FCC PART 15C
MEASUREMENT AND TEST REPORT
for
WISTECH DIGITAL PRODUCTS CO., LTD.

FM Transmitter
Model No.: WT-602

Prepared for	:	WISTECH DIGITAL PRODUCTS CO., LTD.
Address	:	2/F, C BUILDING, 3RD INDUSTRIAL ZONE, HOURUI SHENZHEN

Prepared by	:	SHENZHEN LCS CERTIFICATION SERVICES INC.
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Report Number	:	LCS080927811R
Date of Test	:	Sep 28, 2008
Date of Report	:	Sep 30, 2008

TABLE OF CONTENT

TEST REPORT DESCRIPTION

Applicant	:	WISTECH DIGITAL PRODUCTS CO. LTD.
Manufacturer	:	WISTECH DIGITAL PRODUCTS CO. LTD.
EUT	:	FM Transmitter
MODEL NO.	:	WT-602
POWER SUPPLY	:	DC3V batteries

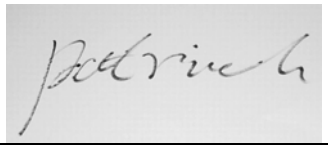
Applicable Standards	
Standard	**Test Result**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

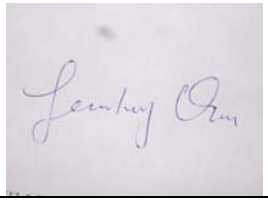
The above equipment was tested at Shenzhen Huatongwei International Inspection Co., Ltd.

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and Part 15.239.

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

Test Date : Sep 28, 2008

Prepared by : 

Reviewed by : 

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	FM Transmitter
Model Number	:	WT-602
Power Supply	:	DC3V
Work Frequency Range	:	88.1, 88.3, 88.5, 88.7, 88.9, 107.1, 107.3, 107.5, 107.7, 107.9 MHz
Applicant	:	WISTECH DIGITAL PRODUCTS CO., LTD.
Address	:	2/F, C BUILDING, 3RD INDUSTRIAL ZONE, HOURUI SHENZHEN
Manufacturer	:	WISTECH DIGITAL PRODUCTS CO., LTD.
Address	:	2/F, C BUILDING, 3RD INDUSTRIAL ZONE, HOURUI SHENZHEN
Date of Sample received	:	Sep 27, 2008
Date of Test	:	Sep 28, 2008

1.2. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.4 (2003) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.239.

1.3. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

1.4. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

1.5. General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

1.6. FCC Part 15.205 Restricted Bands of Operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6
(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

1.7. Description of Test Modes

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

2. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

3. FACILITIES AND ACCREDITATIONS

3.1. Facilities

All measurement facilities used to collect the measurement data are located on the address of Shenzhen Huatongwei International Inspection Co., Ltd at Huatongwei Building, Keji Rd. 12 S., High-tech Park, Nanshan District, Shenzhen, Guangdong, P.R.China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

3.2. Equipment

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3.3. Laboratory Accreditation and Listing

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories，Date of Registration: August 02, 2007. Valid time is until March 04, 2009.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 1999 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is from Aug 24, 2005 to Sept 30, 2009

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date September 12, 2006.

IC-Registration No.: 5377

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377 on November 28th, 2005.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

4. SETUP OF EQUIPMENT UNDER TEST

4.1. Setup Configuration of EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

4.2. Support Equipment

Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
iPod	N/A	iPod Shuffle	N/A	4H717GNTVTE

Remark:

--All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

--Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

5. RADIATED EMISSION MEASUREMENT

Limit

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.

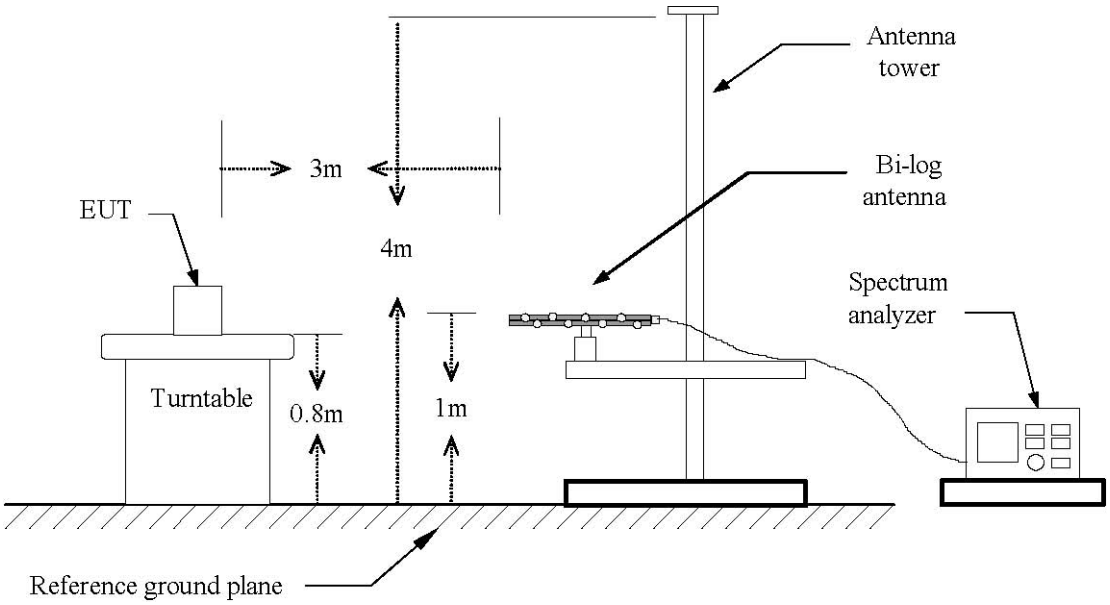
Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Measurement Equipment Used

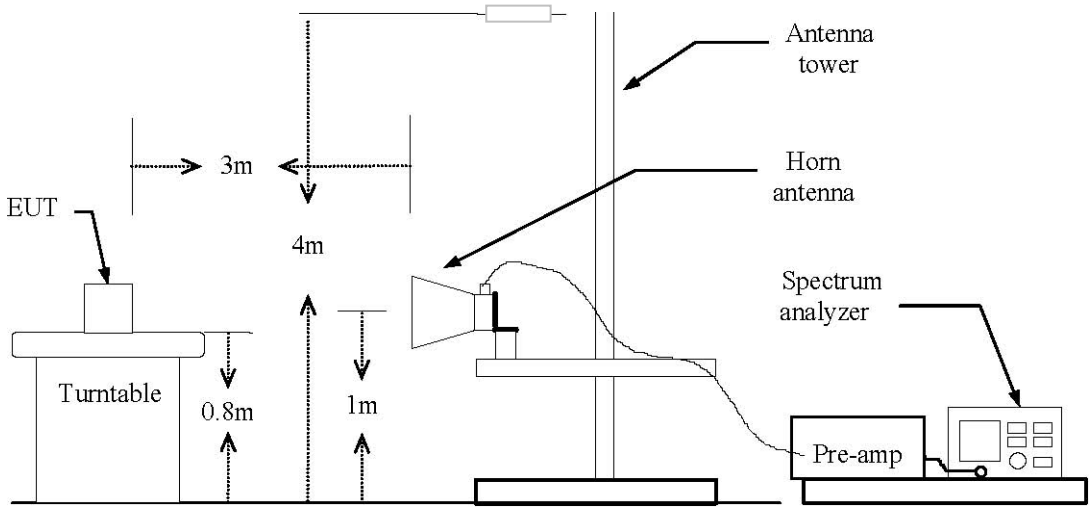
3/5 Anechoic Chamber Radiation Test Site # 4				
Equipment type	Manufacturer	Model	Serial Number	Calibration Due
Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	10/2009
EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	10/2009
Double-Ridged-Wave-guide Horn Antenna	ROHDE & SCHWARZ	HF906	100039	10/2009
Turntable	ETS	2088	2149	N/A
RF Test Panel	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	N/A
Antenna Mast	ETS	2075	2346	N/A
EMI Test Software	ROHDE & SCHWARZ	ES-K1 V1.71	N/A	10/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration Below 1 GHz



Above 1 GHz



Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Repeat above procedures until the measurements for all frequencies are complete.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Measuring Results

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-2003.The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST DATA

Carrier frequency:

Frequency (MHz)	Read dBuV PK	Read dBuV AV	Polar	Ant Height m	Ant./CL Amp.CF(dB) dB	Result dBuv/m PK	Result dBuv/m AV	Limit dBuv/m PK	Limit dBuv/m AV	Margin dBuv/m PK	Margin dBuv/m AV
88.1	47.7	34.1	H	1.1	11.7	**59.4**	**44.8**	68	48	-8.6	-3.2
88.1	39.0	28.4	V	1.3	11.7	**50.7**	**40.1**	68	48	-17.3	-7.9

Frequency (MHz)	Read dBuv PK	Read dBuV AV	Polar	Ant Height m	Ant./CL Amp.CF(dB) dB	Result dBuv/m PK	Result dBuv/m AV	Limit dBuv/m PK	Limit dBuv/m AV	Margin dBuv/m PK	Margin dBuv/m AV
107.9	41.5	30.8	H	1.2	14.1	**55.6**	**44.9**	68	48	-12.4	-3.1
107.9	37.4	26.3	V	1.4	14.1	**51.5**	**40.4**	68	48	-16.5	-7.6

Remark：

(1) Measuring frequencies from 25 MHz to the 1GHz。

(2) The IF bandwidth of EMI Test Receiver between 25MHz to 1GHz was 120KHz.

OUT-OF-BAND EMISSIONS:

88.1 MHz

Frequency (MHz)	Result (dBuV/m)	Polar H/V	Ant Height(m)	Ant./CL Antenna Amp.CF(dB)	Limit (dBuV/m)	Margin (dBuV/m
176.20	40.0	H	2.0	11.5	43.5	-3.5
264.30	42.6	H	2.3	12.6	46.0	-3.4
352.40	42.5	H	2.0	17.4	46.0	-3.5
440.50	41.1	H	2.5	20.2	46.0	-4.9
Other	--					

Frequency (MHz)	Result (dBuV/m)	Polar H/V	Ant Height(m)	Ant./CL Antenna Amp.CF(dB)	Limit (dBuV/m)	Margin (dBuV/m
176.20	35.8	V	2.1	11.5	43.5	-7.7
264.30	33.6	V	2.3	12.6	46.0	-12.4
Other	--					

107.9 MHz

Frequency (MHz)	Result (dBuV/m)	Polar H/V	Ant Height(m)	Ant./CL Antenna Amp.CF(dB)	Limit (dBuV/m)	Margin (dBuV/m
215.80	40.2	H	2.0	11.1	43.5	-3.3
323.70	39.7	H	2.2	15.5	46.0	-6.3
431.60	42.9	H	2.4	20.2	46.0	-3.1
539.50	33.5	H	2.1	21.2	46.0	-12.5
Other	--					

Frequency (MHz)	Result (dBuV/m)	Polar H/V	Ant Height(m)	Ant./CL Antenna Amp.CF(dB)	Limit (dBuV/m)	Margin (dBuV/m
215.80	34.3	V	2.0	11.1	43.5	-9.2
323.70	34.7	V	2.3	15.5	46.0	-11.3
431.60	29.4	V	2.4	20.2	46.0	-16.6
Other	--					

Remark：

(1) Measuring frequencies from 30 MHz to the 1GHz。

(2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.

(3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.

6. Occupied Bandwidth

Limit

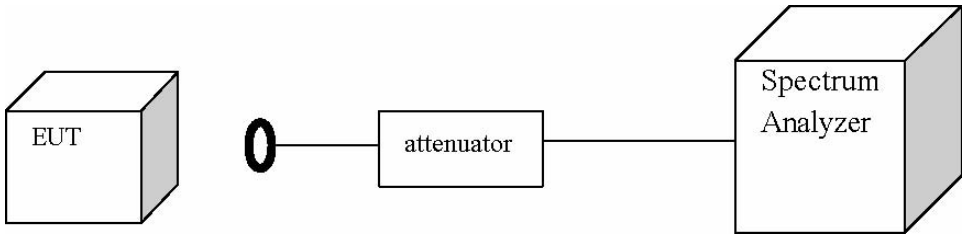
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100106	10/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



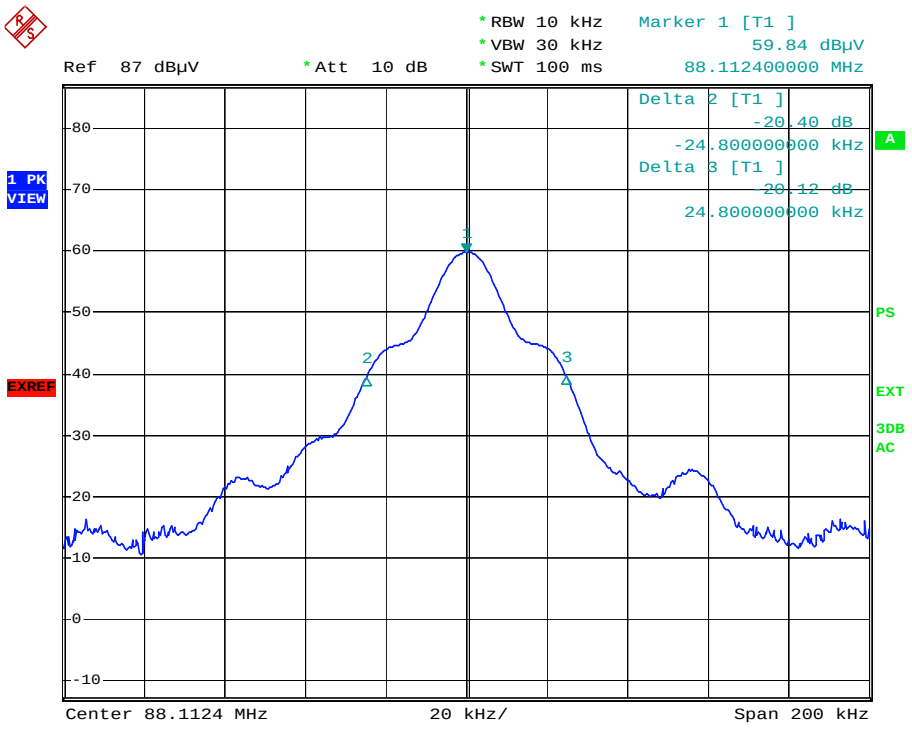
Test Procedure

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW is set to 10 kHz and VBW is set 30 kHz.

Test Results

No non-compliance noted.

Test Plot



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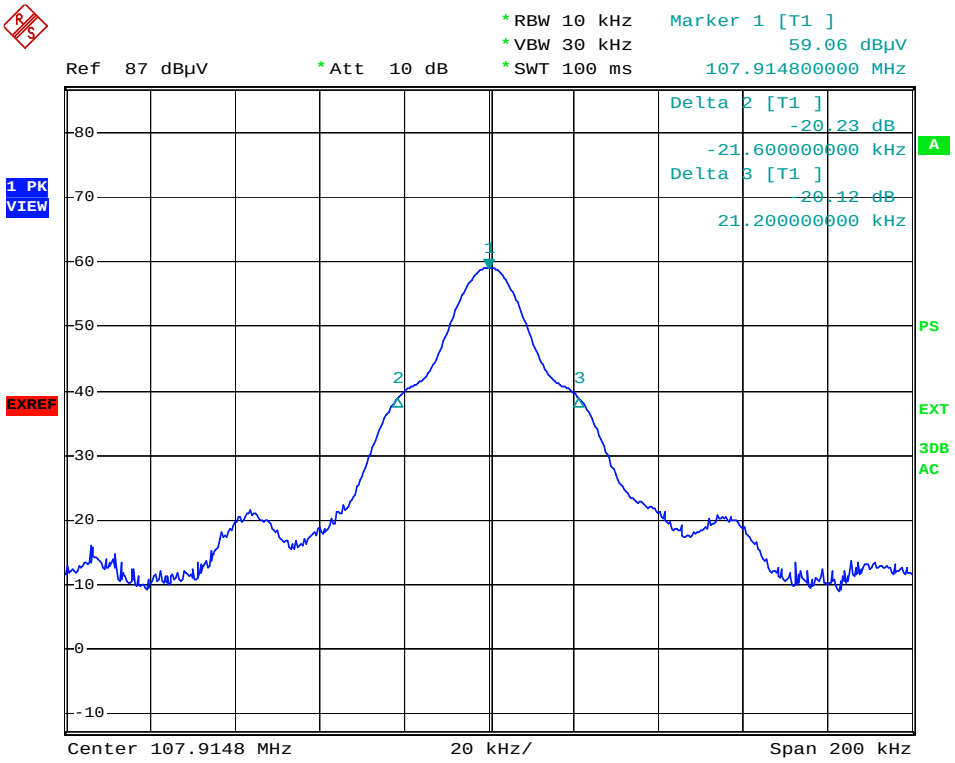

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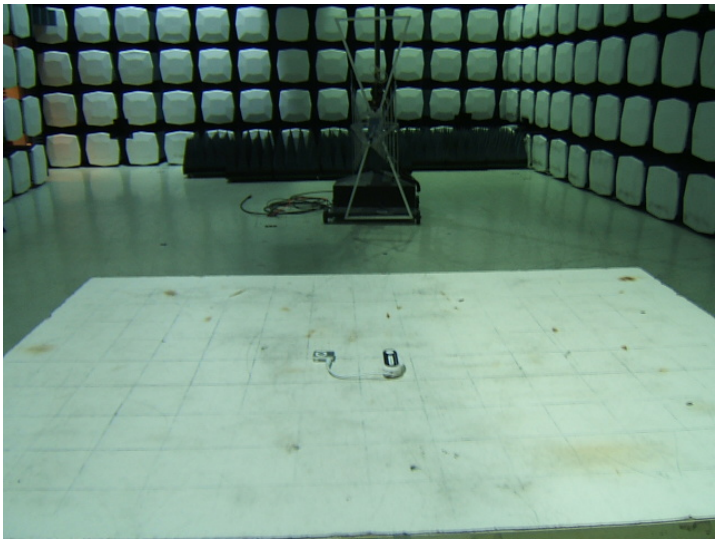
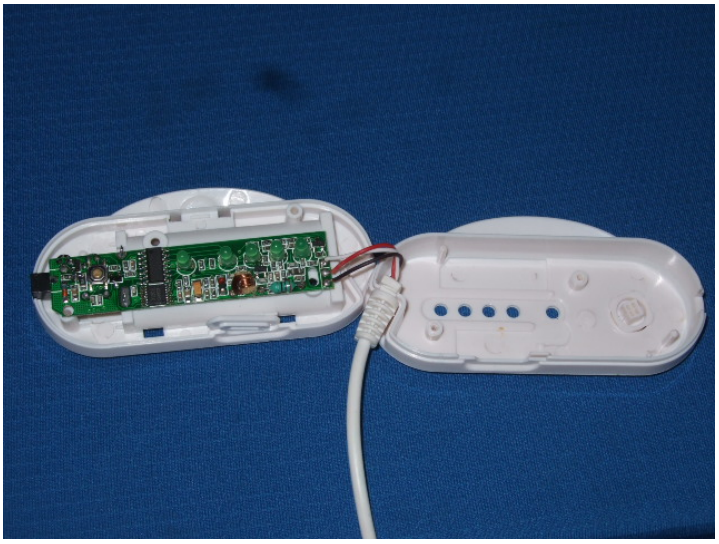
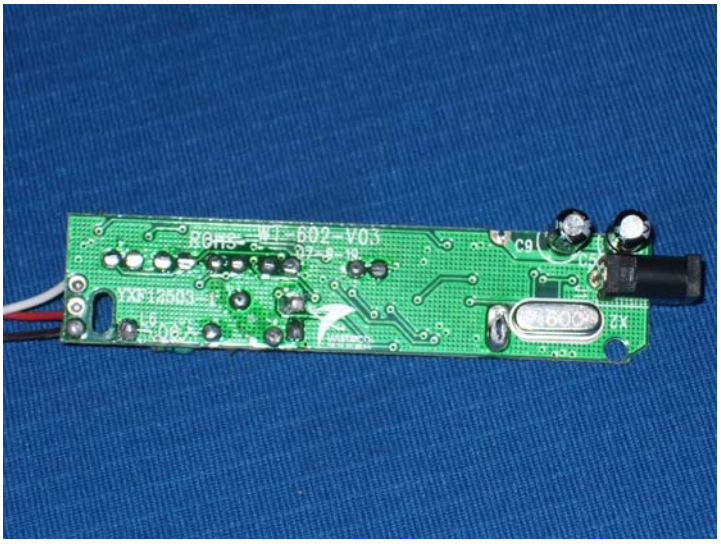
7. PHOTOGRAPHS

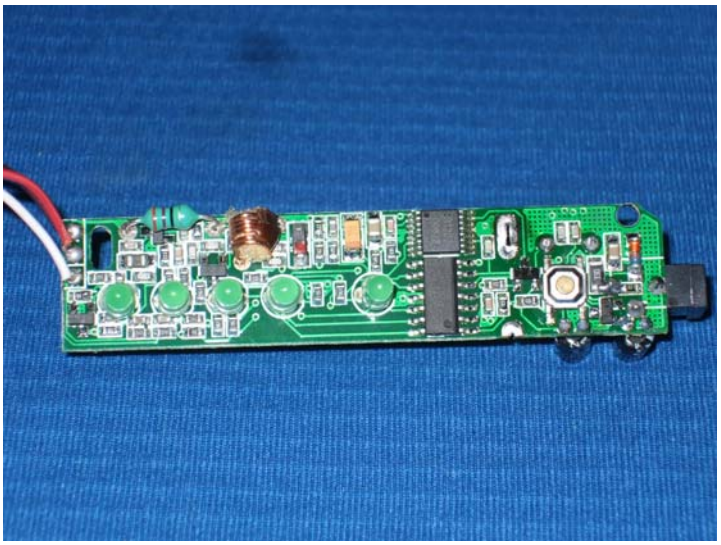
APPENDIX I—TEST SETUP



APPENDIX II-Photos of the EUT







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