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	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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STC Test Report

Date : 2008-10-22

Page 7 of 24

No. : HM162621

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

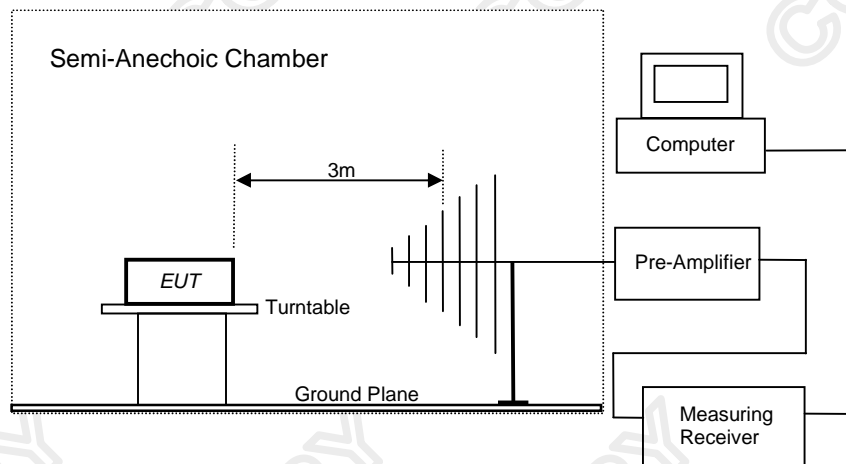
Test Requirement:	FCC 47CFR 15.231a
Test Method:	ANSI C63.4:2003
Test Date:	2008-10-14
Mode of Operation:	Tx on mode, Rx on mode

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.

*: 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.

Test Setup:



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STC Test Report

Date : 2008-10-22

Page 8 of 24

No. : HM162621

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

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [$\mu\text{V/m}$]	Field Strength of Spurious Emission [Average] [$\mu\text{V/m}$]
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, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permissible unwanted emission level is 20dB below the maximum permitted fundamental level.

Results of Tx on mode: PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μV	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
315.06	52.0	16.0	68.0	2511.9	60,441.8	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μV	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
315.06	45.6	16.0	61.6	1202.3	6,044.2	Horizontal

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STC Test Report

Date : 2008-10-22

Page 9 of 24

No. : HM162621

Results of Tx on mode: PASS

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
630.12	< 1.0	23.0	< 24.0	< 15.8	604.4	Vertical
+ 945.18	< 1.0	26.7	< 27.7	< 24.3	500.0	Vertical
1260.24	< 1.0	32.2	< 33.2	< 45.7	604.4	Vertical
1575.30	< 1.0	38.8	< 39.8	< 97.7	604.4	Vertical
1890.36	< 1.0	17.4	< 18.4	< 8.3	604.4	Vertical
2205.42	< 1.0	17.2	< 18.2	< 8.1	604.4	Vertical
2520.48	< 1.0	18.8	< 19.8	< 9.8	604.4	Vertical
+ 2835.54	< 1.0	19.7	< 20.7	< 10.8	500.0	Vertical
+ 3150.60	< 1.0	20.6	< 21.6	< 12.0	500.0	Vertical

Remarks:

Adjusted by Duty Cycle = -6.4dB

FCC Limit for Average Measurement = $41.6667(315.06\text{MHz}) - 7083.3333 = 6,044.2\mu\text{V/m}$

+: 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 5.2dB
1GHz to 18GHz 5.1dB

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STC Test Report

Date : 2008-10-22

Page 10 of 24

No. : HM162621

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

Frequency [MHz]	Field Strength [microvolts/meter]	Measurement Distance [meter]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Results of Tx on mode: PASS

Radiated Emission Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
73.90	9.6	7.9	17.5	7.5	100	Vertical
115.90	16.4	9.1	25.5	18.8	150	Horizontal
127.60	16.9	8.7	25.6	19.1	150	Horizontal
630.10	17.7	23.0	40.7	108.4	200	Horizontal

Remarks:

No further spurious emissions found between lowest internal frequency and 30MHz.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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STC Test Report

Date : 2008-10-22

Page 11 of 24

No. : HM162621

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

Frequency [MHz]	Field Strength [microvolts/meter]	Measurement Distance [meter]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Results of Rx on mode: PASS

Radiated Emission Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
54.90	15.8	9.1	24.9	17.6	100	Vertical
119.40	18.2	8.9	27.1	22.6	150	Horizontal

Remarks:

No further spurious emissions found between lowest internal frequency and 30MHz.

Correction Factor included Antenna Factor and Cable Attenuation.

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

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STC Test Report

Date : 2008-10-22

Page 12 of 24

No. : HM162621

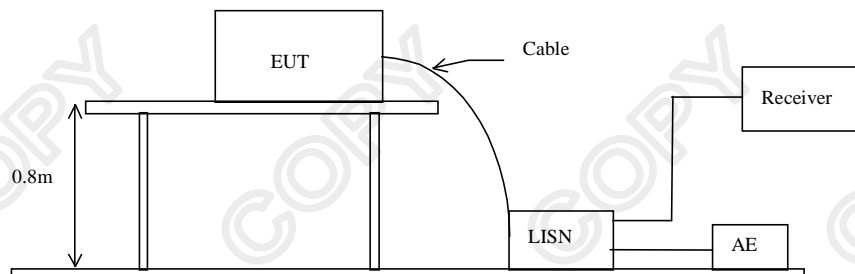
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207
Test Method: ANSI C63.4:2003
Test Date: 2008-10-14
Mode of Operation: On mode

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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STC Test Report

Date : 2008-10-22

Page 13 of 24

No. : HM162621

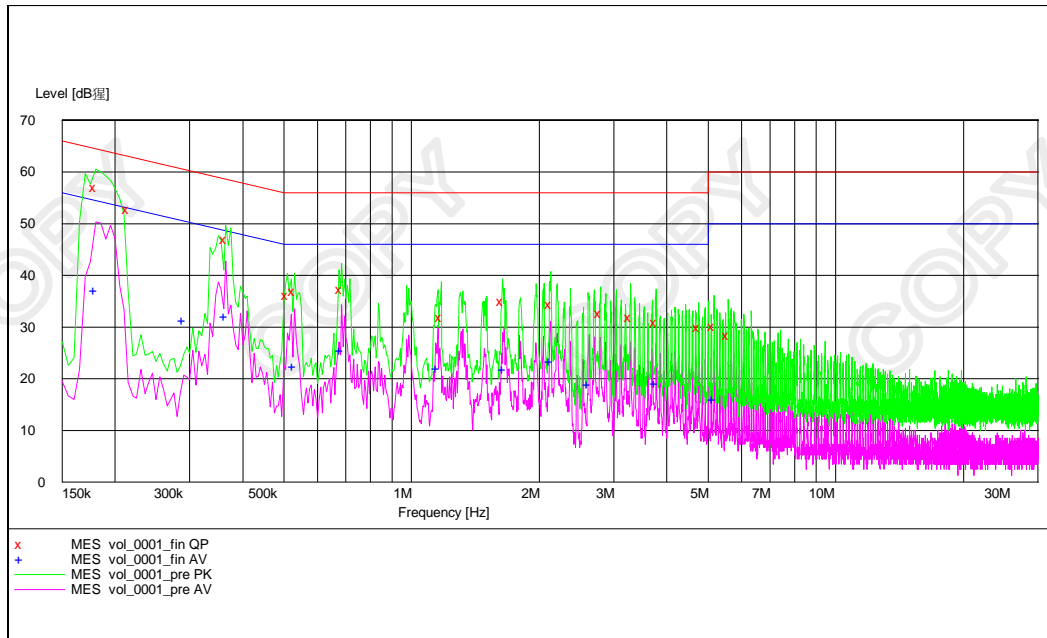
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
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: PASS



Remarks:

Calculated measurement uncertainty : 3.97dB

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STC Test Report

Date : 2008-10-22

Page 14 of 24

No. : HM162621

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231a
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2008-10-14
Mode of Operation:	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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STC Test Report

Date : 2008-10-22

Page 15 of 24

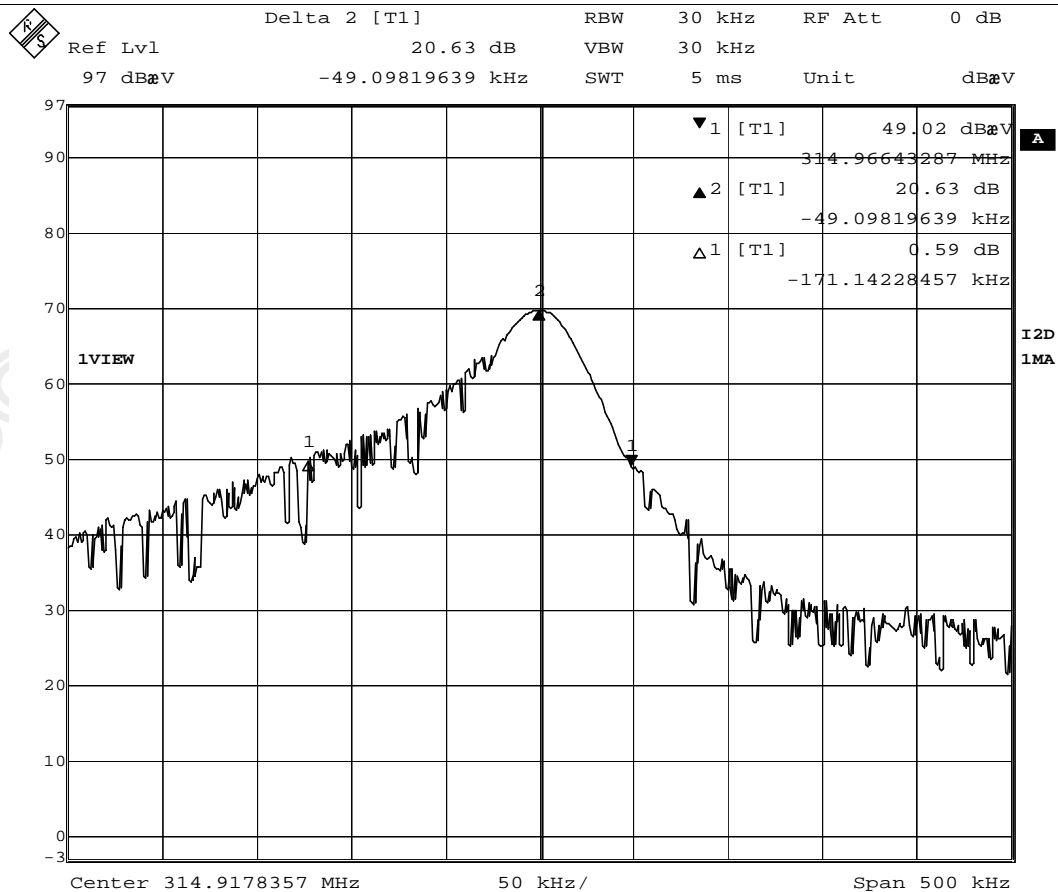
No. : HM162621

Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits * [KHz]
315.059	122.75	787.6475

*: FCC Limit for Bandwidth measurement
= (0.25%)(Center Frequency)
= (0.0025)(315.059)
= 787.6475KHz

20dB Bandwidth of Fundamental Emission



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STC Test Report

Date : 2008-10-22

Page 16 of 24

No. : HM162621

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2006/07/11	2009/07/11
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Lindgren	FACT-3	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2010/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2007/10/30	2009/10/30
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	2008/01/23	2009/01/23

Remarks:-

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

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STC Test Report

Date : 2008-10-22

Page 17 of 24

No. : HM162621

Appendix B

Duty Cycle Correction During 100msec

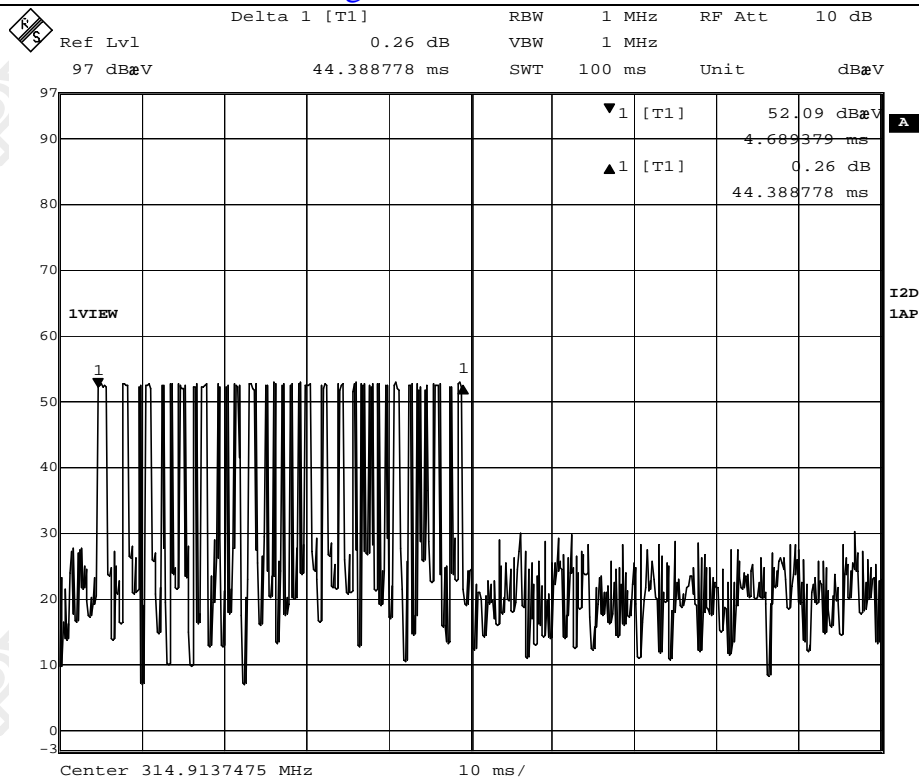
Each function key sends a different series of characters, but each packet period (44.6msec) never exceeds a series of 13 long (0.942msec) and 20 short (0.461msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $(13 \times 0.942) + (20 \times 0.461) \text{ msec per } 44.6 \text{ msec} = 48.1\%$ duty cycle. Figure A through E show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = $20\text{Log}(0.48) = -6.4\text{dB}$

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

Figure A [Pulse Train]



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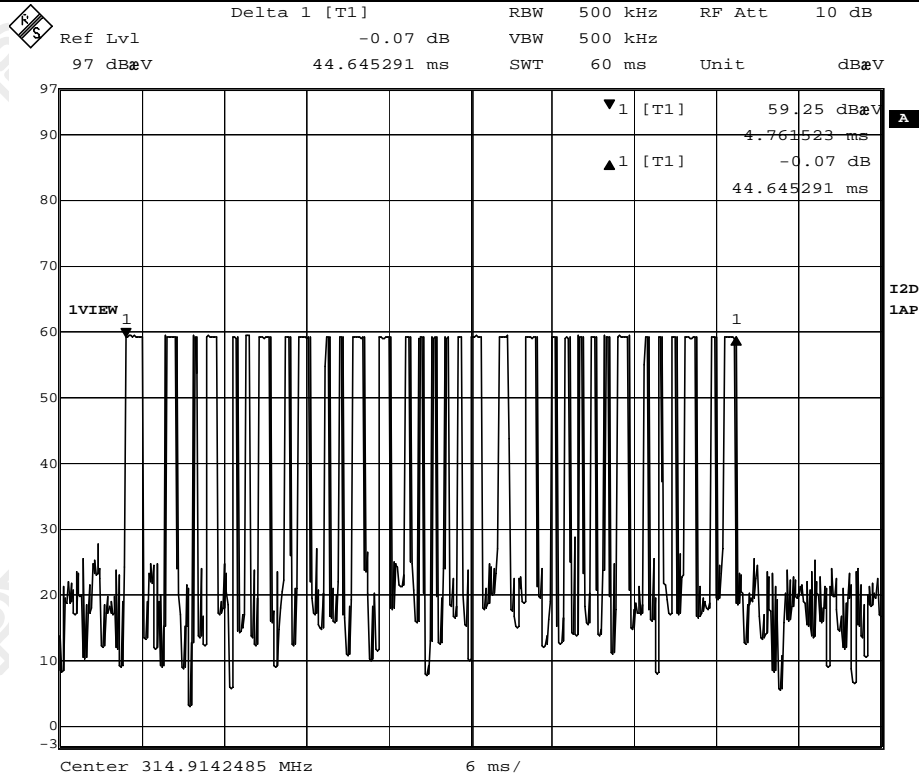
STC Test Report

Date : 2008-10-22

Page 18 of 24

No. : HM162621

Figure B [Pulse Train of Repeated Signal]



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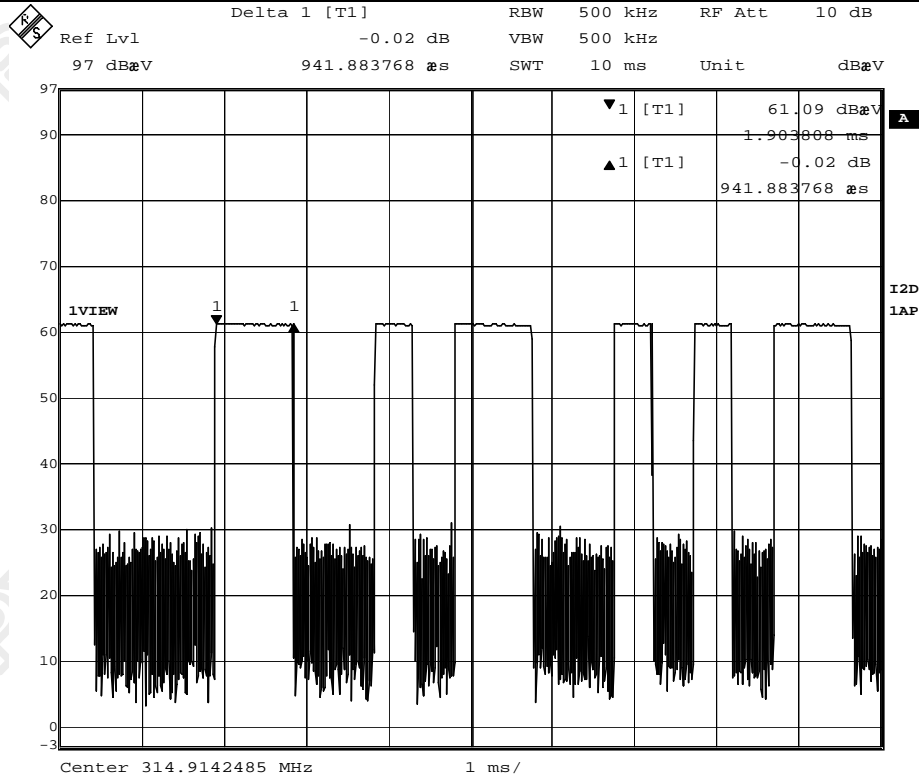
STC Test Report

Date : 2008-10-22

Page 19 of 24

No. : HM162621

Figure C [13 Long Pulse and 20 Short Pulse within 44.64ms]



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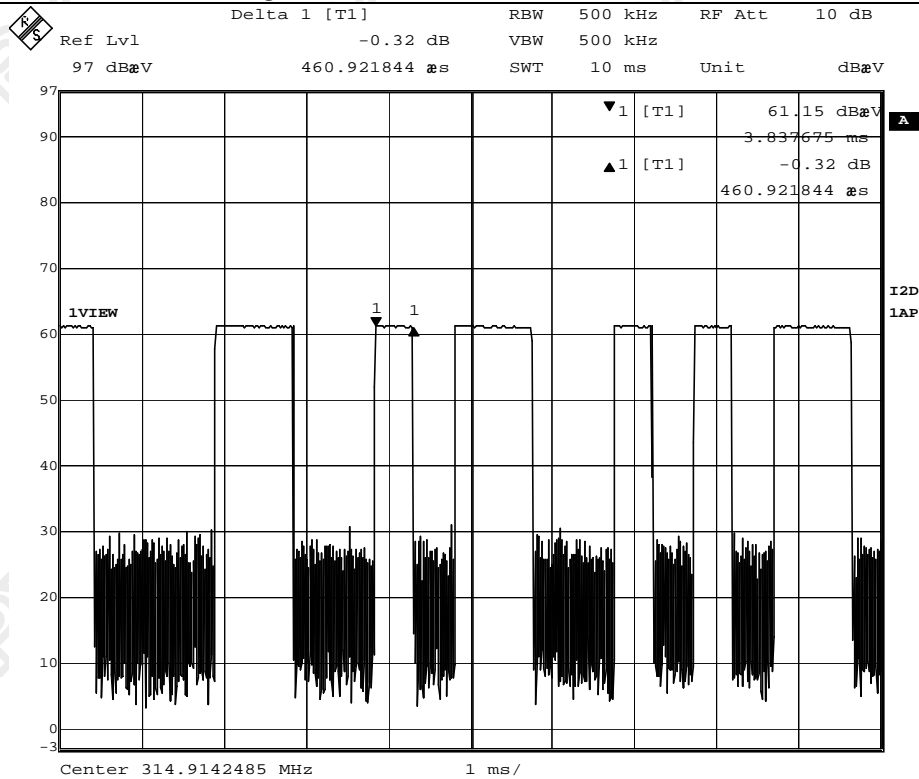
STC Test Report

Date : 2008-10-22

Page 20 of 24

No. : HM162621

Figure D [Short Pulse Period 461 μ s]



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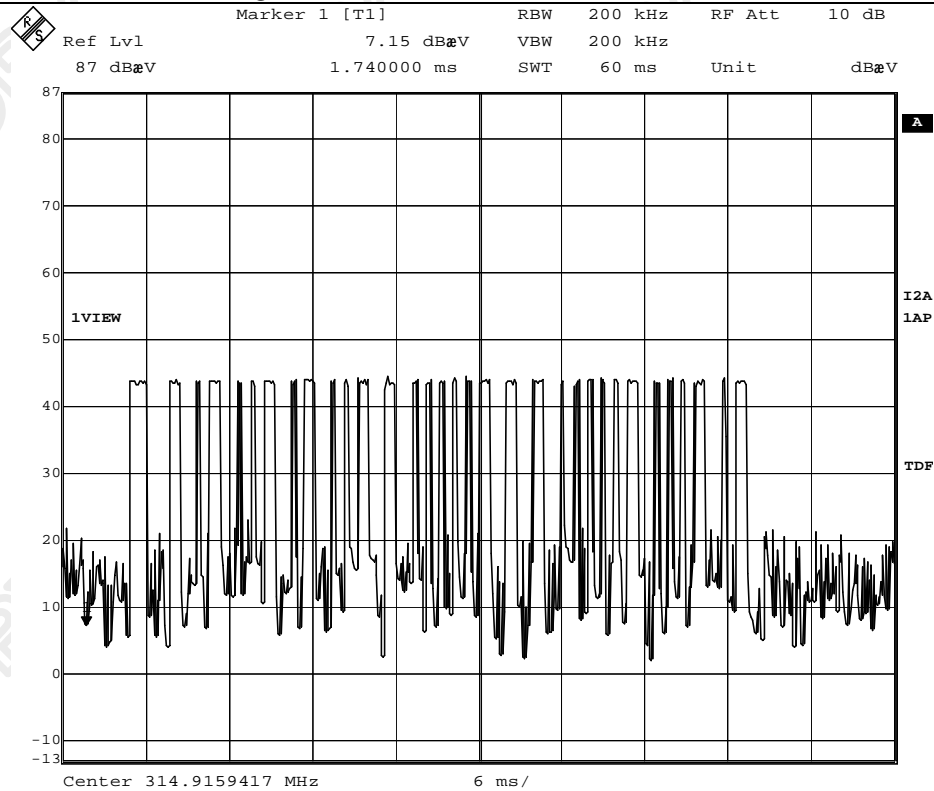
STC Test Report

Date : 2008-10-22

Page 21 of 24

No. : HM162621

Figure E [Pulse Train of Origin Signal]



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STC Test Report

Date : 2008-10-22

Page 22 of 24

No. : HM162621

Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a2). A transmitter automatically activated must automatically deactivate within not more than 5 seconds of being released. 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.

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STC Test Report

Date : 2008-10-22

Page 23 of 24

No. : HM162621

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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STC Test Report

Date : 2008-10-22

Page 24 of 24

No. : HM162621

Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



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

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