



Test Report

Product Name : Multi Laser Presenter

Model No. : MLR-5011, PAUM30

FCC ID.: J755011

Applicant : Sunrex Technology Corp.

Address : No.188-1, Chung Cheng Road. , Ta Ya Shiang , Taichung Hsien ,
Taiwan, R.O.C.

Date of Receipt : Jan 14, 2003

Date of Test : Jan 20, 2003

Report No. : 031H038FI

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : Jan 20, 2003

Report No. : 031H038FI

Accredited by NIST (NVLAP)
NVLAP Lab Code: 200347-0

Product Name : Multi Laser Presenter

Applicant : Sunrex Technology Corp.

Address : No.188-1, Chung Cheng Road. , Ta Ya Shiang , Taichung Hsien ,
: Taiwan, R.O.C.

Manufacturer : Sunrex Technology Corp.

Model No. : MLR-5011, PAUM30

FCC ID. : J755011

Rated Voltage : DC 3V(Power by Battery)

Trade Name : Innovace, TARGUS

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.249

Measurement Procedure : ANSI C63.4:1992

Test Result : Complied



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(Kevin Wang)

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Attachment 1: EUT Test Photographs

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : Multi Laser Presenter
Trade Name : Innovace, TARGUS
FCC ID. : J755011
Model No. : MLR-5011, PAUM30
Frequency Range : 917.3MHz
Type of Modulation : FM
Antenna type : Soldered on PCB
Antenna Gain : -13dBi
Operator Selection of : Not Applied
Operating Frequency
Frequency of each Channel
Channel Frequency
Channel 1: 917.3 MHz

Note:

1. This device is a 2.4GHz Multi Laser Presenter included a 917.3MHz transmitting function.
2. The variation of model number is for different trade. The circuit of each model is identical.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
4. This device is a composite device in accordance with part 15 regulations. The function for the receiver was measured and made a test report that the report number is 031H038F, certified under Declaration of conformity.
5. QuietTek had verified the construction and function in typical operation, then shown in this test report.

1.2. Operation Description

The EUT is Multi Laser Presenter. The operation frequency is 917.3MHz with FM modulation. the signal will be transmitted through 917.3MHz FM RF signal from the soldered on PCB antenna from EUT to receiver. The EUT is a 917.3MHz Multi Laser Presenter intends to use in household and office PC system.

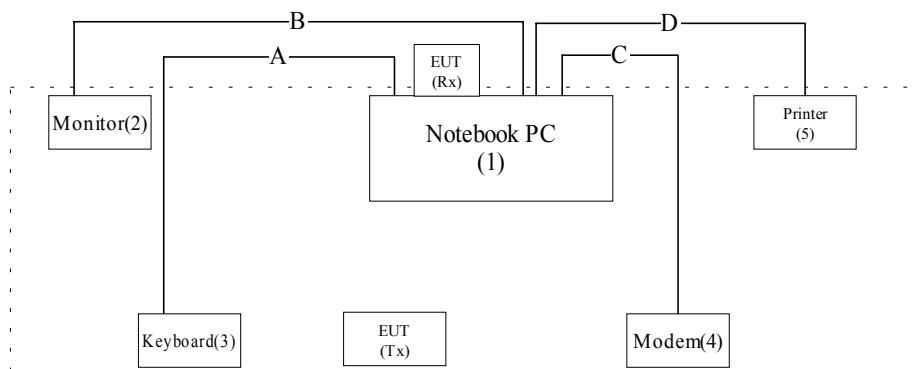
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Notebook PC	DELL	Latitude 610	N/A	Non-shielded, 1.7m, a ferrite core bonded
	Monitor	VIEWSNOC	VCDT21490-1P	ER01502850	Non-shielded, 1.6m
(2)	Keyboard	ACER	6311-TW4C/6	N/A	--
(3)	Modem	ACEEX	DM-1414	960011397	Non-shielded, 1.6m
(4)	Printer	HP	C2642A	MY75J1D1D2	Non-shielded, 0.7m

Signal Cable Type	Signal cable Description
A. Keyboard Cable	Shielded, 1.8m.
B. VGA Cable	Shielded, 1.6m, a ferrite core bonded.
C. Modem Cable	Shielded, 1.5m.
D. Printer Cable	Shielded, 1.2m.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- 1.5.1 Setup the EUT and display as shown on 1.4.
- 1.5.2 Turn on the power of all equipment.
- 1.5.3 The EUT will transmit the signal.
- 1.5.4 Repeat the above procedure 1.5.2 to 1.5.3

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

August 30, 2001 Accreditation on NVLAP
NVLAP Lab Code: 200347-0



Site Name: Quietek Corporation

Site Address: No. 75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail: service@quietek.com

2. Conducted Emission

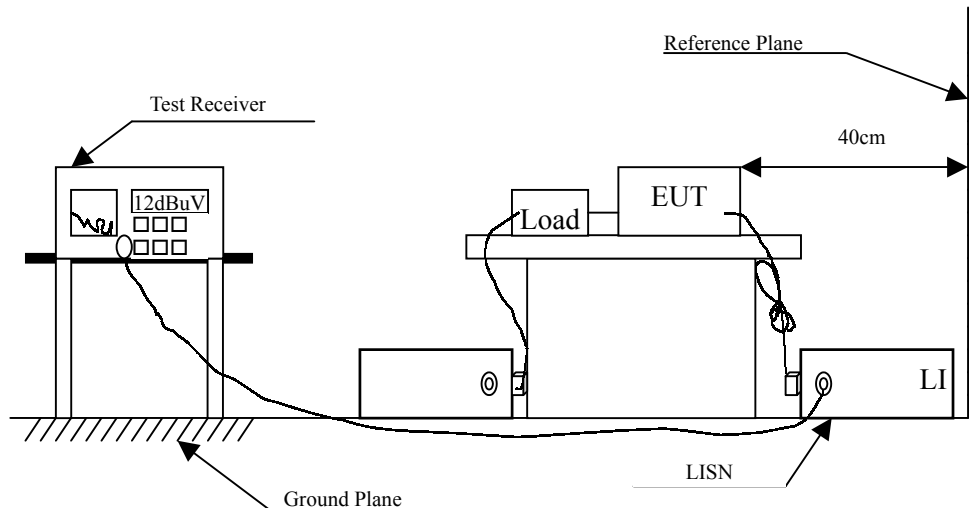
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2002	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2002	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2002	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	No.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:1992 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : Multi Laser Presenter
Test Item : Conducted Emission
Power Line : Line 1
Test Mode : Normal Operation

Frequency	Cable	Probe	Reading	Emission	Limits
	Loss	Factor	Level	Level	
MHz	dB	dB	dBuV	dBuV	dBuV
Quasi-Peak					
*0.174	0.01	0.11	51.51	51.63	64.78
0.292	0.04	0.16	37.25	37.45	60.47
0.410	0.05	0.20	29.17	29.42	57.66
3.978	0.19	0.41	29.03	29.63	56.00
7.194	0.24	0.47	23.21	23.92	60.00
27.082	0.39	0.59	22.64	23.62	60.00
Average					
0.174	0.01	0.11	42.50	42.62	54.77
0.292	0.04	0.16	30.80	31.00	50.47
0.410	0.05	0.20	25.20	25.45	47.65
3.978	0.19	0.41	20.40	21.00	46.00
7.194	0.24	0.47	19.60	20.31	50.00
27.082	0.39	0.59	18.30	19.28	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : Multi Laser Presenter
 Test Item : Conducted Emission
 Power Line : Line 2
 Test Mode : Normal Operation

Frequency	Cable	Probe	Reading	Emission	Limits
	Loss	Factor	Level	Level	
MHz	dB	dB	dBuV	dBuV	dBuV
Quasi-Peak					
*0.175	0.01	0.11	52.49	52.61	64.73
0.232	0.02	0.14	43.77	43.93	62.37
0.350	0.04	0.18	34.94	35.16	58.95
3.564	0.18	0.40	27.21	27.79	56.00
11.749	0.29	0.51	19.73	20.54	60.00
23.466	0.37	0.58	21.10	22.05	60.00
Average					
0.175	0.01	0.11	43.20	43.32	54.72
0.232	0.02	0.14	34.40	34.56	52.38
0.350	0.04	0.18	26.90	27.12	48.96
3.564	0.18	0.40	22.20	22.78	46.00
11.749	0.29	0.51	16.00	16.81	50.00
23.466	0.37	0.58	17.40	18.35	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

3. Radiated Emission

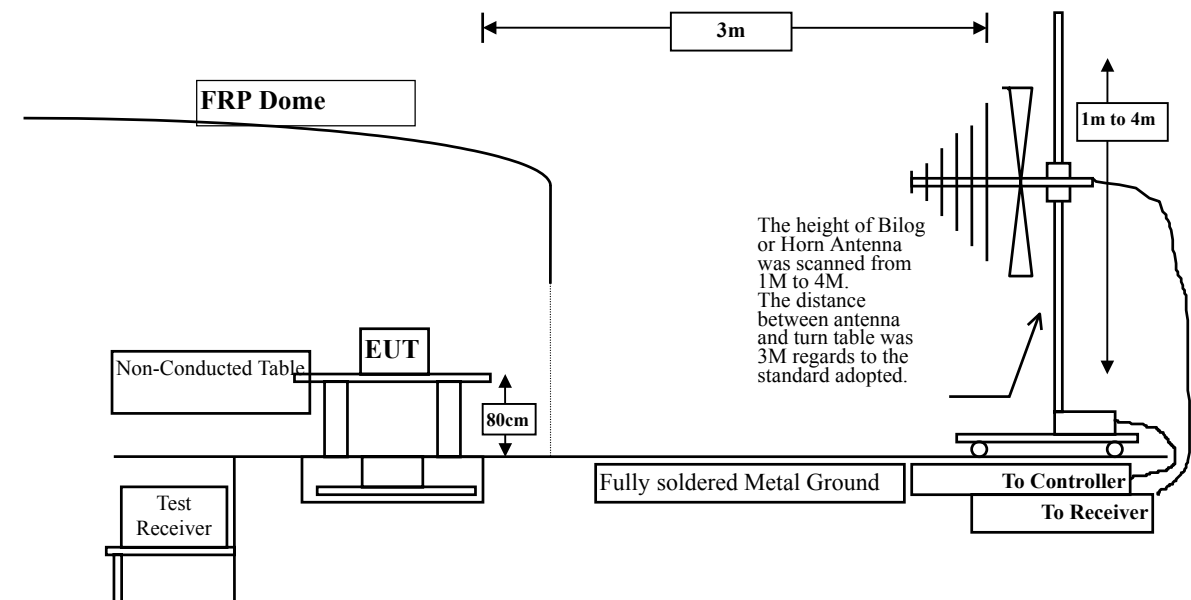
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1		Test Receiver	R & S	ESCS 30 / 825442/14	May, 2002
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2002
		Pre-Amplifier	HP	8447D/3307A01812	May, 2002
		Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2002
		Horn Antenna	EM	EM6917 / 103325	May, 2002
SSite # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2002
	X	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2002
	X	Pre-Amplifier	HP	8447D/3307A01814	May, 2002
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2002
	X	Horn Antenna	EM	EM6917 / 103325	May, 2002

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart B Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks :

1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks :

1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

3.5. Test Result of Radiated Emission

Product : Multi Laser Presenter
 Test Item : Fundamental Radiated Emission
 Test Site : No.2 OATS
 Test Mode : Normal Operation

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

917.280	1.65	24.38	22.60	78.90	82.32	31.68	114.00
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Vertical

Peak Detector:

917.330	1.65	24.37	22.60	70.15	73.57	40.43	114.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Multi Laser Presenter
Test Item : Harmonic Radiated Emission
Test Site : No.2 OATS
Test Mode : Normal Operation

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

1834.920	2.53	25.09	35.09	55.32	47.85	26.15	74.00
2752.080	3.05	27.89	34.29	49.81	46.46	27.54	74.00
3669.300	3.58	28.87	34.35	52.98	51.08	22.92	74.00
4586.400	4.11	30.79	34.42	49.14	49.62	24.38	74.00
5503.640	4.63	31.87	34.53	46.52	48.50	25.50	74.00
6421.120	5.16	34.07	34.75	44.50	48.98	25.02	74.00
7338.400	5.69	36.57	34.99	38.90	< 46.17	27.83	74.00
8255.700	6.21	36.68	35.29	39.24	< 46.83	27.17	74.00

Vertical

Peak Detector:

1833.900	2.53	25.09	35.09	53.06	45.59	28.41	74.00
2753.500	3.05	27.89	34.29	47.21	43.86	30.14	74.00
3669.300	3.58	28.87	34.35	55.81	53.91	20.09	74.00
4586.500	4.11	30.79	34.42	51.18	51.66	22.34	74.00
5501.120	4.63	31.87	34.53	46.06	48.04	25.96	74.00
6421.140	5.16	34.07	34.75	46.47	50.95	23.05	74.00
7338.600	5.69	36.57	34.99	39.36	< 46.63	27.37	74.00
8255.700	6.21	36.68	35.29	38.10	< 45.69	28.31	74.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Multi Laser Presenter
Test Item : General Radiated Emission
Test Site : No.2 OATS
Test Mode : Normal Operation

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

50.130	1.35	7.24	0.00	3.86	12.45	27.55	40.00
61.215	1.45	6.11	0.00	8.83	16.39	23.61	40.00
132.863	2.14	12.82	0.00	8.54	23.50	20.00	43.50
157.570	2.38	11.67	0.00	11.38	25.43	18.07	43.50
166.710	2.47	10.87	0.00	12.94	26.27	17.23	43.50
199.587	2.78	10.24	0.00	11.62	24.64	18.86	43.50
232.500	3.10	11.45	0.00	8.81	23.36	22.64	46.00
265.763	3.42	13.23	0.00	7.42	24.07	21.93	46.00
398.775	4.27	16.62	0.00	15.51	36.40	9.60	46.00
*451.750	4.54	17.12	0.00	15.35	37.01	8.99	46.00

Vertical:

72.400	1.56	8.53	0.00	9.59	19.68	20.32	40.00
129.000	2.10	11.52	0.00	8.34	21.96	21.54	43.50
132.950	2.14	11.86	0.00	8.93	22.93	20.57	43.50
193.640	2.73	8.36	0.00	10.03	21.12	22.38	43.50
258.188	3.35	13.50	0.00	4.96	21.81	24.19	46.00
336.700	3.95	14.34	0.00	5.65	23.94	22.06	46.00
398.650	4.27	16.31	0.00	11.46	32.03	13.97	46.00
*452.200	4.55	16.61	0.00	16.33	37.49	8.51	46.00
516.600	4.88	17.50	0.00	1.55	23.93	22.07	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

4. Band Edge

4.1. Test Equipment

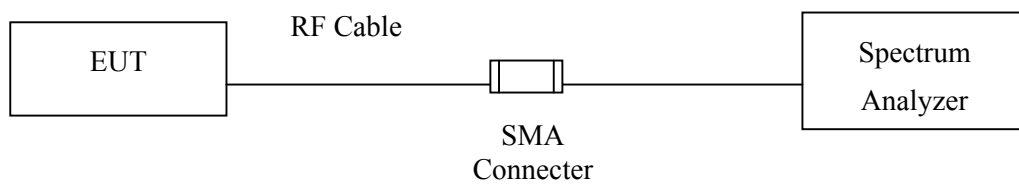
The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2002
X Test Receiver	R & S	ESCS 30 / 825442/14	May, 2002
X Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2002
X Pre-Amplifier	HP	8447D/3307A01812	May, 2002
X Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2002
X Horn Antenna	EM	EM6917 / 103325	May, 2002

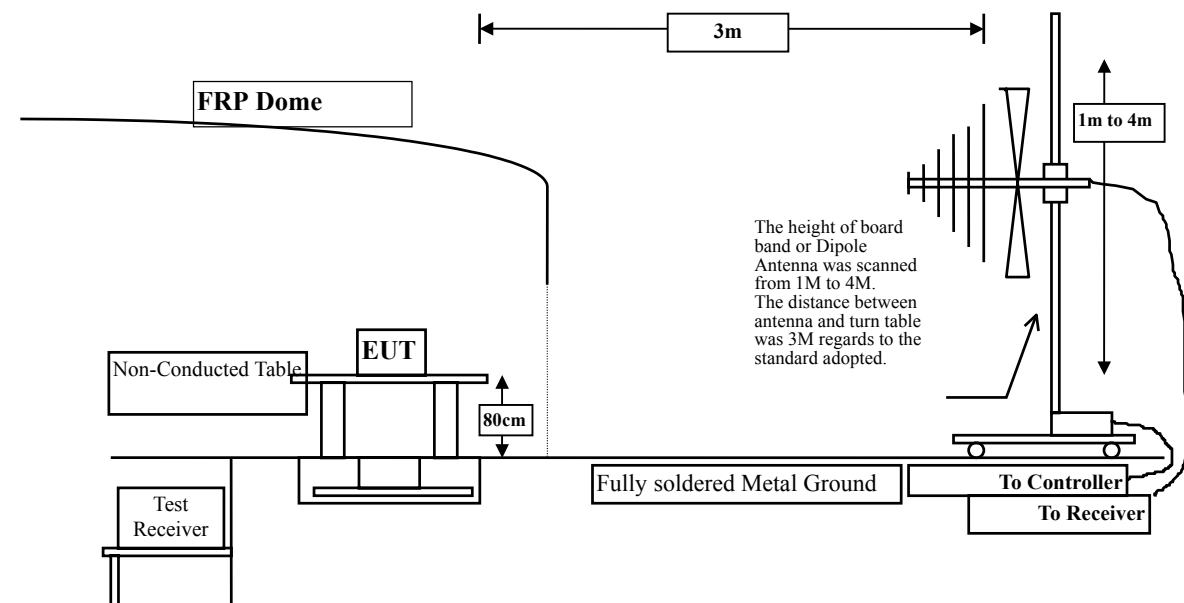
- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

4.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



4.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

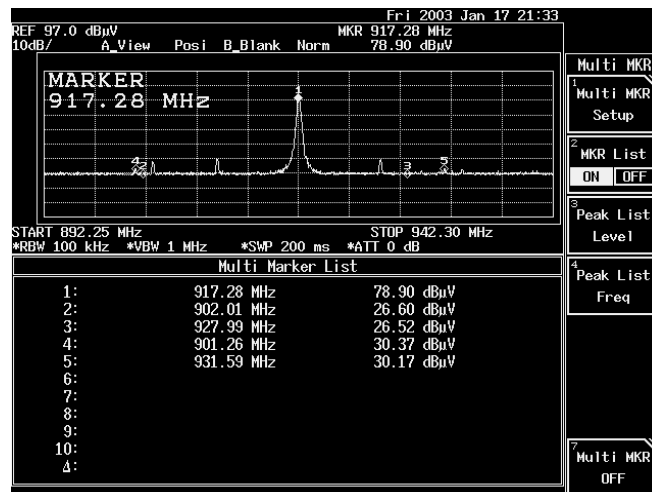
4.5. Test Result of Band Edge

Product : Multi Laser Presenter
 Test Item : Band Edge
 Test Site : No.2 OATS
 Test Mode : Normal Operation

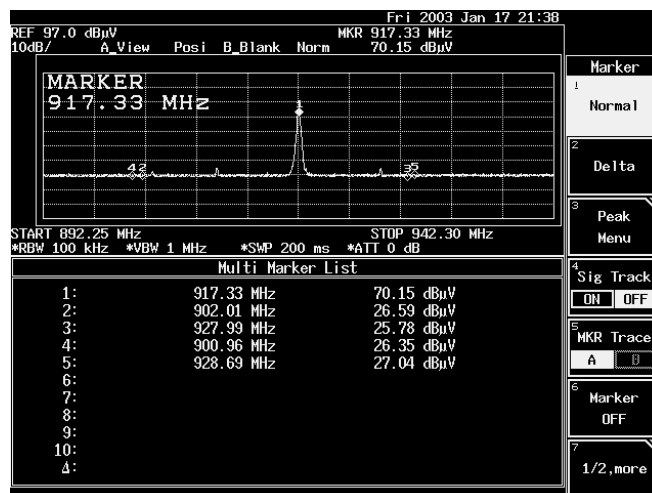
RF Radiated Measurement:Quasi- (Peak Detector)

Polarization	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
Horizontal	901.26	30.37	33.58	46	Pass
Horizontal	931.59	30.17	33.76	46	Pass
Vertical	900.96	26.35	29.56	46	Pass
Vertical	928.69	27.04	30.60	46	Pass

Horizontal



Vertical



5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

Front View of Conducted Test



Back View of Conducted Test



Front View of Radiated Test



Back View of Radiated Test



Front View of Radiated Test (Horn)



Attachment 2 : EUT Detailed Photographs

Attachment 2 : EUT Detailed Photographs

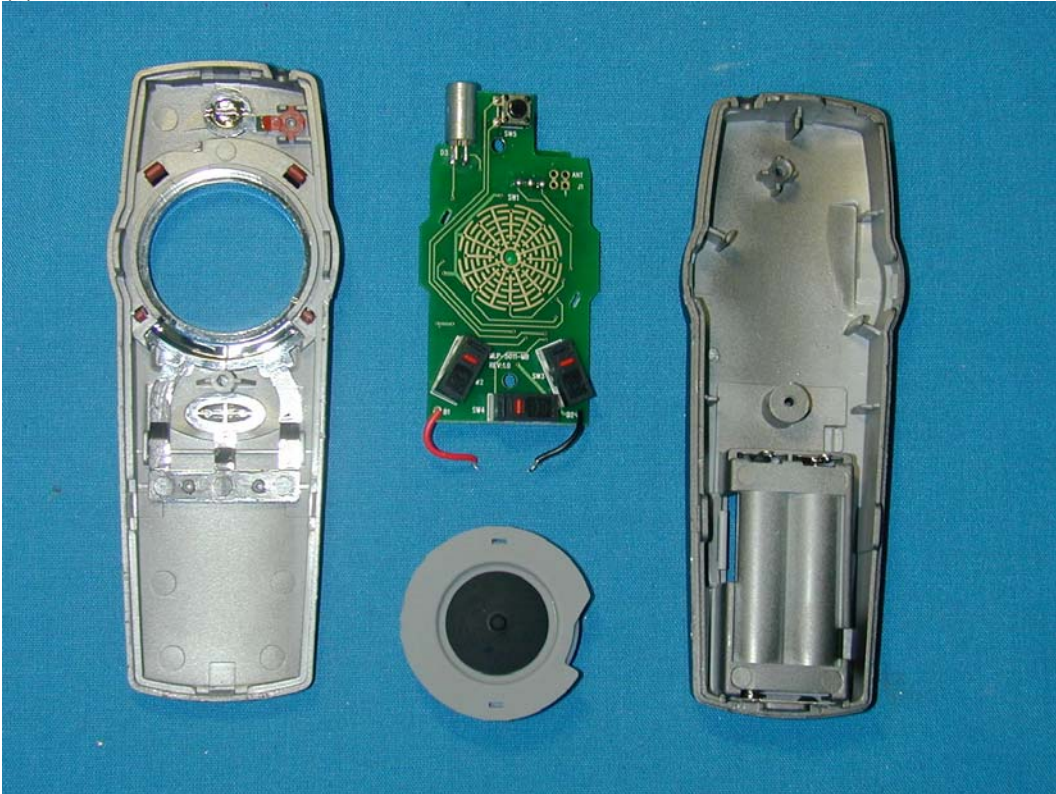
(1) EUT Photo



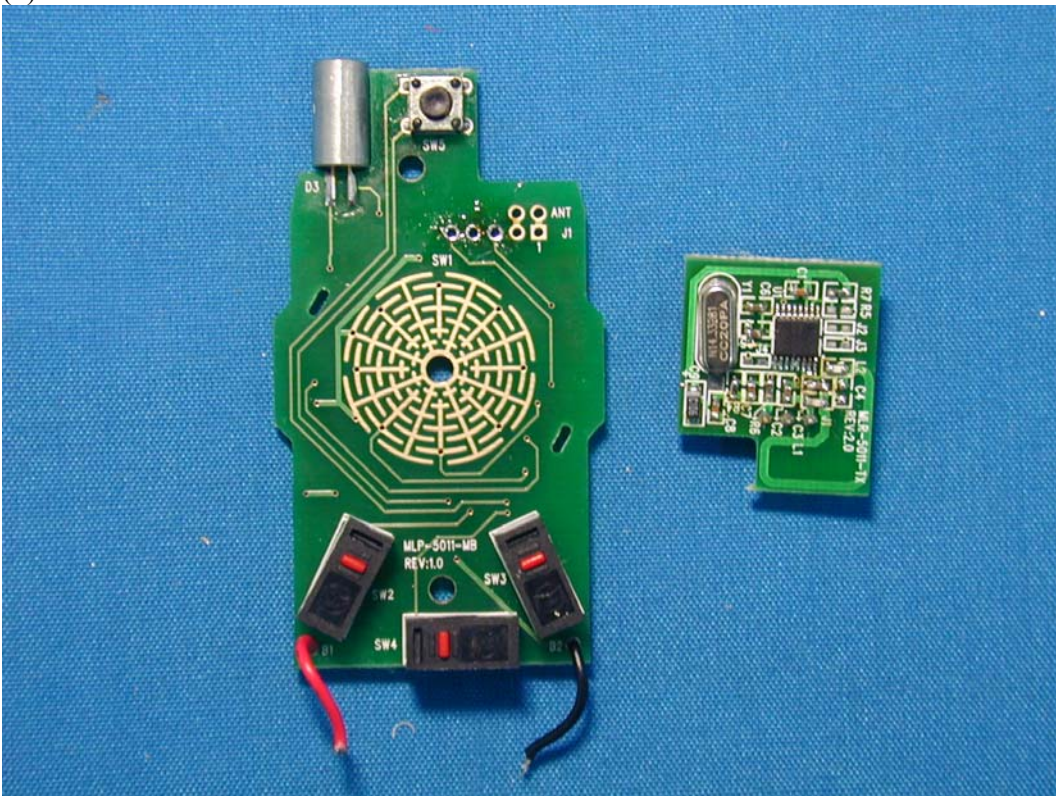
(2) EUT Photo



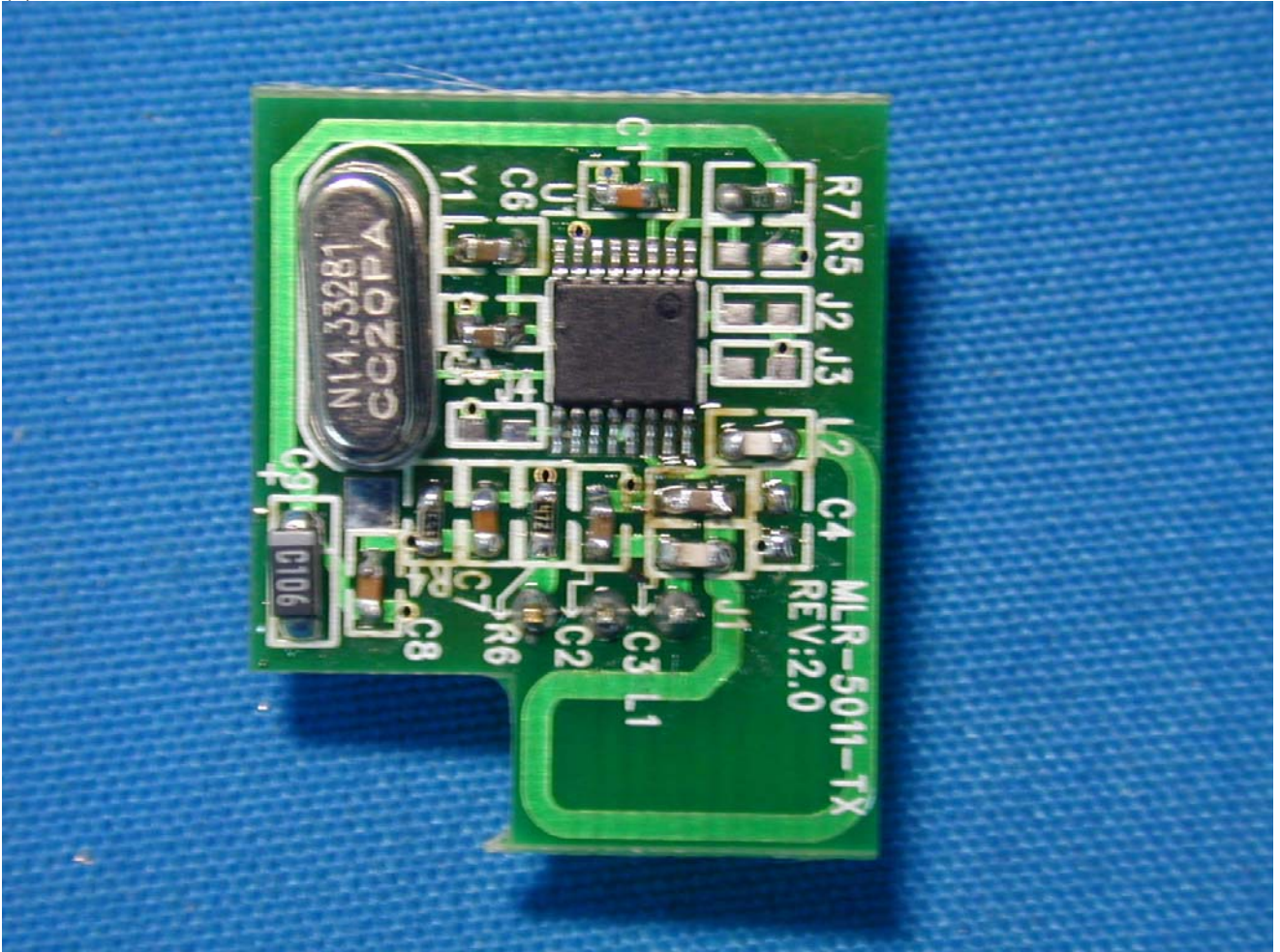
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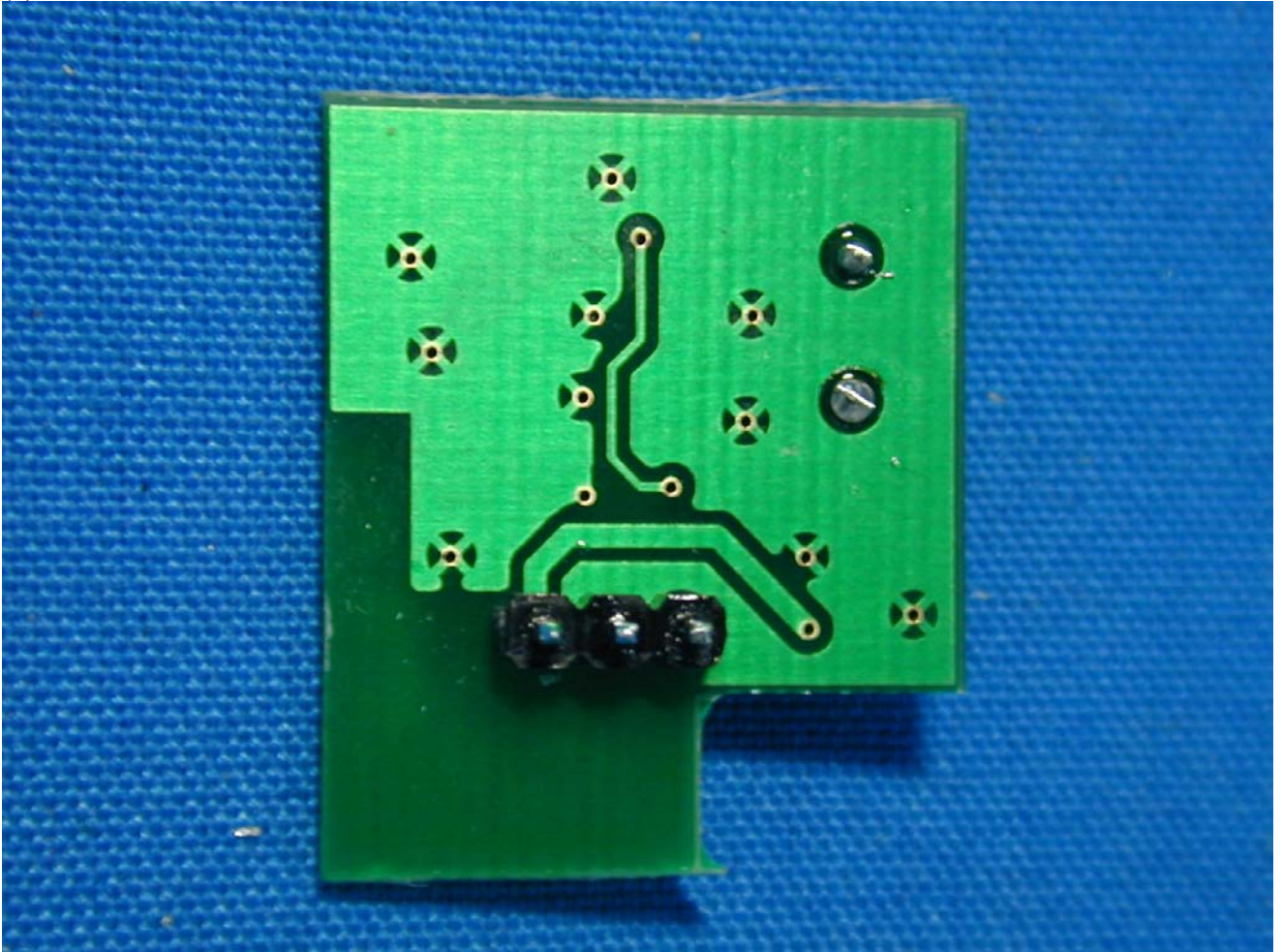
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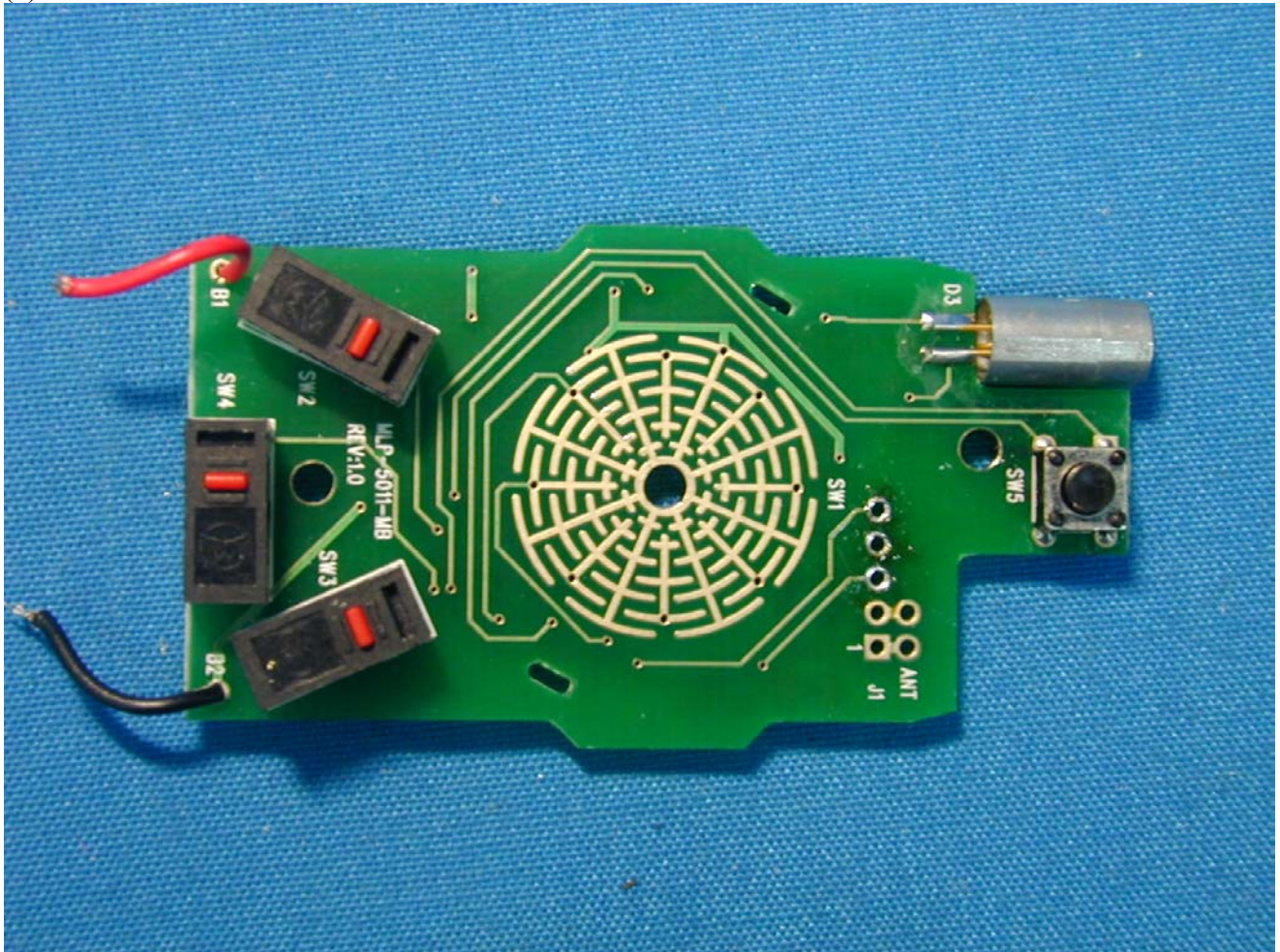
(5) EUT Photo



(6) EUT Photo



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