

FCC 47 CFR PART 15 SUBPART B  
TEST REPORT

For

Teenage Engineering AB

OP-1

Model No.: TE002AS001A

Prepared for : Teenage Engineering AB  
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Report Number : F190903001  
Date of Test : September 9 ~ September 15, 2011  
Date of Report : October 27, 2011

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## TEST REPORT DESCRIPTION

Applicant : Teenage Engineering AB  
Manufacturer : Teenage Engineering AB  
EUT : OP-1  
Model No. : TE002AS001A  
Power Supply : DC 3.7V

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B Class B & FCC / ANSI C63.4-2009

The device described above is tested by Global Certification Corp. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Global Certification Corp. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Global Certification Corp.

Date of Test : September 9, 2011 to September 15, 2011



Approved & Authorized Signer :

*Alex Chou*

Alex Chou / Manager

## 1. SUMMARY OF TEST RESULT

<b>EMISSION</b>		
Description of Test Item	Standard & Limits	Results
Conducted Disturbance at Mains Terminals	FCC Part 15, Subpart B, Class B ANSI C63.4: 2009	Pass
Radiated Disturbance	FCC Part 15, Subpart B, Class B ANSI C63.4: 2009	Pass
Note: N/A is an abbreviation for Not Applicable.		

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

EUT : OP-1

Model Number : TE002AS001A

Working Freq. : 400MHz max

Test Voltage : DC 3.7V

Applicant : Teenage Engineering AB

Address : Katarina bangata 71 garage, Stockholm, Sweden

Manufacturer : Teenage Engineering AB

Address : Katarina bangata 71 garage, Stockholm, Sweden

Date of Received : September 8, 2011

Date of Test : September 9, 2011 to September 15, 2011

### 2.2. Description of Support Device

PC : Manufacturer: DELL  
M/N: 9702  
S/N: L3C4410  
CE, FCC: DOC

LCD Monitor : Manufacturer: DELL  
M/N: 9227-AE6  
S/N:4M0293084302824  
CE, FCC: DOC

Keyboard : Manufacturer: DELL  
M/N: KU-0225  
S/N:0585494  
CE, FCC: DOC

Mouse : Manufacturer: DELL  
M/N: MO28UOL  
S/N:44G7862 068  
CE, FCC: DOC

SATA Hard Drive : Manufacturer: HITACHI  
M/N: SATA-150  
S/N: Q4E4DZ8E  
CE, FCC: DOC

### 2.3.Measurement Uncertainty

Conducted Emission Uncertainty : 2.8dB

Radiated Emission Uncertainty : 3.3dB (3m Chamber)

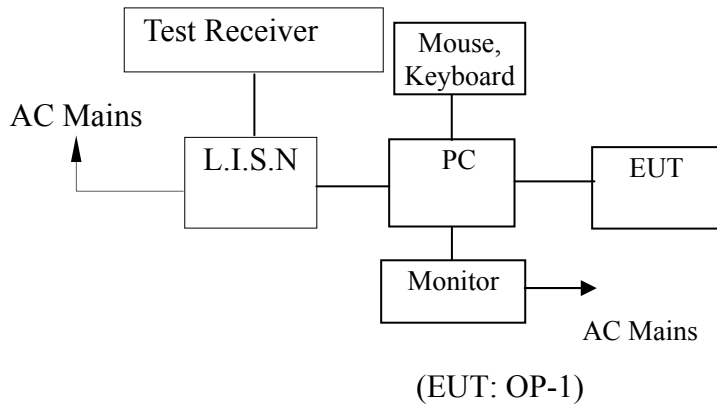
### 3. MEASURING DEVICE AND TEST EQUIPMENT

Conducted Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Jul 16, 2012	
LISN	SCHAFFNER	NNB41	03/10015	Nov 06, 2012	For EUT
LISN	EMCO	3825/2	9001-1589	Nov 06, 2012	For Support Unit
RF Cable	Huber+Suhner	RG223/U	001	Nov 01, 2012	
50ohm Terminal	N/A	50Ω	QC-TM001	Nov 06, 2012	
Impedance Stabilization	Teseq GmbH	ISN T8	23334	Jun 26, 2012	
Radiated Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Nov 07, 2012	
Bilog Antenna	SUNOL	JB1	A052204	Jun 27, 2012	
Turn table	EMCO	2080	9508-1805	N/A	
Controller	EMCO	2090	9804-1328	N/A	
Preamplifier	WIRELESS	FPA6592G	60017	Aug. 11, 2012	
Spectrum Analyzer	NEX	NS-265	5044006	May 11, 2012	
RF Cable	JYE BAO	RG214/U	28M-002	Nov 01, 2012	
Thermo-Hygro meter	WISEWIND	4-INU-1	050100378	Nov 02, 2012	

※ Calibration interval of instruments listed above is one year

## 4. POWER LINE CONDUCTED EMISSION MEASUREMENT

### 4.1. Block Diagram of Test Setup



### 4.2. Measuring Standard

FCC Part 15, Subpart B, Class B ANSI C63.4: 2009

### 4.3. Power Line Conducted Emission Limits (Class B)

Frequency (MHz)	Limit (dB $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.  
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

### 4.4. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet FCC requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

EUT : OP-1  
Model Number : TE002AS001A

### 4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown on Section 4.1.

4.5.2. Turn on the power of all equipments.

4.5.3. Let the EUT work in measuring mode (Connect to PC) and measure it.



#### 4.6. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the FCC regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCS30) is set at 9kHz in 150kHz~30MHz and 200Hz in 9kHz~150kHz.

The frequency range from 150kHz to 30MHz is investigated.

All the scanning waveform is put in Appendix I.

#### 4.7. Measuring Results

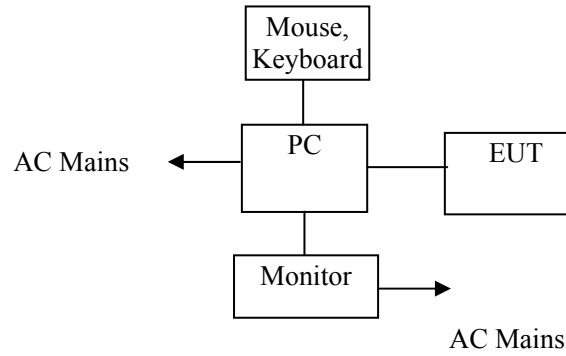
**PASS.**

Please refer to Appendix I.

## 5. RADIATED EMISSION MEASUREMENT

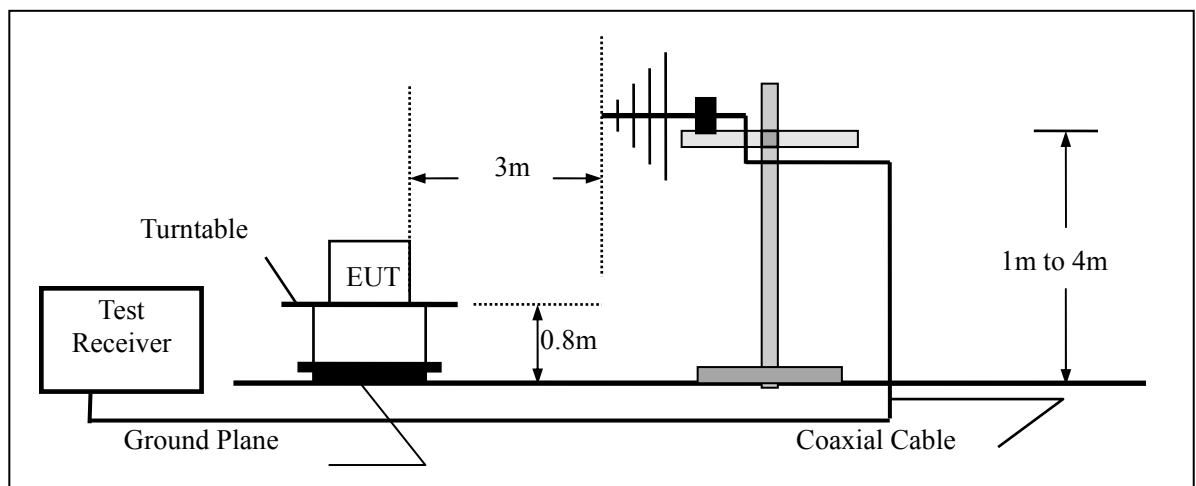
### 5.1. Block Diagram of Test Setup

#### 5.1.1. Block diagram of connection between the EUT and simulators



(EUT: OP-1)

#### 5.1.2. Block diagram of test setup (In chamber)



(EUT: OP-1)

### 5.2. Measuring Standard

FCC Part 15, Subpart B, Class B ANSI C63.4: 2009

### 5.3.Radiated Emission Limits (Class B)

Frequency MHz	Distance Meters	Field Strengths Limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

Frequency (GHz)	Distance (Meters)	Field Strengths Limit	
		Average ( $\text{dB}\mu\text{V}/\text{m}$ )	Peak ( $\text{dB}\mu\text{V}/\text{m}$ )
1~15	3	54	74

- Remark:
- (1) Emission level ( $\text{dB}\mu\text{V}$ ) =  $20 \log$  Emission level  $\mu\text{V}/\text{m}$
  - (2) The smaller limit shall apply at the cross point between two frequency bands.
  - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

### 5.4.EUT Configuration on Measurement

The FCC Class B regulations test method must be used to find the maximum emission during radiated emission measurement.

EUT : OP-1  
Model Number : TE002AS001A

### 5.5.Operating Condition of EUT

5.5.1.Setup the EUT as shown on Section 5.1.

5.5.2.Turn on the power of all equipments.

5.5.3.Let the EUT work in measuring mode (Connect to PC ) and measure it.

### 5.6.Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) and horn antenna are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver ( ESU26) is set at 120kHz.

The worst scanning curves are attached in Appendix II.

## 5.7.Measuring Results

**PASS.**

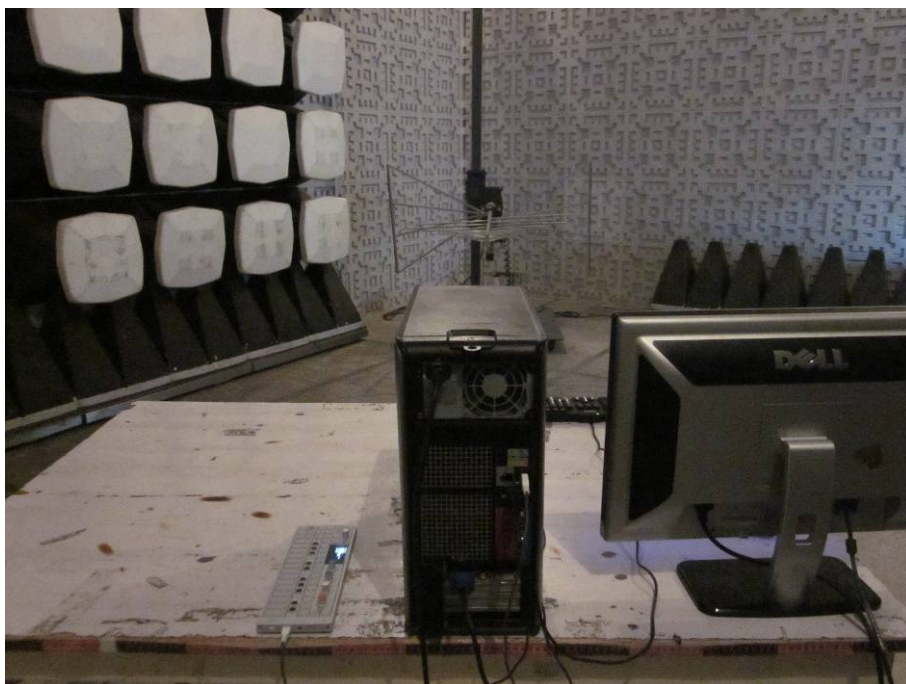
The frequency range from 30MHz to 2GHz is investigated.  
Please refer to Appendix II.

## 6. PHOTOGRAPHS

### 6.1.Photos of Conducted Emission Measurement

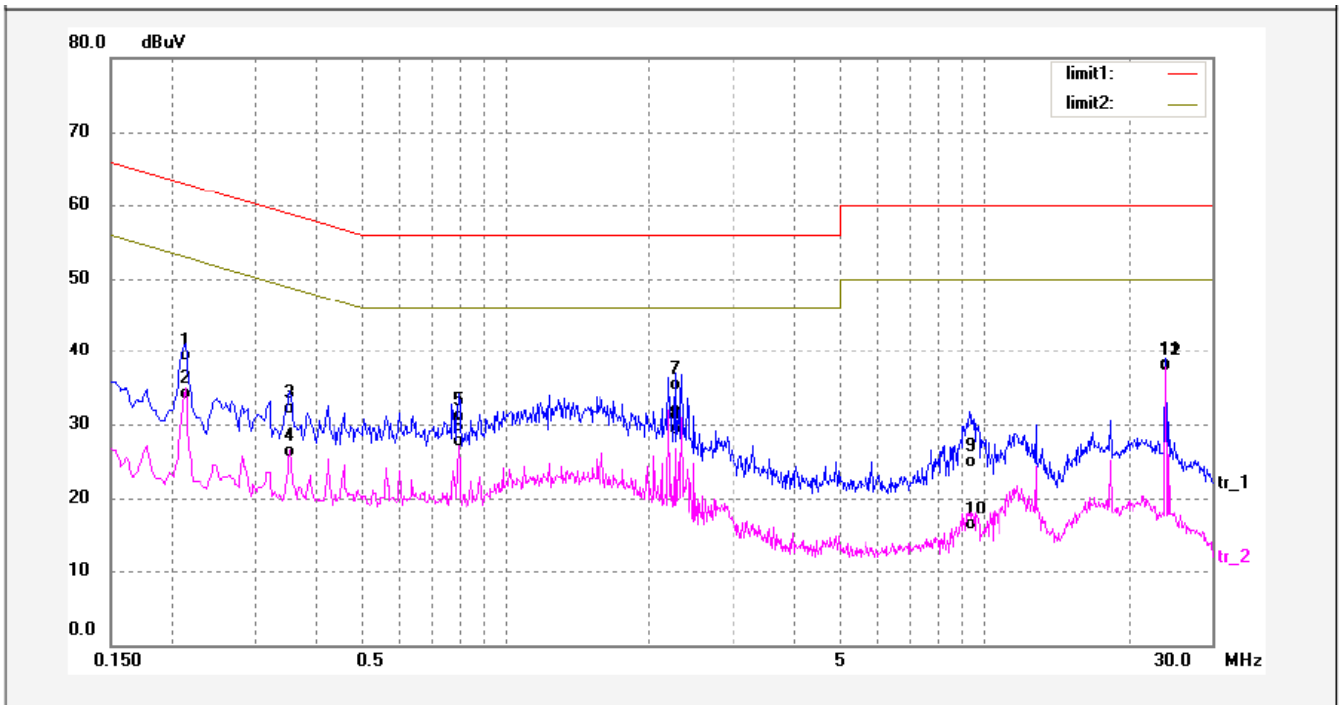


### 6.2.Photos of Radiation Emission Measurement



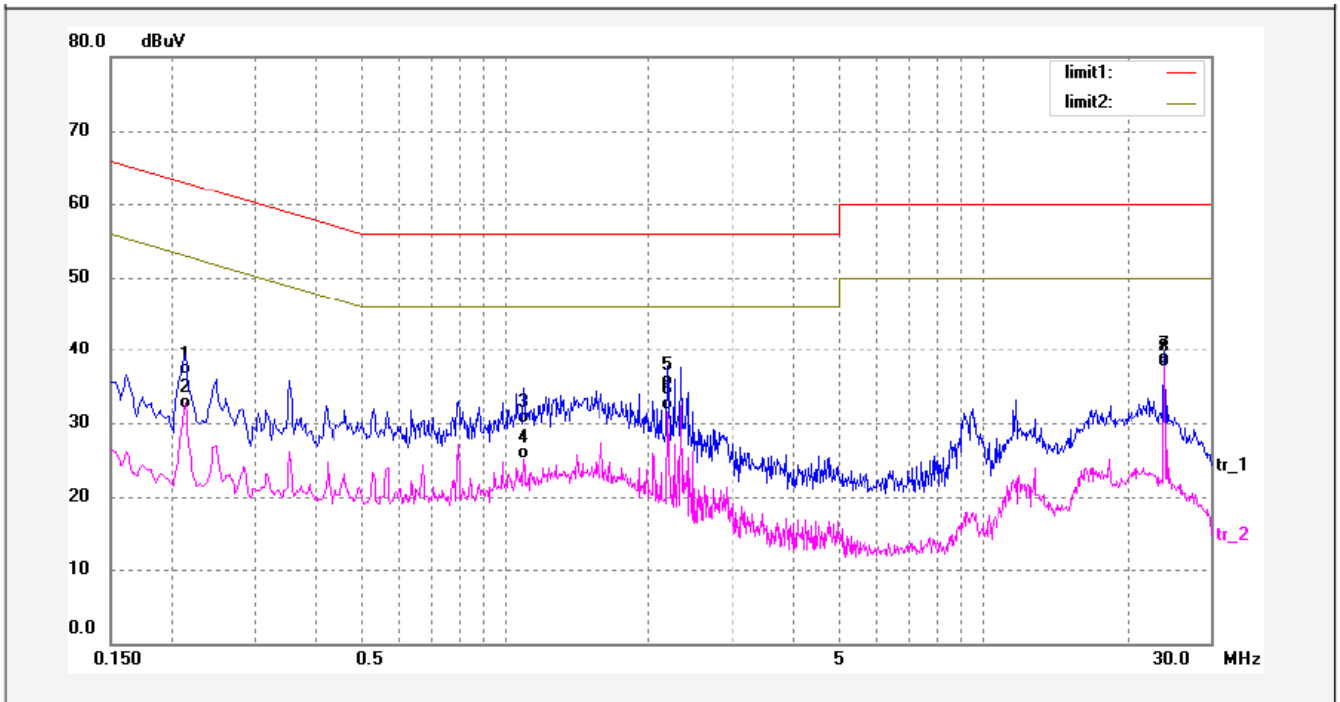
# APPENDIX I

Phase: L



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2140	27.76	10.66	38.42	63.04	-24.62	QP	
2	0.2140	22.60	10.66	33.26	53.04	-19.78	AVG	
3	0.3540	20.52	10.74	31.26	58.87	-27.61	QP	
4	0.3540	14.81	10.74	25.55	48.87	-23.32	AVG	
5	0.7980	18.09	12.17	30.26	56.00	-25.74	QP	
6	0.7980	14.66	12.17	26.83	46.00	-19.17	AVG	
7	2.2659	22.17	12.26	34.43	56.00	-21.57	QP	
8	2.2659	16.15	12.26	28.41	46.00	-17.59	AVG	
9	9.3500	12.19	11.89	24.08	60.00	-35.92	QP	
10	9.3500	3.64	11.89	15.53	50.00	-34.47	AVG	
11	24.0780	24.86	12.48	37.34	60.00	-22.66	QP	
12	24.0780	24.71	12.48	37.19	50.00	-12.81	AVG	

Phase: N

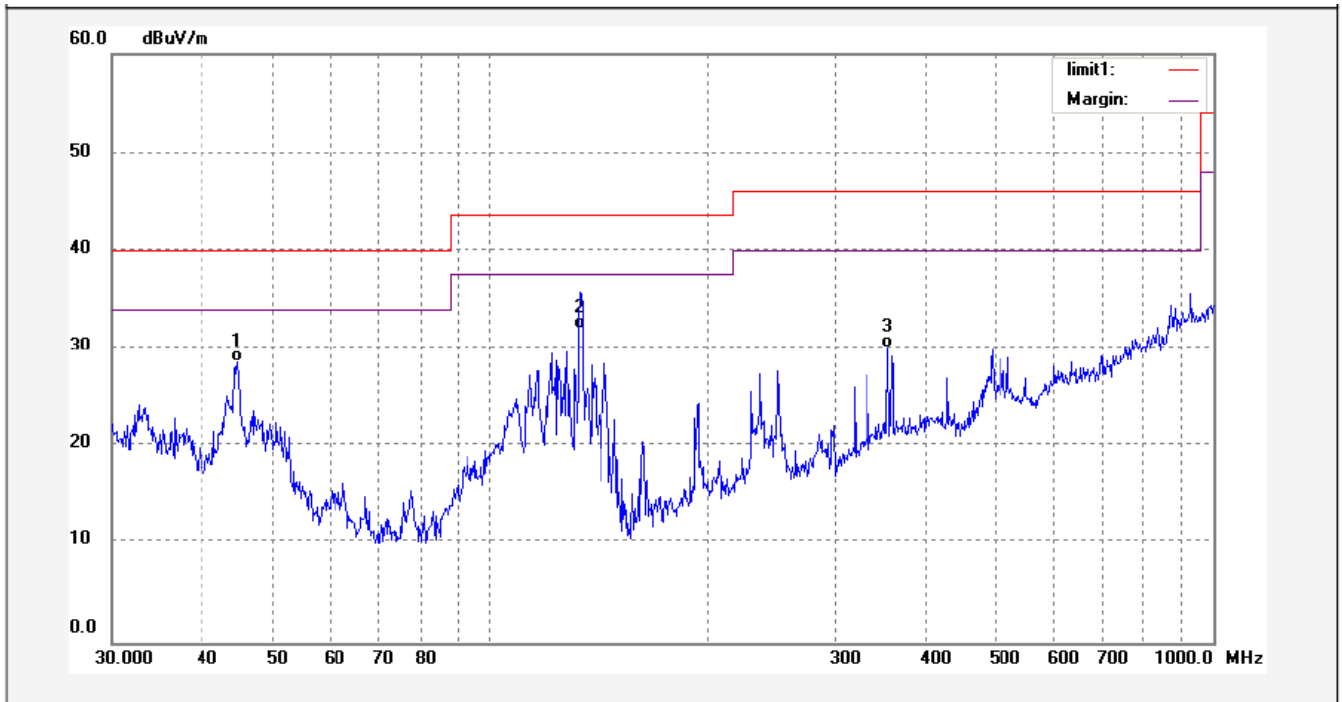


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2140	25.84	10.66	36.50	63.04	-26.54	QP	
2	0.2140	21.25	10.66	31.91	53.04	-21.13	AVG	
3	1.0980	17.71	12.19	29.90	56.00	-26.10	QP	
4	1.0980	12.91	12.19	25.10	46.00	-20.90	AVG	
5	2.1980	22.66	12.25	34.91	56.00	-21.09	QP	
6	2.1980	19.48	12.25	31.73	46.00	-14.27	AVG	
7	24.0780	25.45	12.48	37.93	60.00	-22.07	QP	
8	24.0780	24.93	12.48	37.41	50.00	-12.59	AVG	



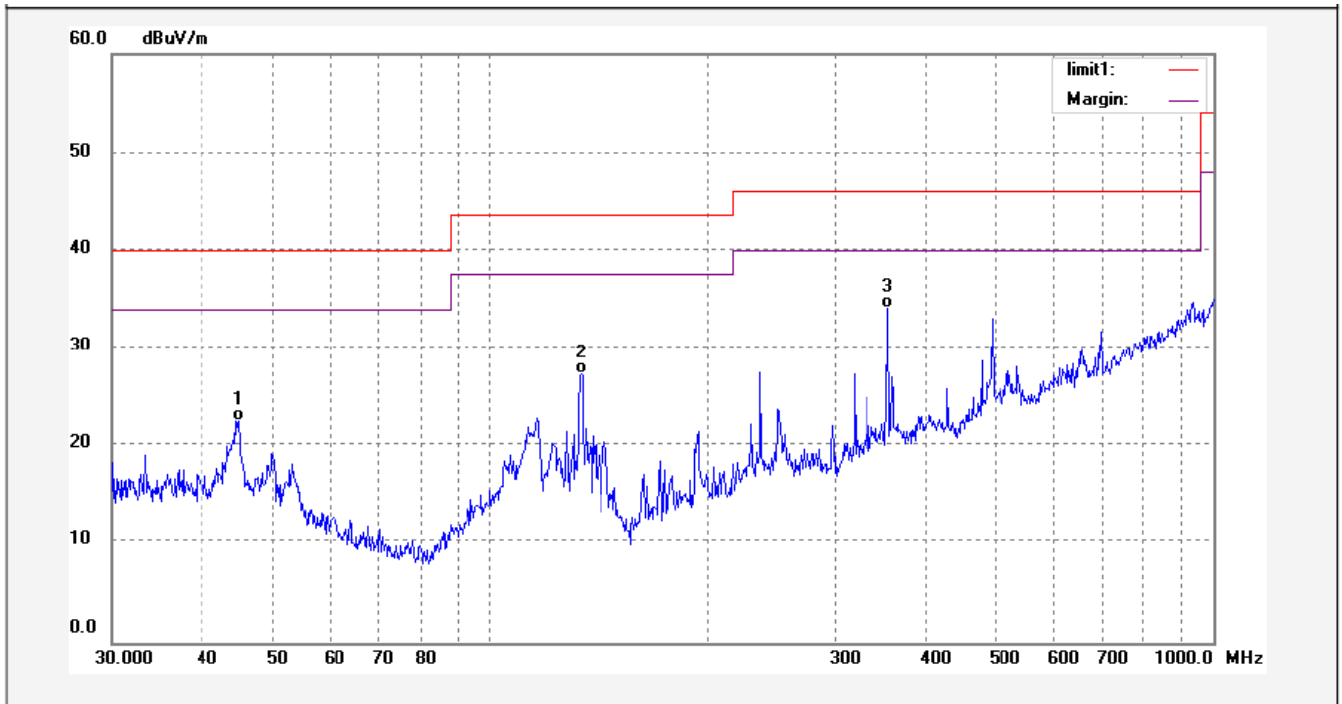
# APPENDIX II

Polarization: Vertical



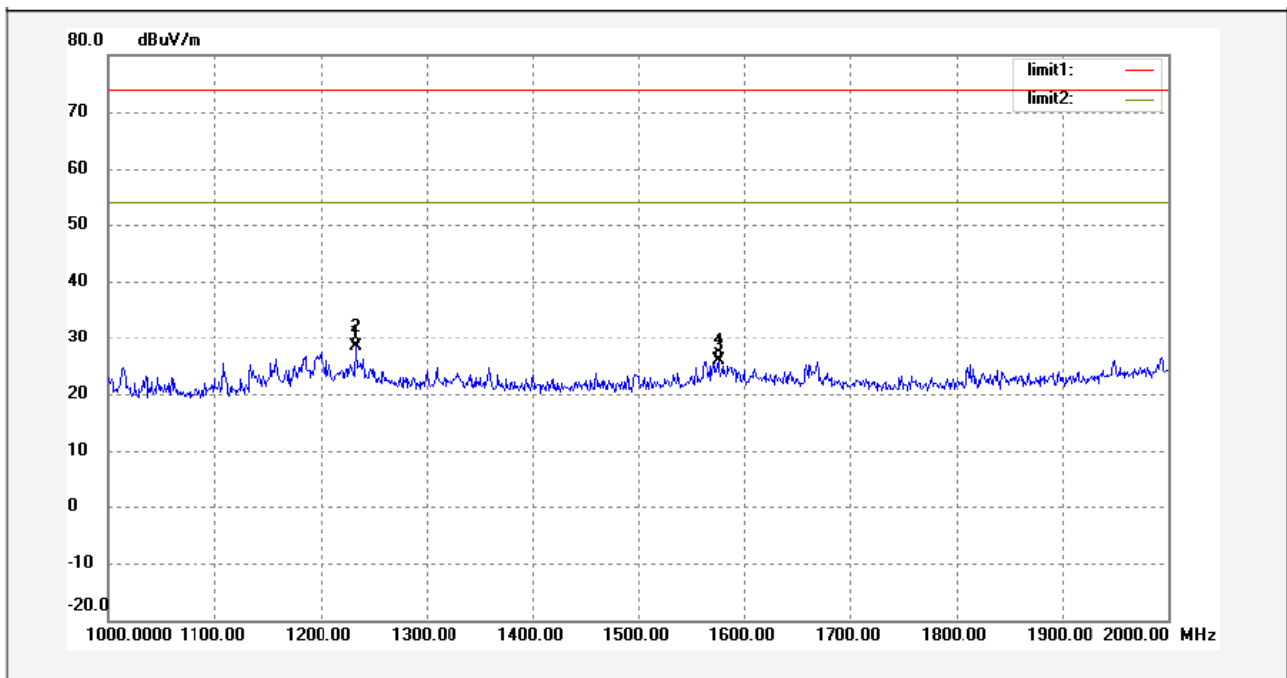
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	44.7793	13.81	14.80	28.61	40.00	-11.39	QP	
2	133.0809	20.00	12.06	32.06	43.50	-11.44	QP	
3	354.6912	9.70	20.43	30.13	46.00	-15.87	QP	

Polarization: Horizontal



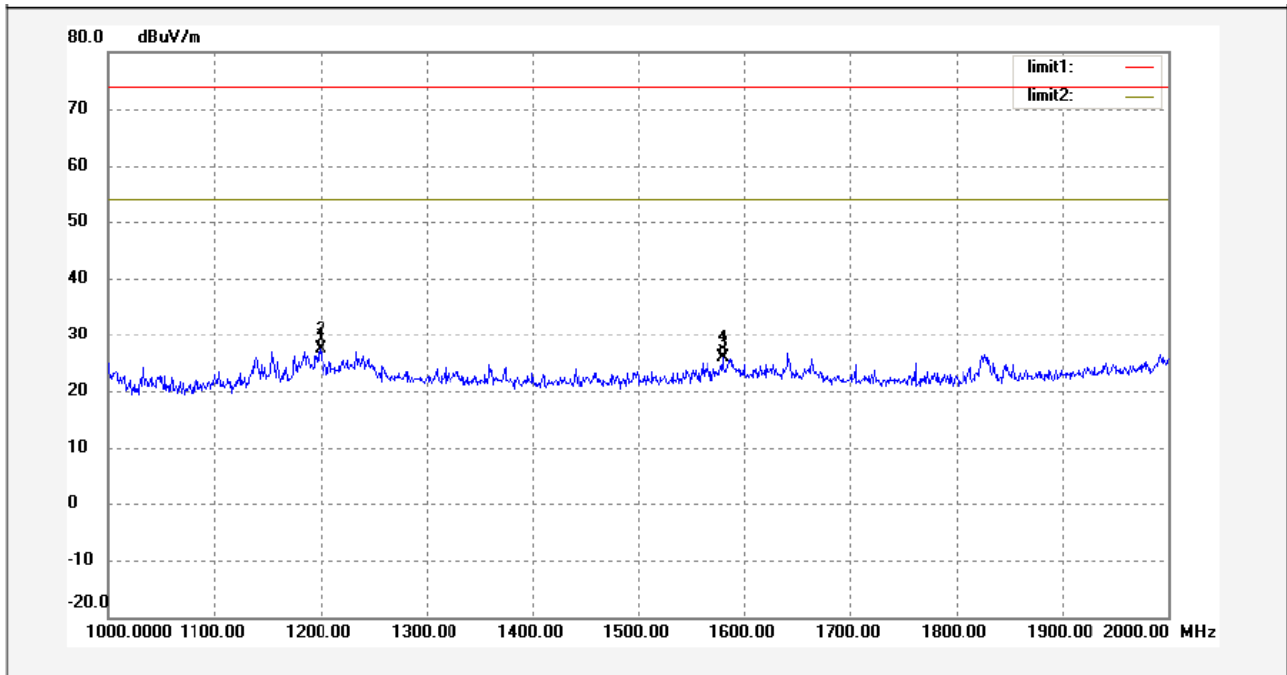
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	44.9369	7.82	14.77	22.59	40.00	-17.41	QP	
2	133.5493	15.36	12.08	27.44	43.50	-16.06	QP	
3	354.6912	13.76	20.43	34.19	46.00	-11.81	QP	

Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1233.467	42.39	-13.97	28.42	74.00	-45.58	peak	
2	1233.467	42.39	-13.97	28.42	54.00	-25.58	AVG	
3	1576.152	39.65	-13.77	25.88	74.00	-48.12	peak	
4	1576.152	39.65	-13.77	25.88	54.00	-28.12	AVG	

Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1199.399	41.57	-14.31	27.26	74.00	-46.74	peak	
2	1199.399	41.57	-14.31	27.26	54.00	-26.74	AVG	
3	1580.160	39.72	-13.78	25.94	74.00	-48.06	peak	
4	1580.160	39.72	-13.78	25.94	54.00	-28.06	AVG	

# APPENDIX III (Photos of EUT)



