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# FCC Test Report

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Report No.: AGC02M120701F1

**FCC ID** : OPJDSM101  
**PRODUCT DESIGNATION** : Digital Satellite Meter  
**BRAND NAME** : LUXONUS  
**MODEL NAME** : DSM-101,LXN-PN-DSM-101  
**CLIENT** : Luxonus Inc.  
**DATE OF ISSUE** : Jul.25, 2012  
**STANDARD(S)** : FCC Part 15 Rules  
**REPORT VERSION** : V 1.0

**Attestation of Global Compliance (Shenzhen) Co., Ltd.**

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## 1. VERIFICATION OF COMPLIANCE

Applicant:	Luxonus Inc. 611 Mason St. Suite 508, San Francisco, CA 94108
Manufacturer:	FUJIAN BAOTONG SCIENCE & TECHNOLOGY CO., LTD Jiangnan Hi-tech park, Licheng District Quanzhou, Fujian, China
Product Designation:	Digital Satellite Meter
Brand Name:	LUXONUS
Model Name:	DSM-101, LZN-PN-DSM-101
Model difference:	All the same except for the model name.
Report No.:	AGC02M120701F1
FCC ID:	OPJDSM101
Date of test:	Jul.20 to Jul.24, 2012
Deviation:	None
Condition of Test Sample:	Normal

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2003. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested By:   
Bart Xie Jul.25, 2012

Reviewed By:   
Forrest Lei Jul.25, 2012

Approved By:   
Solger Zhang Jul.25, 2012

## 2. PRODUCT INFORMATION

**Housing Type:** Plastic

**Adapter Rating input:** AC100~240V, 50/60Hz, 0.5A MAX.

**Adapter Output:** DC12V, 1500mA

### I/O Port Information (Applicable Not Applicable)

I/O Port of EUT			
I/O Port Type	Q'TY	Cable	Tested with
Power Input	1	1.7m, unshielded	1
USB Port	1	0	1
AV IN	1	0	1
AV OUT	1	0	1

### TEST MODE:

1. DVB-S
2. Multimedia

\*\*Note: Above all test modes were tested and only the worst mode (DVB-S) test data recorded in the test report.

### 3. TEST FACILITY

<b>Facility</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd.
<b>Location:</b>	2F, No.2 Building, Huafeng No.1 Technical,Industrial Park, Sanwei, Xixiang, Baoan District,Shenzhen,China
<b>Description:</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003
<b>Site Filing:</b>	The FCC Registration Number is 259865 The IC Number is 9083A
<b>Instrument Tolerance:</b>	All measuring equipment is in accord with ANSI C63.4 requirements that meet industry regulatory agency and accreditation agency requirement.

#### 4. TEST EQUIPMENT LIST

##### Equipment used during the tests:

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	N/A	07/18/2012	07/17/2013
ANTENNA	A.H.	SAS-521-4	N/A	07/18/2012	07/17/2013
AMPLIFIER	EM	EM30180	0607030	07/18/2012	07/17/2013
POSITIONING CONTROLLER	MF	MF-7802	N/A	07/18/2012	07/17/2013
TEST RECEIVER	R&S	ESCI	N/A	07/18/2012	07/17/2013
AMN	R&S	ESH2-Z5	862060/020	07/18/2012	07/17/2013

The calibrations of the measuring instruments, including any accessories that may affect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

## 5. SUPPORT EQUIPMENT LIST

AUX Description:	Manufacturer	Model No.	Cable
Host Computer	Dell	78MD82X	1.5m Unshielded
Monitor	Dell	E178Pc	1.5m Unshielded 1.8m shielded data Cable with core
Keyboard	Dell	L100	1.8m shielded data Cable with core
Mouse	Dell	OCJ339	1.8m shielded data Cable

*\*\*Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.*

## 6. SYSTEM DESCRIPTION

### EUT test procedure:

1. Connect EUT and peripheral devices if any.
2. Power on the EUT, the EUT begins to work.
3. Make sure the EUT operates normally during the test.

### Measurement Uncertainty:

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

- Uncertainty of Conducted Emission,  $U_c = \pm 2.75\text{dB}$
- Uncertainty of Radiated Emission,  $U_c = \pm 3.2\text{dB}$

## 7 FCC LINE CONDUCTED EMISSION TEST

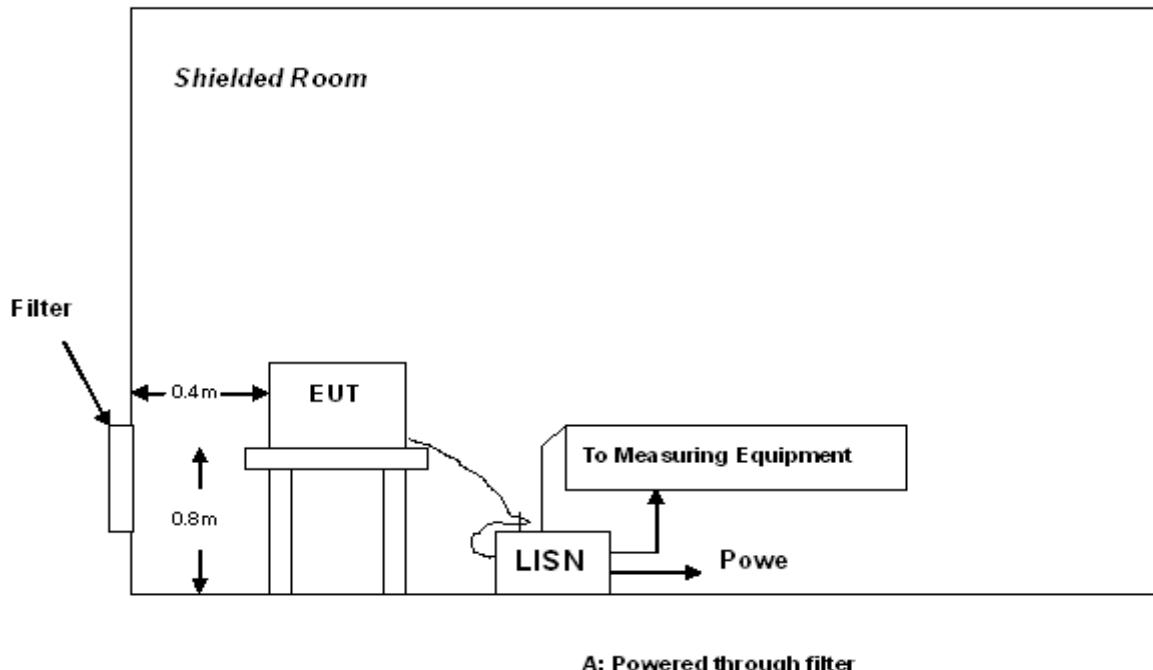
### 7.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

\*\*Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

### 7.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



### **7.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST**

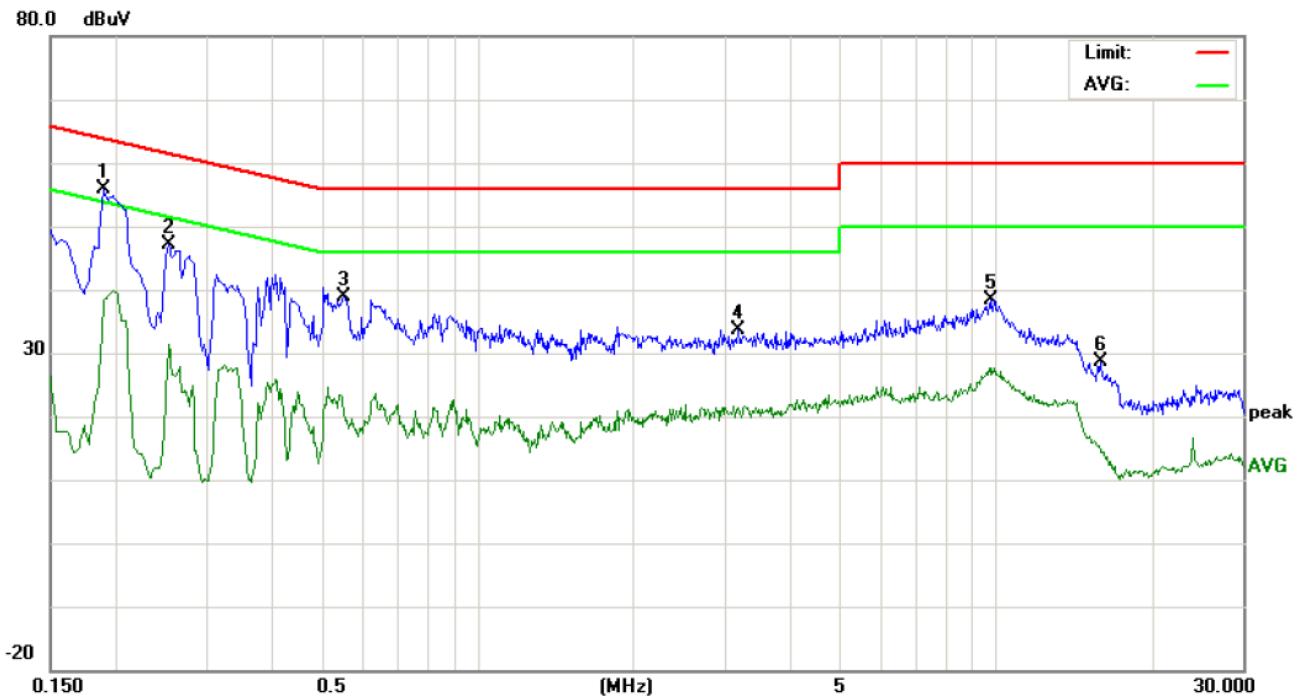
- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC 12V power from a adapter which received power from a LISN supplying power of AC 120V/60Hz. All support equipments received power from a second LISN supplying power of AC120V/60Hz, if any.
- 5) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 7) During the above scans, the emissions were maximized by cable manipulation.
- 8) The above test mode(s) were scanned during the preliminary test and the test data of the worst case condition(s) was reported as following:

### **7.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST**

- 1) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

## 7.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

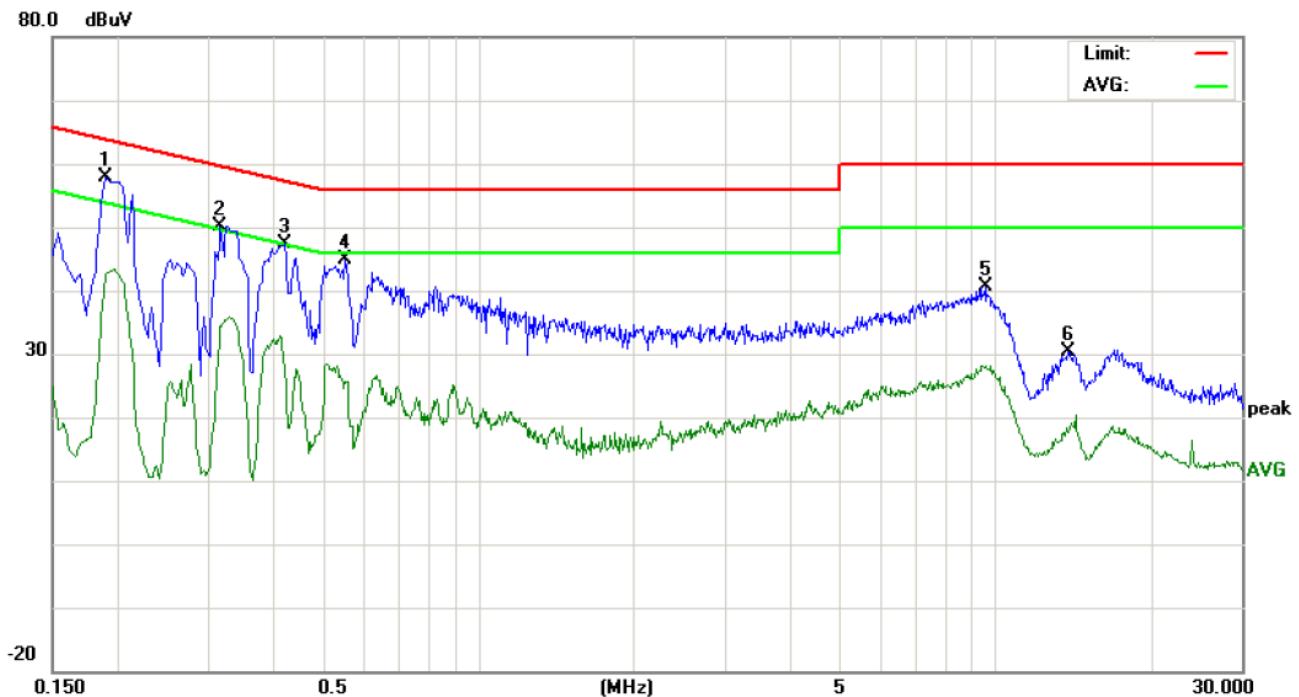
### LINE CONDUCTED EMISSION TEST-L



Site: Conduction Phase: **L1** Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: DCC 12V Humidity: 60 %  
 EUT: Digital Satellite Meter  
 M/N: DSM-101  
 Mode: DVB-S  
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1900	45.65		28.03	10.20	55.85		38.23	64.03	54.03	-8.18	-15.80	P	
2	0.2540	36.73		21.13	10.27	47.00		31.40	61.62	51.62	-14.62	-20.22	P	
3	0.5540	28.46		10.58	10.35	38.81		20.93	56.00	46.00	-17.19	-25.07	P	
4	3.1980	23.05		10.48	10.53	33.58		21.01	56.00	46.00	-22.42	-24.99	P	
5	9.7900	28.27		16.36	10.21	38.48		26.57	60.00	50.00	-21.52	-23.43	P	
6	15.9060	18.46		4.82	10.11	28.57		14.93	60.00	50.00	-31.43	-35.07	P	

LINE CONDUCTED EMISSION TEST-N



Site: Conduction Phase: **N** Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: DC 12V Humidity: 60 %  
 EUT: Digital Satellite Meter  
 M/N: DSM-101  
 Mode: DVB-S  
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		dB	Peak	QP	AVG	QP	AVG	QP	AVG	
1	0.1900	47.74		32.44	10.20	57.94		42.64	64.03	54.03	-6.09	-11.39	P	
2	0.3180	39.90		24.04	10.30	50.20		34.34	59.76	49.76	-9.56	-15.42	P	
3	0.4220	36.95		17.02	10.35	47.30		27.37	57.41	47.41	-10.11	-20.04	P	
4	0.5540	34.60		15.30	10.35	44.95		25.65	56.00	46.00	-11.05	-20.35	P	
5	9.5820	30.25		17.54	10.33	40.58		27.87	60.00	50.00	-19.42	-22.13	P	
6	13.8780	20.17		7.61	10.12	30.29		17.73	60.00	50.00	-29.71	-32.27	P	

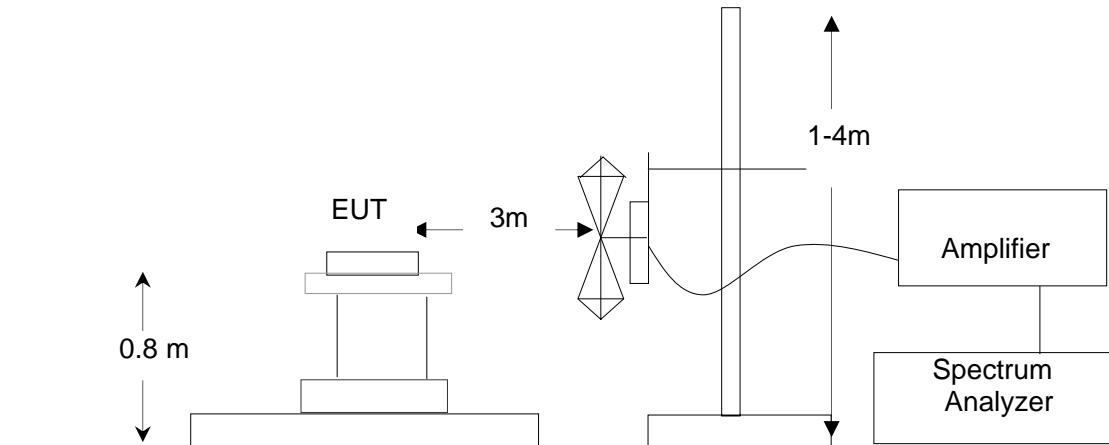
## 8. FCC RADIATED EMISSION TEST

### 8.1 LIMITS OF RADIATE EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dB <sub>u</sub> V/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

\*\*Note: The lower limit shall apply at the transition frequency.

### 8.2 BLOCK DIAGRAM OF RADIATED EMISSION TEST



### **8.3 PRELIMINARY PROCEDURE OF RADIATED EMISSION TEST**

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC12V power by adapter which received power from the socket under the turntable. All support equipments received AC 120V/60Hz power from another socket under the turntable, if any.
- 5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The above test mode(s) were scanned during the preliminary test and the test data of the worst case condition(s) was reported as following:

### **8.4 FINAL PROCEDURE OF RADIATED EMISSION TEST**

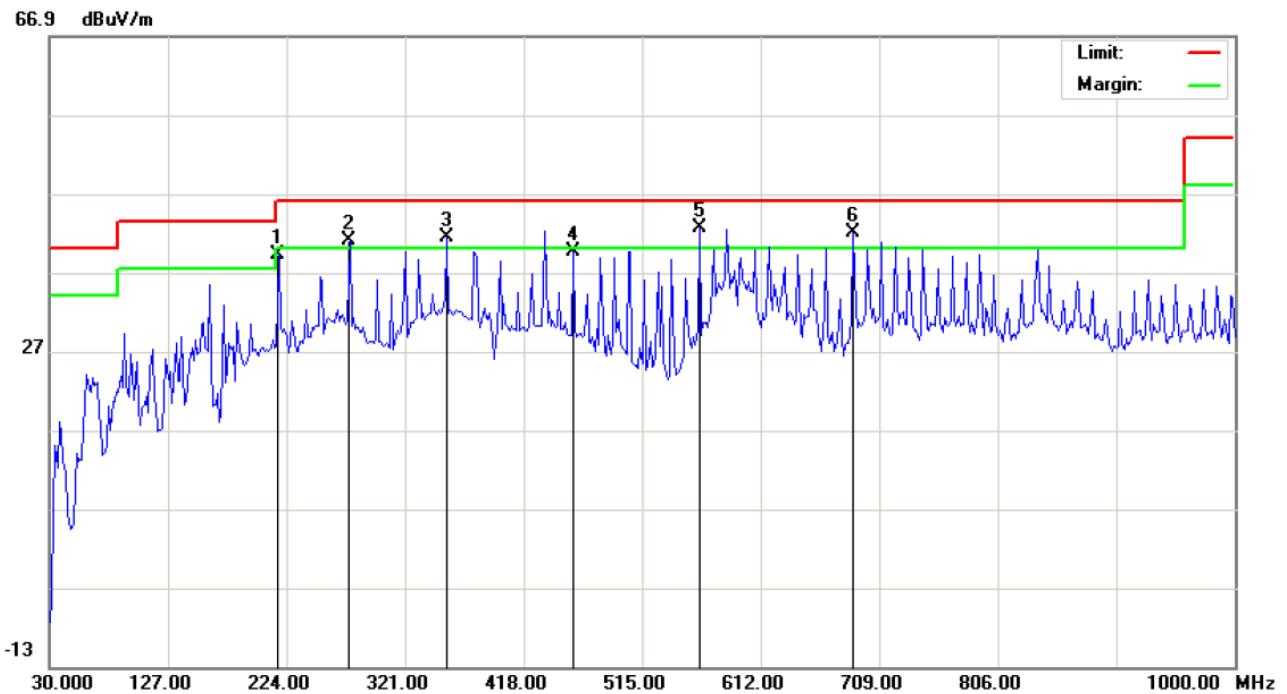
EUT and support equipment were set up on the turntable as per step 7 of the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P/Peak. reading is presented.

## 8.5 TEST RESULT OF RADIATED EMISSION TEST

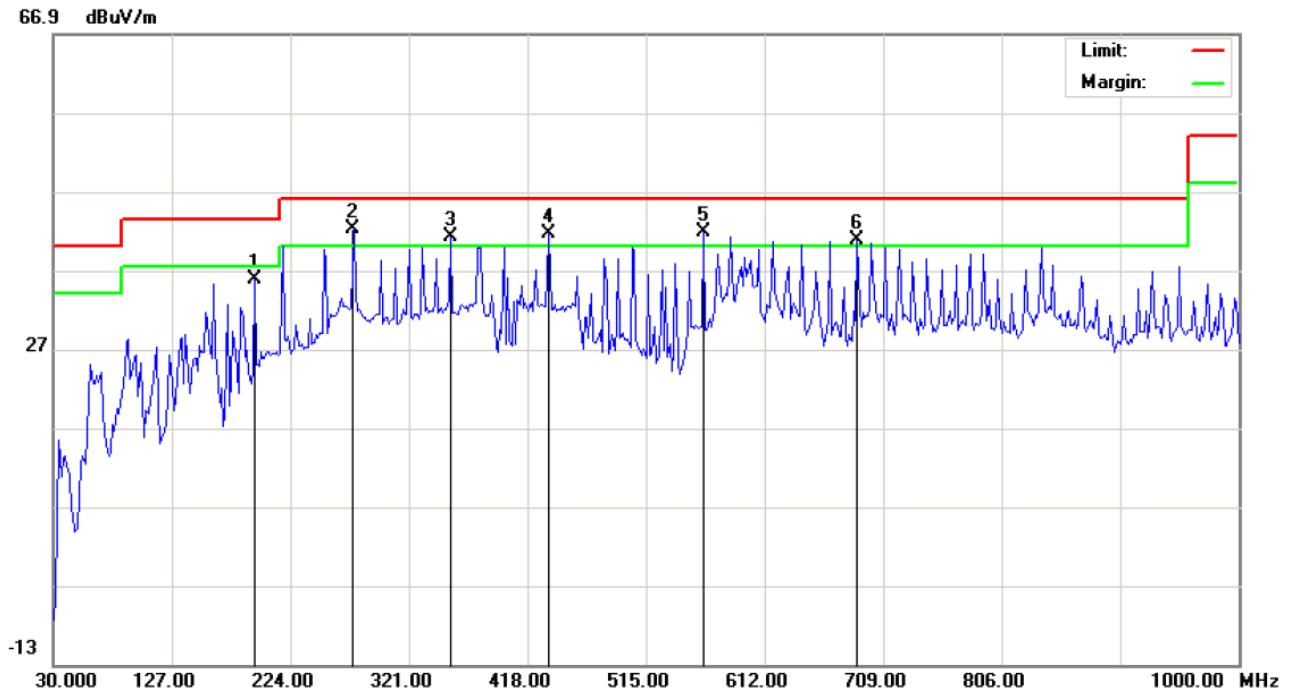
### RADIATED EMISSION TEST-HORIZONTAL



Site: site #1  
 Polarization: **Horizontal**  
 Temperature: 26  
 Limit: FCC Class B 3M Radiation  
 Power: DC 12V  
 Humidity: 60 %  
 EUT: Digital Satellite Meter  
 Distance: 3m  
 M/N: DSM-101  
 Mode: DVB-S  
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		217.5329	27.74	11.54	39.28	46.00	-6.72	peak			
2	!	275.7332	23.78	17.20	40.98	46.00	-5.02	peak			
3	!	354.9499	22.41	19.08	41.49	46.00	-4.51	peak			
4		458.4166	18.00	21.52	39.52	46.00	-6.48	peak			
5	*	561.8831	18.63	24.07	42.70	46.00	-3.30	peak			
6	!	687.9832	18.58	23.34	41.92	46.00	-4.08	peak			

## RADIATED EMISSION TEST-VERTICAL

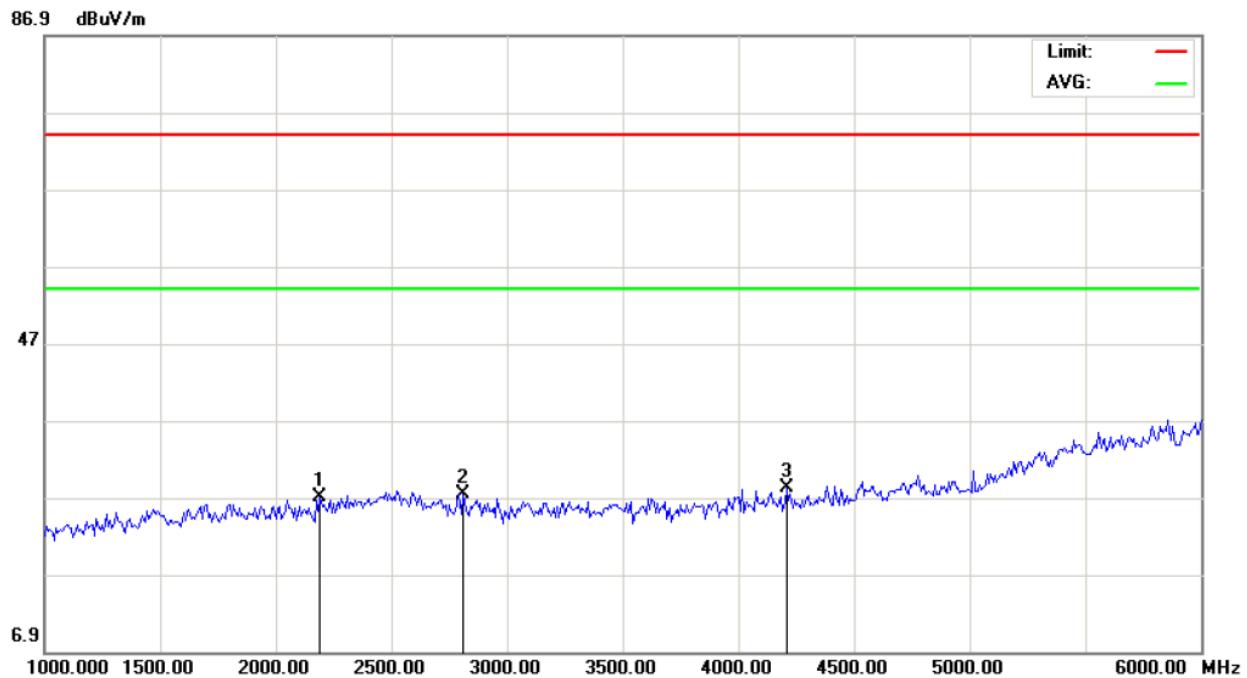


Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation Power: DC 12V Humidity: 60 %  
EUT: Digital Satellite Meter Distance: 3m  
M/N: DSM-101  
Mode: DVB-S  
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		194.9000	28.20	7.55	35.75	43.50	-7.75	peak			
2	*	275.7332	25.08	17.20	42.28	46.00	-3.72	peak			
3	!	354.9499	22.21	19.08	41.29	46.00	-4.71	peak			
4	!	435.7832	20.42	21.26	41.68	46.00	-4.32	peak			
5	!	561.8831	17.75	24.07	41.82	46.00	-4.18	peak			
6	!	687.9832	17.46	23.34	40.80	46.00	-5.20	peak			

**ABOVE 1GHZ**

RADIATED EMISSION TEST-HORIZONTAL

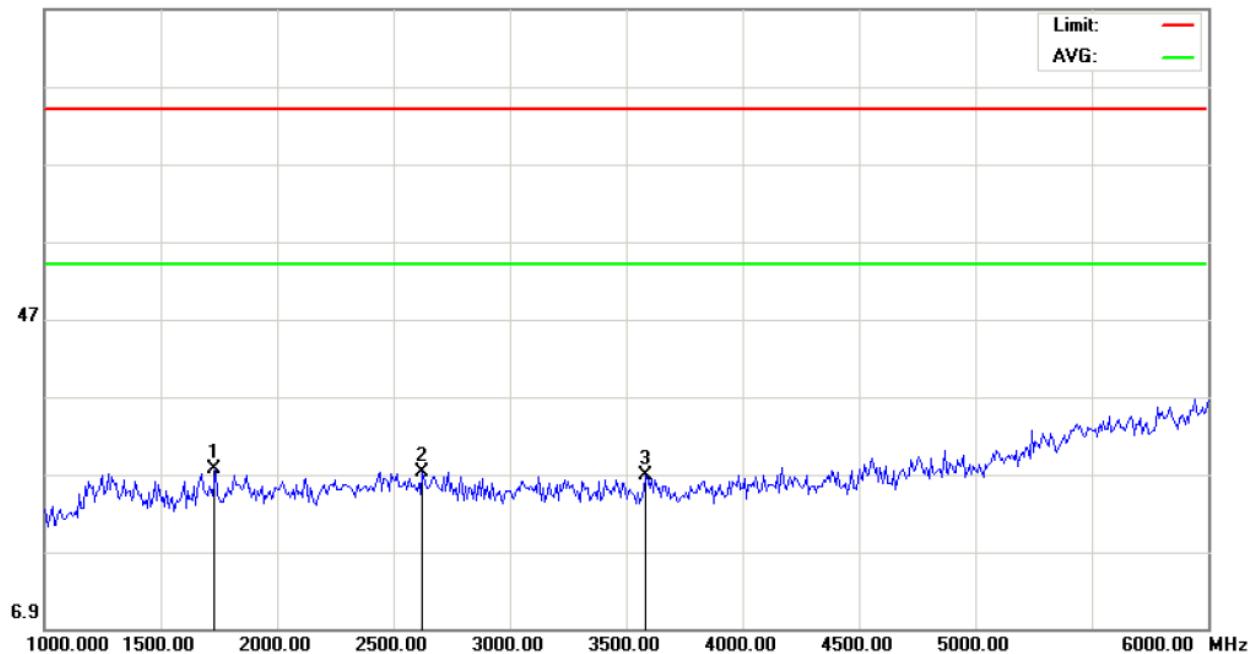


Site: site #1 Polarization: **Horizontal** Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: DC 12V Humidity: 60 %  
 EUT: Digital Satellite Meter Distance: 3m  
 M/N: DSM-101  
 Mode: DVB-S  
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2191.667	36.24	-9.23	27.01	74.00	-46.99	peak			
2		2808.333	35.81	-8.46	27.35	74.00	-46.65	peak			
3	*	4208.333	34.12	-6.01	28.11	74.00	-45.89	peak			

RADIATED EMISSION TEST-VERTICAL

86.9 dBuV/m



Site: site #1 Polarization: *Vertical* Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: DC 12V Humidity: 60 %  
 EUT: Digital Satellite Meter Distance: 3m  
 M/N: DSM-101  
 Mode: DVB-S  
 Note:

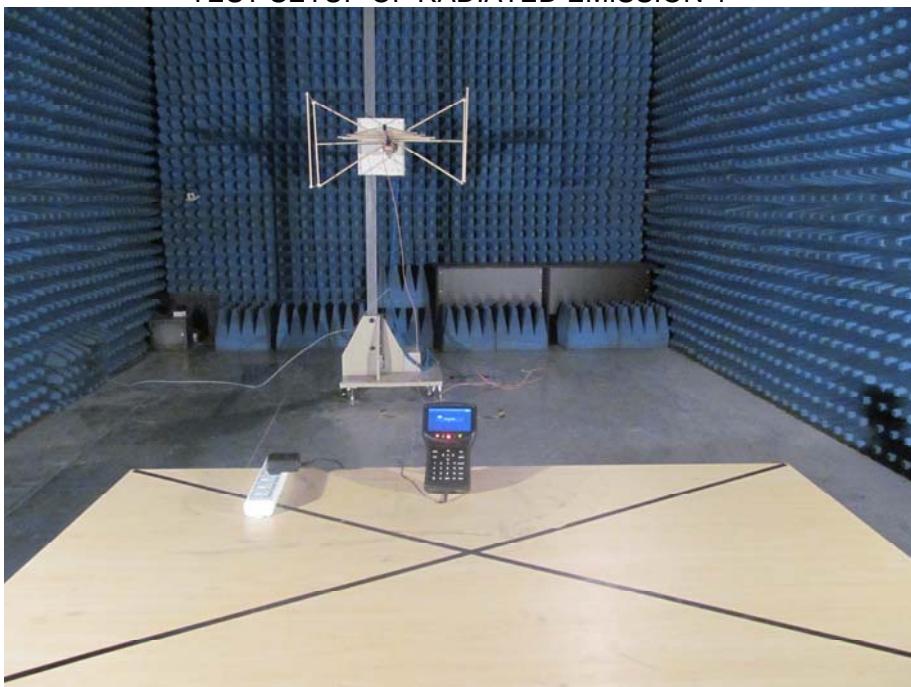
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
									Height	Degree	
									cm	degree	
1	*	1733.333	37.77	-10.26	27.51	74.00	-46.49	peak			
2		2625.000	35.39	-8.19	27.20	74.00	-46.80	peak			
3		3583.333	34.41	-7.52	26.89	74.00	-47.11	peak			

**APPENDIX 1**  
**PHOTOGRAPHS OF TEST SETUP**

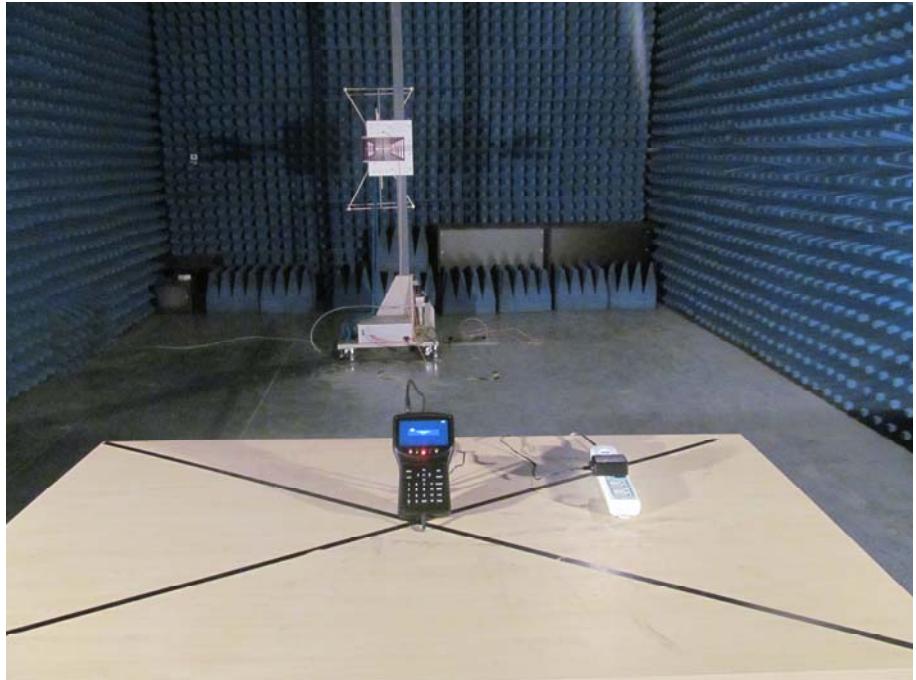
**TEST SETUP OF CONDUCTED EMISSION**



**TEST SETUP OF RADIATED EMISSION-1**



TEST SETUP OF RADIATED EMISSION-2



## APPENDIX 2

### PHOTOGRAPHS OF EUT

#### ALL VIEW OF EUT



#### TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



LEFT VIEW OF EUT



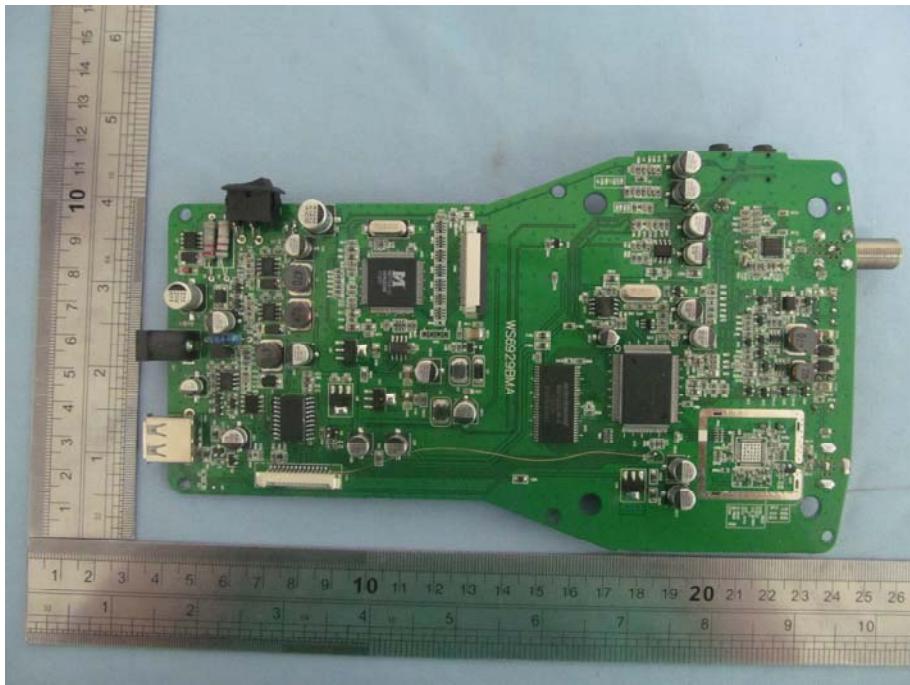
RIGHT VIEW OF EUT



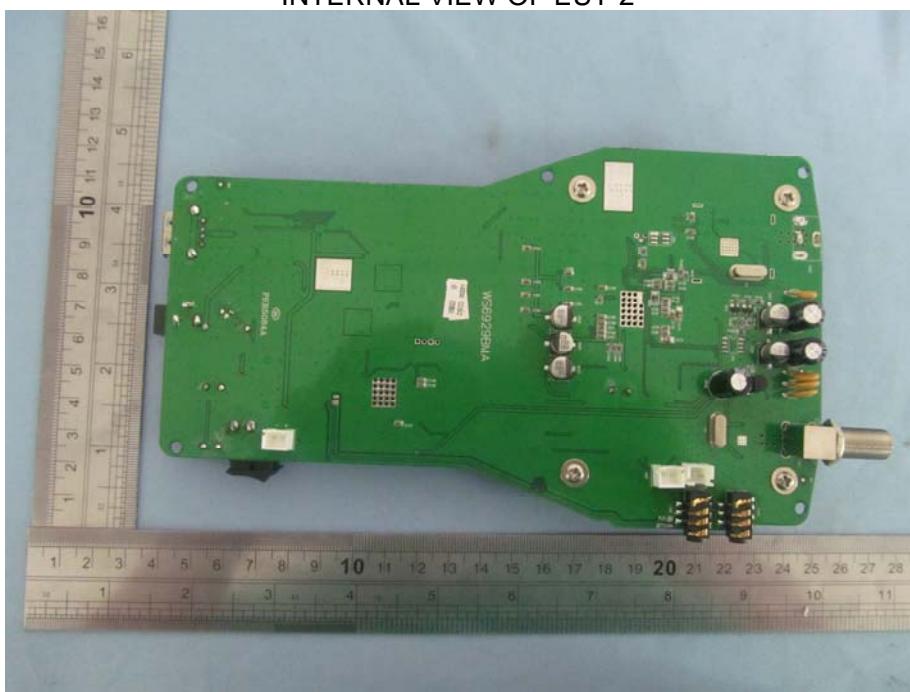
OPEN VIEW OF EUT



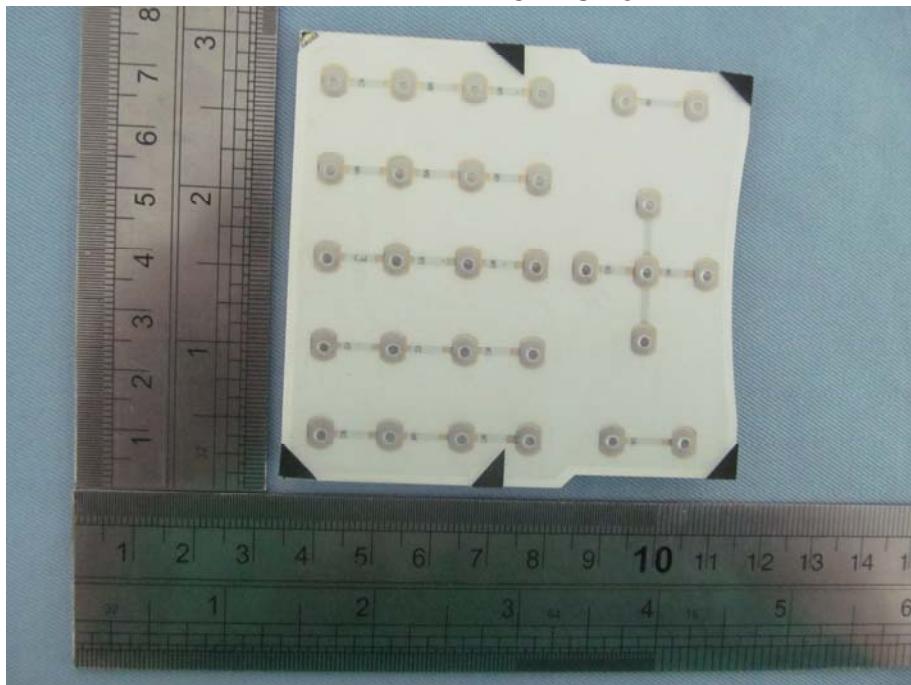
INTERNAL VIEW OF EUT-1



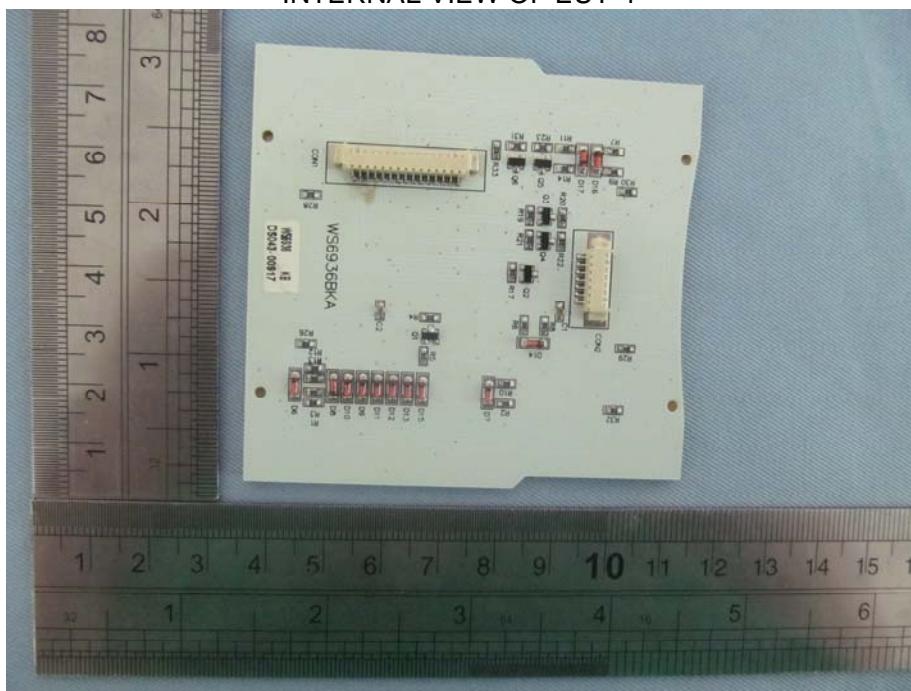
INTERNAL VIEW OF EUT-2



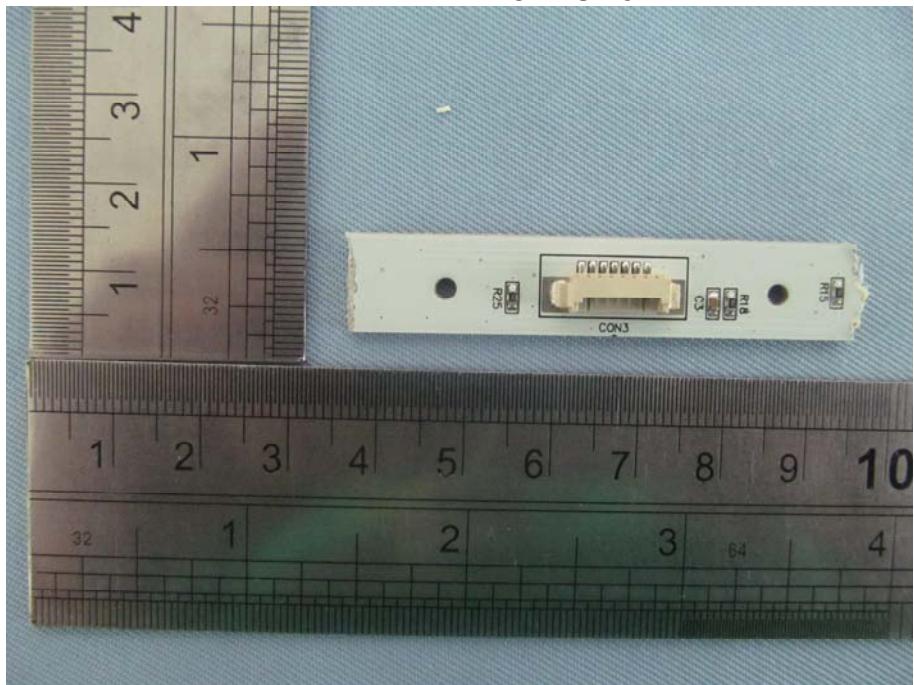
INTERNAL VIEW OF EUT-3



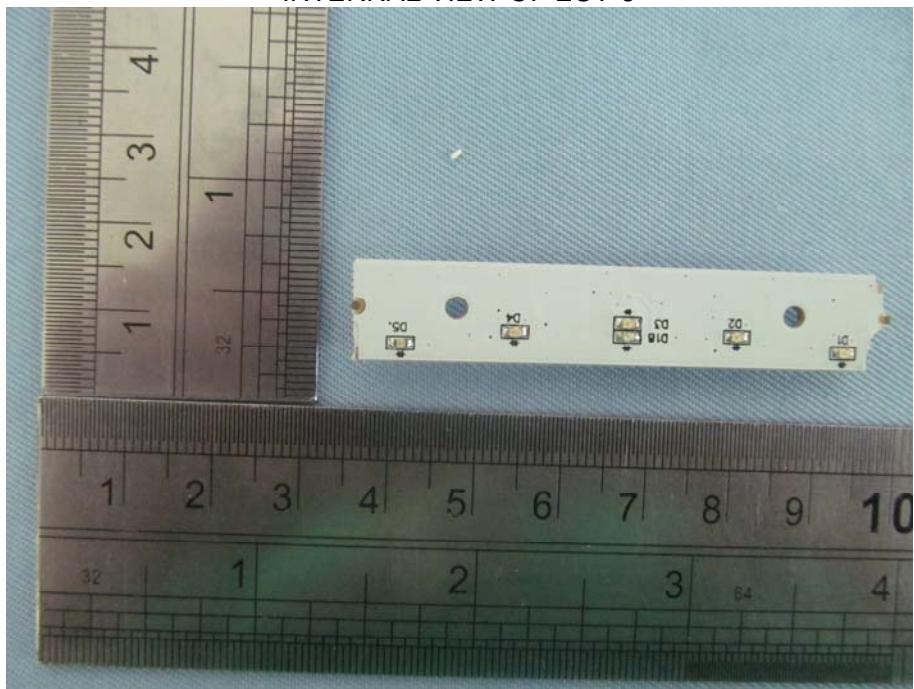
INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



INTERNAL VIEW OF EUT-6



----END OF REPORT----