

APPLICATION FOR CERTIFICATION

On Behalf of

POKEN S,A

EUT Description: Poken SPARK

Model Number: SPARK II

FCC ID: ZFSSPA101

Prepared for : POKEN S.A

Rue Du Pont 22, CH-1003 Lausanne, Switzerland

Prepared By : EST Technology Co., Ltd.

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Report Number : ESTE-R1108005

Date of Test : Aug.5~22, 2011

Date of Report : Aug.24, 2011



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TEST REPORT CERTIFICATION


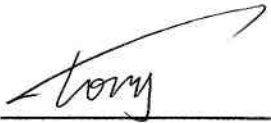

Applicant : POKEN S.A
EUT Description : Poken SPARK
FCC ID : ZFSSPA101
Model NO. : SPARK II
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : DC 3V from battery (DC 5V from PC)
(D) TEST VOLTAGE : DC 3V from battery (DC 5V from PC)

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C 2008

The device described above is tested by EST Technology Co., Ltd to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits for radiated and conducted emissions.

The test results are contained in this test report and EST Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of tests. Also, this report shows that EUT is technically compliant with FCC requirements.

Prepared by:	Tested by:	Approved by:
		
Ada / Assistant	Tony/ Engineer	Iceman Hu / Manager

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Conducted Emission Test	FCC Part 15C: 15.207 ANSI C63.10: 2009	PASS
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C :15.225 ANSI C63.10: 2009	PASS
Frequency Tolerance Test	FCC Part 15C: 15.225 ANSI C63.10: 2009	PASS
Bandwidth Test	FCC Part 15C: 15.225 ANSI C63.10: 2009	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product Name : Poken SPARK

Model Number : SPARK II

Operation Frequency : 13.56MHz

Antenna and Gain : Integrated PCB loop antenna, -60dBi Gain.

Applicant : POKEN S.A
Rue Du Pont 22, CH-1003 Lausanne, Switzerland

Manufacturer : POKEN S.A
Rue Du Pont 22, CH-1003 Lausanne, Switzerland

Date of Test : Aug.5~22, 2011

Date of Receipt : Aug.5, 2011

Sample Type : Prototype production

2.2. Tested Supporting System Details

N/A

2.3. EUT Configuration and operation conditions for test.

EUT

EUT work continues Tx mode and frequency as below:

Channel	Frequency
Sole	13.56MHz

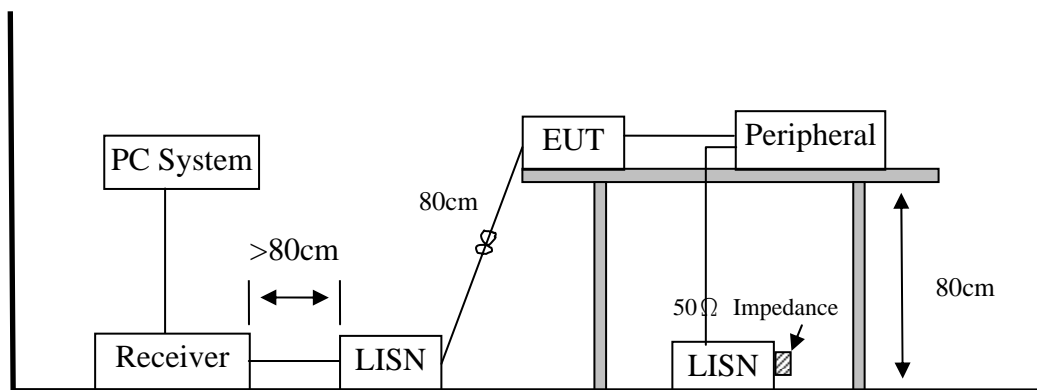
Note: A typical modulation was applied when performance test.

3. POWER LINE CONDUCTED EMISSION TEST

3.1. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde& Schwarz	ESVS30	832354	Mar,19,11	1 Year
Artificial Mains Network	Rohde& Schwarz	ENV216	101260	Mar,19,11	1 Year
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	101100	Sep,20,10	1 Year

3.2. Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. POKEN PULSE (EUT)

Model Number : SPARK II
 Serial Number : N/A
 Manufacturer : POKEN S.A

3.4.2. Support Equipments : PC

Model Number : PP25L
 FCC ID : QDS-BRCM1028
 Manufacturer : DELL

3.5.Operating Condition of EUT

3.5.1.Setup the EUT and simulator as shown as Section 3.2.

3.5.2.Turn on the power of all equipment.

3.5.3.Let the EUT work in test mode (Running) and measure it.

3.6.Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 2#). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N. #3), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2003 on conducted Emission test.

The bandwidth of test receiver is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.7.

3.7.Conducted Disturbance at Mains Terminals Test Results

PASS

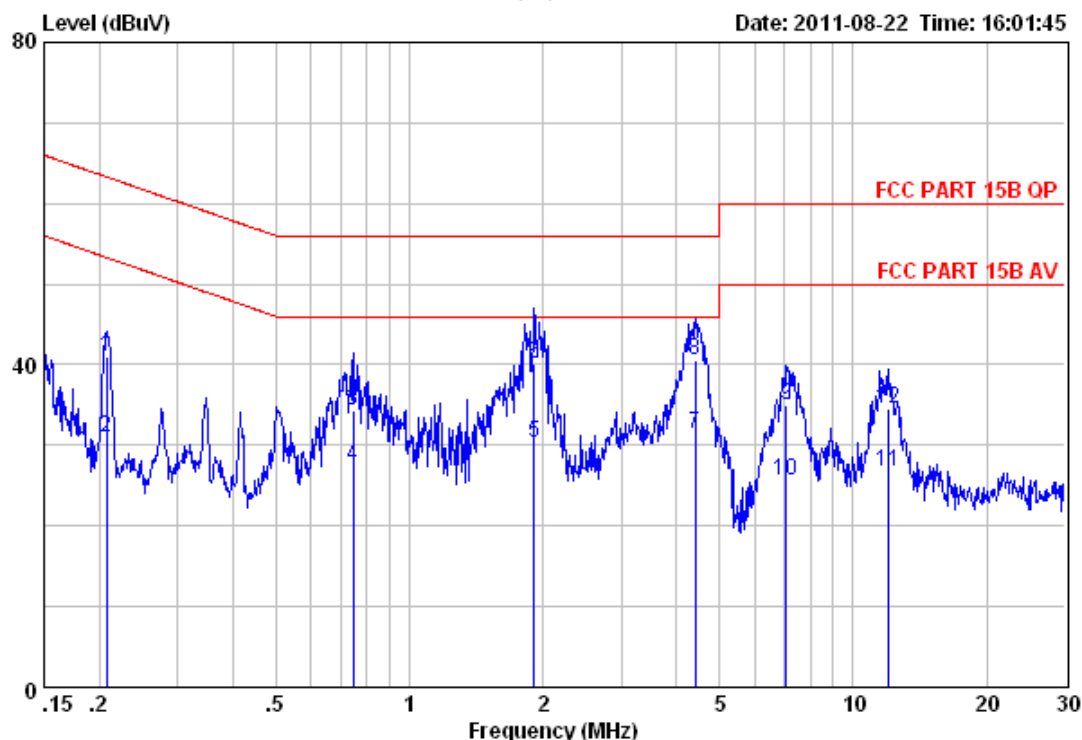
EST Technology

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Data: 9

File: D:\test data\P\POKEN.EMI (16)

Date: 2011-08-22 Time: 16:01:45



Site no. : 844 Shielded Room Data no. : 9
Limit : FCC PART 15B QP LINE Phase : LINE
Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa
Engineer : Tony
EUT : Poken SPARK
Power : DC 5V From PC Input AC 120V/60Hz
M/N : SPARK II
Test Mode : Normal

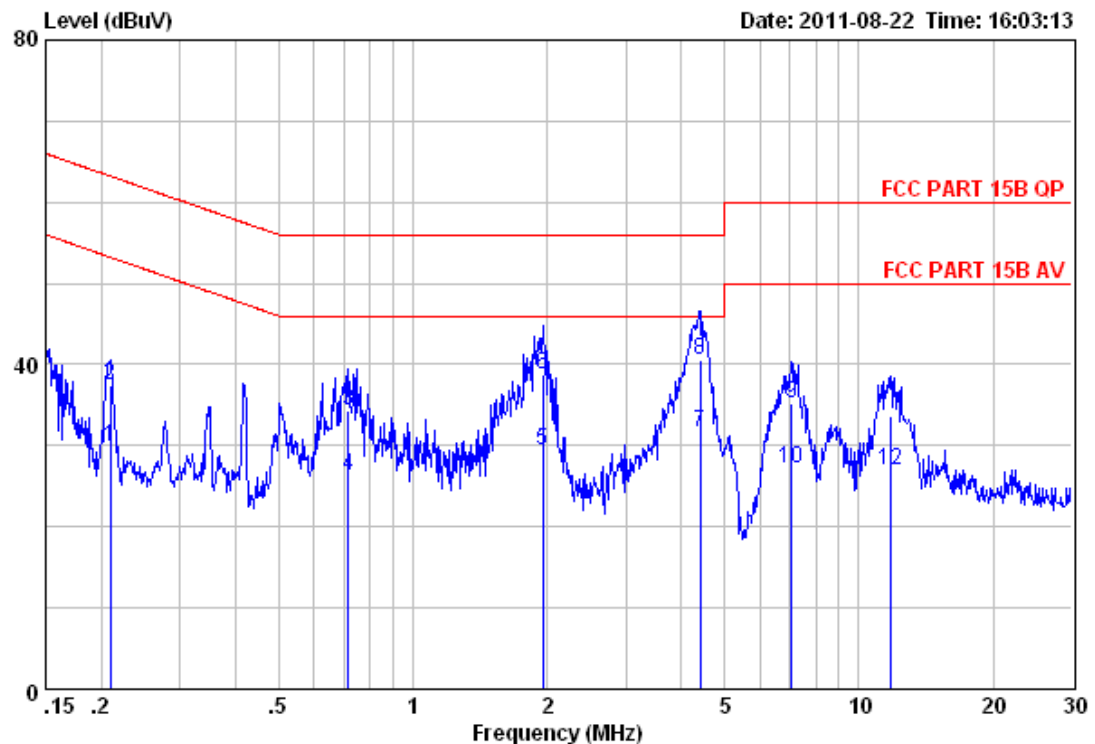
		LISN	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.21	9.61	9.80	21.69	41.10	63.32	22.22	QP
2	0.21	9.61	9.80	11.49	30.90	53.32	22.42	Average
3	0.75	9.60	9.81	15.01	34.42	56.00	21.58	QP
4	0.75	9.60	9.81	8.09	27.50	46.00	18.50	Average
5	1.91	9.61	9.84	10.95	30.40	46.00	15.60	Average
6	1.91	9.61	9.84	20.61	40.06	56.00	15.94	QP
7	4.41	9.64	9.84	11.92	31.40	46.00	14.60	Average
8	4.41	9.64	9.84	21.17	40.65	56.00	15.35	QP
9	7.06	9.66	9.86	15.43	34.95	60.00	25.05	QP
10	7.06	9.66	9.86	6.08	25.60	50.00	24.40	Average
11	12.06	9.67	9.91	7.22	26.80	50.00	23.20	Average
12	12.06	9.67	9.91	14.91	34.49	60.00	25.51	QP

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Data: 11 File: D:\test data\P\POKEN.EMI (16)

Date: 2011-08-22 Time: 16:03:13



Site no. : 844 Shielded Room Data no. : 11
Limit : FCC PART 15B QP LINE Phase : NEUTRAL
Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa
Engineer : Tony
EUT : Poken SPARK
Power : DC 5V From PC Input AC 120V/60Hz
M/N : SPARK II
Test Mode : Normal

	Freq. (MHz)	LISN Factor (dB/m)	Cable Loss (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	0.21	9.60	9.80	10.50	29.90	53.23	23.33	Average
2	0.21	9.60	9.80	18.13	37.53	63.23	25.70	QP
3	0.72	9.63	9.81	14.95	34.39	56.00	21.61	QP
4	0.72	9.63	9.81	6.86	26.30	46.00	19.70	Average
5	1.96	9.62	9.83	10.05	29.50	46.00	16.50	Average
6	1.96	9.62	9.83	19.39	38.84	56.00	17.16	QP
7	4.41	9.65	9.84	12.11	31.60	46.00	14.40	Average
8	4.41	9.65	9.84	21.11	40.60	56.00	15.40	QP
9	7.06	9.66	9.86	15.79	35.31	60.00	24.69	QP
10	7.06	9.66	9.86	7.68	27.20	50.00	22.80	Average
11	11.74	9.72	9.90	14.00	33.62	60.00	26.38	QP
12	11.74	9.72	9.90	7.28	26.90	50.00	23.10	Average

4. RADIATED EMISSION TEST

4.1. Test Equipment

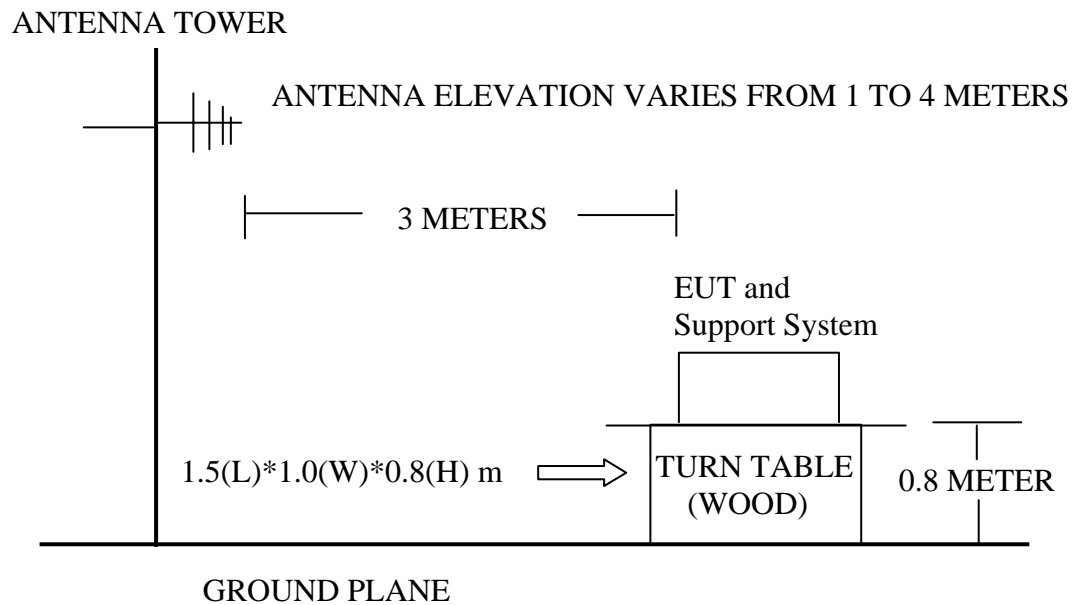
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Dec.05,10	1 Year
	10m Chamber					
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 11	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 11	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 11	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 10	1 Year
6	RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 11	1 Year
7	Coaxial Switch	Anritsu	MP59B	M73989	May.08, 11	1 Year
8	Loop antenna	CHASE	HLA6120	6120	Dec.14, 10	1 Year

4.2. Block Diagram of Test Setup

4.2.1. Block Diagram of connection between EUT and simulators



4.2.2. Anechoic Chamber Setup Diagram



4.3. Radiated Emission Limit

Frequency (MHz)	Measurement Distance (m)	Field Strength (dB μ V/m)[QP]
1.705 ~ 13.110	10	48.64
13.110 ~ 13.410	10	59.60
13.410 ~ 13.553	10	69.60
13.553 ~ 13.567	10	103.10
13.567 ~ 13.710	10	69.60
13.710 ~ 14.010	10	59.60
14.010 ~ 30	10	48.64
30 ~ 88	3	40.00
88 ~ 216	3	43.50
216 ~ 960	3	46.00
960 ~ 1000	3	54.00

- Remark :
- (1) Emission level dB μ V = 20 log Emission level μ V/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.

4.4.Operating Condition of EUT

4.4.1.Setup the EUT as shown in Section 4.2.

4.4.2.Turned on the power of all equipment.

4.4.3.Let the EUT worked in test modes and tested it.

4.5.Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above 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 between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2009 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

The bandwidth of the VBW is set at 300kHz and RBW is set at 120kHz measurement from 30MHz to 1GHz

For frequency range below 30MHz the Loop antenna was used at 10m measurement distance with antenna heights of 1m and antenna loop front and side faced to the EUT.

The axis of the antenna was rotated to maximize the emission. A CISPR quasi-peak detector is used for measurements below 30MHz and RBW/VBW is 9kHz/30kHz.

The limit 1.75MHz to 30MHz in clause 4.3 are specified at 30 meters, and measurements were made at 10 meters, the limit is translated to 10 meters by using a formula as follows:

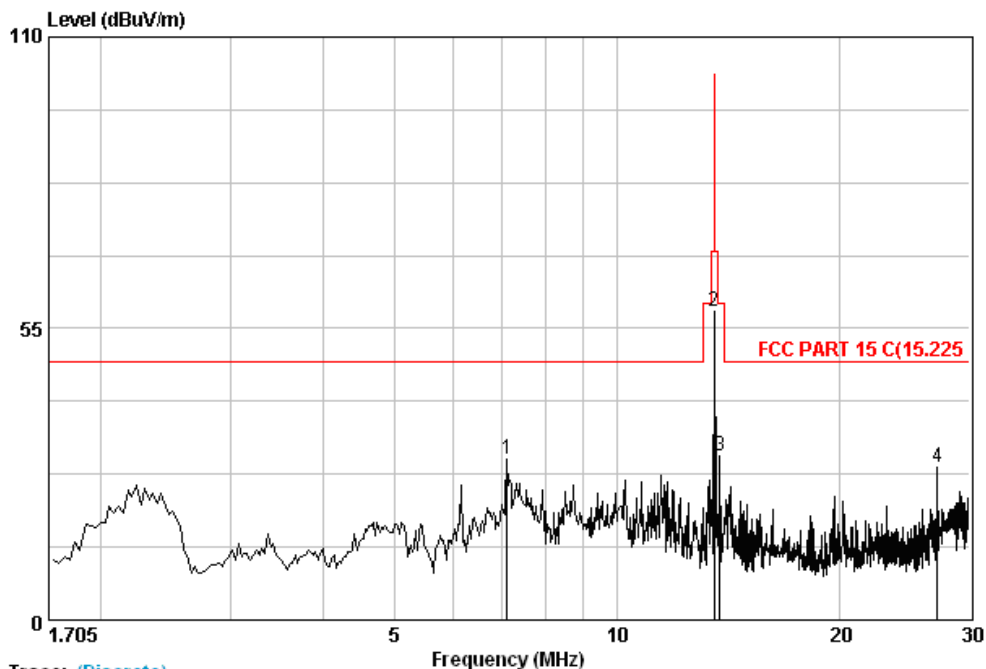
$$\text{Limit}_{30\text{m}} = \text{Limit}_{10\text{m}} + 40\log(30\text{m}/10)$$

The frequency range from 1.705MHz to 1000MHz are checked.

4.6.Radiated Emission Test Results

PASS.

Data: 2



Trace: (Discrete)

Site no. : 10m Chamber Test Site Data no. : 1
 Dis. / Ant. : 10m FACTOR Ant. pol. : Side
 Limit : CISPR 22B(10M)
 Env. / Ins. : 25°C/57% ESVS10 Engineer : Tony
 EUT : Poken SPARK M/N: SPARK II
 Power Rating : DC 3V
 Test Mode : Normal

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	7.11	19.06	0.94	10.40	30.40	48.64	18.24	QP
2	13.56	19.80	1.12	37.16	58.08	103.10	45.02	QP
3	13.79	19.80	1.12	9.96	30.88	59.60	28.72	QP
4	27.13	20.66	1.35	6.73	28.74	48.64	19.90	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

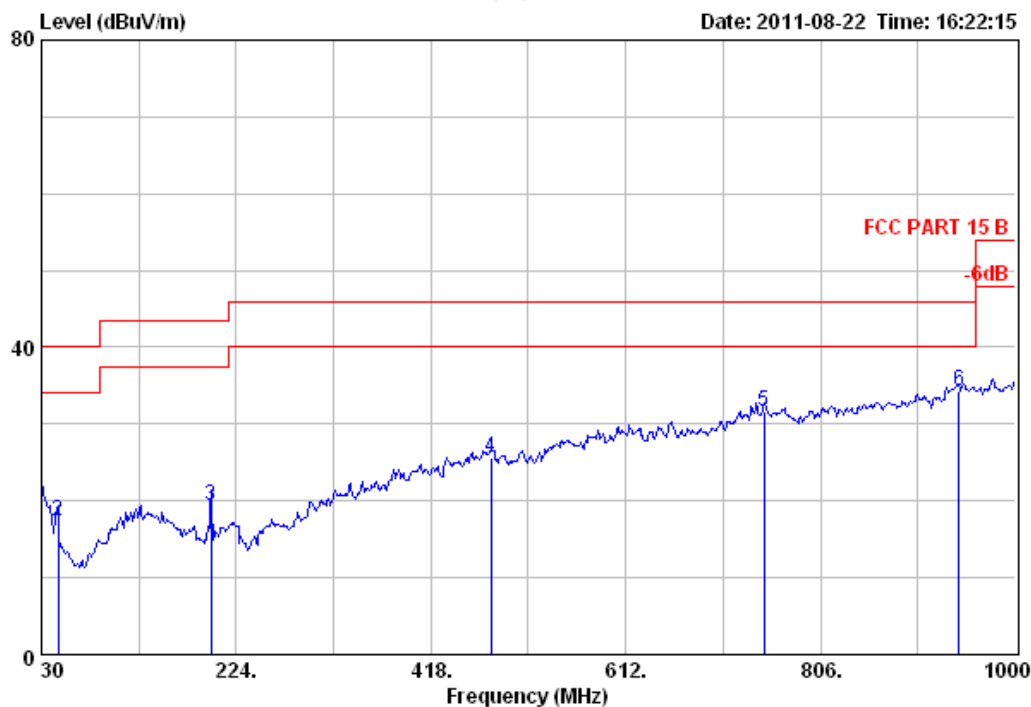
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Data: 15

File: D:\test data\P\POKEN.EMI (16)

Date: 2011-08-22 Time: 16:22:15



Site no. : 3m Chamber Data no. : 15
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.4'; Humi:55%; Press:101.50kPa
 Engineer : Tony
 EUT : Poken SPARK
 Power : DC 3V
 M/N : SPARK II
 Test Mode : TX

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.00	18.30	1.60	1.59	21.49	40.00	18.51	QP
2	46.49	9.20	1.90	6.26	17.36	40.00	22.64	QP
3	198.78	7.71	3.82	7.92	19.45	43.50	24.05	QP
4	478.14	17.40	6.32	2.00	25.72	46.00	20.28	QP
5	749.74	22.19	8.17	1.35	31.71	46.00	14.29	QP
6	943.74	24.64	9.51	0.15	34.30	46.00	11.70	QP

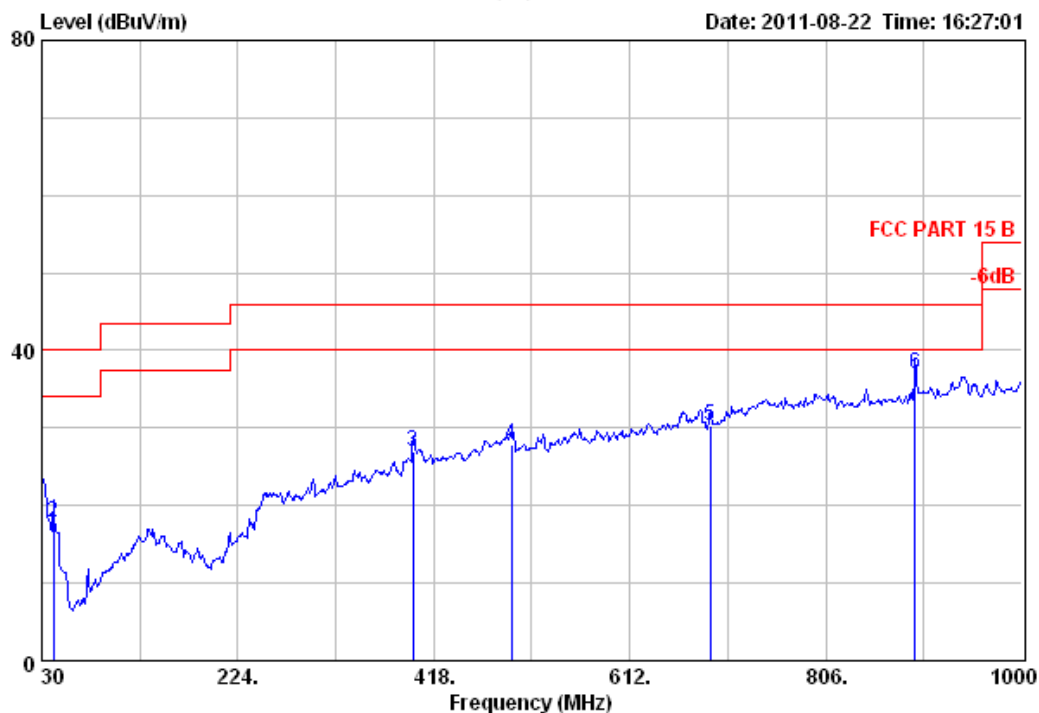
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Data: 16

File: D:\test data\P\POKEN.EMI (16)

Date: 2011-08-22 Time: 16:27:01



Site no. : 3m Chamber Data no. : 16
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.4'; Humi:55%; Press:101.50kPa
 Engineer : Tony
 EUT : Poken SPARK
 Power : DC 3V
 M/N : SPARK II
 Test Mode : TX

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.00	18.30	1.60	2.27	22.17	40.00	17.83	QP
2	41.64	11.75	1.84	4.14	17.73	40.00	22.27	QP
3	397.63	15.96	5.64	5.37	26.97	46.00	19.03	QP
4	494.63	17.84	6.49	3.55	27.88	46.00	18.12	QP
5	691.54	20.40	7.71	2.25	30.36	46.00	15.64	QP
6	894.27	23.01	8.82	5.10	36.93	46.00	9.07	QP

5. FREQUENCY TOLERANCE TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4411B	MY50140697	Mar,19,11	1 Year

5.2. Test procedure

The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.

5.3. Test Results

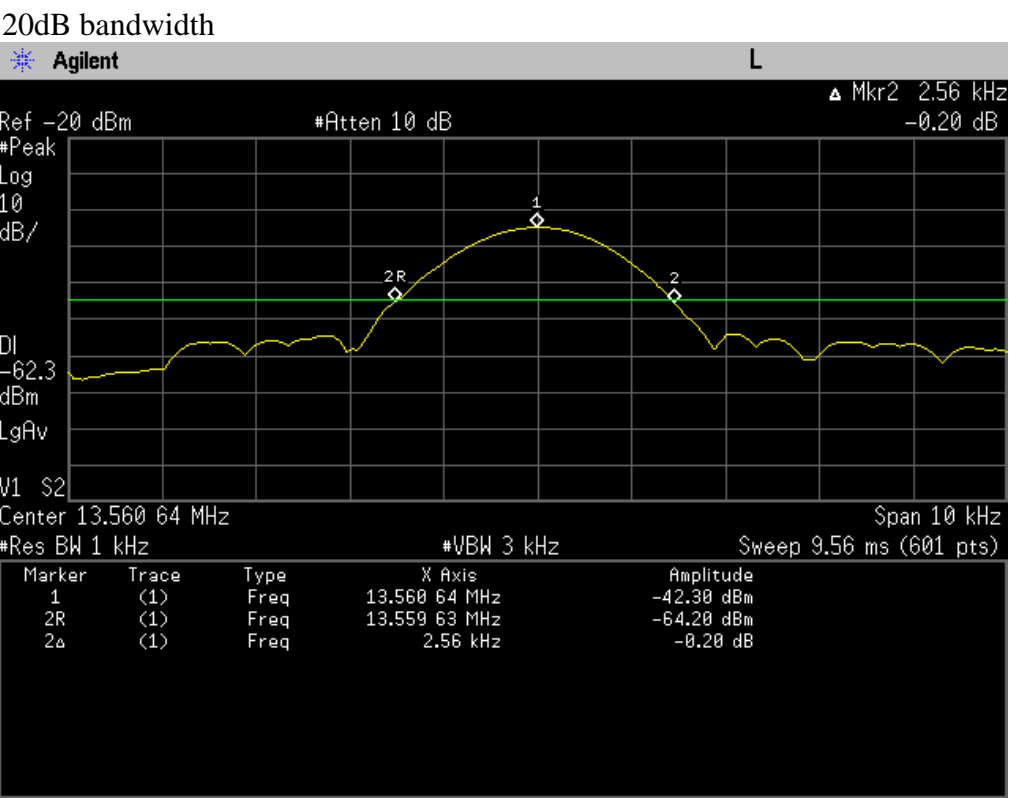
Test condition		0 Minutes Later		2 Minutes Later		5 Minutes Later		10 Minutes Later		Limit (Hz)	Test Result
Voltage (V)	Temperature (Degree C)	Measurement Freq (Hz)	Freq Tolerance (Hz)	Measurement Freq (Hz)	Freq Tolerance (Hz)	Measurement Freq (Hz)	Freq Tolerance (Hz)	Measurement Freq (Hz)	Freq Tolerance (Hz)		
DC 3V	-20	1356.17	17	1356.21	21	1356.17	17	1356.10	10	1356	PASS
	-10	1356.11	11	1356.13	13	1356.22	22	1356.18	18	1356	PASS
	0	1356.13	13	1356.15	15	1356.10	10	1356.10	10	1356	PASS
	10	1356.07	7	1356.06	6	1356.09	9	1356.13	13	1356	PASS
	20	1356.06	6	1356.06	6	1356.07	7	1356.08	8	1356	PASS
	30	1356.06	6	1356.06	6	1356.07	7	1356.12	12	1356	PASS
	40	1356.13	13	1356.15	15	1356.11	11	1356.11	11	1356	PASS
	50	1356.16	16	1356.17	17	1356.09	9	1356.11	11	1356	PASS
2V	20	1356.21	21	1356.26	26	1356.18	18	1356.20	20	1356	PASS
2.5V		1356.33	33	1356.25	25	1356.11	11	1356.16	16	1356	PASS
3V		1356.06	6	1356.06	6	1356.07	7	1356.08	8	1356	PASS
3.5V		1356.11	11	1356.15	15	1356.25	25	1356.08	8	1356	PASS
4V		1356.16	16	1356.20	20	1356.24	24	1356.16	16	1356	PASS

6. BANDWITH TEST

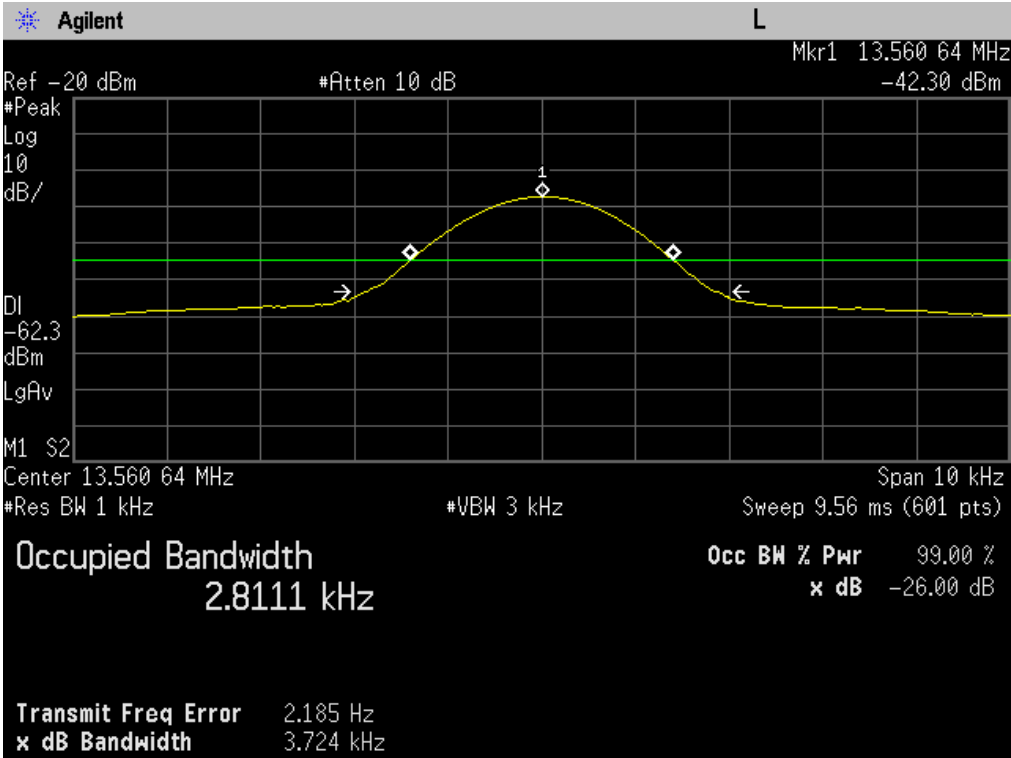
6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4411B	MY50140697	Mar,19,11	1 Year

6.2. Test Results



99% bandwidth

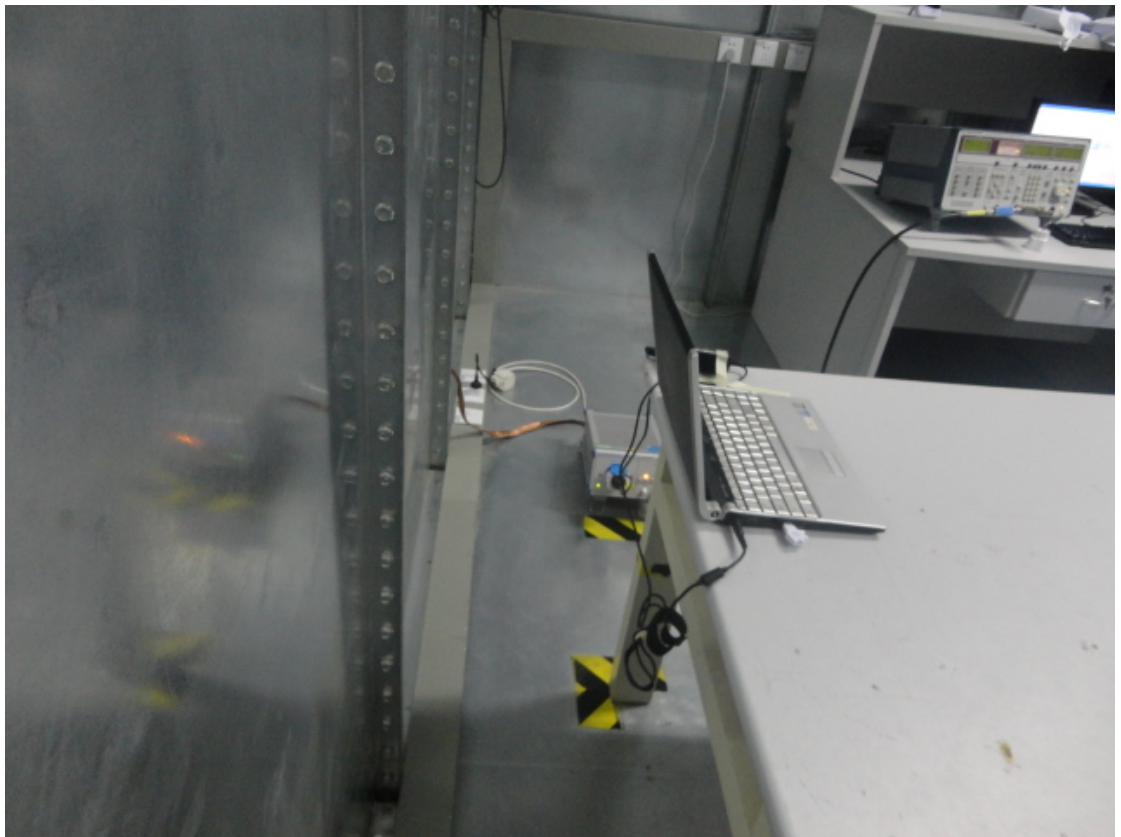
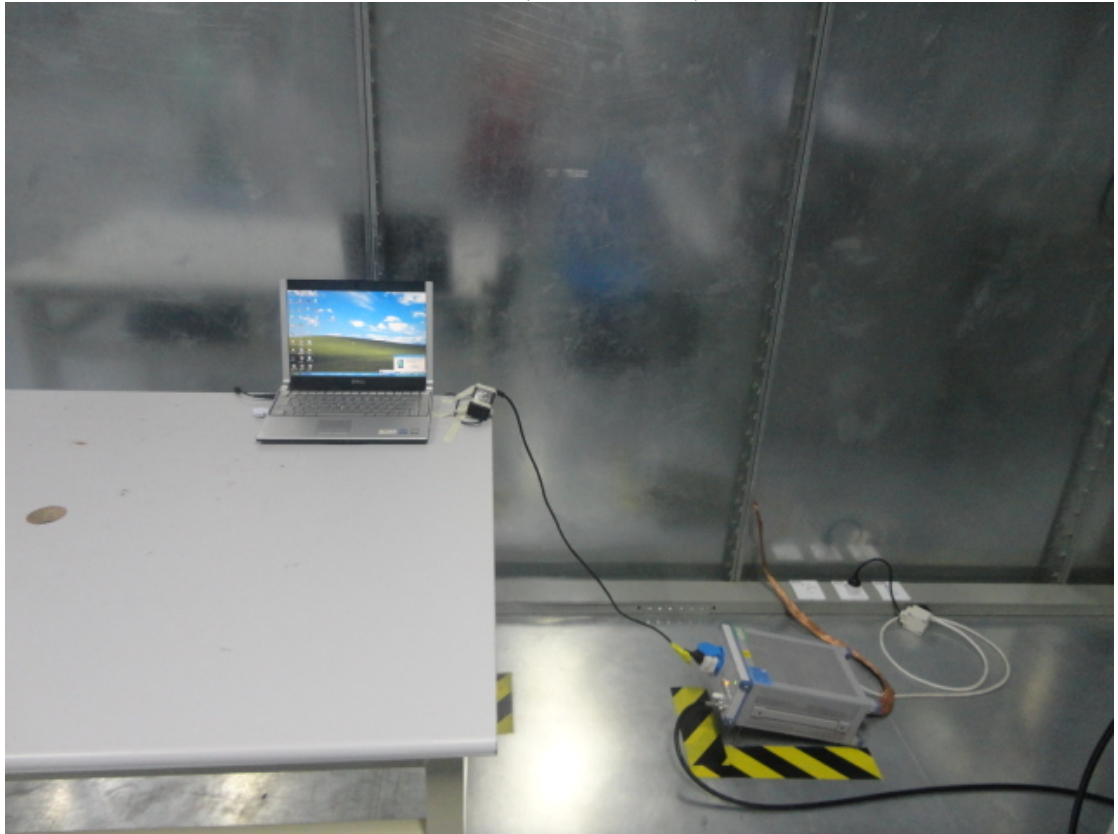


7. DEVIATION TO TEST SPECIFICATIONS

[NONE]

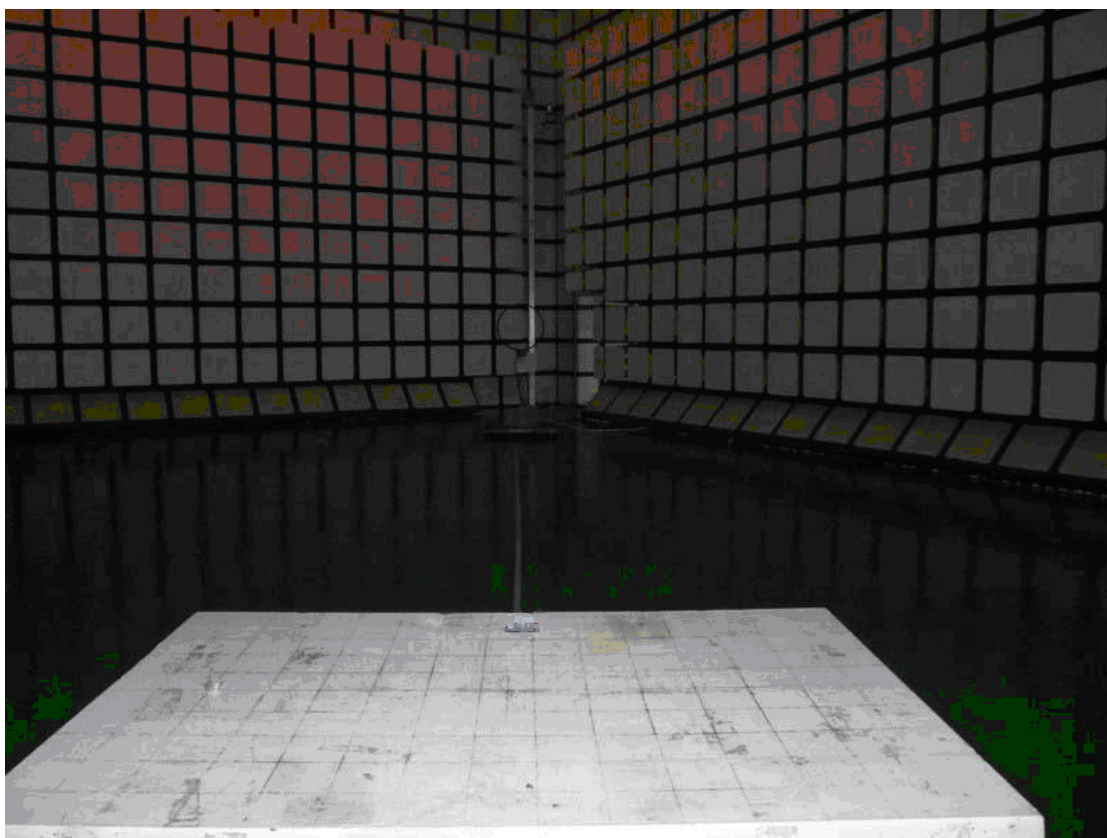
8. PHOTOGRAPH

Photos of conducted emission test (0.15-30MHz)

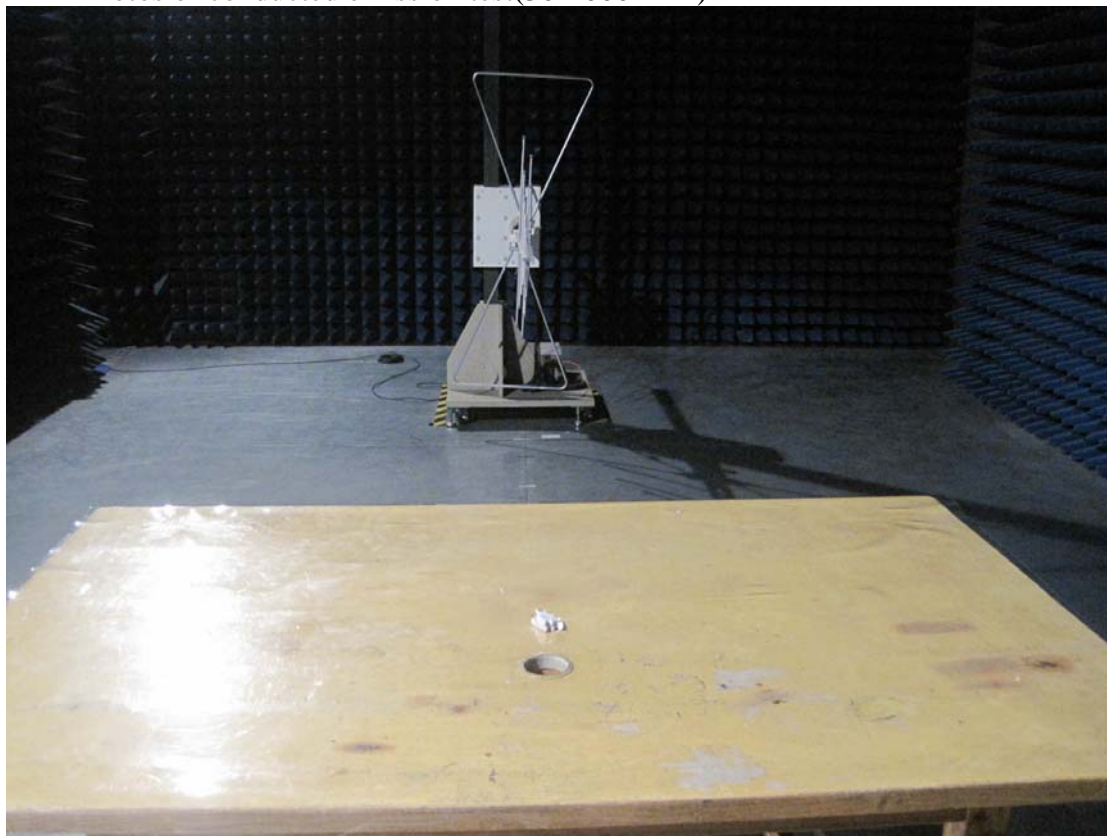




Photos of conducted emission test(1.705-30MHz)



Photos of conducted emission test(30-1000MHz)



9. PHOTOGRAPH OF EUT

Figure 1
General Appearance of the EUT

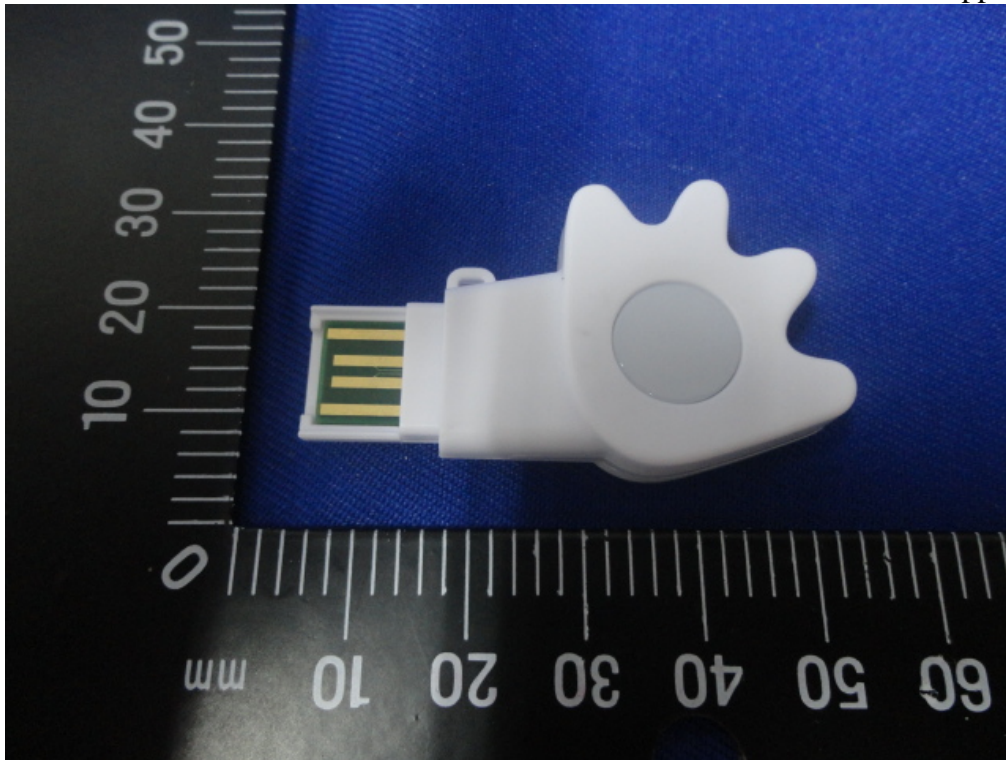


Figure 2
General Appearance of the EUT

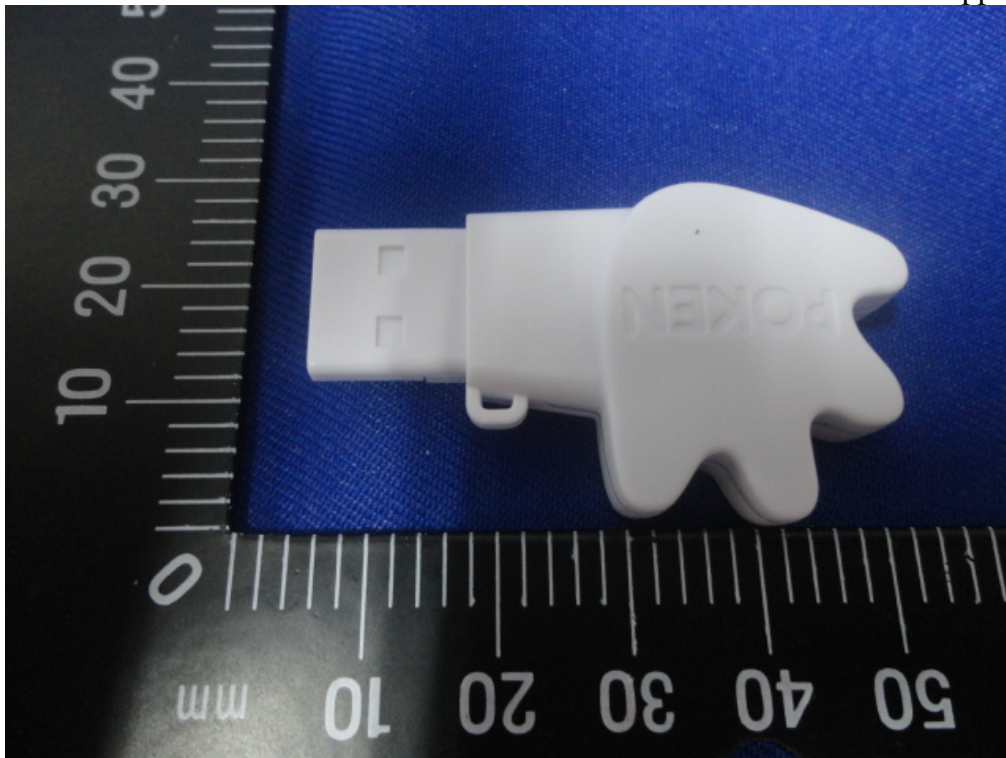


Figure 3
Inside of the EUT

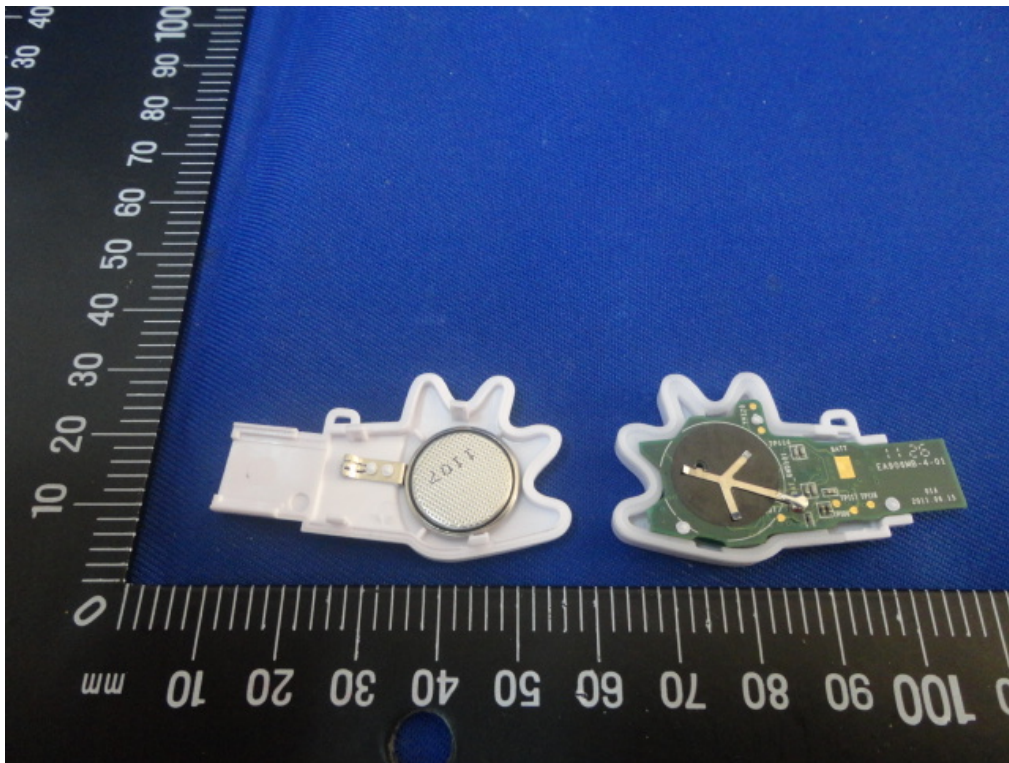


Figure 4
Inside of the EUT

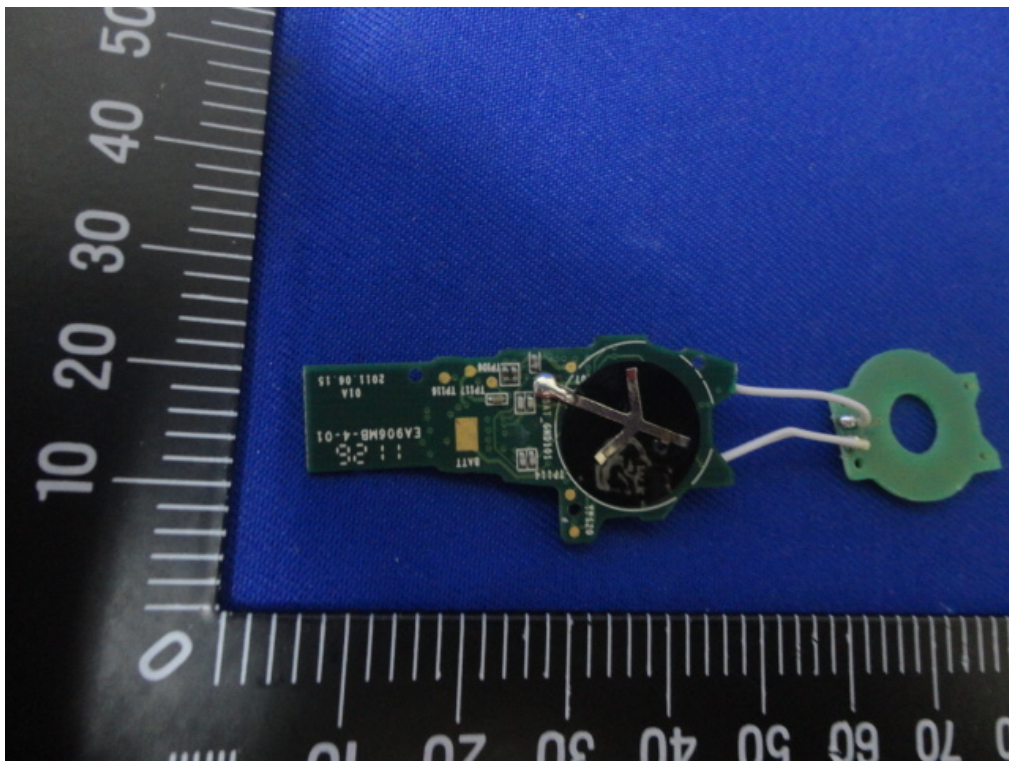


Figure 5
Inside of the EUT

