

## Hong Kong Standards and Testing Centre

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No.: HM152916

Applicant: GOLIGHT, INC.

R3 Box 37B, Culbertson, NE 69024

**Description of Samples:** Model name: STRYKER

Model no.: 3200
Brand name: Golight
FCC ID: MMK3200T

Date Samples Received: 2004-11-17

**Date Tested:** 2005-01-03

Investigation Requested: FCC Part 15 Subpart C

**Conclusions:** The submitted product was deemed to have

<u>COMPLIED</u> 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: ----

K C Lee, EMC for Chief Executive

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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

GOLIGHT, INC. R3 Box 37B, Culbertson, NE 69024

**HKSTC Code Number for Applicant** 

WII003

#### Manufacturer

GOLIGHT, INC. R3 Box 37B, Culbertson, NE 69024



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# 1.3 Equipment Under Test [EUT] Description of Sample

Product: STRYKER

Manufacturer: GOLIGHT, INC.

Brand Name: Golight Model Number: 3200

Input Voltage: 12Vd.c ("23A" size battery x 2)

#### 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a GOLIGHT, INC., STRYKER. The EUT is to transmit RF signal while each button is being pressed, Modulation by Data Code type is pulse modulation.

#### 1.4 Date of Order

2004-11-17

#### 1.5 Submitted Sample(s):

4 Samples per model

#### 1.6 Test Duration

2005-01-03

#### 1.7 Country of Origin

China

#### 香港新界大埔工業村大宏街 10 號



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#### 1.8 Additional Information of EUT

	Submitted	Not Available
User Manual		
Part List		5
Circuit Diagram		
Printed Circuit Board [PCB] Layout		
Block diagram	$\boxtimes$	
FCC ID Label	$\boxtimes$	



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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 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 /	Te	est Resul	t		
	·		Severity	Pass	Failed	N/A		
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2003	N/A	$\boxtimes$				
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	Class B	$\boxtimes$		/П		
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	Class B			$\boxtimes$		

Note: N/A - Not Applicable



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#### 3.0 Test Results

#### 3.1 Emission

#### 3.1.1 Radiated Emissions (30 - 1000MHz)

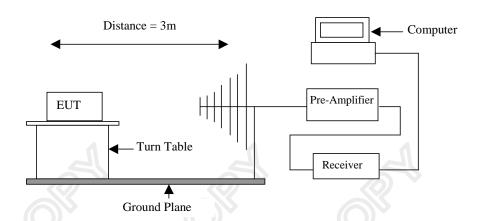
Test Requirement: FCC 47CFR 15.231a
Test Method: ANSI C63.4:2003
Test Date: 2005-01-03
Mode of Operation: Tx mode

#### **Test Method:**

The sample was placed 0.8m above the ground plane on the OATS \*. 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.

\*: OATS [Open Area Test Site] located at HKSTC 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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#### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of	Field Strength of	Field Strength of
Fundamental	Fundamental Emission	Spurious Emission
	[Average]	[Average]
[MHz]	[μV/m]	[µV/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,  $\mu$ V/m at 3 meters=56.81818(F)-6136.3636; for the band 260-470 MHz,  $\mu$ 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:

Field Strength of Fundamental Emissions Peak Value								
Frequency	Measured	Correction	Field	Field	Limit	E-Field		
	Level @3m	Factor	Strength	Strength	@3m	Polarity		
MHz	dBμV/m	dBµV/m	dBµV/m	μV/m	μV/m			
434.00	44.7	18.8	63.5	1496.2	110,000.1	Horizontal		

	Field Strength of Spurious Emissions									
					Pea	k Value				
F	requency	Me	easured	Correction	Field			Field	Limit @3m	E-Field
		Lev	el @3m	Factor	St	rength	S	trength		Polarity
	MHz	d	BµV/m	dBµV/m	dE	3μV/m		μV/m	μV/m	
	868.00		36.8	26.0		62.8		1380.4	11,000.0	Horizontal
+	1302.00		17.5	30.2		47.7		242.7	5,000.0	Horizontal
	1736.00	<	1.0	32.2	٧	33.2	٧	45.7	11,000.0	Vertical
	2170.00	<	1.0	38.8	٧	39.8	٧	97.7	11,000.0	Vertical
	2604.00	<	1.0	17.4	٧	18.4	٧	8.3	11,000.0	Vertical
	3038.00	<	1.0	17.2	٧	18.2	٧	8.1	11,000.0	Vertical
	3472.00	<b>Y</b>	1.0	18.8	٧	19.8	<b>'</b>	9.8	11,000.0	Vertical
+	3906.00	<	1.0	19.7	٧	20.7	<	10.8	5,000.0	Vertical
+	4340.00	<	1.0	20.6	٧	21.6	٧	12.0	5,000.0	Vertical



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#### Results:

Field Strength of Fundamental Emissions							
Average Value							
Frequency	Measured	Correction	Field	Field	Limit	E-Field	
	Level @3m	Factor	Strength	Strength	@3m	Polarity	
MHz	dBµV/m	dBµV/m	dBµV/m	μV/m	μV/m		
434.00	34.2	18.8	53.0	446.7	11,000.0	Horizontal	

	Field Strength of Spurious Emissions Average Vaule									
Frequ	ency	Me	asured	Correction		Field		Field	Limit @3m	E-Field
		Lev	el @3m	Factor	St	rength	S	trength		Polarity
MH	lz	d	BµV/m	dBµV/m	dE	BμV/m		μV/m	μV/m	
868	3.00		36.8	25.8		62.6		1349.0	1,100.0	Horizontal
+ 130	2.00		7.0	30.2		37.2		72.4	500.0	Horizontal
173	6.00	<	1.0	32.2	٧	33.2	٧	45.7	1,100.0	Vertical
217	0.00	<	1.0	38.8	٧	39.8	٧	97.7	1,100.0	Vertical
260	4.00	<	1.0	17.4	٧	18.4	٧	8.3	1,100.0	Vertical
303	8.00	<	1.0	17.2	<	18.2	٧	8.1	1,100.0	Vertical
347	2.00	<	1.0	18.8	<	19.8	٧	9.8	1,100.0	Vertical
+ 390	6.00	<	1.0	19.7	<	20.7	٧	10.8	500.0	Vertical
+ 434	0.00	<	1.0	20.6	<	21.6	<b>V</b>	12.0	500.0	Vertical

#### Remarks:

\*: Adjusted by Duty Cycle = -10.5dB

FCC Limit for Average Measurement =  $41.6667(434MHz)-7083.3333=11,000.0145\mu V/m$ 

+: 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 limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB



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

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]		
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 quasipeak detector and above 1000MHz are based on measurements employing an average detector.

#### Results:

Radiated Emissions Quasi-Peak							
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field	
	Level @3m	Factor	Strength	Strength	4	Polarity	
MHz	dBμV/m	dBµV/m	dBμV/m	μV/m	μV/m		
	NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS						

#### Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB



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#### 3.1.1 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.107
Test Method: ANSI C63.4:2003

Test Date: N/A
Mode of Operation: N/A

Results: N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.



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### 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: 2004-12-20 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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#### Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range	20dB Bandwidth	FCC Limits *
[MHz]	[kHz]	[kHz]
434	53	1085

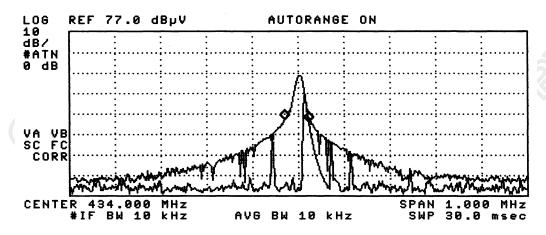
FCC Limit for Bandwidth measurement = (0.25%)(Center Frequency)

=(0.0025)(434) =1085kHz

#### 20dB Bandwidth of Fundamental Emission

# 09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997 MARKER ▲ ACTV DET: PEAK

53 kHz -.97 dB MEAS DET: PEAK QP AVG MKR4 53 kHz -.97 dB





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#### Appendix A

#### **List of Measurement Equipment**

#### **Radiated Emission**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	15/06/04
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	15/06/04
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	15/06/04
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	15/06/04
EM011	ATTENNUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	15/06/04
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	15/06/04
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	15/06/04
EM020	HORN ANTENNA	EMCO	3115	4032	30/07/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	30/07/03
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	08/02/03
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	13/01/04
EM145	EMI TEST RECEIVER	R&S	ESCS 30	830245/021	04/10/04
EM219	BICONILOG ANTENNA	EMCO	3142C	00029071	28/10/03
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A

#### **Line Conducted**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	17/10/03
EM119	LISN	R&S	ESH3-Z5	0831.5518.52	14/10/04
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	СМ
EM142	PULES LIMITER	R&S	ESH3Z2	357.8810.52	04/08/04
EM181	EMI TEST RECEIVER	R&S	ESIB7	100072	06/01/04
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	17/10/03
EM197	LISN	EMCO	4825/2	1193	05/06/04

#### 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**

Each function key sends a different series of characters, but each packet period (82.5msec) never exceeds a series of 8 long (1.875msec) and 17 short (562μsec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 8x1.875msec+17x562μsec per 82.5msec=29.7% duty cycle. Figure A through C show the characteristics of the pulses train for one of these functions.

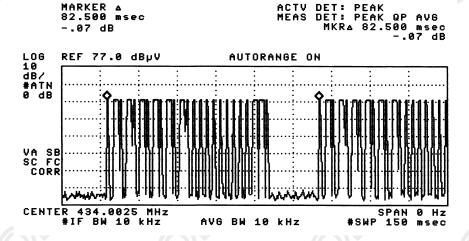
#### Remarks:

Duty Cycle Correction = 20Log(0.297) =-10.5dB

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

#### Figure A [Pulse Train]

09:11:24 JAN 16, 1995 23:49:37 NOV 12,

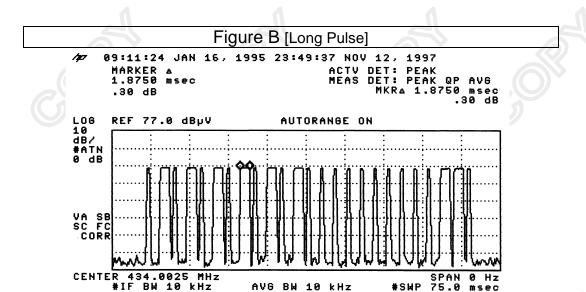




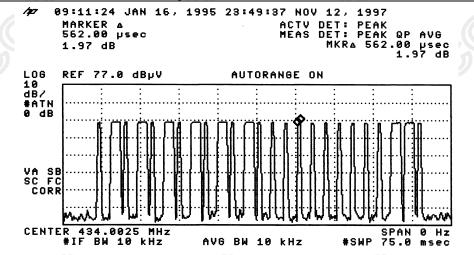
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### Figure C [Short Pulse]





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#### Appendix C

#### Periodic Operation [FCC 47CFR 15.231a]

According to FCC 47CFR15.231a. A transmitter manually activated must automatically deactivate within not more than 5 seconds of being released. The transmitter is a 6 button transmitter. The EUT continues to transmit while each button is being pressed. 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.

#### 香港新界大埔工業村大宏街 10 號



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#### Appendix D

#### **Photographs of EUT**

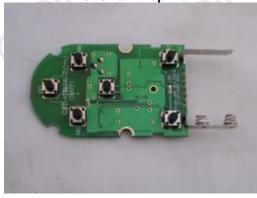
Front View of the product



Rear View of the product



**Inner Circuit Top View** 



**Inner Circuit Bottom View** 





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#### Photographs of EUT

Measurement of Radiated Emission Test Set Up

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