



Test Report

Applicant: Enping Karsect Electronics Co., Ltd.
Address of Applicant: F45-1, District F, Foreign and Private Capital Industrial Zone, Enping, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Monitor System
Model No.: KP1TA
Trade Mark: Karsect
Serial No.: Not supplied by client
Standards: FCC PART15 SUBPART C: 2013
Date of Receipt: Jan. 6, 2014
Date of Test: Jan. 6 to Mar. 8, 2014
Date of Issue: Mar. 9, 2014
Test Result : **PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Tested by:

Sandy Yu

Sandy Yu / EMC Engineer

Authorized Signature:

Henly

Henly Xie / Manager, Representative of the Lab

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

All test results in this report can be traceable to National or International Standards.

The test report prepare by:

Guangdong Huesent Testing & Inspection Technology Co., Ltd.

Self-ordained 68# courtyard, No.91, Dongguanzhuang Road,Guangzhou,China.

Tel: 86-20-28263298 Fax: 86-20-28263237

<http://www.hst.org.cn> E-mail:hst@hst.org.cn

1 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (9kHz to 25GHz)	FCC PART 15.249	ANSI C63.4:2003	In FCC PART 15.249	PASS
Occupied Bandwidth	FCC PART 15.215	ANSI C63.10:2009	In FCC PART 15.215	PASS
Conducted Emissions at Mains Terminals	FCC PART 15.207	ANSI C63.4:2003	In FCC PART 15.207	PASS

Remark:

♣

Channel	Frequency/ MHz	Channel	Frequency/ MHz
01: Lowest	903.0	25	914.8
02	903.3	26	915.5
03	903.7	27	916.2
04	904.2	28	916.5
05	905.0	29	917.0
06	905.3	30	917.5
07	906	31	917.9
08	906.5	32	918.5
09	907.0	33	918.9
10	907.7	34	919.5
11	908.0	35	920.0
12	908.5	36	920.5
13	909.2	37	920.8
14	909.5	38	921.5
15	910.0	39	922.0
16	910.5	40	922.5
17	911.0	41	923.0
18	911.5	42	923.5
19	912.0	43	924.0
20	912.5	44	924.5
21	913.0	45	925.0
22	913.5	46	925.3
23	914.0	47	926.1
24: Mid	914.5	48: Highest	926.5

The tests were carried out on the 3 samples with the typical frequency of lowest/ middle/ highest channels listed above.

2 Contents

1	TEST SUMMARY	2
2	CONTENTS.....	4
3	GENERAL INFORMATION.....	5
4.1.	CLIENT INFORMATION	5
4.2.	GENERAL DESCRIPTION OF E.U.T.....	5
4.3.	DETAILS OF E.U.T.	5
4.4.	DESCRIPTION OF SUPPORT UNITS.....	5
4.5.	STANDARDS APPLICABLE FOR TESTING	5
4.6.	TEST LOCATION	6
4.7.	DEVIATION FROM STANDARDS	6
4.8.	ABNORMALITIES FROM STANDARD CONDITIONS	6
5.	EQUIPMENTS USED DURING TEST	7
6.	TEST RESULTS.....	9
6.1.	RADIATION INTERFERENCE	9
6.1.1	<i>E.U.T. Operation</i>	9
6.1.2	<i>Test Setup</i>	9
6.1.3	<i>Test Procedure</i>	9
6.1.4	<i>Measurement Data</i>	10
6.1.5	<i>Radiated outside of the specified frequency bands</i>	14
6.1.6	<i>Measurement Data for 15.249.d</i>	16
6.2.	OCCUPIED BANDWIDTH	26
6.2.1	<i>E.U.T. Operation</i>	26
6.2.2	<i>Test Setup</i>	26
6.2.3	<i>Test Procedure</i>	26
6.2.4	<i>Measurement Data</i>	27
6.3.	CONDUCTED EMISSIONS AT MAINS TERMINALS 150 KHZ TO 30 MHZ.....	31
6.3.1	<i>EUT Operation</i>	31
6.3.2	<i>Test Configuration</i>	32
6.3.3	<i>Test Procedure</i>	32
6.3.4	<i>Measurement Data</i>	33
7.	PHOTOGRAPHS	35
7.1.	RADIATED EMISSION TEST SETUP	35
7.2.	CONDUCTED EMISSION TEST SETUP	37
7.3.	EUT CONSTRUCTIONAL DETAILS	38
7.4.	ANTENNA PHOTO	60

3 General Information

4.1. Client Information

Applicant: Enping Karsect Electronics Co., Ltd.
Address of Applicant: F45-1, District F, Foreign and Private Capital Industrial Zone,
Enping, Guangdong, China

4.2. General Description of E.U.T.

EUT Name: Monitor System
Item No.: KP1TA
Serial No.: Not supplied by client

4.3. Details of E.U.T.

Power Supply: 12V-18Vdc, by AC/DC adapter, model:HHD135-500, input: 120Vac, 60Hz, 18W, output: 13.5Vdc500mA
Main Function: Wireless monitor system with an associated receiver for transmitting voice.
Oscillating Frequency: Base's RF module IC (model: 15E03), crystal frequency: 10MHz, location: X1.
Frequency Range: 903.000 MHz to 926.500 MHz
Modulation: 8FSK.
Antenna Type: external dipole antenna; Gained: 6 dBi; Antenna length: 25cm of the base.

4.4. Description of Support Units

Test the EUT with audio signal generator.

4.5. Standards Applicable for Testing

The standard used was FCC PART 15, SUBPART C, PART 15.249.

The EUT belongs to low power communication device transmitter, and it's an unlicensed low power auxiliary device.

4.6. Test Location

Guangdong Huesent Testing & Inspection Technology Co., Ltd.

No.91, Dongguanzhuang Road, Guangzhou, China.

Tel: 86-20-87221905, Fax: 86-20-87223892

CNAS- Accreditation No.: L2885.

CMA- Authorisation Certificate No.: 2008191614Z

Radiated and conducted emission tests were subcontracted to the laboratory following-

Guangdong Environment Radiation Monitoring Center.

860, South Guangzhou Avenue, Guangzhou, P.R. China

Tel: 86-20-84281721 Fax: N/A Email: Kevin.ma@nemko.com

FCC- Registration No: 667318 on on Sep. 29, 2009

CNAS- Accreditation No: L5539.

4.7. Deviation from Standards

None.

4.8. Abnormalities from Standard Conditions

None.

5. Equipments Used during Test

Test Equipment	Manufactory	Model No.	Serial No.	Cal Date	Cal Due to Date
			Equipment No.		
3m Semi-anechoic Chamber	Albatross Projecets Gm	SAC-3M	/	2012-10-9	2014-10-9
			1.001		
Spectrum Analyzer	R&S	FSP30	101230	2013-7-30	2014-7-30
			1.003		
Spectrum Analyzer	R&S	FSP30	100207	2013-3-30	2014-3-30
			EMC0001		
EMI Receiver	R & S	ESCI	100849	2013-7-30	2014-7-30
			1.002		
EMI Receiver	R & S	ESCI	100336	2013-3-4	2014-3-4
			EMC1002	2014-2-20	2015-2-20
LISN	AFJ	LS16C	16010643209	2013-2-28	2014-2-28
			EMC1003	2014-2-20	2015-2-20
Two-Line V-Network	R & S	ENV216	100101	2013-7-30	2014-7-30
			1.004		
Shielding Room	DG ZongZhou	ZW-391 7x3.9x3 m	/	2011-5-25	2014-5-25
			EMC1001		
RF Signal Generator	R & S	SMB100A-B106	118622	2013-3-22	2014-3-22
			1.031		
Anechoic Chamber	ETS•Lindgren	RFSD-F-100	/	2012-4-10	2014-4-10
			ITL-100		
Power Meter	R & S	NRP2	101859	2013-3-22	2014-3-22
			1.033		
RF Power Amplifier	BONN	BLWA 0830-160/100/ 60D	118622	2013-3-22	2014-3-22
			1.032		
18G RF Pre-amplifier	MITEQ	AFS44	1381096	2013-6-8	2014-6-8
			1.01.1		
Power Meter	Rohde & Schwarz	URV35	100193	2013-6-8	2014-6-8
			EMC1506		
Audio Analyzer	Hewlett Packard	8903B	0467331	2013-2-27	2014-2-27
			EMC0011	2014-2-20	2015-2-20
Power Sensor	Rohde & Schwarz	URV5-Z7	100287	2013-6-8	2014-6-8
			EMC1507		
Low Loss Coaxial Cable	HST	2 m	/	2013-12-6	2014-12-6
			EMC1008		
Noise Generator	Ningbo Zhongce	DF1681	6006867	2013-5-30	2014-5-30
			EMC0009		

Monopole Antenna	HST	N/A	EMC6002	2013-6-8	2014-6-8
1G-18GHz Double Ridged Guide Antenna	R & S	HF906	100685	2013-5-22	2014-5-22
			1.01		
15G-26.5(40)GHz Double Ridged Guide Antenna	Schwarzbeck	BBHA 9170	/	2013-6-8	2014-6-8
			EMC7001		
9k-30MHz Loop Antenna	BJ 2nd Factory	ZN30900A	B2-005;	2013-9-24	2014-9-24
			EMC6001		
Biconilog Antenna	Schwarzbeck	VULB9163	9163-378	2013-5-22	2015-5-22
			1.011		
Audio Signal Generator	HK LONGWEI	TAG-101	EMC0010	2013-11-12	2014-11-12

6. Test Results

6.1. RADIATION INTERFERENCE

Test Requirement: FCC Part15.249, a) & FCC Part15.209

Test Method: ANSI C63.4:2003

Detector: Peak for pre-scan (The resolution bandwidth was 100kHz and the video bandwidth was 300kHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz.)

Average detector if maximised peak within 6dB of limit

Test Date: Jan. 22, 2014

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 18°C

Humidity: 52% RH

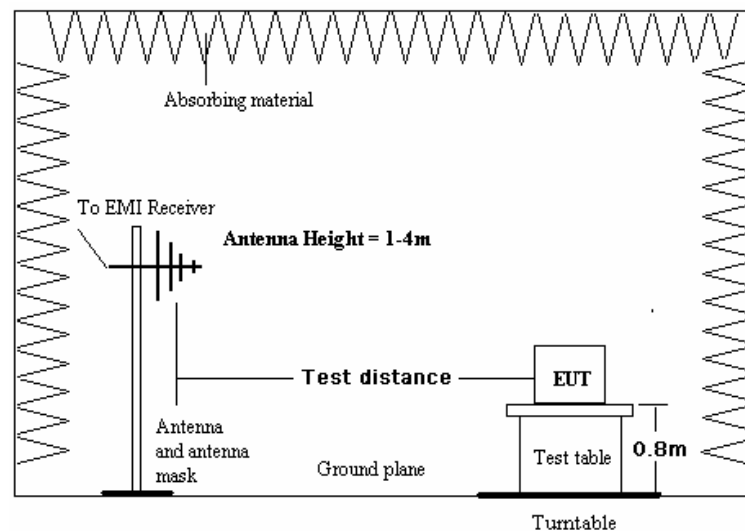
Atmospheric Pressure: 1020mBar

EUT Operation:

In the fundamental test, an audio signal generator supplied a sinusoidal signal at 1 kHz as input in worst case (within 1kHz to 20kHz input for pre-testing), connecting with the EUT to peripheral devices.

Test the EUT work normally in on mode during the whole test.

6.1.2 Test Setup



6.1.3 Test Procedure

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical polarities.

6.1.4 Measurement Data

Copy from FCC Part 15.249.a)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental	Field Strength	
Frequency	Fundamental	Harmonics
MHz	millivolts/meter(mV/m)	microvolts/meter(uV/m)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

Peak measurement of carrier						
Frequency	Level		Transducer	Limit	Margin	
MHz	dBuV/m		dB	dBuV/m	dB	
	V	H			V	H
903.0 (L)	90.0	104.2	-14.8	114	24.0	9.8
914.5 (M)	98.5	104.0	-14.8		15.5	10.0
926.5 (H)	97.4	103.7	-14.7		16.6	10.3
Note: 50mV/m (94dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.						
Average measurement of carrier						
Frequency	Level		Transducer	Limit	Margin	
MHz	dBuV/m		dB	dBuV/m	dB	
	V	H			V	H
903.0 (L)	73.3	79.3	-14.8	94	20.7	14.7
914.5 (M)	73.5	79.5	-14.8		20.5	14.5
926.5 (H)	73.7	79.8	-14.7		20.3	14.2
Note: 50mV/m (94dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB. The transducer factor = antenna factor + cable loss - preamplifier. The Level = Read level + transducer factor. H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.						

	For Peak Value	For AV Value
Detector:	Peak	Average
Resolution bandwidth:	100 kHz	100 kHz
Video bandwidth:	300 kHz	300 kHz

Peak measurement of harmonics and spurious emission at lowest channel 903.0MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1806.0	53.2	53.3	-12.8	74dB	20.8	20.7
3 rd	2709.0	56.2	56.5	-9.9		17.8	17.5
4 th	3612.0	56.5	57.2	-8.6		17.5	16.8
5 th	4515.0	56.6	57.1	-7.6		17.4	16.9
6 th	5418.0	57.1	57.5	-4.0		16.9	16.5
7 th	6321.0	57.2	57.5	-3.7		16.8	16.5
8 th	7224.0	57.0	57.8	-2.0		17.0	16.2
9 th	8127.0	57.6	58.2	-1.8		16.4	15.8
10 th	9030.0	57.7	58.3	-1.6		16.3	15.7

Average measurement of harmonics and spurious emission at lowest channel 903.0MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1806.0	45.2	46.3	-12.8	54dB	8.8	7.7
3 rd	2709.0	44.2	46.2	-9.9		9.8	7.8
4 th	3612.0	45.3	47.2	-8.6		8.7	6.8
5 th	4515.0	46.3	47.3	-7.6		7.7	6.7
6 th	5418.0	46.1	47.7	-4.0		7.9	6.3
7 th	6321.0	47.0	47.4	-3.7		7.0	6.6
8 th	7224.0	47.2	47.8	-2.0		6.8	6.2
9 th	8127.0	47.5	48.2	-1.8		6.5	5.8
10 th	9030.0	47.7	48.8	-1.6		6.3	5.2

Note:

500 μ V/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

The transducer factor = antenna factor + cable loss - preamplifier.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

	For Peak Value	For AV Value
Detector:	Peak	Average
Resolution bandwidth:	1 MHz	1 MHz
Video bandwidth:	3 MHz	3 MHz

Peak measurement of harmonics and spurious emission at middle channel 914.5MHz

Peak measurement of harmonics and spurious emission at middle channel of 17.0MHz							
Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1829.0	53.1	53.2	-12.8	74dB	20.9	20.8
3 rd	2743.5	56.3	56.4	-9.9		17.7	17.6
4 th	3658.0	56.3	56.7	-8.6		17.7	17.3
5 th	4572.5	56.5	57.2	-7.6		17.5	16.8
6 th	5487.0	56.8	57.7	-4.0		17.2	16.3
7 th	6401.5	57.4	57.2	-3.7		16.6	16.8
8 th	7316.0	57.1	57.5	-2.0		16.9	16.5
9 th	8230.5	57.2	58.6	-1.8		16.8	15.4
10 th	9145.0	57.7	58.4	-1.6		16.3	15.6

Average measurement of harmonics and spurious emission at middle channel 914.5MHz

Average measurement of harmonics and spurious emission at middle channel of 10 MHz							
Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1829.0	45.3	46.4	-12.8	54dB	8.7	7.6
3 rd	2743.5	44.6	46.5	-9.9		9.4	7.5
4 th	3658.0	45.2	47.7	-8.6		8.8	6.3
5 th	4572.5	46.2	47.4	-7.6		7.8	6.6
6 th	5487.0	46.5	47.6	-4.0		7.5	6.4
7 th	6401.5	47.1	47.2	-3.7		6.9	6.8
8 th	7316.0	47.3	47.8	-2.0		6.7	6.2
9 th	8230.5	47.5	48.8	-1.8		6.5	5.2
10 th	9145.0	47.6	48.9	-1.6		6.4	5.1

Note:

500 μ V/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

The transducer factor = antenna factor + cable loss - preamplifier.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

	For Peak Value	For AV Value
Detector:	Peak	Average
Resolution bandwidth:	1 MHz	1 MHz
Video bandwidth:	3 MHz	3 MHz

Peak measurement of harmonics and spurious emission at highest channel 926.5MHz

Peak measurement of harmonics and spurious emission at highest channel 020.0MHz							
Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1853.0	53.6	53.5	-12.8	74dB	20.4	20.5
3 rd	2779.5	56.1	56.7	-9.9		17.9	17.3
4 th	3706.0	56.4	57.8	-8.6		17.6	16.2
5 th	4632.5	56.2	57.8	-7.6		17.8	16.2
6 th	5559.0	57.3	57.7	-4.0		16.7	16.3
7 th	6485.5	57.4	57.7	-3.7		16.6	16.3
8 th	7412.0	57.1	57.6	-2.0		16.9	16.4
9 th	8338.5	57.2	58.1	-1.8		16.8	15.9
10 th	9265.0	57.7	58.8	-1.6		16.3	15.2

Average measurement of harmonics and spurious emission at highest channel 926.5MHz

Average Measurement of harmonics and spurious emission at highest channel 620.0MHz							
Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1853.0	45.3	46.6	-12.8	54dB	8.7	7.4
3 rd	2779.5	44.1	46.6	-9.9		9.9	7.4
4 th	3706.0	45.3	47.2	-8.6		8.7	6.8
5 th	4632.5	46.3	47.6	-7.6		7.7	6.4
6 th	5559.0	46.2	47.9	-4.0		7.8	6.1
7 th	6485.5	47.1	47.6	-3.7		6.9	6.4
8 th	7412.0	47.3	47.7	-2.0		6.7	6.3
9 th	8338.5	47.4	48.7	-1.8		6.6	5.3
10 th	9265.0	47.8	48.6	-1.6		6.2	5.4

Note:

500 μ V/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

The transducer factor = antenna factor + cable loss - preamplifier.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

	For Peak Value	For AV Value
Detector:	Peak	Average
Resolution bandwidth:	1 MHz	1 MHz
Video bandwidth:	3 MHz	3 MHz

Note:

The EUT's transmitting frequency range is 903 - 926.5MHz, and it is complied with the requirements of FCC Part 15.249.a).

6.1.5 Radiated outside of the specified frequency bands

Copy from FCC Part 15.249.d)

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

Copy from FCC Part 15.209: Radiated emission limits, general requirements

(a) 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	Field Strength	Measurement Distance
MHz	microvolts/meter(uV/m)	(meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** 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.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Note:

Since the fundamental emissions peak and average values are shown on section 6.1.4 of this report, the general radiated emission limits in Section 15.209 is the lesser attenuation.

Limits for the frequency bands of 903 M - 928 MHz

Frequency	15.209 General Radiated limits	
MHz	dBuV/m@3m	
	QP	AVG
30 - 88	40	/
88 - 216	43.5	/
216 - 960	46	/
960 - 1000	54	/
Above 1000	74(PK)	54

Frequency	15.249.d) limits	
MHz	dBuV/m@3m	
	QP	AVG
30 - 88	40	/
88 - 216	43.5	/
216 - 903	46	/
928-960	46	/
960 - 1000	54	/
1000-9280 & except for harmonics	74(PK)	54

Remark:

1. RF line voltage (dBuV)= 20 log RF line voltage (uV)
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.

6.1.6 Measurement Data for 15.249.d

Test the EUT work normally in transmitting mode in mains.

1) 9kHz~30MHz Test result

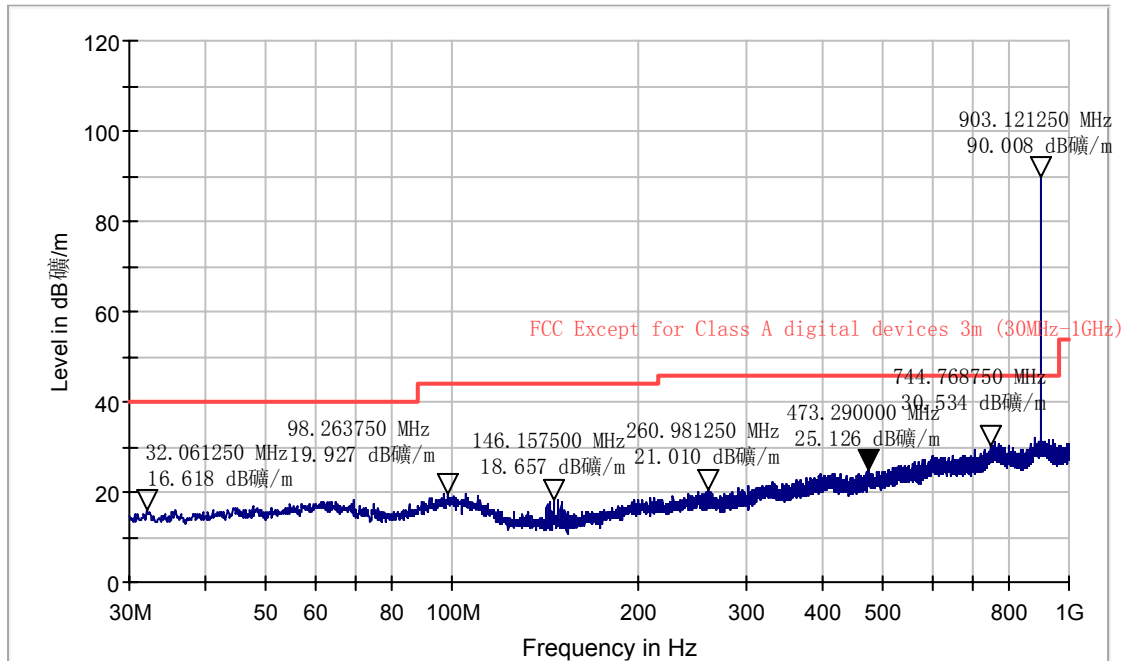
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report.

2) 30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Test curves (with the Quasi-peak measurement and QP limit), 30M-1GHz, Horizontal & Vertical:

1#: lowest channel 903.0MHz, Horizontal

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
32.1	16.6	16.5	40	23.4
98.3	19.9	11.2	43.5	23.6
146.2	18.7	11.7	43.5	24.8
261.0	21.0	12.9	46	25.0
473.3	25.1	20.0	46	20.9
744.8	30.5	17.9	46	15.5
902.0	31.2	17.8	46	14.8

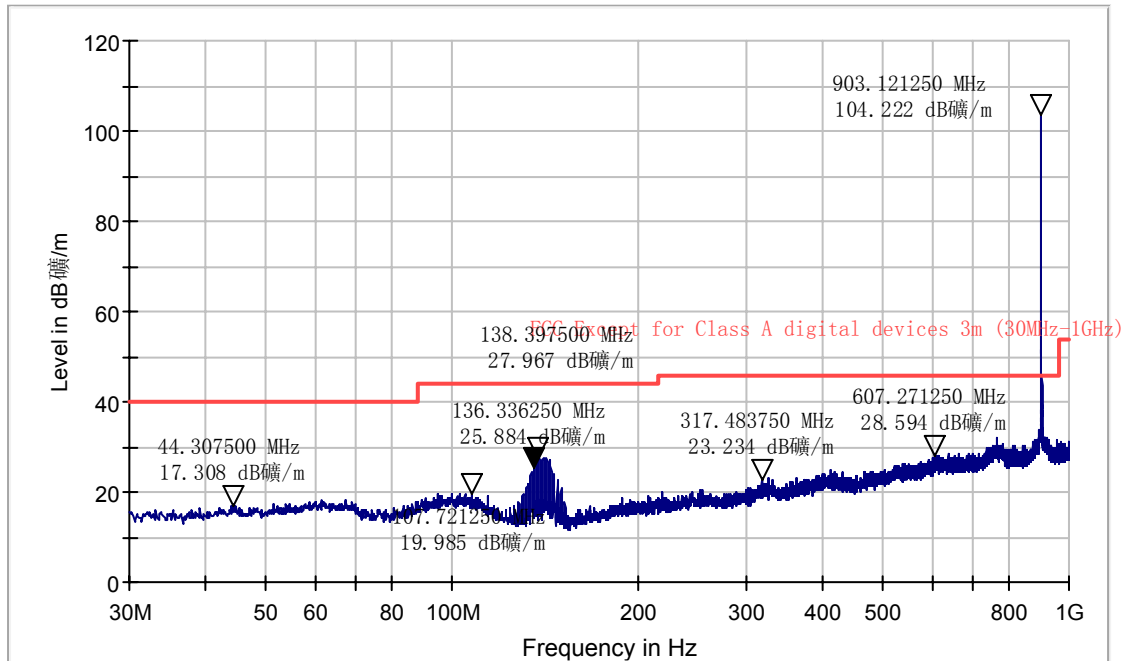
Note:

The transducer factor includes antenna factor and cable loss.

PK value 90.0dBuV/m at 903.1MHz is the fundamental.

1#: lowest channel 903.0MHz, Vertical

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
44.3	17.3	12.6	40	22.7
107.7	20.0	11.3	43.5	23.5
136.3	25.9	11.5	43.5	17.6
138.4	28.0	11.5	43.5	15.5
317.5	23.2	15.9	46	22.8
607.3	28.6	19.2	46	17.4
902.0	33.4	14.2	46	12.6

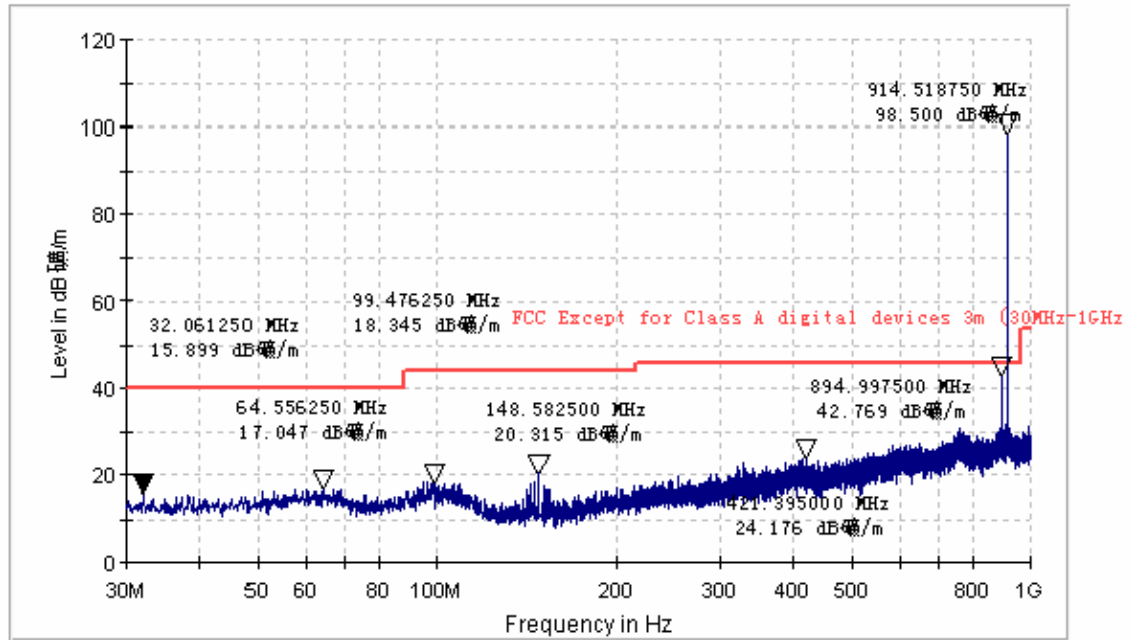
Note:

The transducer factor includes antenna factor and cable loss.

PK value 104.2dBuV/m at 903.1MHz is the fundamental.

2#: middle channel 914.5MHz, Horizontal

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
32.1	15.9	16.5	40	24.1
64.6	17.0	12.3	40	23.0
99.5	18.3	11.2	43.5	25.2
148.6	20.3	11.9	43.5	23.2
421.4	24.2	18.9	46	21.8
895.0	42.8	15.2	46	3.2

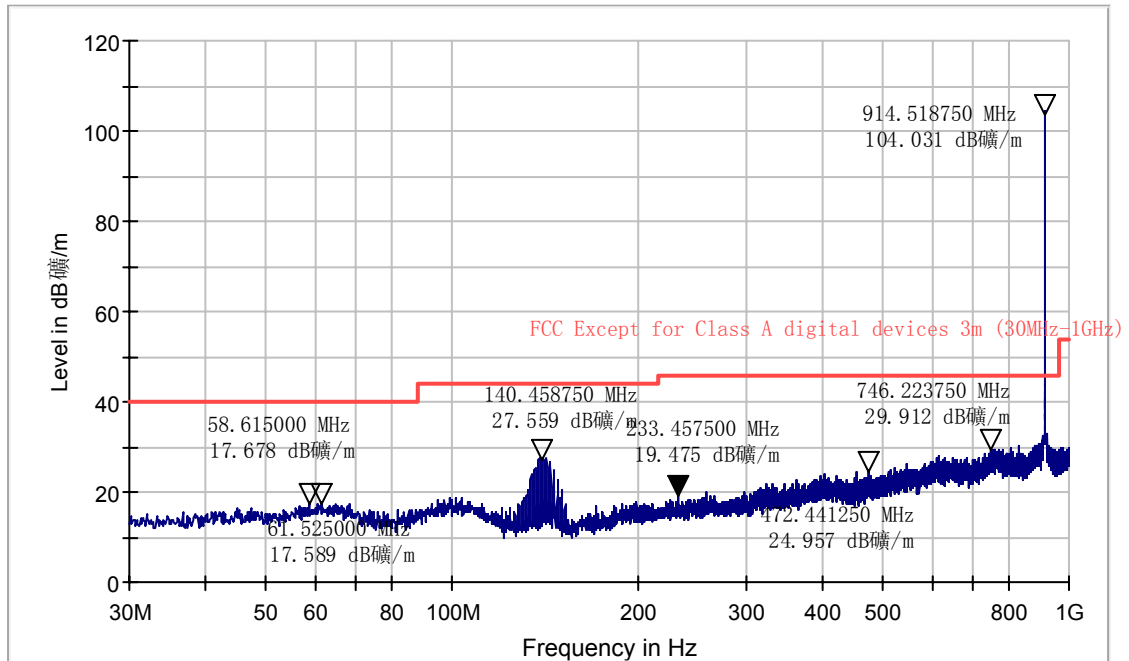
Note:

The transducer factor includes antenna factor and cable loss.

PK value 98.5dBuV/m at 914.5MHz is the fundamental.

2#: middle channel 914.5MHz, Vertical

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
58.6	17.7	12.4	40	22.3
61.5	17.6	12.4	40	22.4
140.5	27.6	11.8	43.5	15.9
233.5	19.5	12.5	46	26.5
472.4	25.0	20.0	46	21.0
746.2	29.9	17.9	46	16.1

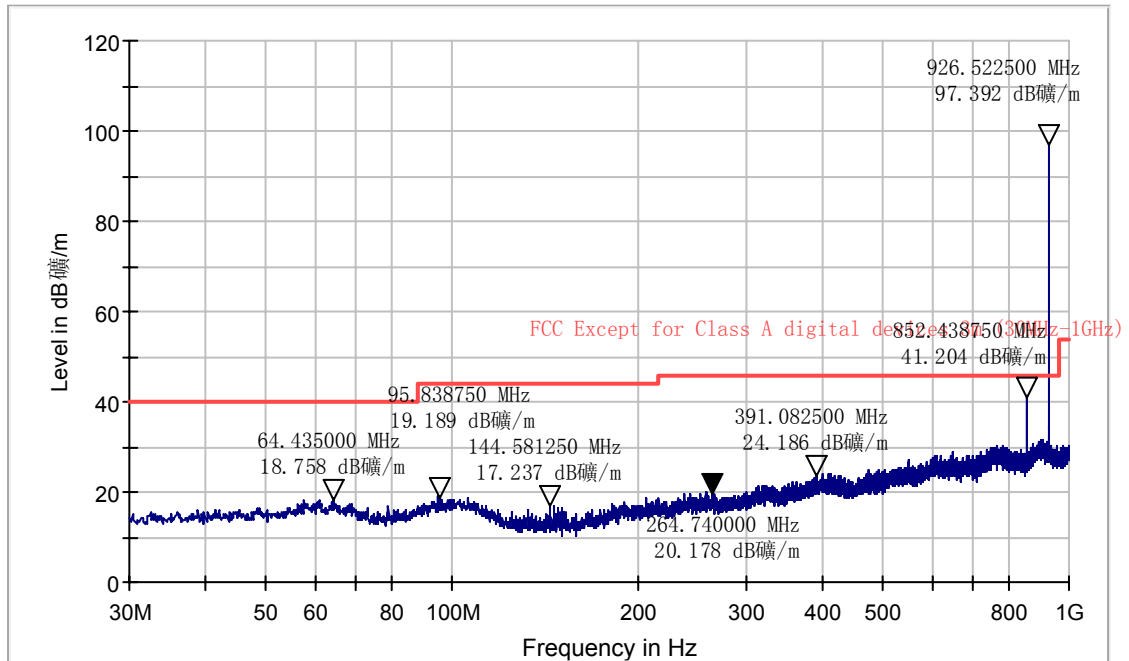
Note:

The transducer factor includes antenna factor and cable loss.

PK value 104.0dBuV/m at 914.5MHz is the fundamental.

3#: highest channel 926.5MHz, Horizontal

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
64.4	18.8	12.3	40	21.2
95.8	19.2	11.2	40	20.8
144.6	17.2	11.8	43.5	26.3
264.7	20.2	14.2	46	25.8
391.1	24.2	18.2	46	21.8
852.4	41.2	14.2	46	4.8
928.0*	33.4	14.2	46	12.6

Note:

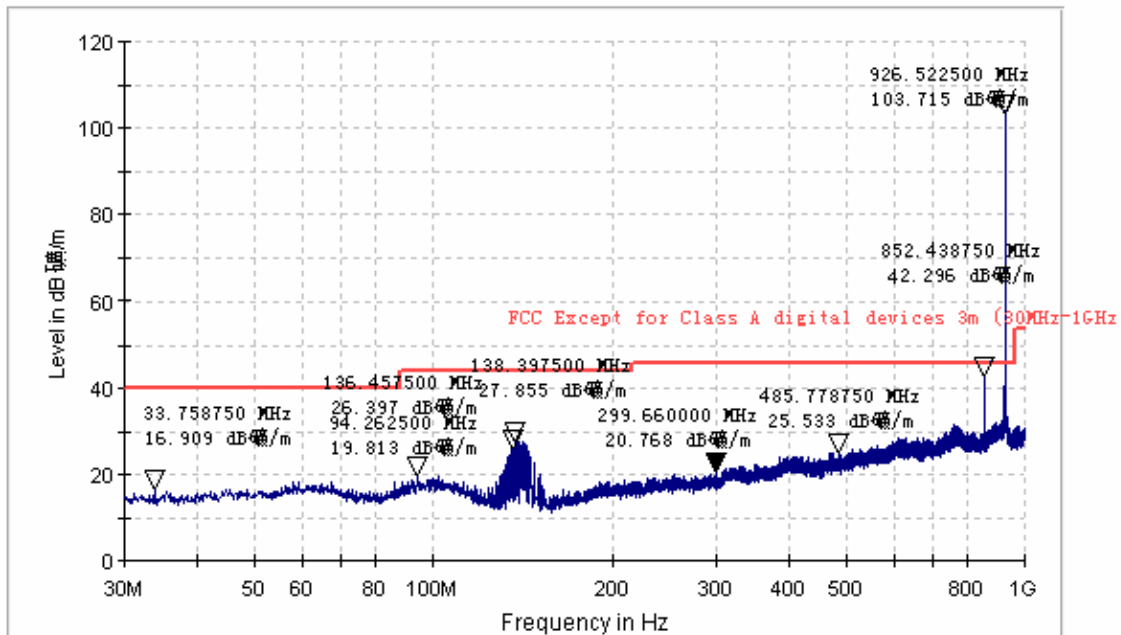
The transducer factor includes antenna factor and cable loss.

PK value 97.4dBuV/m at 926.5MHz is the fundamental.

* means the max average value for band-edge (frequency range of 902MHz to 928MHz, except for harmonics) is the plot measurement at 928.0MHz.

3#: highest channel 926.5MHz, Vertical

FCC PART15 Rad. EM VULB9163 PRE



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
33.7	16.9	16.5	40	23.1
94.3	19.8	11.2	43.5	23.7
136.5	26.4	11.6	43.5	17.1
138.4	27.9	11.6	43.5	15.6
299.7	20.8	15.9	46	25.2
485.8	25.5	20.1	46	20.5
852.0	42.3	17.7	46	3.7
928.0*	34.2	14.2	46	11.8

Note:

The transducer factor includes antenna factor and cable loss.

PK value 103.7dBuV/m at 926.5MHz is the fundamental.

* means the max average value for band-edge (frequency range of 902MHz to 928MHz, except for harmonics) is the plot measurement at 928.0MHz.

3) 1 GHz~25 GHz Spurious Emissions .Average & PK Measurement

Average measurement at lowest channel 903.0MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.202	40.5	39.1	-12.8	54	13.5	14.9
2.394	42.3	40.9	-12.2		11.7	13.1
3.554	40.6	39.9	-12.1		13.4	14.1
5.264	40.2	39.7	-11.9		13.8	14.3
7.452	40.9	39.4	-8.0		13.1	14.6
10.252	40.6	40.5	-4.6		13.4	13.5
12.782	39.7	39.5	-3.6		14.3	14.5
22.657	39.4	39.8	-0.8		14.6	14.2
Note:						
The transducer factor includes antenna factor and cable loss.						

Peak measurement at lowest channel 903.0MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.202	50.1	50.2	-12.8	74	23.9	23.8
2.394	51.0	50.3	-12.2		23.0	23.7
3.554	50.3	49.4	-12.1		23.7	24.6
5.264	50.2	49.9	-11.9		23.8	24.1
7.452	49.7	50.7	-8.0		24.3	23.3
10.252	50.4	50.2	-4.5		23.6	23.8
12.782	50.8	50.3	-3.6		23.2	23.7
22.657	49.8	50.6	-0.8		24.2	23.4
Note:						
The transducer factor includes antenna factor and cable loss.						

Average measurement at middle channel 914.5MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.226	40.6	40.2	-12.8	54	13.4	13.8
2.385	40.7	40.4	-12.2		13.3	13.6
2.592	40.6	40.4	-12.1		13.4	13.6
5.342	40.2	39.8	-11.9		13.8	14.2
7.555	40.7	40.3	-8.0		13.3	13.7
10.374	40.3	39.8	-4.6		13.7	14.2
12.648	40.2	40.2	-3.6		13.8	13.8
23.420	40.3	40.9	-0.8		13.7	13.1
Note: The transducer factor includes antenna factor and cable loss.						

Peak measurement at middle channel 914.5MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.226	50.2	50.3	-12.8	74	23.8	23.7
2.385	50.6	50.6	-12.2		23.4	23.4
2.592	50.2	50.6	-12.1		23.8	23.4
5.342	50.3	50.5	-11.9		23.7	23.5
7.555	50.6	50.2	-8.0		23.4	23.8
10.374	50.4	50.2	-4.5		23.6	23.8
12.648	50.2	50.4	-3.6		23.8	23.6
23.420	50.5	50.2	-0.8		23.5	23.8
Note:						
The transducer factor includes antenna factor and cable loss.						

Average measurement at highest channel 926.5MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.240	40.7	40.2	-12.8	54	13.3	13.8
2.384	40.2	40.8	-12.2		13.8	13.2
3.489	50.9	47.8	-12.1		3.1	6.2
5.334	40.6	40.4	-11.9		13.4	13.6
7.492	40.4	40.2	-8.0		13.6	13.8
10.322	40.3	39.7	-4.6		13.7	14.3
13.931	40.4	40.5	-3.5		13.6	13.5
23.423	40.4	40.2	-0.8		13.6	13.8
Note: The transducer factor includes antenna factor and cable loss.						

Peak measurement at highest channel 926.5MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.240	50.4	50.1	-12.8	74	23.6	23.9
2.384	50.4	50.2	-12.2		23.6	23.8
3.489	54.6	51.7	-12.1		19.4	22.3
5.334	50.5	50.1	-11.9		23.5	23.9
7.492	50.5	50.7	-8.0		23.5	23.3
10.322	50.5	50.3	-4.5		23.5	23.7
13.931	50.2	49.9	-3.6		23.8	24.1
23.423	49.8	50.2	-0.8		24.2	23.8
Note: The transducer factor includes antenna factor and cable loss.						

6.2. Occupied Bandwidth

Test Requirement: FCC Part15.215
Test Method: ANSI C63.10: 2009
Detector: Peak for scan (The resolution bandwidth was 1kHz and the video bandwidth was 1kHz, span was 2MHz)
maximised peak hold
Test Date: Jan. 22, 2014

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 18°C

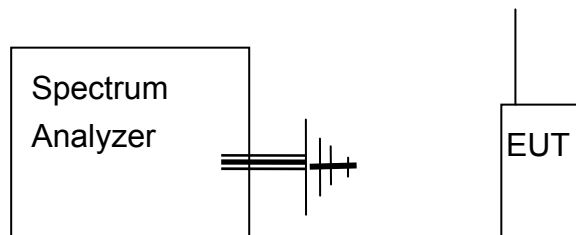
Humidity:52% RH

Atmospheric Pressure: 1020mBar

EUT Operation:

Test the EUT work normally in on mode during the whole test.

6.2.2 Test Setup



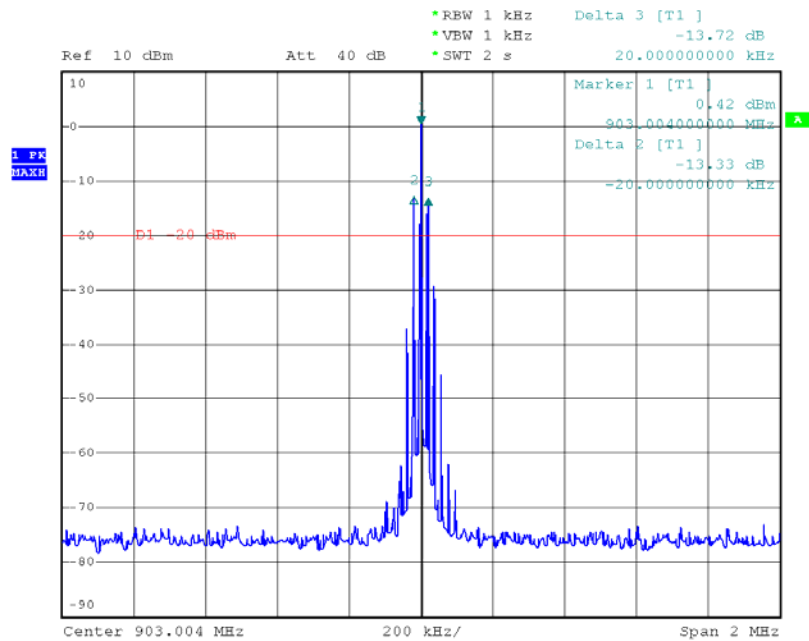
6.2.3 Test Procedure

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:

An initial pre-scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Average measurements were conducted based on the peak sweep graph. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical polarities.

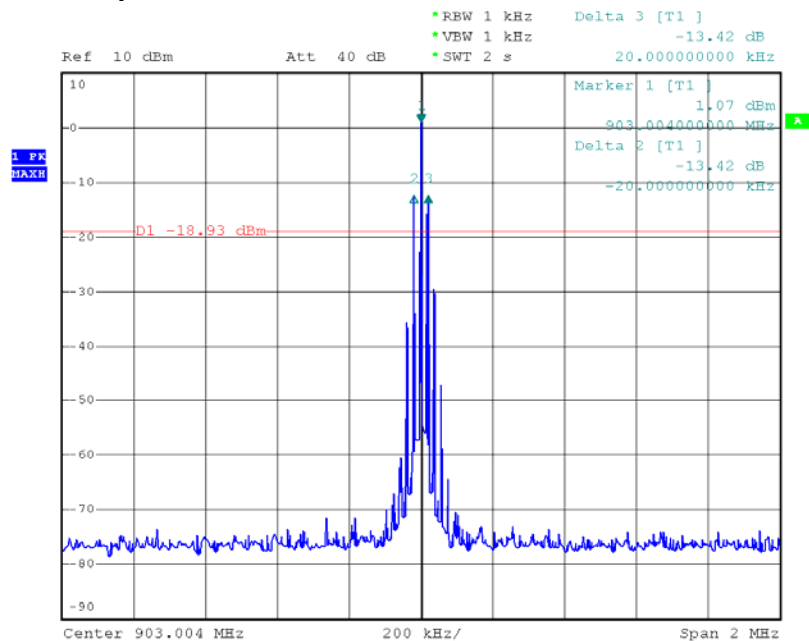
6.2.4 Measurement Data

Maximum Peak hold measurement for lowest channel 903.0MHz (without modulated)

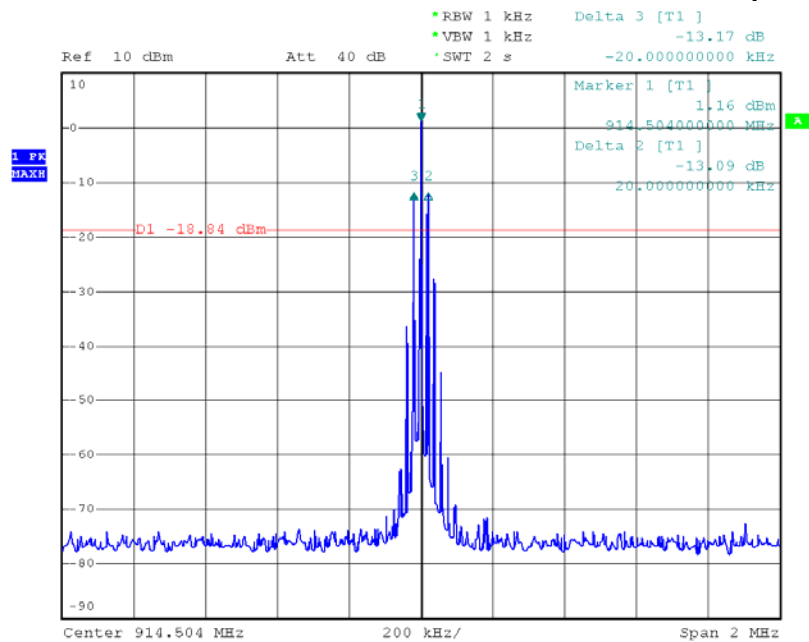


Date: 8.MAR.2014 05:59:49

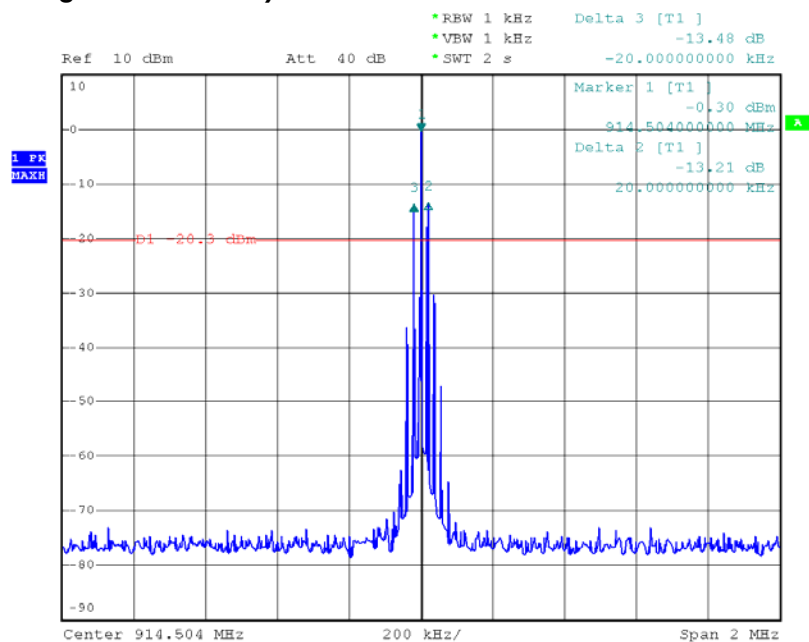
Maximum Peak hold measurement for lowest channel 903.0MHz (with 20kHz sinusoidal signal modulated)



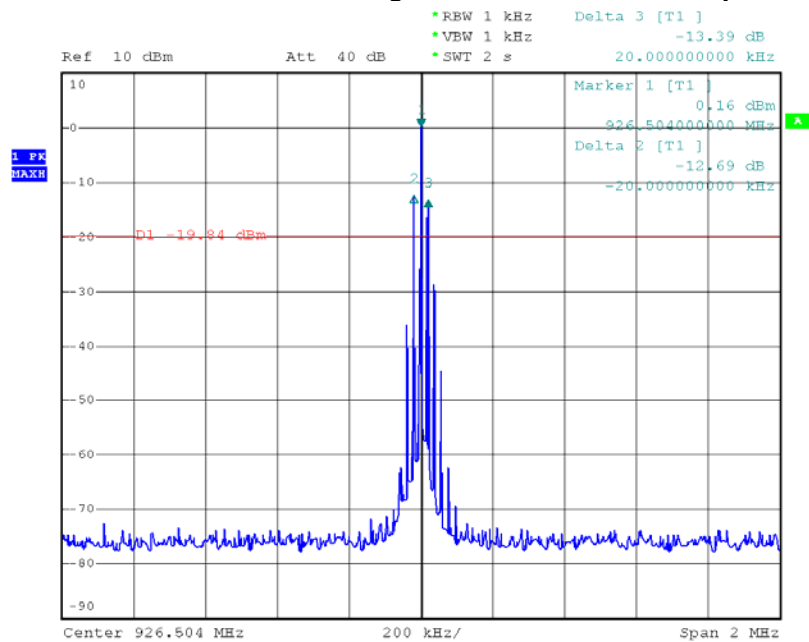
Date: 8.MAR.2014 06:22:43

Maximum Peak hold measurement for middle channel 914.5MHz (without modulated)

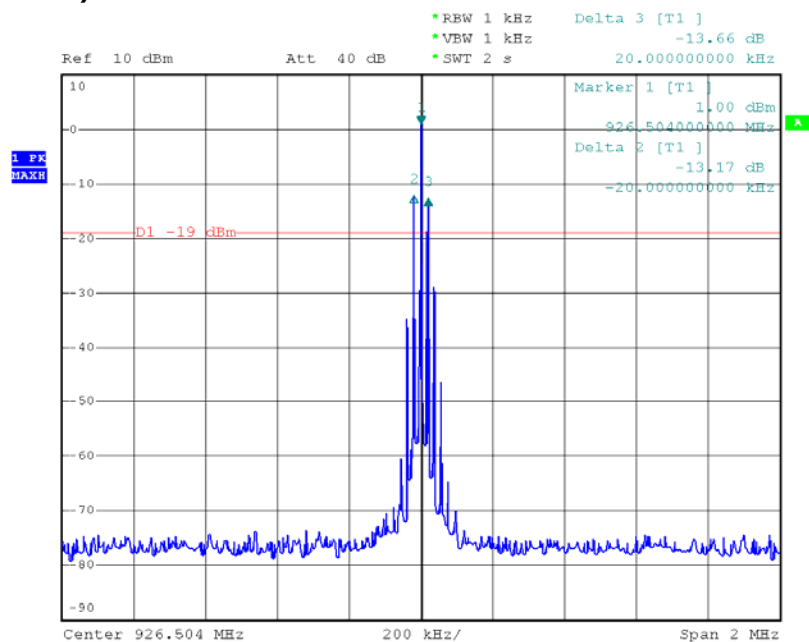
Date: 8.MAR.2014 06:03:38

Maximum Peak hold measurement for middle channel 914.5MHz (with 20kHz sinusoidal signal modulated)

Date: 8.MAR.2014 06:21:10

Maximum Peak hold measurement for highest channel 926.5MHz (without modulated)

Date: 8.MAR.2014 05:57:44

Maximum Peak hold measurement for highest channel 926.5MHz (with 20kHz sinusoidal signal modulated)

Date: 8.MAR.2014 06:23:32

Note: An audio signal generator supplied a sinusoidal signal at 20 kHz as input in worst case (within 1kHz to 20kHz input for pre-testing).

The -20dB Bandwidth:

Without modulated	ΔFL^- / kHz	ΔFL^+ / kHz	-20dB Bandwidth/ kHz
Lowest Ch.: 903.0MHz	-20	20	40
Middle Ch.: 914.5MHz	-20	20	40
Highest Ch.: 926.5MHz	-20	20	40

With 20kHz sinusoidal signal	ΔFL^- / kHz	ΔFL^+ / kHz	-20dB Bandwidth/ kHz
Lowest Ch.: 903.0MHz	-20	20	40
Middle Ch.: 914.5MHz	-20	20	40
Highest Ch.: 926.5MHz	-20	20	40

6.3. Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

Test Requirement: FCC Part 15 C section 15.207

Test Method: ANSI C63.4: 2003

Frequency Range: 150 kHz to 30 MHz

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth)

Test Limit

Limits for conducted disturbance at the mains ports of class B

Frequency Range	Class B Limit dB(μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

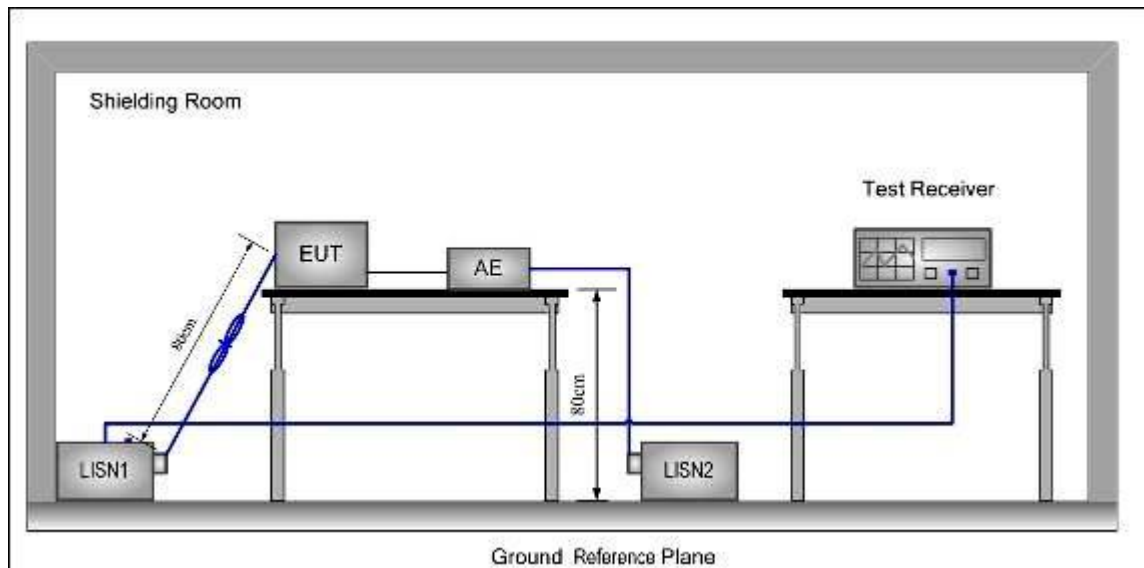
6.3.1 EUT Operation

Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test the EUT work normally in transmitting mode in mains.

6.3.2 Test Configuration



6.3.3 Test Procedure

1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

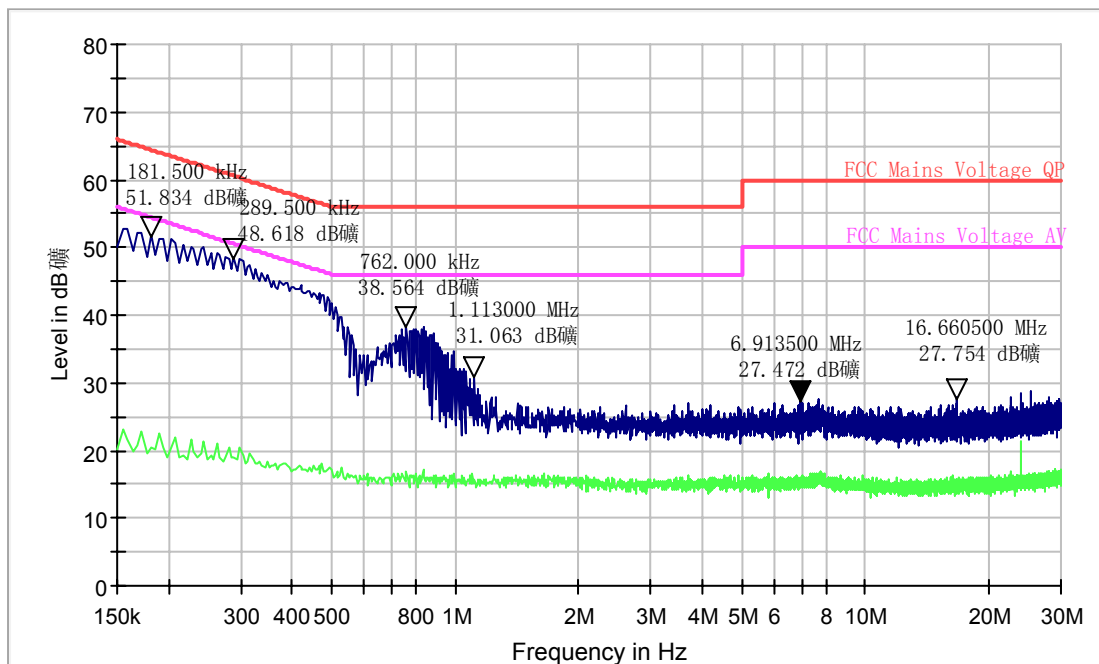
6.3.4 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

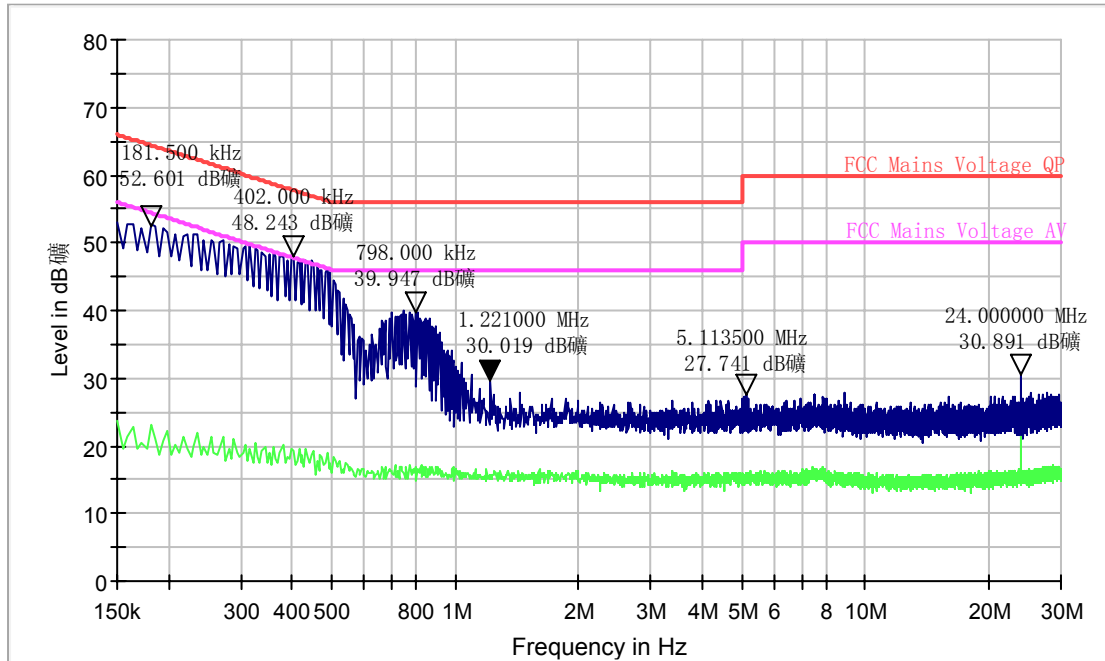
The following Quasi-Peak and Average measurements were performed on the EUT:

Voltage ENV216 PRE



Fruency (MHz)	QP (dBuV)	AV (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	QP Margin (dB)	AV Margin (dB)	QP Limit (dBuV)	AV Limit (dBuV)
0.182	51.8	23.2	1000	9	L1	19.9	12.6	31.2	64.4	54.4
0.290	48.6	21.0				19.9	11.9	29.5	60.5	50.5
0.762	38.6	16.2				20.0	17.4	29.8	56	46
1.113	31.0	16.3				20.0	25.0	29.7	56	46
6.914	27.5	15.8				20.1	32.5	34.2	60	50
16.66	27.8	15.9				20.3	32.2	34.1	60	50
Note: Filter: Off.										

Voltage ENV216 PRE



Fruency (MHz)	QP (dBuV)	AV (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	QP Margin (dB)	AV Margin (dB)	QP Limit (dBuV)	AV Limit (dBuV)
0.182	52.6	23.1	1000	9	N	19.9	11.8	31.3	64.4	54.4
0.402	48.2	20.5				19.9	9.6	27.3	57.8	47.8
0.798	39.9	16.5				20.0	16.1	29.5	56	46
1.221	30.0	16.3				20.0	26.0	29.7	56	46
5.114	27.7	16.3				20.1	32.3	33.7	60	50
24.00	30.9	21.9				20.3	29.1	28.1	60	50

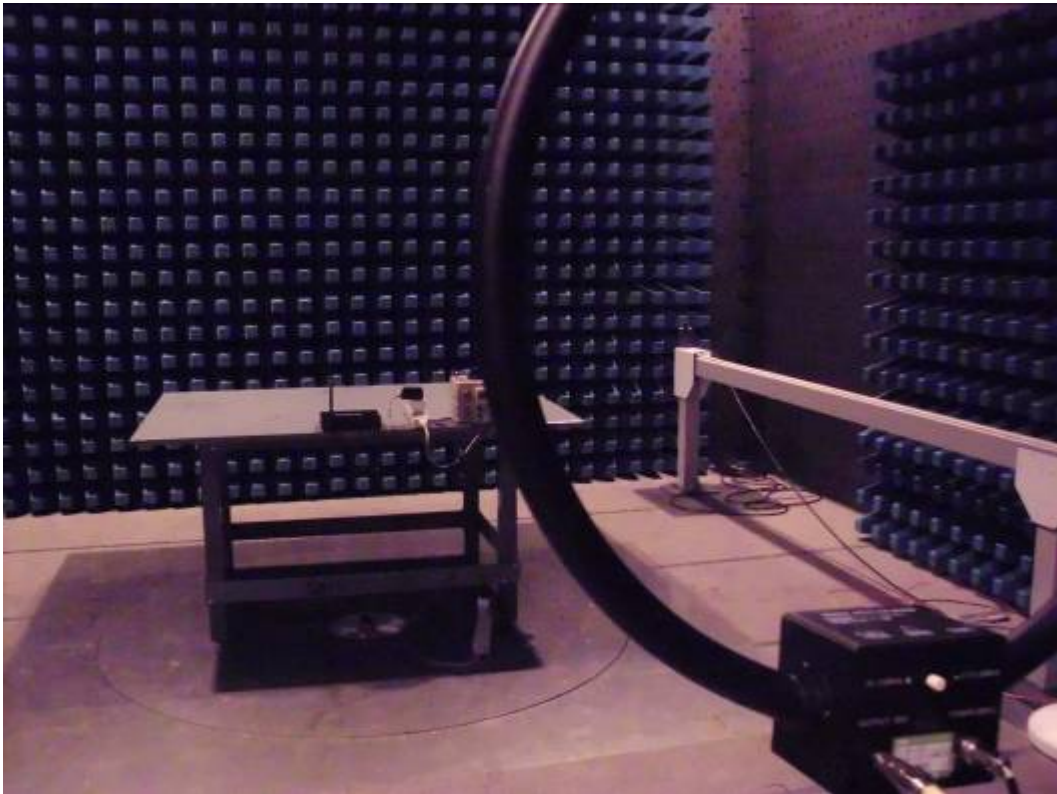
Note:

Filter: Off.

7. Photographs

7.1. Radiated Emission Test Setup

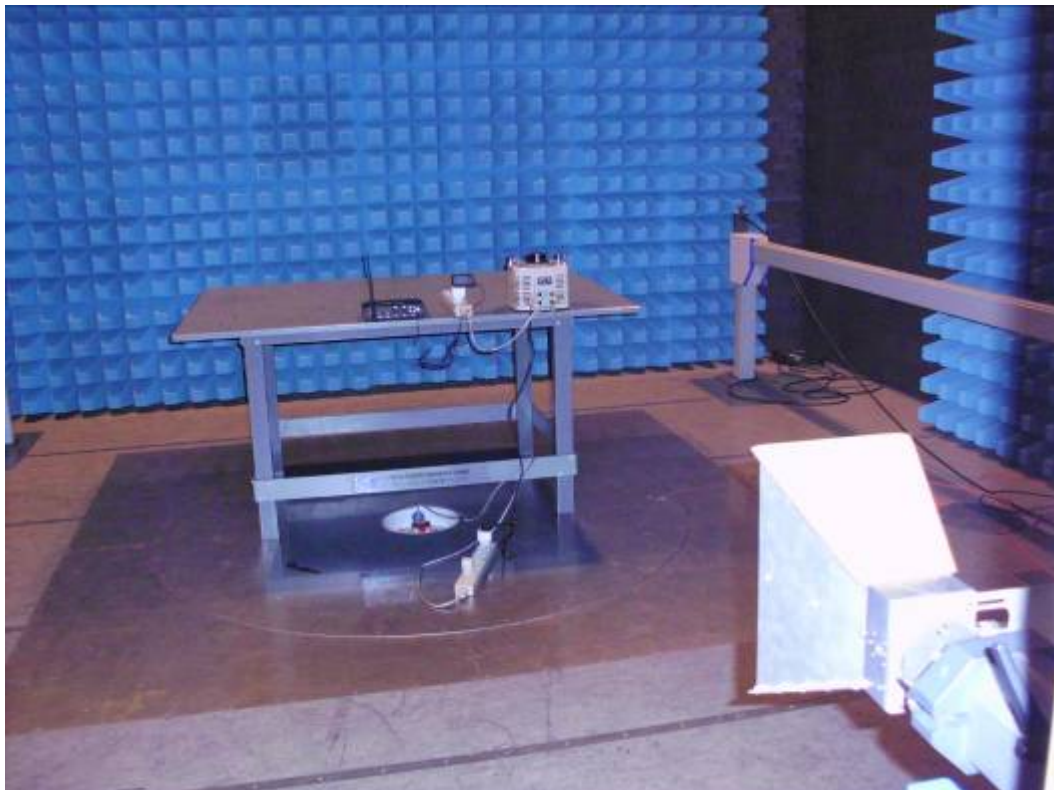
9kHz – 30MHz



30MHz - 1GHz



1GHz – 9.28GHz



7.2. Conducted Emission Test Setup

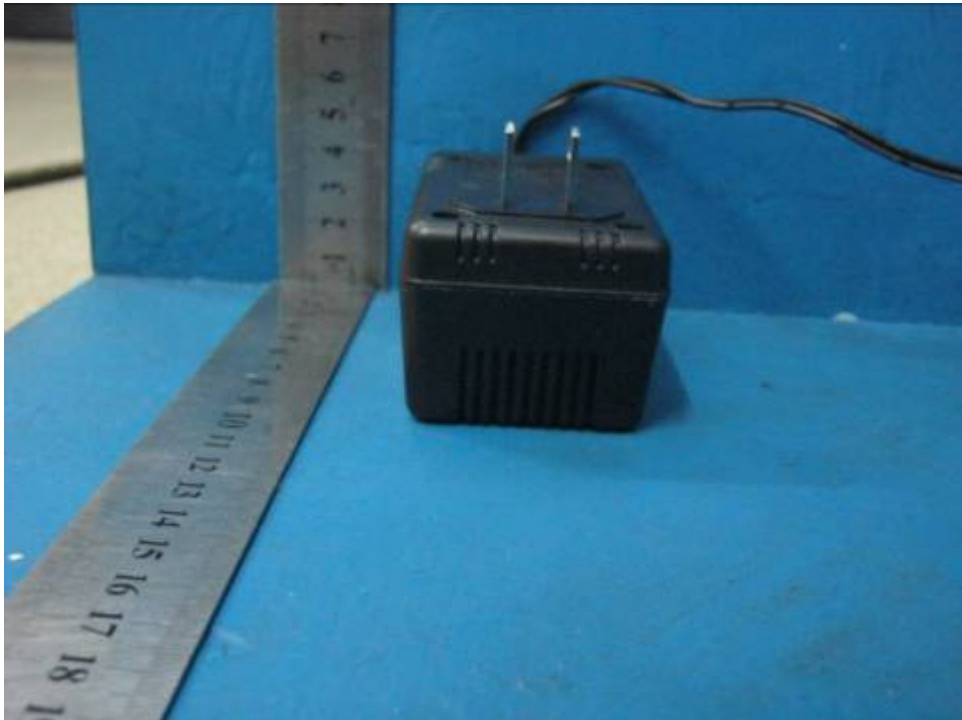


7.3. EUT Constructional Details

Adapter

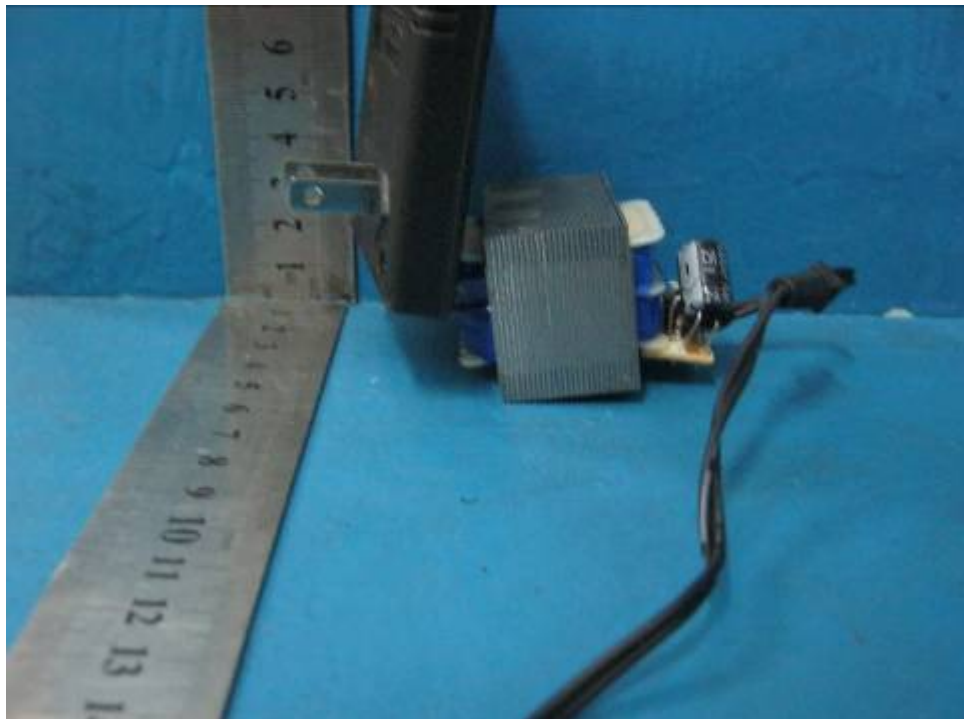
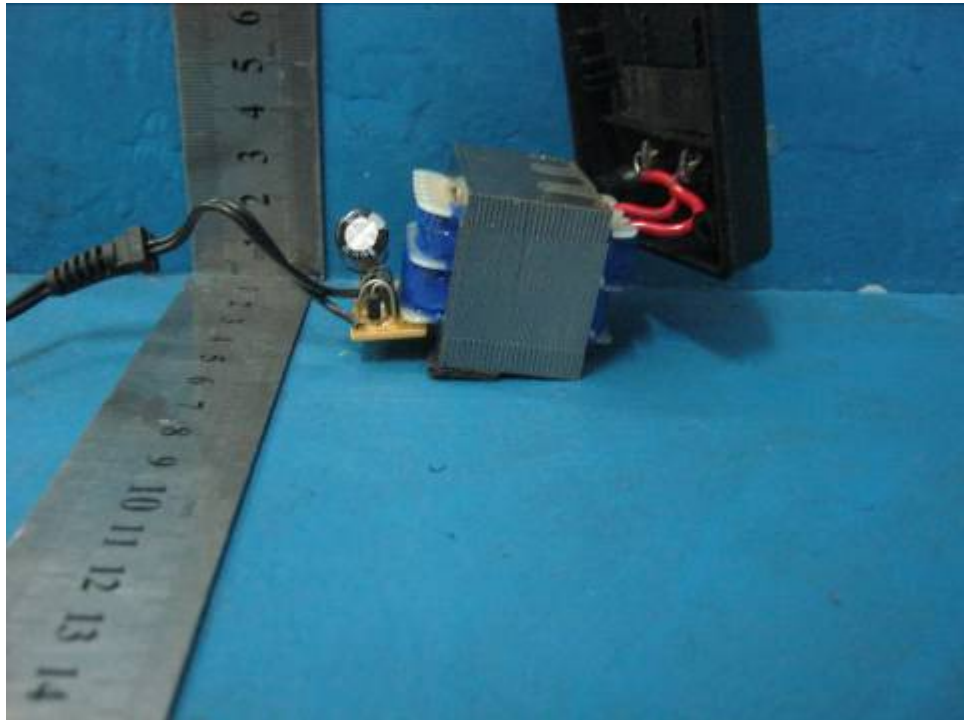


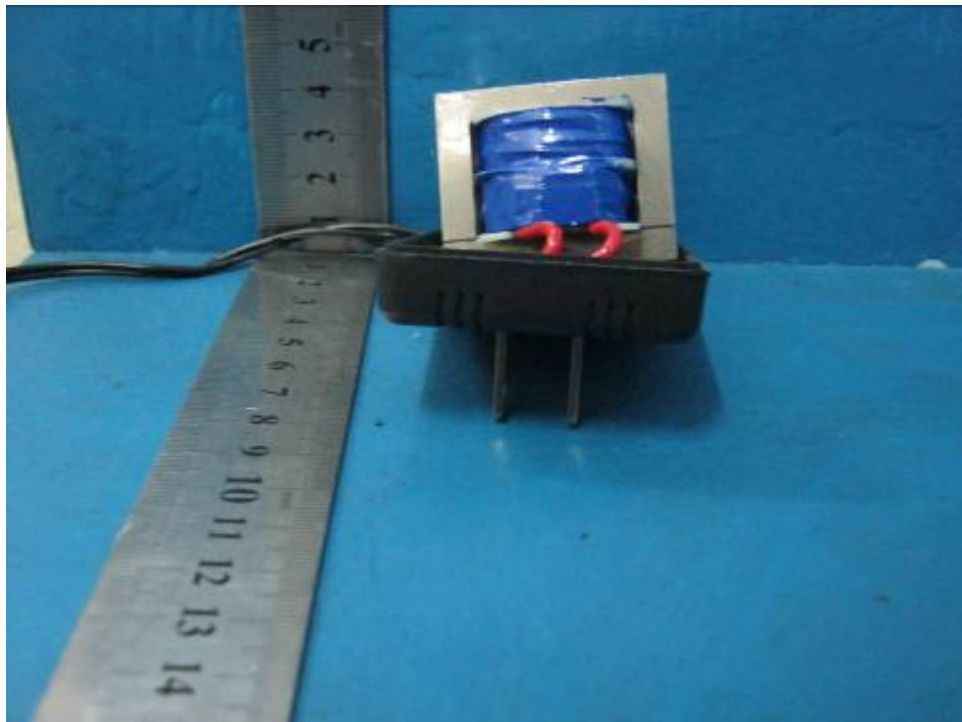














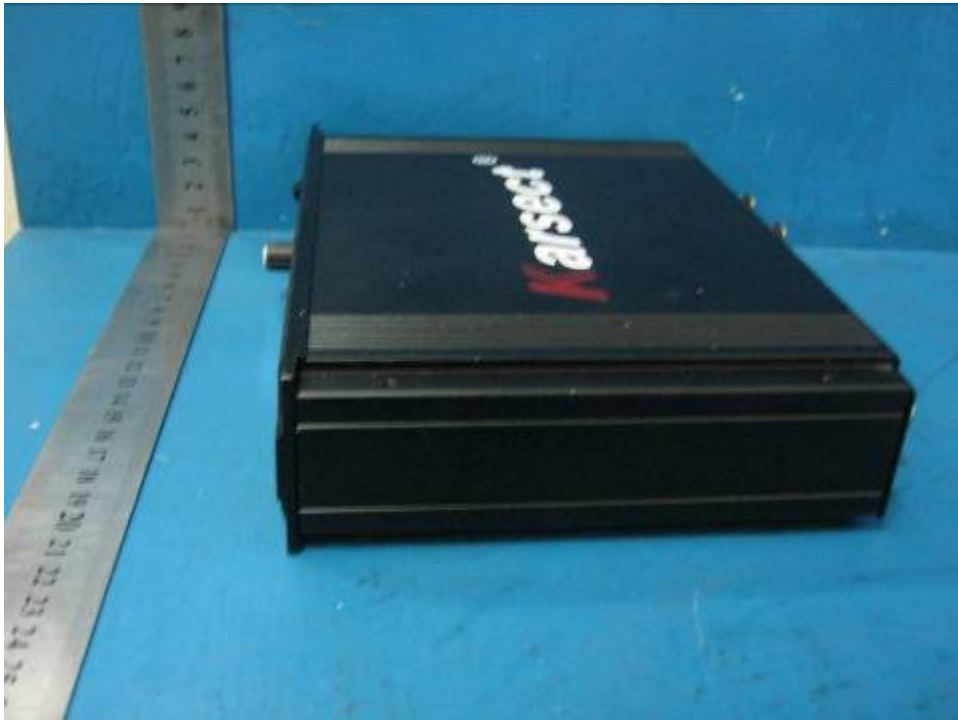
Antenna: length = 25 cm



Transmitter



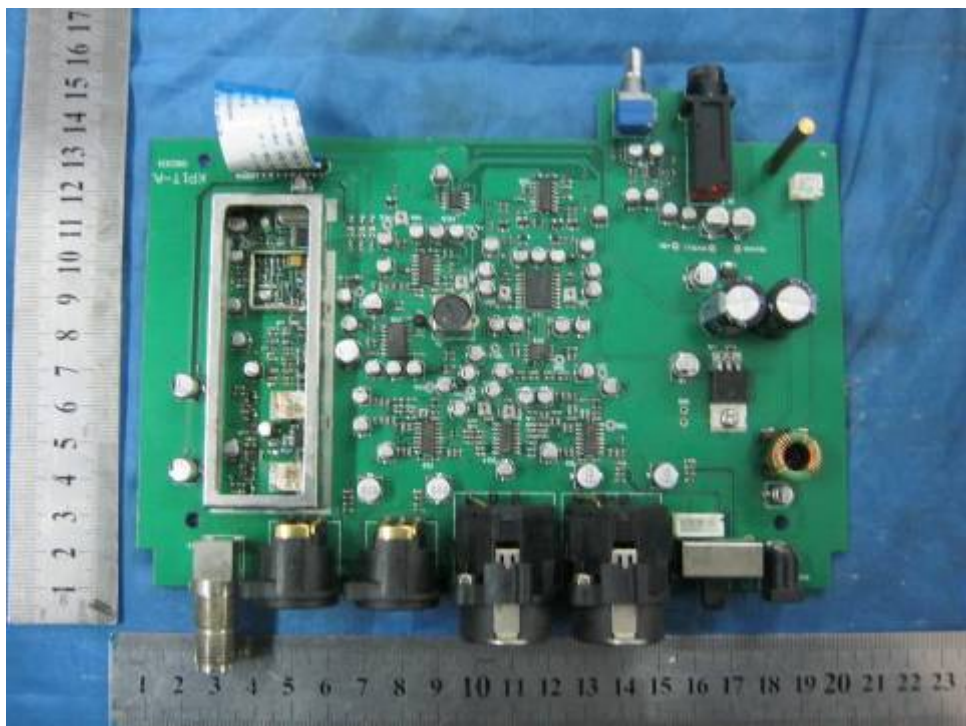


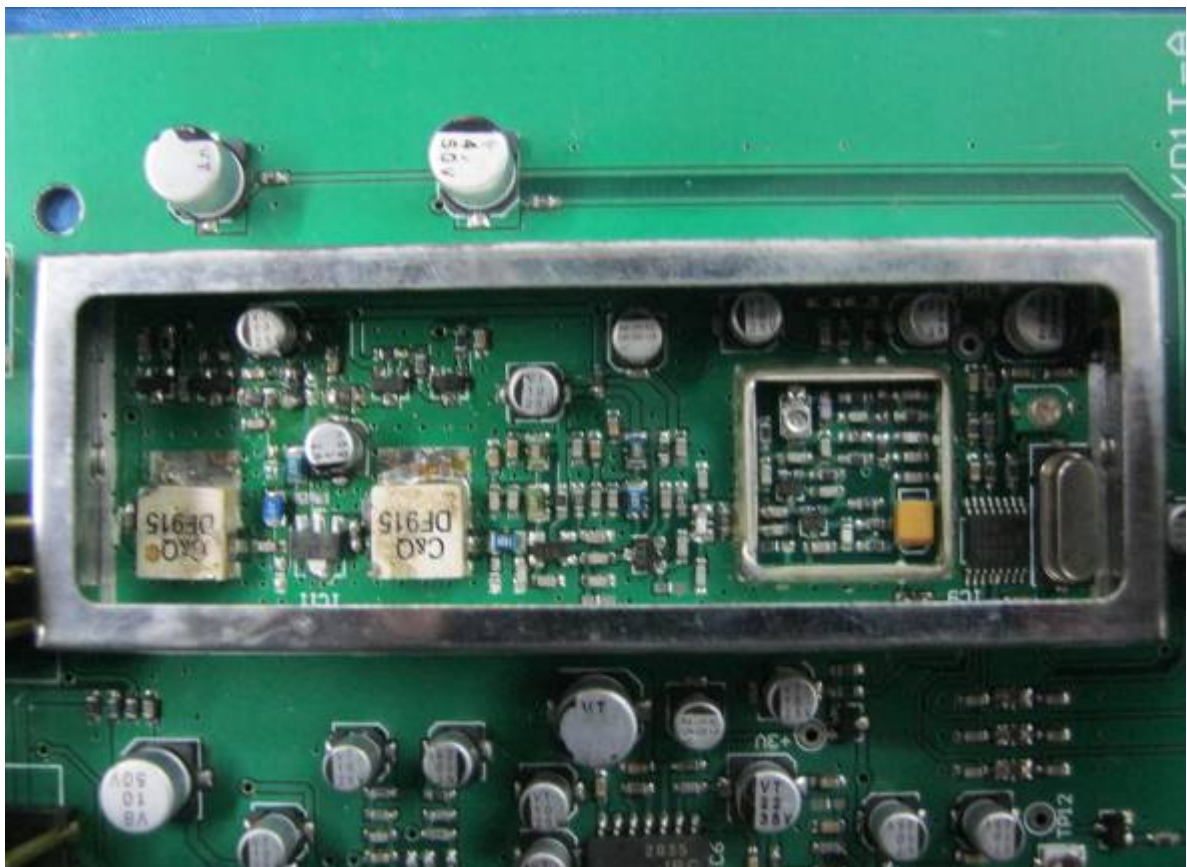


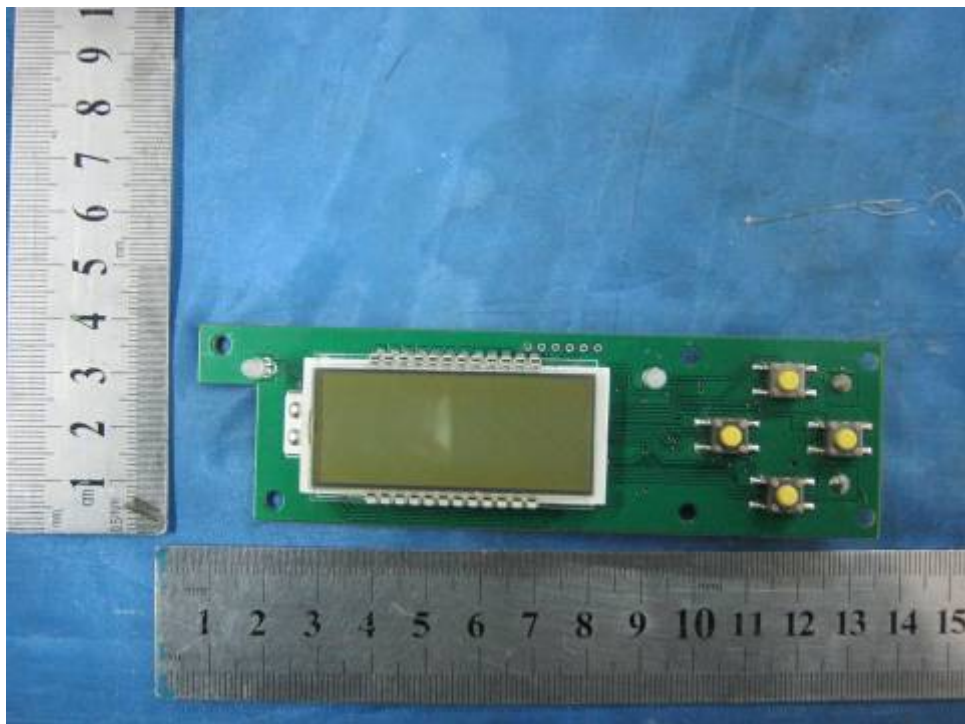
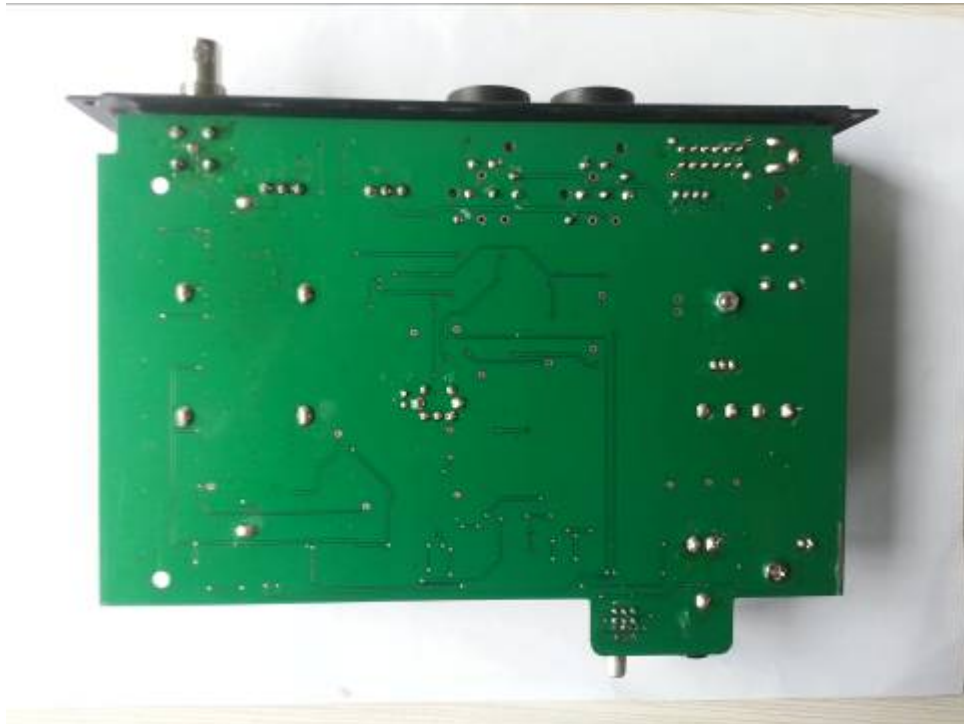


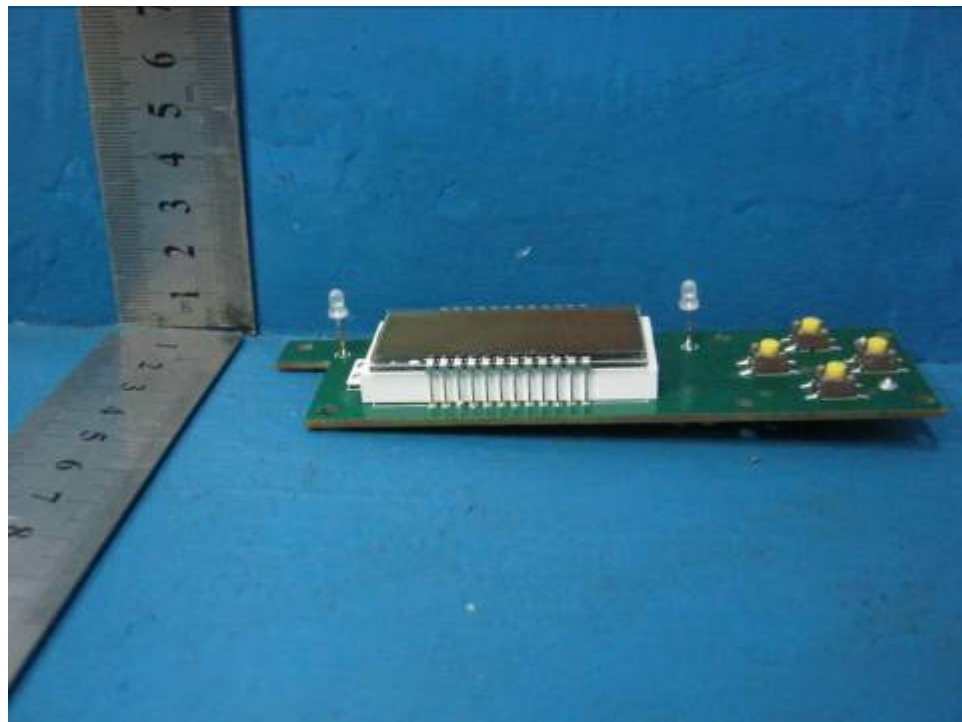
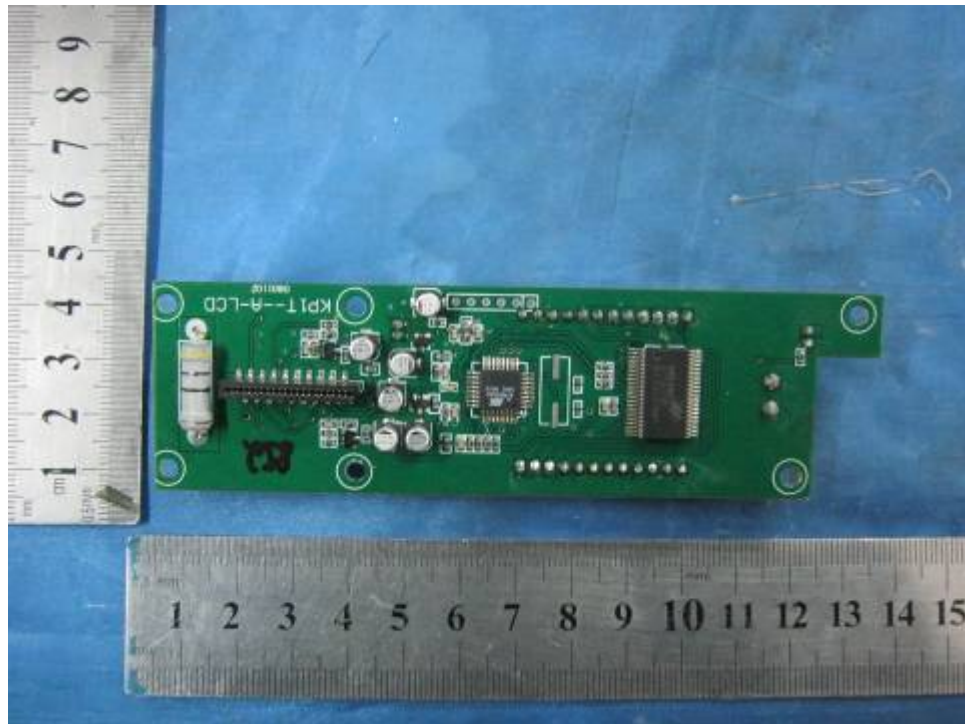


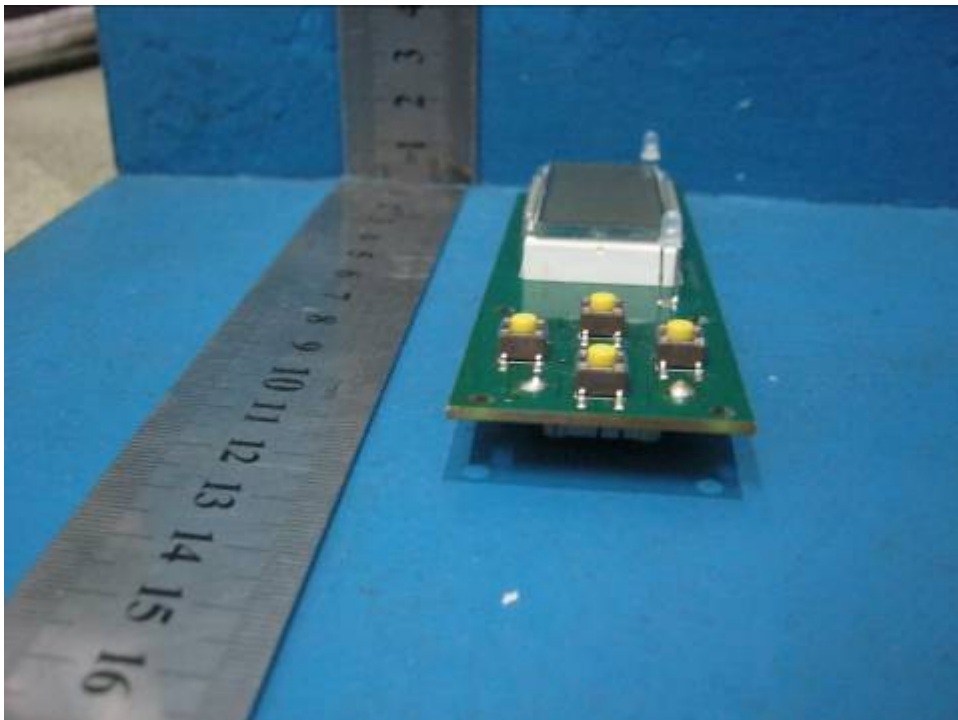
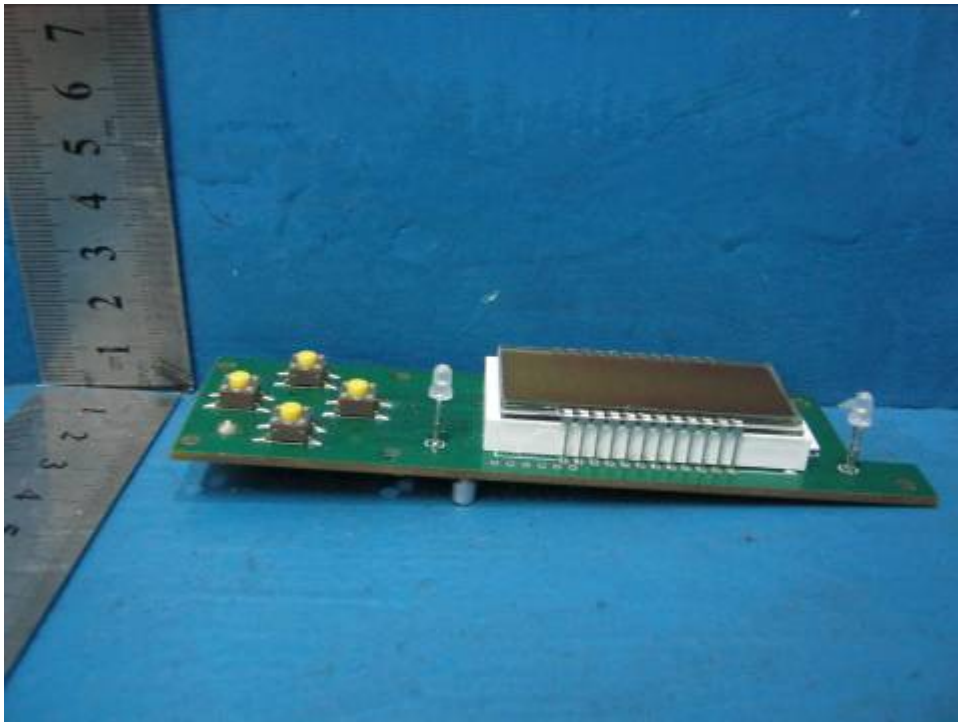


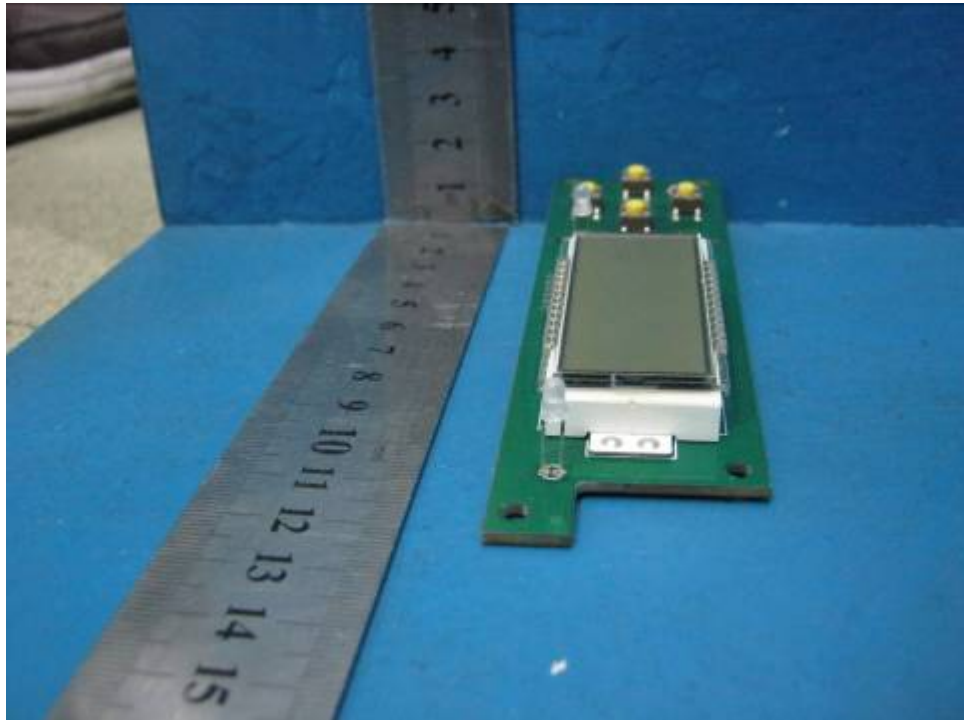














7.4. Antenna Photo

Antenna: length = 25 cm



Note:

The transmitter was used a unique coupling with the antenna, and it's complied with the requirements of section 15.203: antenna requirement.

*****End of Report*****