

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Rondish Company Limited

System Name : Wireless Nurse Call System (Long Range)

System Model Number : Protektor II

EUT Name :Zone Protektor

Model No.: ZP-01

FCC ID: WNG-ZP-01

Prepared for : Rondish Company Limited
Unit G & H, 4/F, Block 1, Kwai Tak Ind. Ctr. 15-33 Kwai
Tak St., Kwai Chung, N. T., Hong Kong

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number : ACS-F13364
Date of Test : Dec.03, 2013~Jan.15,2014
Date of Report : Jan.20, 2013

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TEST REPORT CERTIFICATION

Applicant : Rondish Company Limited
 Manufacturer : Rondish Company Limited
 System Name : Wireless Nurse Call System (Long Range)
 System Model Number : Protektor II
 EUT Name : Zone Protektor
 FCC ID : WNG-ZP-01

(A) MODEL NO. : ZP-01
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : DC 12V
 (D) TEST VOLTAGE : DC 12V

Tested for comply with:
 FCC Rules and Regulations Part 15 Subpart C: 2012
 Test procedure used:
 ANSI C63.10:2009

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

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.

Date of Test : Dec.03~ 23, 2013 Report of date: Jan.03, 2013

Prepared by : Lisa Liang
Lisa Liang / Assistant

Reviewed by: Sunny Lu
Audix Technology (Shenzhen) Co., Ltd. / Assistant Manager

EMC 部門報告專用章

Stamp only for EMC Dept. Report

Signature: David Jin 1.3

Approved & Authorized Signer :

David Jin / Manager

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.

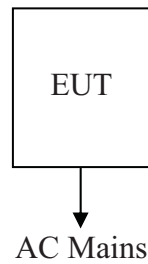
EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10: 2009	N/A
Radiated Emission	FCC Part 15: 15.209 ANSI C63.10: 2009	PASS
Band Edge Compliance	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Conducted spurious emissions	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
6dB Bandwidth	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Peak Output Power	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Power Spectral Density	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
N/A is an abbreviation for Not Applicable. ANSI C63.4: 2009 is used for all test		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

System Name	: Wireless Nurse Call System (Long Range)
System Model Number	: Protektor II
EUT Name	: Zone Protektor
Model Number	: ZP-01
Work frequency	: 916MHz
Antenna Assembly Gain	: Wire antenna, 0dBi PK Gain
Applicant	: Rondish Company Limited Unit G & H, 4/F, Block 1, Kwai Tak Ind. Ctr. 15-33 Kwai Tak St., Kwai Chung, N. T., Hong Kong
Manufacturer	: Rondish Company Limited Unit G & H, 4/F, Block 1, Kwai Tak Ind. Ctr. 15-33 Kwai Tak St., Kwai Chung, N. T., Hong Kong
Date of Test	: Dec.03, 2013~Jan.15,2014
Date of Receipt	: Dec.02, 2013
Sample Type	: Prototype production

2.2. Block Diagram of connection between EUT and simulators



(EUT: Zone Protektor)

2.3. Test Information

A special method was used to control EUT work in Continuous TX mode, and select test channel, wireless mode and Frequency.

Tested mode, channel, and Frequency information		
Mode	Channel	Frequency (MHz)
Tx Mode GFSK modulation	1	916

2.4. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block, Shenzhen
Science & Industrial Park, Nantou,
Shenzhen, Guangdong, China

3m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 90454
Valid Date: Feb.22, 2015

3m & 10m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 794232
Valid Date: Oct.31, 2015

EMC Lab. : Certificated by Industry Canada
Registration Number: IC 5183A-1
Valid Date: Jun.13, 2014

: Certificated by DAkkS, Germany
Registration No: D-PL-12151-01-01
Valid Date: Feb.01, 2014

Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2014

2.5. Measurement Uncertainty (95% confidence levels, k=2)

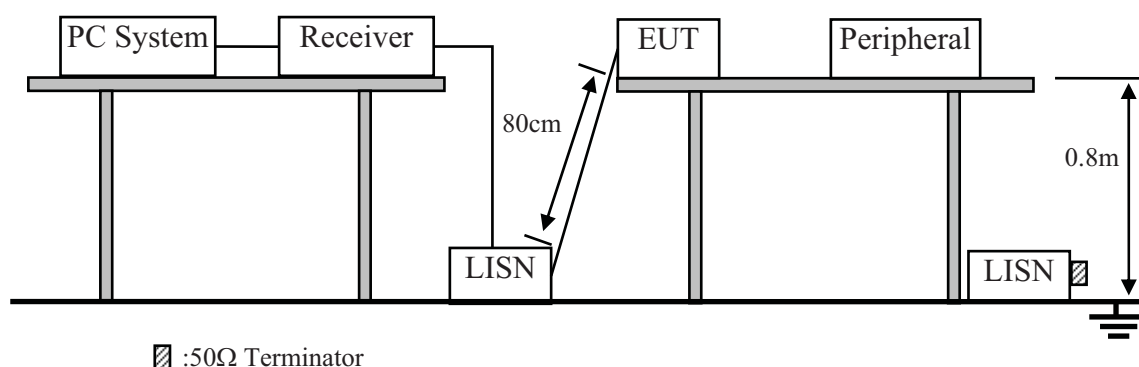
Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	3.22 dB(30~200MHz, Polarize: H)
	3.23 dB(30~200MHz, Polarize: V)
	3.49 dB(200M~1GHz, Polarize: H)
	3.39 dB(200M~1GHz, Polarize: V)
Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz)	4.97 dB (1~6GHz, Distance: 3m)
	4.99 dB (6~18GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57 dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Power density test	2.00 dB
Uncertainty for Frequency range test	7×10^{-8}
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6°C
	3%

3. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Oct.31, 13	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Oct.31, 13	1 Year
3.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.08, 13	1 Year
4.	Terminator	Hubersuhner	50Ω	No. 1	May.08, 13	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 2	May.08, 13	1 Year
6.	RF Cable	Fujikura	3D-2W	No.1	May.08, 13	1Year
7.	Coaxial Switch	Anritsu	MP59B	M50564	May.08, 13	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 13	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(μV)	Average Level dB(μV)
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. Zone Protektor (EUT)

Model Number : ZP-01

Serial Number : N/A

3.4.2. Tested Supporting System Details

No.	Description	ACS No.	Manufacture r	Model	Serial Number	Approved type
1	Power Adapter	N/A	LEADER	MU12-S120100-A1	N/A	<input checked="" type="checkbox"/> FCC DoC <input type="checkbox"/> BSMI ID:
Cable: Unshielded, Detachable, 1.5m						

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 (TX Mode) and measure it.

3.6. Test Procedure

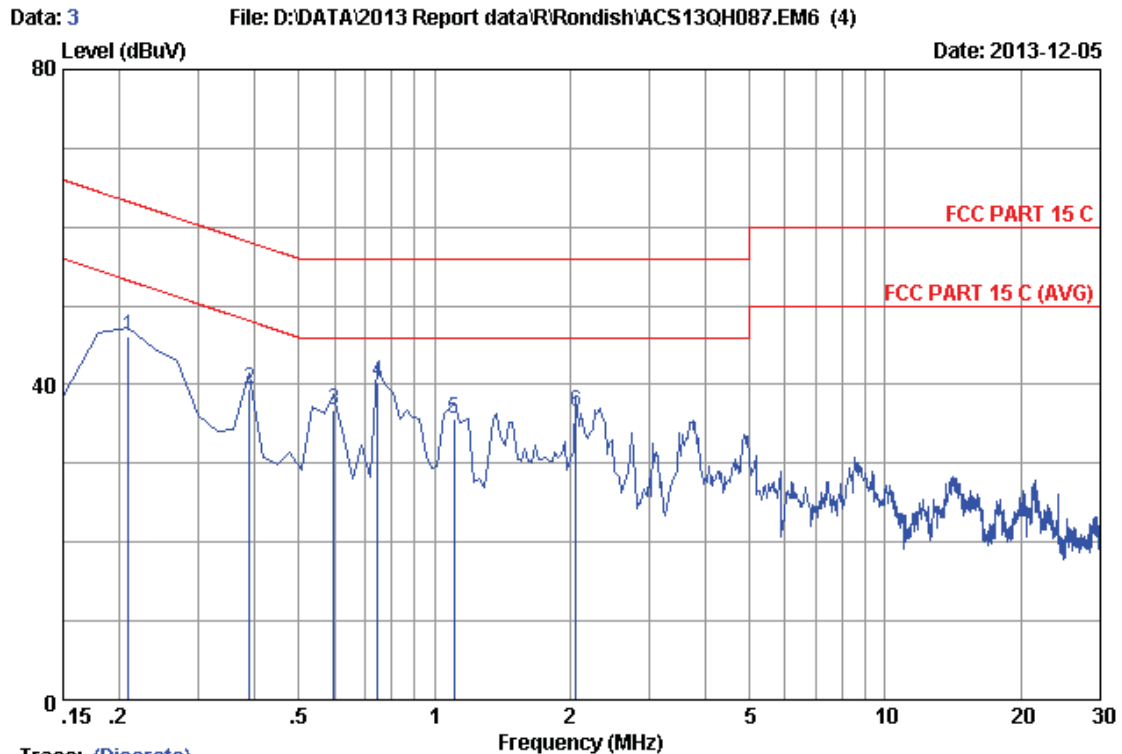
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). 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 C63.4-2009 on conducted Emission test.

The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 9kHz.

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

3.7. Conducted Emission at Mains Terminals Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

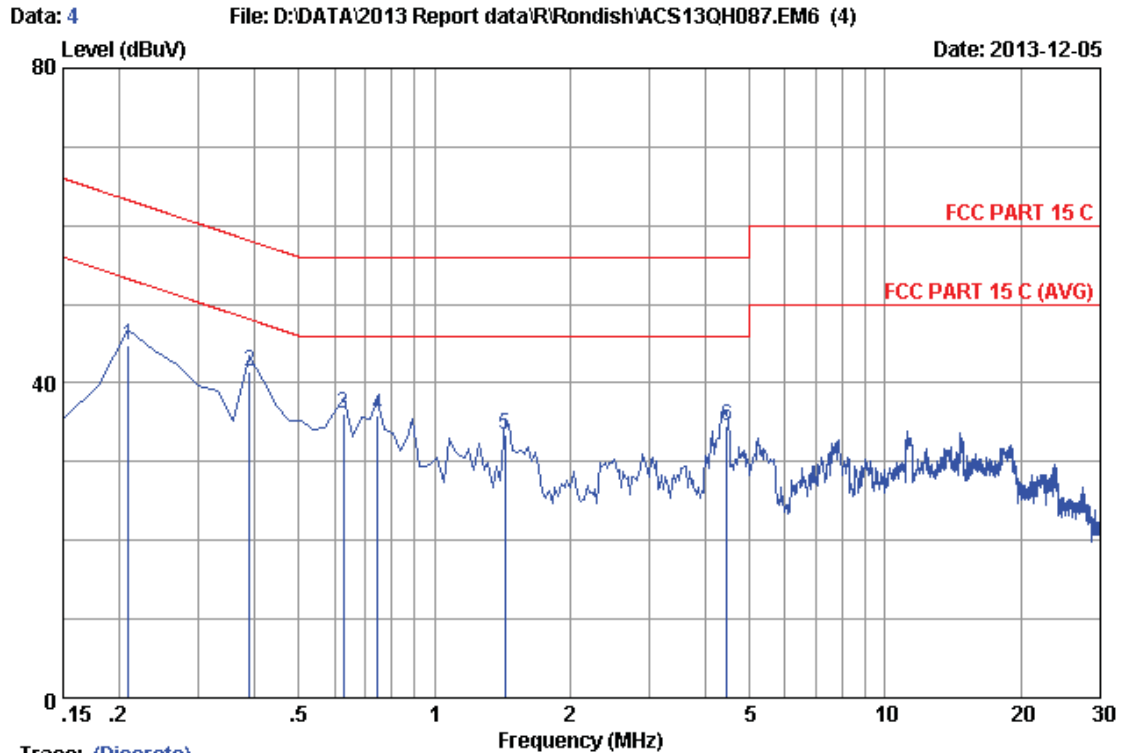


Trace: (Discrete)

Site no :1#conduction Data No :3
 Dis./Ant. :2013 ESH2-Z5 LINE
 Limit :FCC PART 15 C
 Env./Ins. :25.5°C/55% Engineer :Leo-Li
 EUT :Zone Protektor M/N:ZP-01
 Power Rating :DC 12V From Adapter Input AC 120V/60Hz
 Test Mode :916MHz Tx

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.20970	0.15	0.01	46.07	46.23	63.22	16.99	QP
2	0.38880	0.16	0.02	39.30	39.48	58.09	18.61	QP
3	0.59775	0.16	0.02	36.50	36.68	56.00	19.32	QP
4	0.74700	0.17	0.03	40.11	40.31	56.00	15.69	QP
5	1.105	0.18	0.03	35.35	35.56	56.00	20.44	QP
6	2.060	0.22	0.04	36.22	36.48	56.00	19.52	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.



Trace: (Discrete)

Site no :1#conduction Data No :4
 Dis./Ant. :2013 ESH2-Z5 NEUTRAL
 Limit :FCC PART 15 C
 Env./Ins. :25.5°C/55% Engineer :Leo-Li
 EUT :Zone Protektor M/N:ZP-01
 Power Rating :DC 12V From Adapter Input AC 120V/60Hz
 Test Mode :916MHz Tx

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.20970	0.18	0.01	44.58	44.77	63.22	18.45	QP
2	0.38880	0.21	0.02	41.21	41.44	58.09	16.65	QP
3	0.62760	0.26	0.02	35.79	36.07	56.00	19.93	QP
4	0.74700	0.27	0.03	35.65	35.95	56.00	20.05	QP
5	1.434	0.26	0.03	33.20	33.49	56.00	22.51	QP
6	4.448	0.33	0.06	34.10	34.49	56.00	21.51	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector.
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

4. RADIATED EMISSION TEST

4.1. Test Equipment

Frequency rang: 30~1000MHz

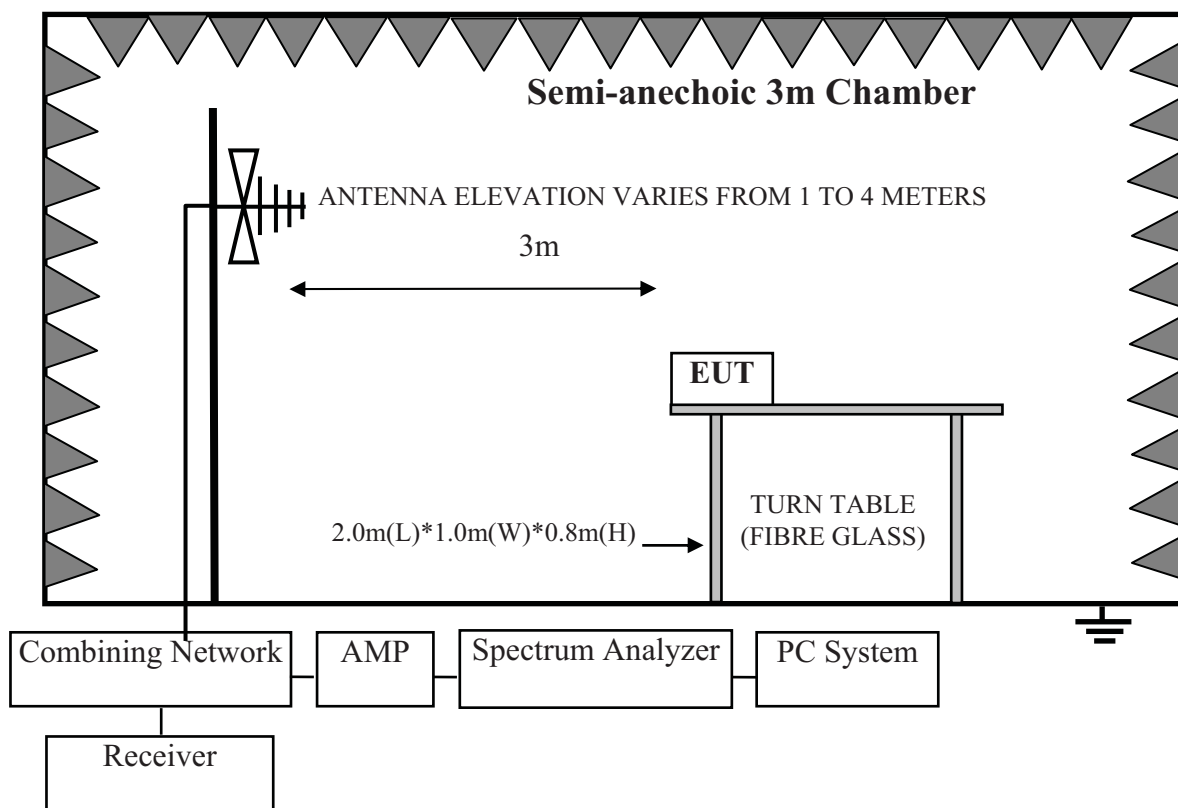
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Nov.24, 13	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 13	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 13	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 13	1 Year
5	Bilog Antenna	TESEQ	CBL6112D	35375	May.30, 13	1 Year
6	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	May.08, 13	1 Year
7	Coaxial Switch	Anritsu	MP59B	M74389	May.08, 13	1 Year

Frequency rang: above 1000MHz

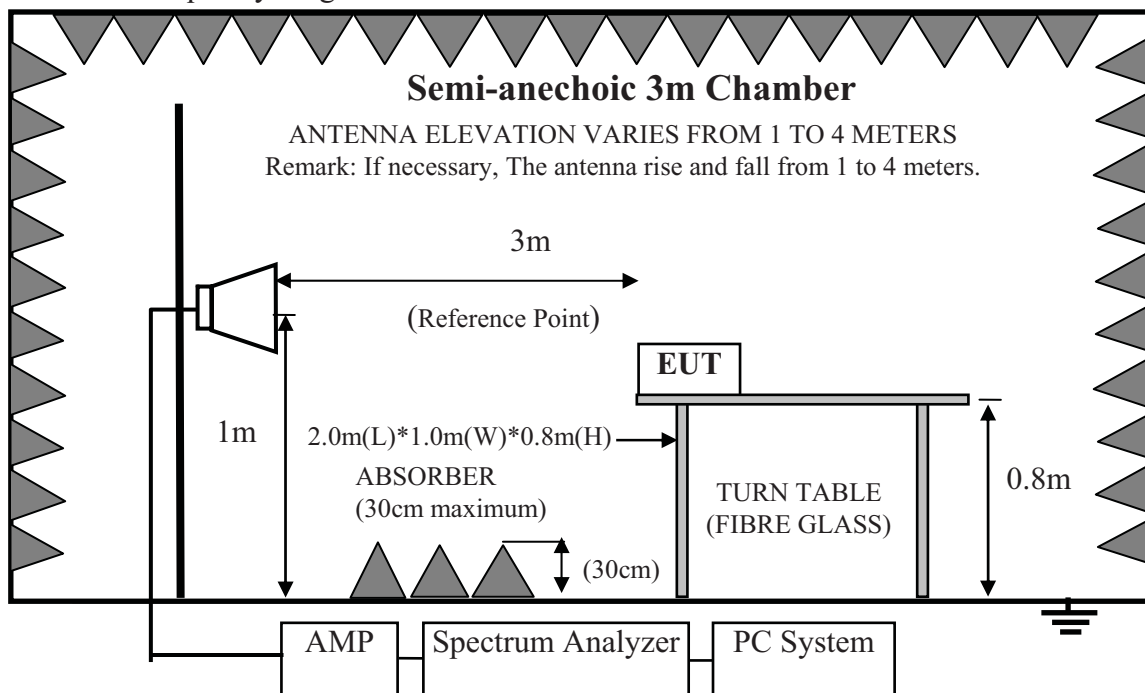
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY41440292	May.08, 13	1 Year
2	Horn Antenna	EMCO	3115	9510-4580	May.28, 13	1 Year
3	Amplifier	Agilent	8449B	3008A00863	May.08, 13	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX106	77980/6	May.08, 13	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	May.08, 13	1 Year

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



4.3.Radiated Emission Limit

4.3.1.15.247 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(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.

4.3.2.15.205 Restricted bands of operation

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	2690 - 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)

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.4.EUT Configuration 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.

4.4.1.Zone Protektor (EUT)

Model Number : ZP-01
Serial Number : N/A

4.5.Operating Condition of EUT

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

4.5.2.Turned on the power of all equipment.

4.5.3.Let the EUT work in test mode (TX Mode) and measure it.

4.6.Test Procedure

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. Power on the EUT and let it working in test mode, then test it. 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 are set on test.

The EUT was tested at X.Y.Z position and found the worst case position reported in the report.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

The frequency range from 30MHz to 10th harmonic (10GHz) are checked.

4.7.Radiated Emission Test Results

PASS.

All the emissions from 30MHz to 10GHz were comply with 15.209 limits.

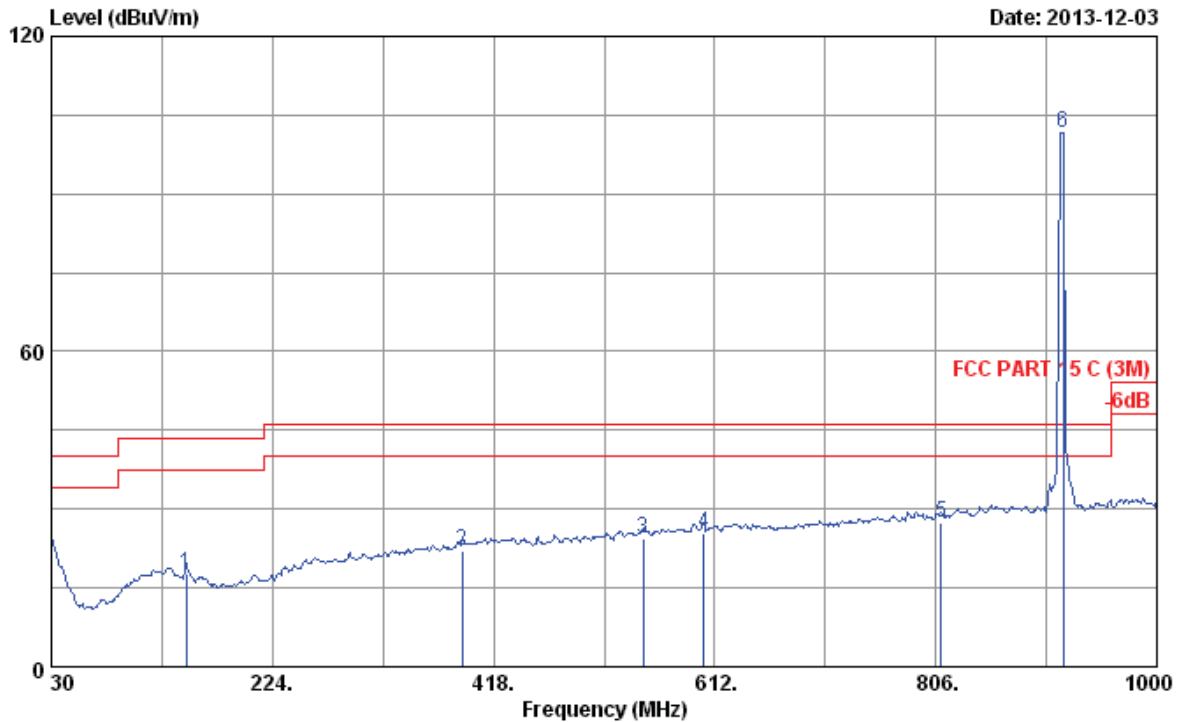
Note: For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

Frequency: 30MHz~1GHz

Data: 8

File: E:\2013 Report Data\R\Randish\ACS13QH087.EM6 (12)

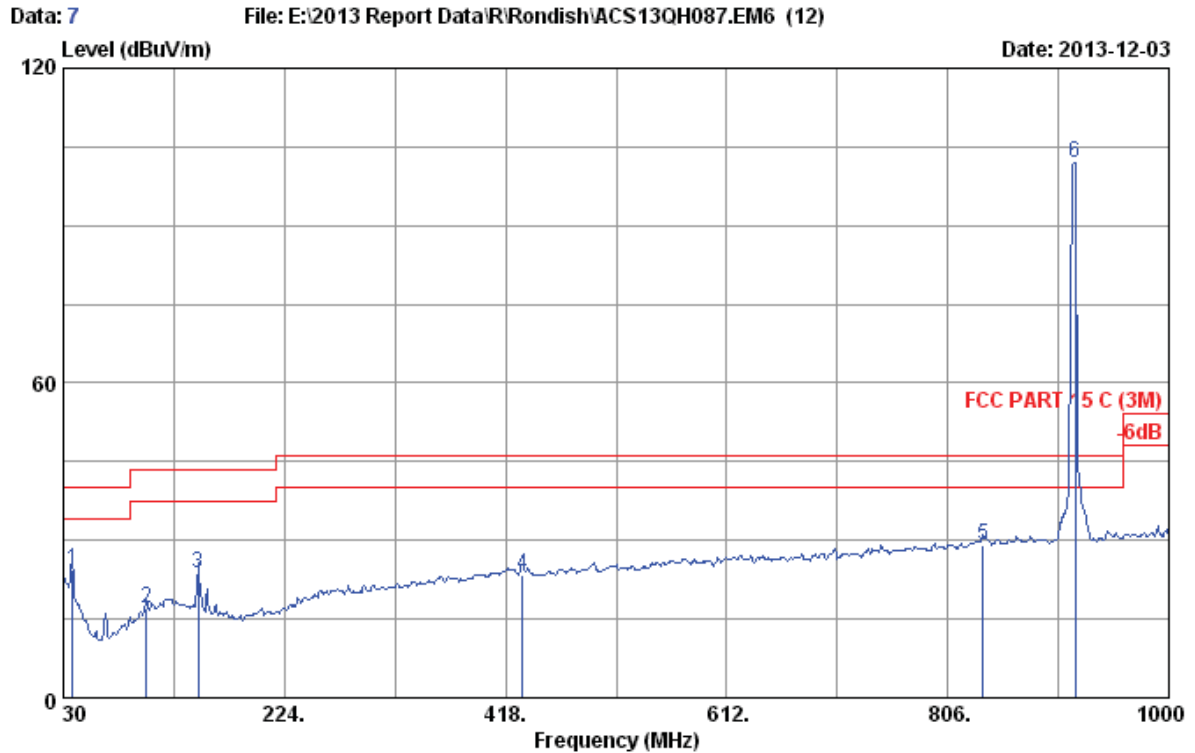
Date: 2013-12-03



Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2013 CBL6112D 35375 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65% Engineer : Leo-Li
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	148.340	11.38	1.59	4.67	17.64	43.50	25.86	QP
2	390.840	16.23	2.43	3.56	22.22	46.00	23.78	QP
3	548.950	18.86	2.89	2.55	24.30	46.00	21.70	QP
4	602.300	19.20	3.04	3.12	25.36	46.00	20.64	QP
5	810.850	20.80	3.64	2.99	27.43	46.00	18.57	QP
6	916.550	21.80	3.98	75.83	101.61	46.00	-55.61	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. 916.550MHz is the Signal from fundament Frequency.
 No need to comply with the limit



Site no. : 3m Chamber Data no. : 7
 Dis. / Ant. : 3m 2013 CBL6112D 35375 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65% Engineer : Leo-Li
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	37.760	15.34	0.97	8.10	24.41	40.00	15.59	QP
2	102.750	11.61	1.42	4.12	17.15	43.50	26.35	QP
3	148.340	11.38	1.59	10.71	23.68	43.50	19.82	QP
4	432.550	17.05	2.55	3.76	23.36	46.00	22.64	QP
5	837.040	21.14	3.73	4.09	28.96	46.00	17.04	QP
6	916.550	21.80	3.98	76.13	101.91	46.00	-55.91	QP

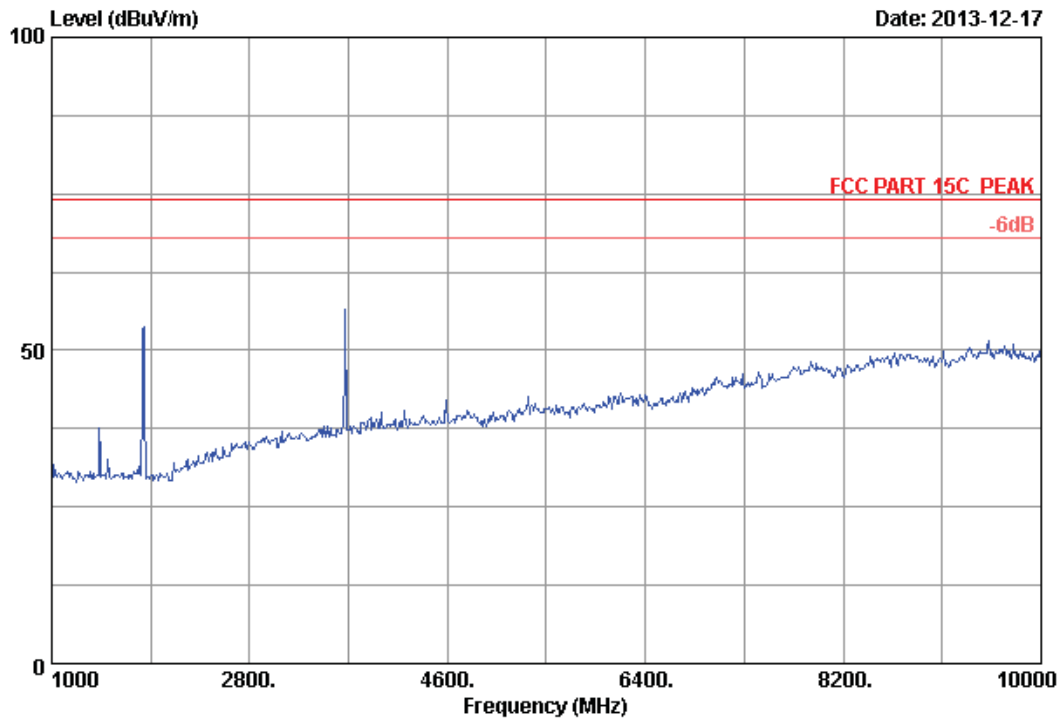
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. 916.550MHz is the Signal from fundament Frequency.
 No need to comply with the limit

Frequency: 1GHz~18GHz

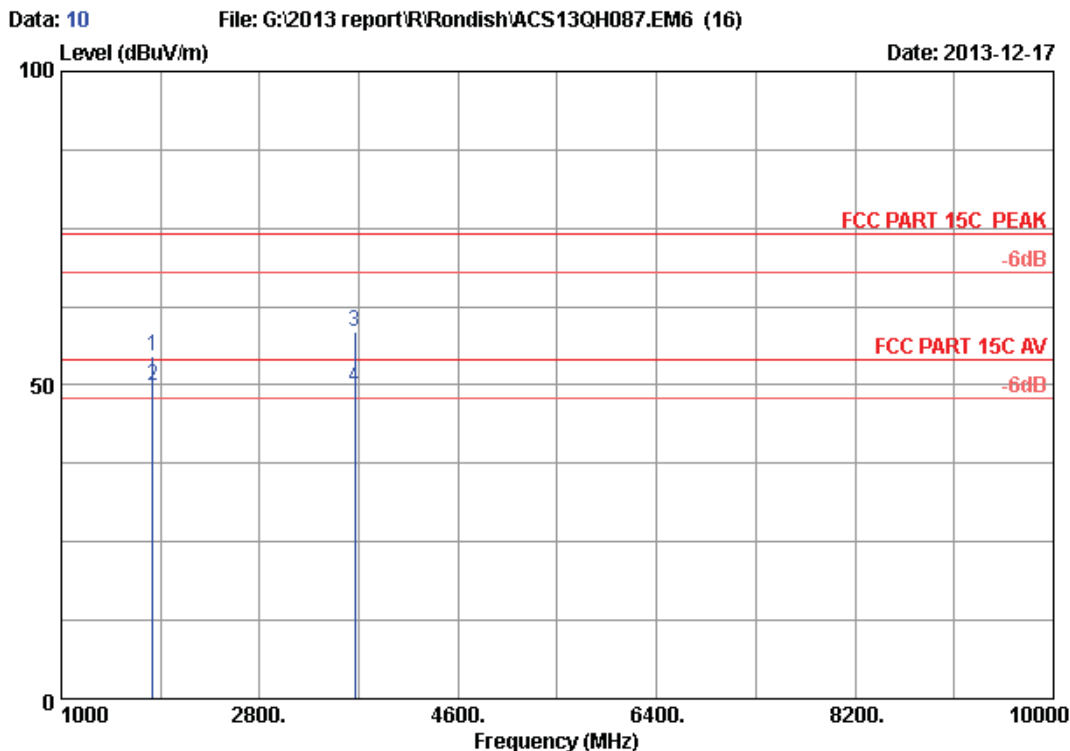
Data: 9

File: G:\2013 report\R\Rondish\ACS13QH087.EM6 (16)

Date: 2013-12-17



Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2012 3115 (4580)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: Zone Protektor		
Power supply	: DC 12V		
Test mode	: Tx Mode 916MHz		
	ZP-01		

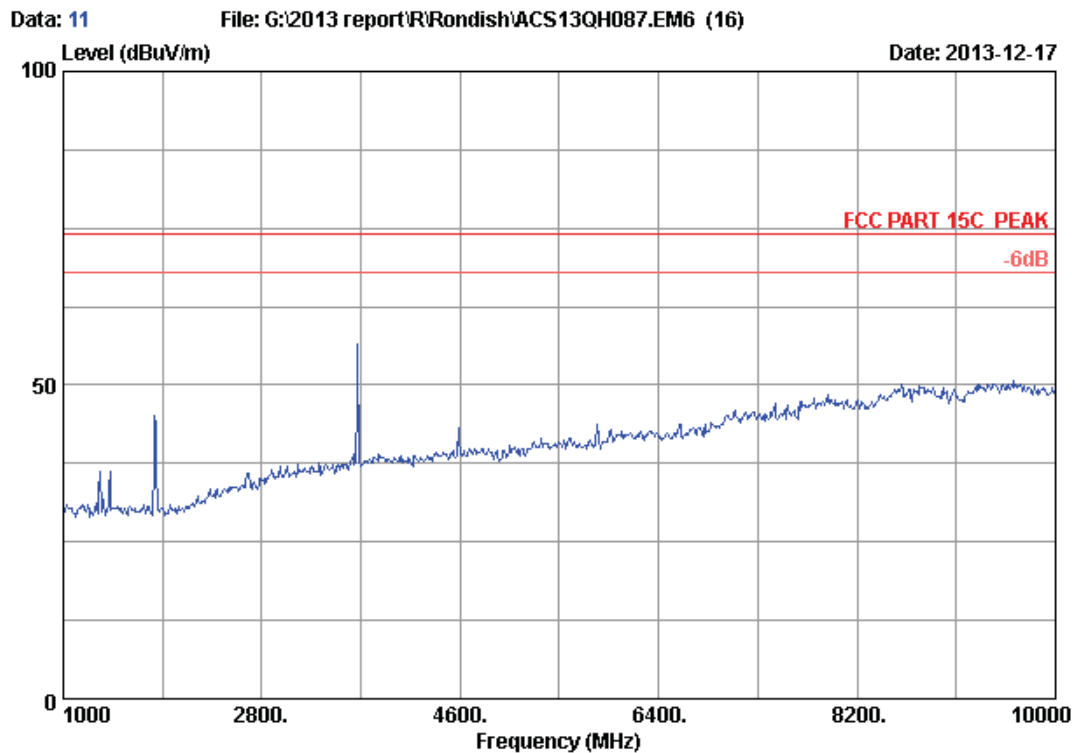


Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Zone Protektor
 Power supply : DC 12V
 Test mode : Tx Mode 916MHz
 ZP-01

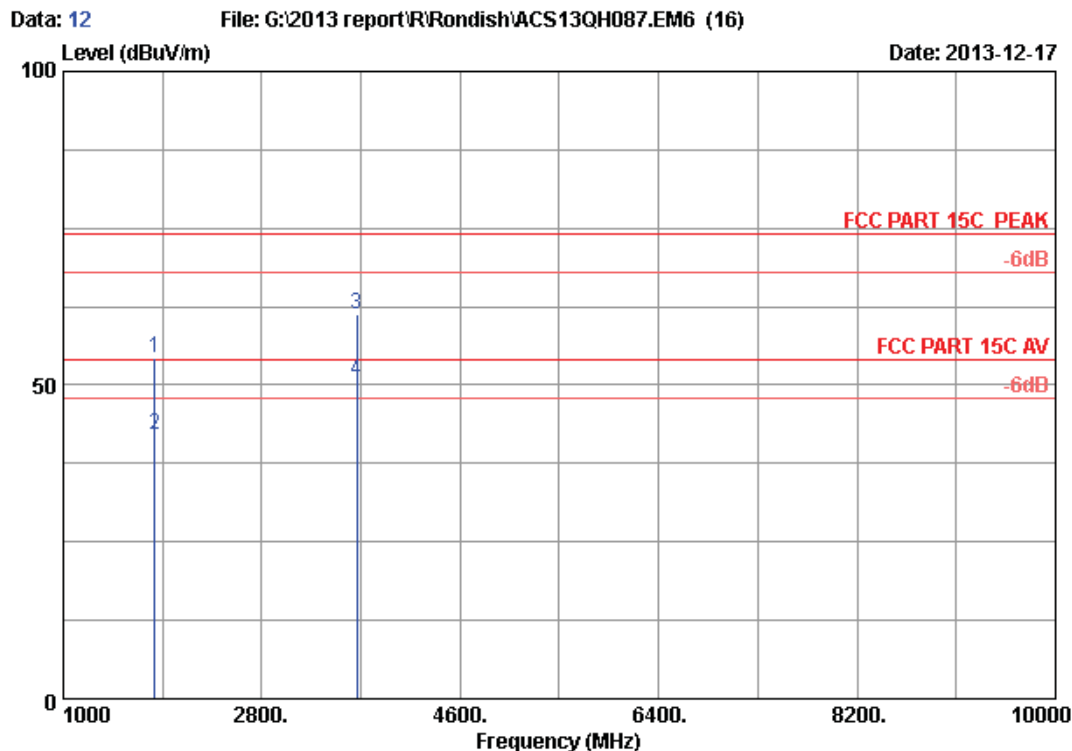
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1832.000	24.50	4.97	35.88	60.91	54.50	74.00	19.50	Peak
2	1832.000	24.50	4.97	35.88	56.18	49.77	54.00	4.23	Average
3	3664.000	30.89	7.37	35.70	56.06	58.62	74.00	15.38	Peak
4	3664.000	30.89	7.37	35.70	47.16	49.72	54.00	4.28	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2012 3115 (4580)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: Zone Protektor		
Power supply	: DC 12V		
Test mode	: Tx Mode 916MHz		
	ZP-01		



Site no. : 3m Chamber Data no. : 12
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Zone Protektor
 Power supply : DC 12V
 Test mode : Tx Mode 916MHz
 ZP-01

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1832.000	24.50	4.97	35.88	60.65	54.24	74.00	19.76	Peak
2	1832.000	24.50	4.97	35.88	48.36	41.95	54.00	12.05	Average
3	3664.000	30.89	7.37	35.70	58.81	61.37	74.00	12.63	Peak
4	3664.000	30.89	7.37	35.70	48.21	50.77	54.00	3.23	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

5. CONDUCTED SPURIOUS EMISSIONS

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,13	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1 Year

5.2. Limit

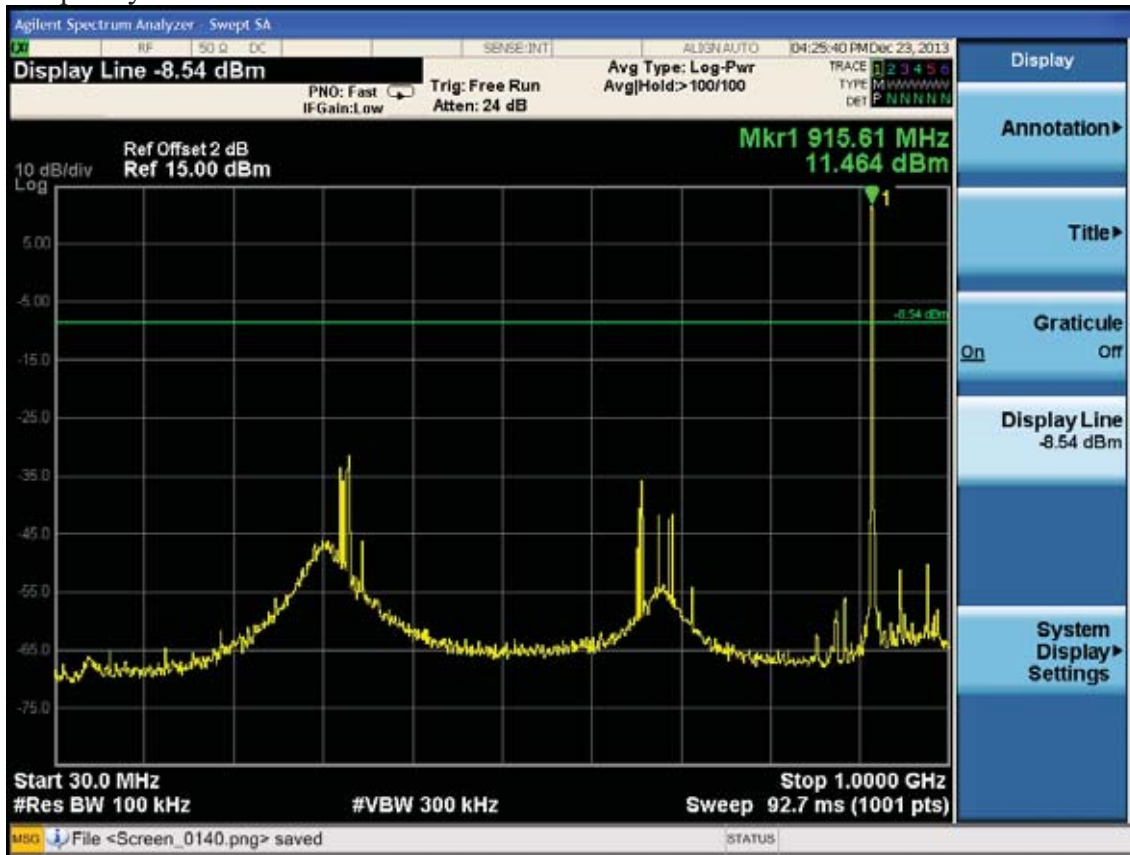
In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

5.3. Test Procedure

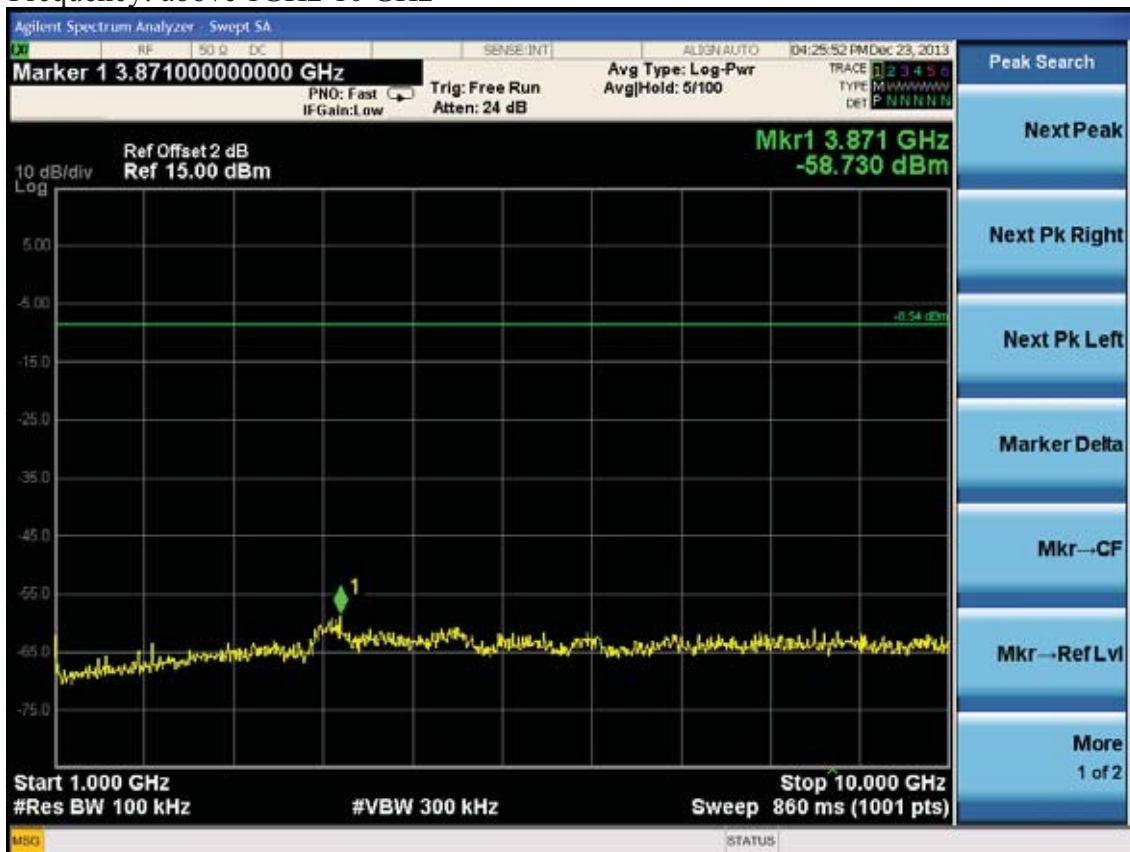
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

Conducted emission test data:

Frequency: 30.0MHz-1GHz



Frequency: above 1GHz-10 GHz



6. BAND EDGE COMPLIANCE TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	9607-4877	May.08, 13	1 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year

6.2. Limit

All the lower and upper band-edges emissions appearing within 608MHz to 614MHz and 960MHz to 1240MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 902MHz to 928MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

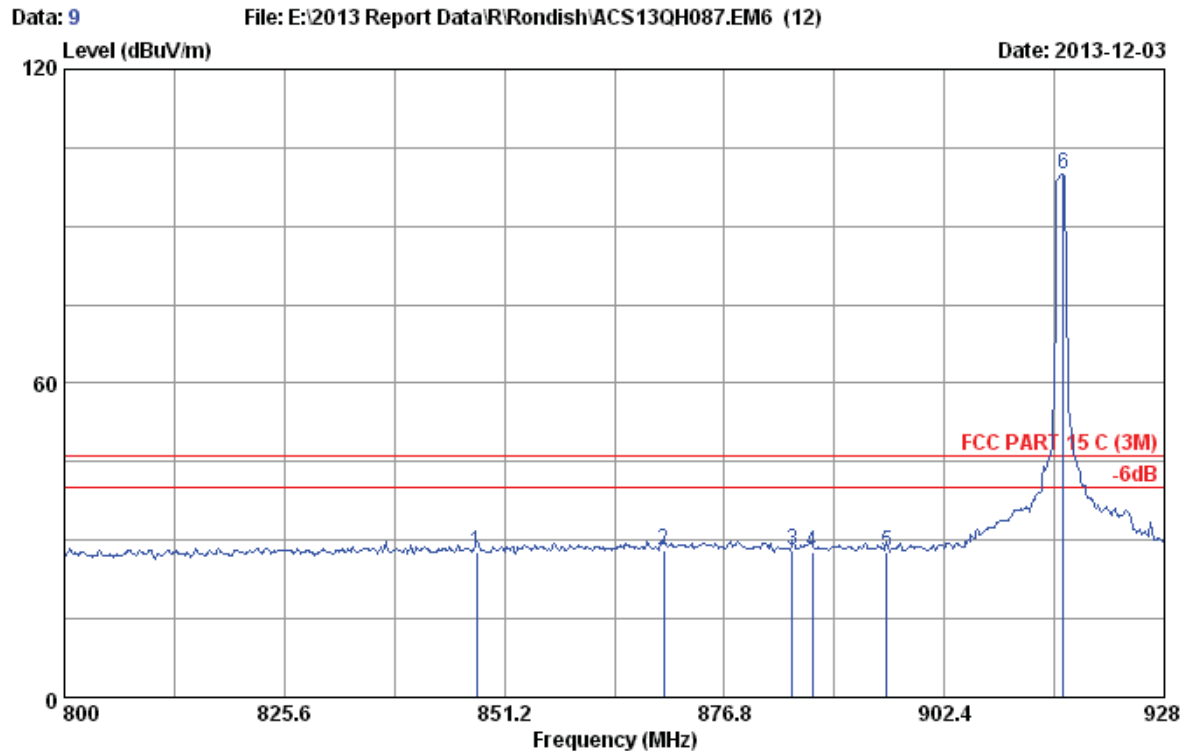
6.3. Test Produce

1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was 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 emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=100KHz; VBW=300KHz ;Sweep time=AUTO
Reading out the QP value of the emission.

6.4. Test Results

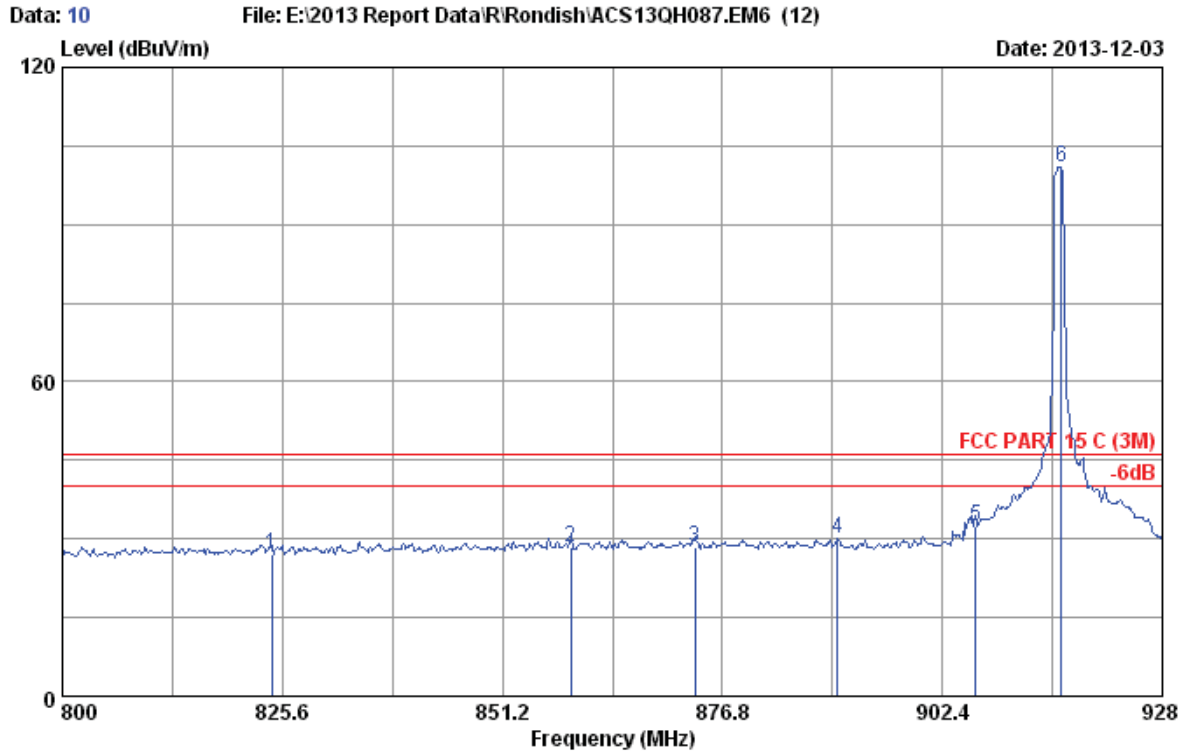
Pass (The testing data was attached in the next pages.)



Site no. : 3m Chamber Data no. : 9
 Dis. / Ant. : 3m 2013 CBL6112D 35375 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65% Engineer : Leo-Li
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	848.000	21.26	3.76	2.66	27.68	46.00	18.32	QP
2	869.760	21.50	3.83	2.78	28.11	46.00	17.89	QP
3	884.736	21.60	3.88	2.44	27.92	46.00	18.08	QP
4	887.040	21.60	3.88	2.27	27.75	46.00	18.25	QP
5	895.744	21.51	3.91	2.26	27.68	46.00	18.32	QP
6	916.224	21.80	3.98	74.06	99.84	46.00	-53.84	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2013 CBL6112D 35375 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65% Engineer : Leo-Li
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

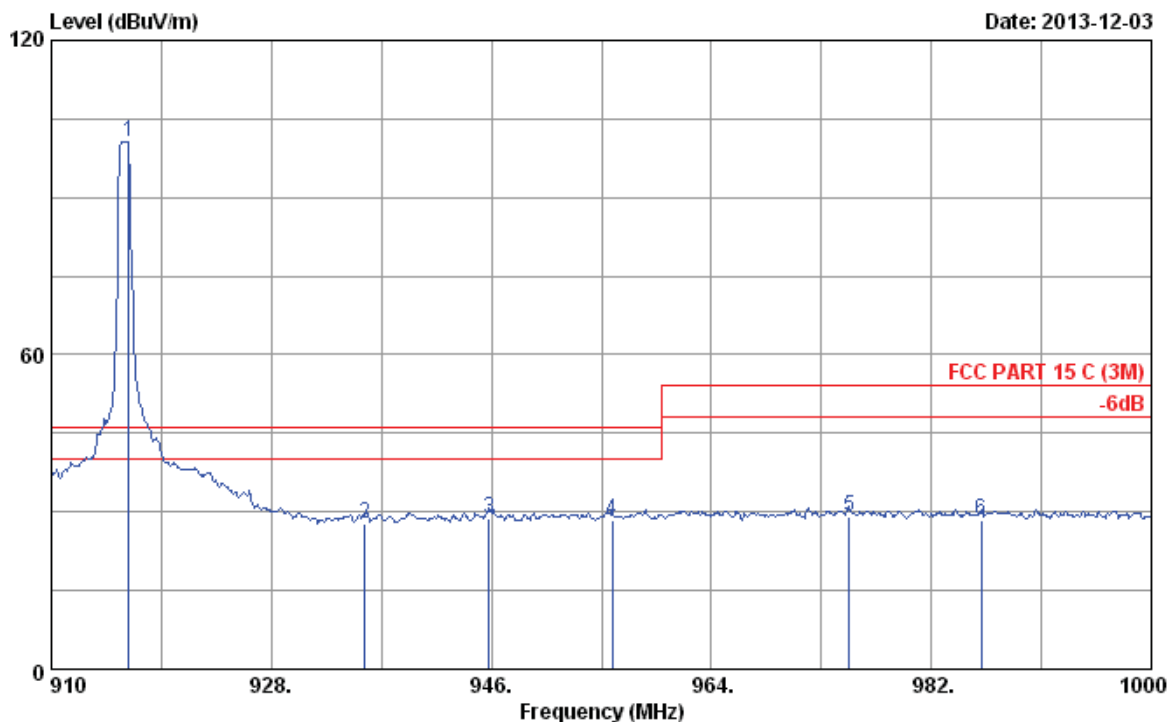
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	824.320	20.99	3.69	2.23	26.91	46.00	19.09	QP
2	859.136	21.40	3.80	3.18	28.38	46.00	17.62	QP
3	873.600	21.57	3.84	2.89	28.30	46.00	17.70	QP
4	890.240	21.60	3.89	4.50	29.99	46.00	16.01	QP
5	906.240	21.70	3.94	6.84	32.48	46.00	13.52	QP
6	916.224	21.80	3.98	75.16	100.94	46.00	-54.94	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Data: 11

File: E:\2013 Report Data\R\Randish\ACS13QH087.EM6 (12)

Date: 2013-12-03



Site no. : 3m Chamber
 Dis. / Ant. : 3m 2013 CBL6112D 35375
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65%
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

Data no. : 11
 Ant. pol. : VERTICAL
 Engineer : Leo-Li

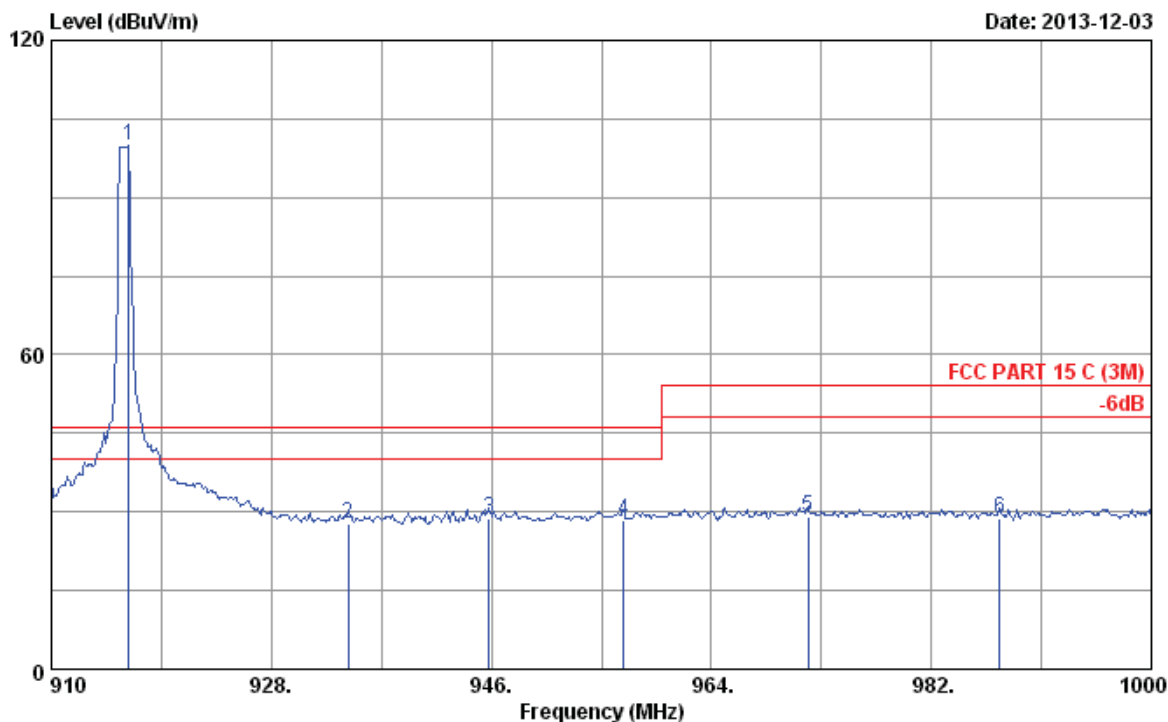
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	916.300	21.80	3.98	74.93	100.71	46.00	-54.71	QP
2	935.650	21.81	4.04	2.06	27.91	46.00	18.09	QP
3	945.820	22.02	4.07	2.75	28.84	46.00	17.16	QP
4	955.900	22.12	4.10	2.34	28.56	46.00	17.44	QP
5	975.250	22.30	4.16	2.50	28.96	54.00	25.04	QP
6	986.050	22.38	4.20	1.79	28.37	54.00	25.63	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Data: 12

File: E:\2013 Report Data\R\Randish\ACS13QH087.EM6 (12)

Date: 2013-12-03



Site no. : 3m Chamber Data no. : 12
 Dis. / Ant. : 3m 2013 CBL6112D 35375 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/65% Engineer : Leo-Li
 EUT : Zone Protektor M/N:ZP-01
 Power rating : DC 12V
 Test Mode : 916MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	916.300	21.80	3.98	74.00	99.78	46.00	-53.78	QP
2	934.300	21.80	4.03	1.97	27.80	46.00	18.20	QP
3	945.820	22.02	4.07	2.79	28.88	46.00	17.12	QP
4	956.800	22.14	4.10	2.16	28.40	46.00	17.60	QP
5	971.920	22.30	4.15	2.72	29.17	54.00	24.83	QP
6	987.580	22.35	4.20	2.12	28.67	54.00	25.33	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

7. 6dB BANDWIDTH Test

7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
2.	Antenna	EMCO	3115	9607-4877	Aug.28, 13	1 Year
3.	HF Cable	Hubersuhner	Sucoflex104	-	May.08, 13	1 Year

7.2.Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

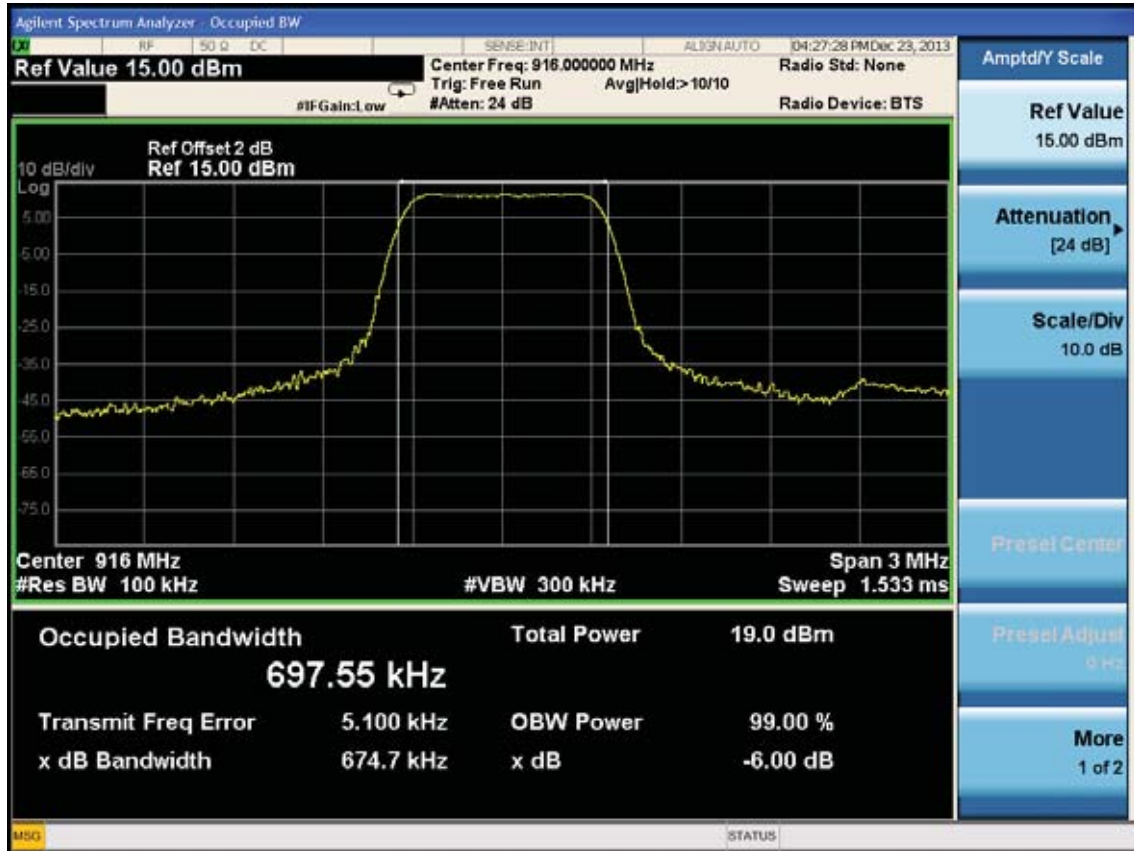
7.3.Test Procedure

The transmitter output was connected to a spectrum analyzer, The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100KHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

7.4.Test Results

EUT: Zone Protektor		
M/N:ZP-01		
Test date:2013-12-23	Pressure: 101.5±1.0kpa	Humidity: 52.6±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature: 23.7±0.6℃

Cable loss: 2.0 dB			
Test Mode	CH (MHz)	6 dB bandwidth (kHz)	Limit (KHz)
GFSK	916	674.7	≥ 500
Conclusion : PASS			



8. OUTPUT POWER TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Meter	Anritsu	ML2487A	6K00002472	May.08, 13	1 Year
2.	Power Sensor	Anritsu	MA2491A	033005	May.08, 13	1 Year

8.2. Limit (FCC Part 15C 15.247 b(3))

For systems using digital modulation in the 902—928MHz, The Peak out put Power shall not exceed 1W(30dBm)

8.3. Test Procedure

- 1, Connected the EUT's antenna port to measure device by suitable attenuator.
- 2, Read the peak output power from the measure device directly.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

8.4. Test Results

EUT: Zone Protektor			
M/N:ZP-01			
Test date:2013-12-23		Pressure: 102.1±1.0kpa	Humidity: 52.2±3.0%
Tested by:Leo-Li		Test site: RF site	Temperature: 22.7±0.6℃
Cable loss: 1.0 dB		Attenuator loss: 20 dB	
Test Mode	Frequency (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	916	11.502	30
Conclusion: PASS			

9. POWER SPECTRAL DENSITY TEST

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 13	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	9607-4877	Aug.28, 13	1 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year

9.2. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

9.3. Test Procedure

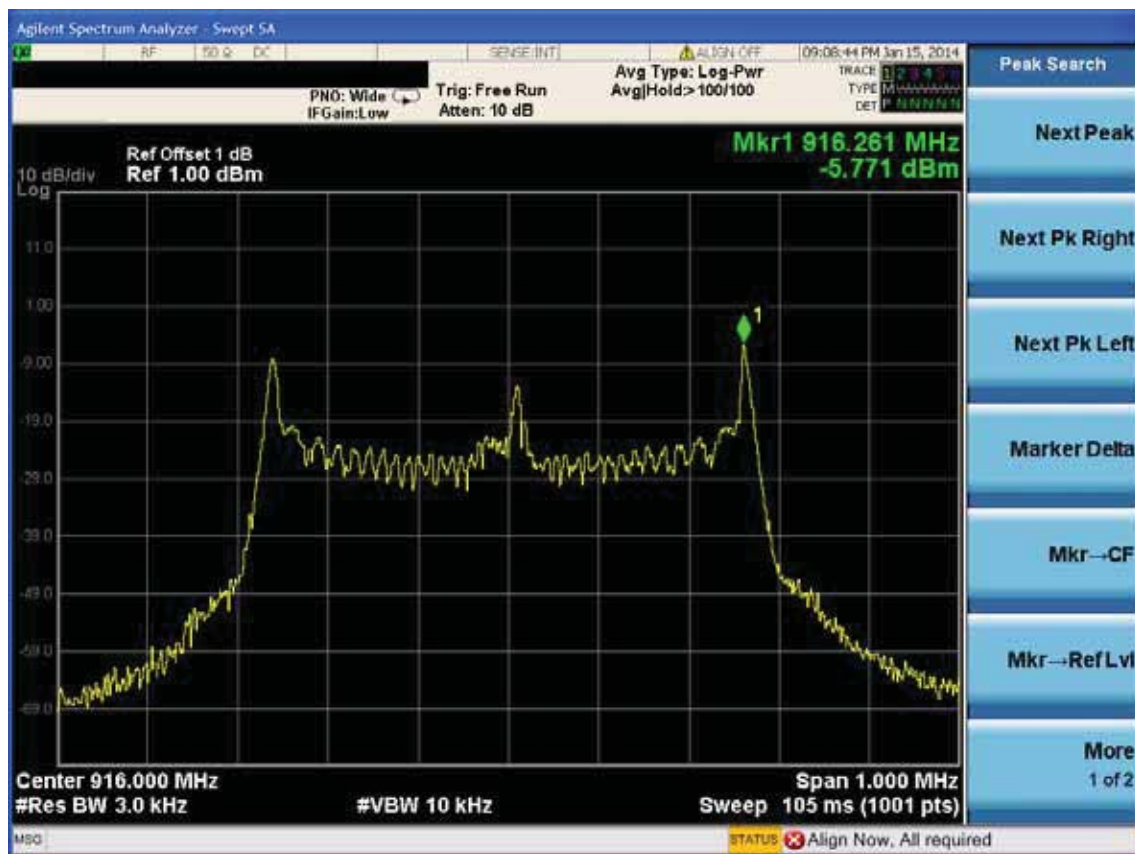
1. Connected the EUT's antenna port to spectrum analyzer device by 20dB attenuator.
2. Set analyzer center frequency to center frequency.
3. Set the span to 1.5 times the DTS Bandwidth.
4. Set the RBW=3KHz; VBW=10KHz; Detector=Peak
Sweep time= AUTO Couple; Trace Mode= max hold
5. Allow trace to fully stabilize.
6. Use the peak marker function to determine the maximum amplitude level within the RBW.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude

9.4.Test Results

EUT: Zone Protektor		
M/N:ZP-01		
Test date:2014-01-15	Pressure: 101.2±1.0kpa	Humidity: 52.7±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature: 23.5±0.6℃

Cable loss: 1.0 dB			
Test Mode	CH (MHz)	Power density (dbm/3KHz)	Limit (dBm/3KHz)
GFSK	916	-5.771	8
Conclusion : PASS			



10. ANTENNA REQUIREMENT

10.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. ANTENNA CONNECTED CONSTRUCTION

The antennas used for this product are wire antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0Bi.

11.DEVIATION TO TEST SPECIFICATIONS

[NONE]

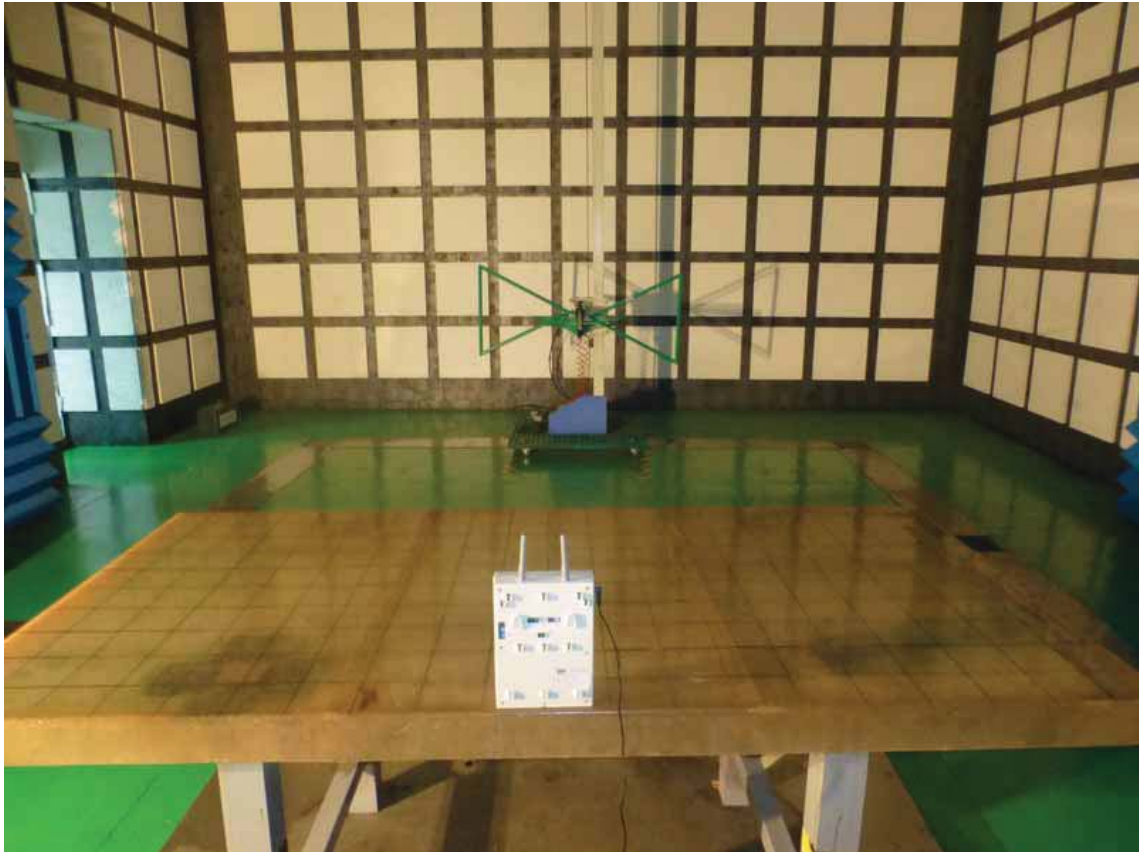
12. PHOTOGRAPH OF TEST

12.1. Photos of Power Line Conducted Emission Test



12.2.Photos of Radiated Emission Test

30-1000MHz



Above 1000MHz



13. PHOTOGRAPH OF EUT

Figure 1
General Appearance of the EUT



Figure 2
General Appearance of the EUT



Figure 3
General Appearance of the EUT



Figure 4
General Appearance of the EUT



Figure 5

General Appearance of the EUT



Figure 6

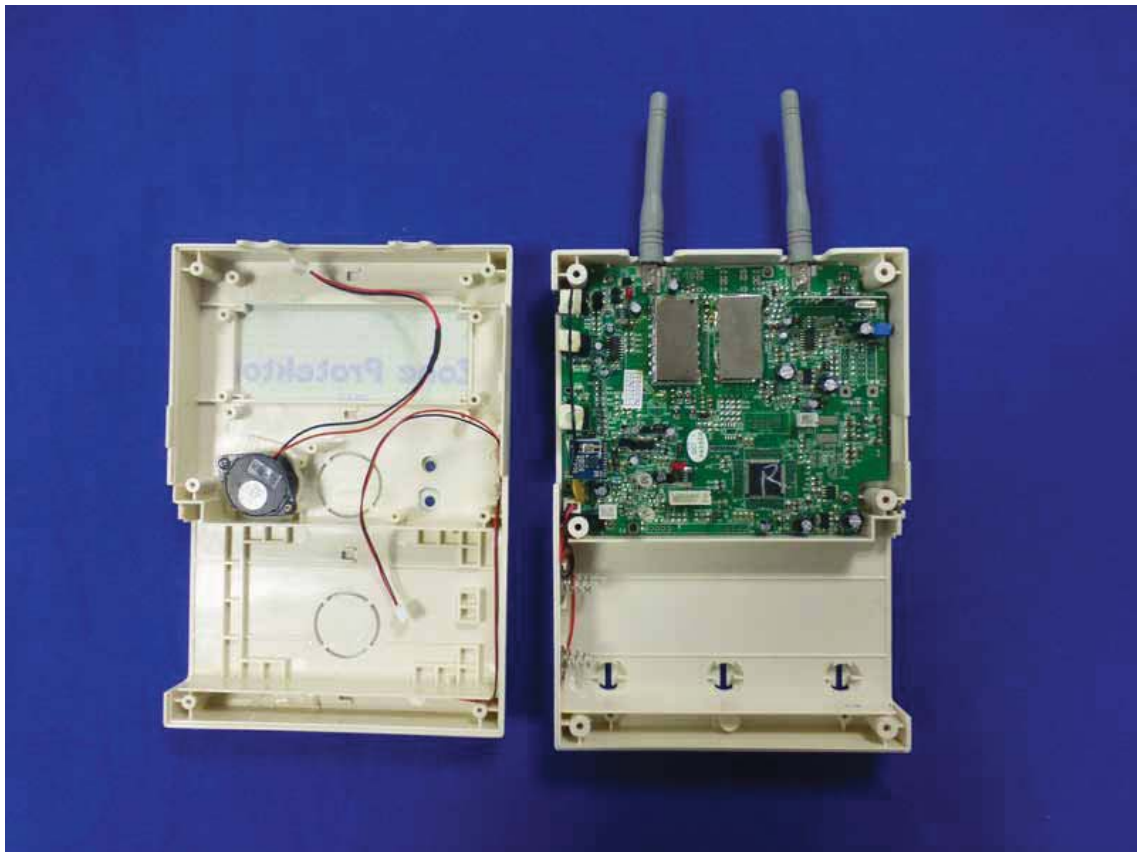
General Appearance of the EUT



Figure 7
Inside of the EUT



Figure 8
Inside of the EUT



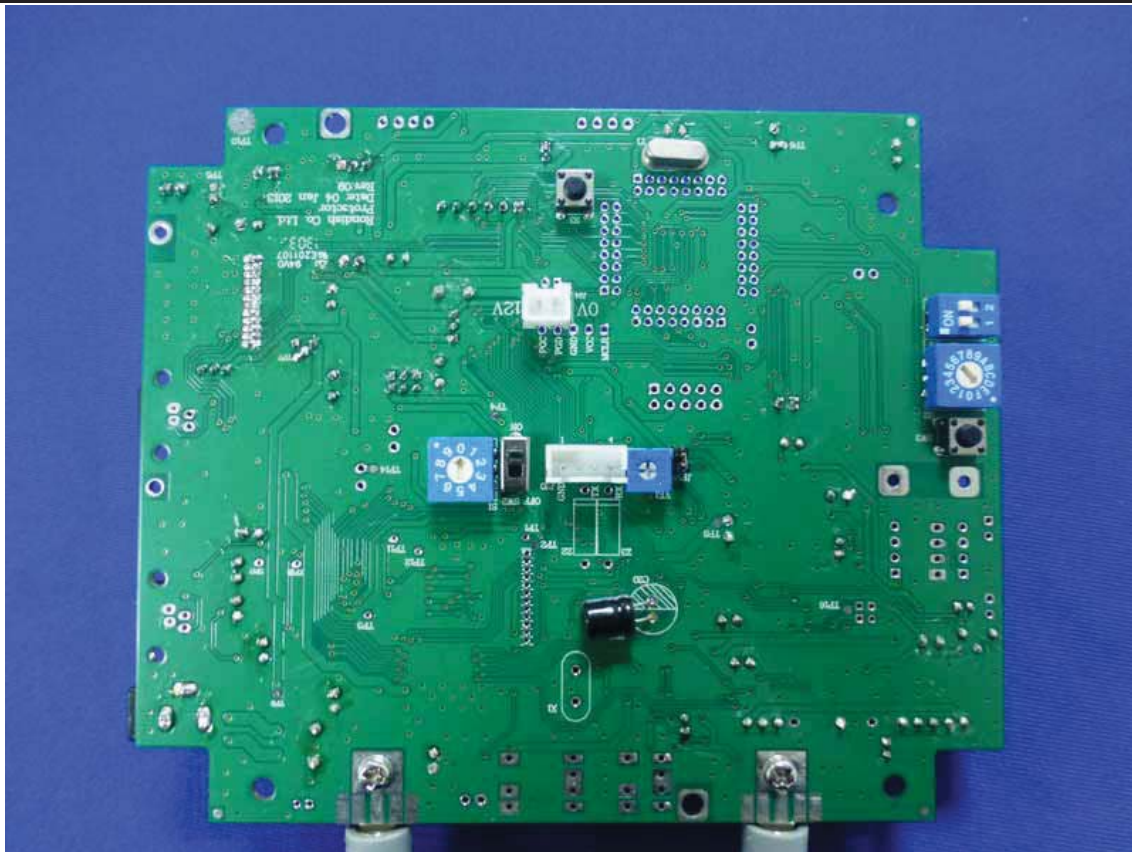


Figure 12
Inside of the EUT

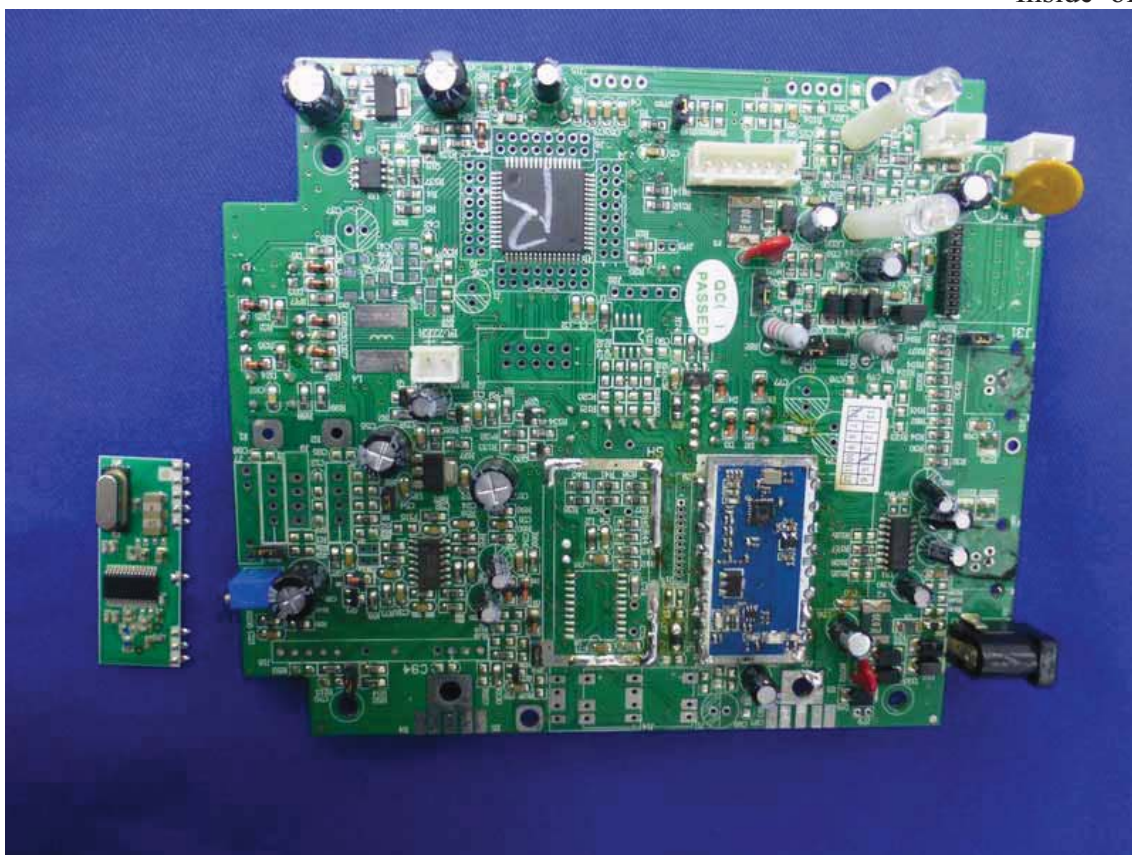


Figure 13
Inside of the EUT

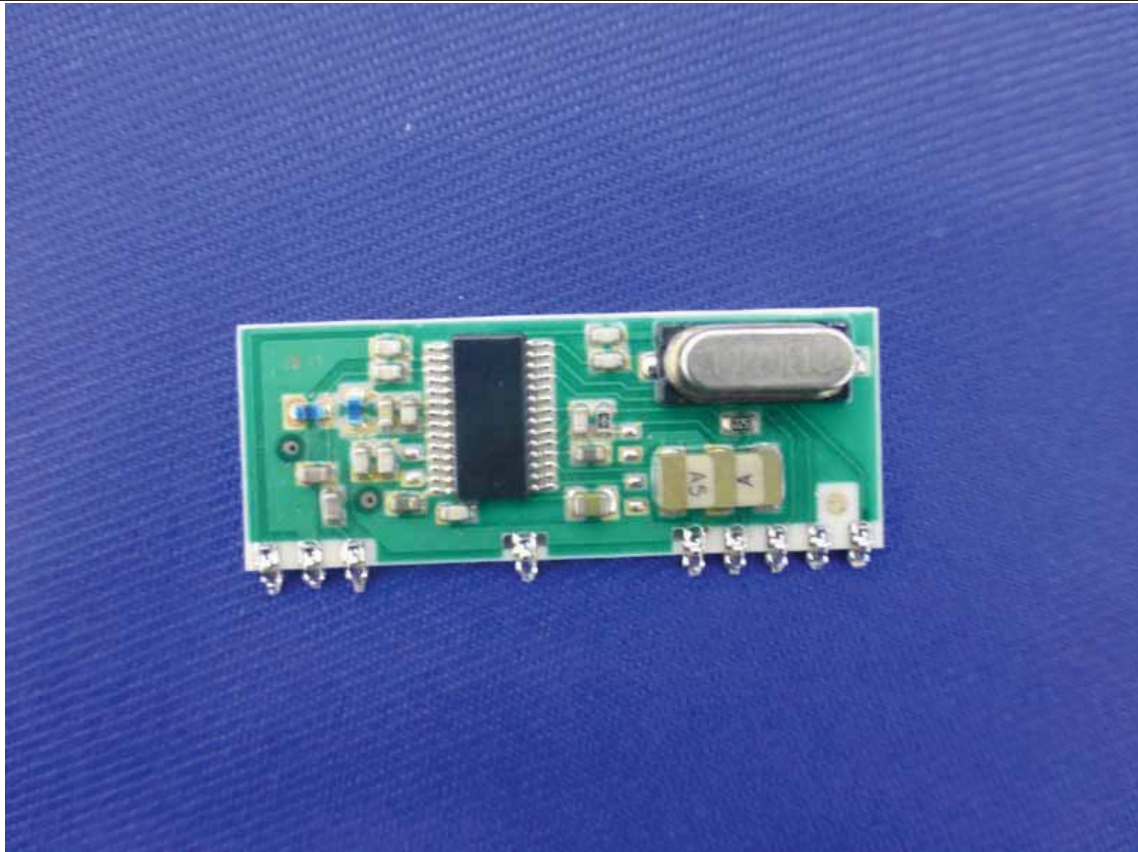


Figure 14
Inside of the EUT

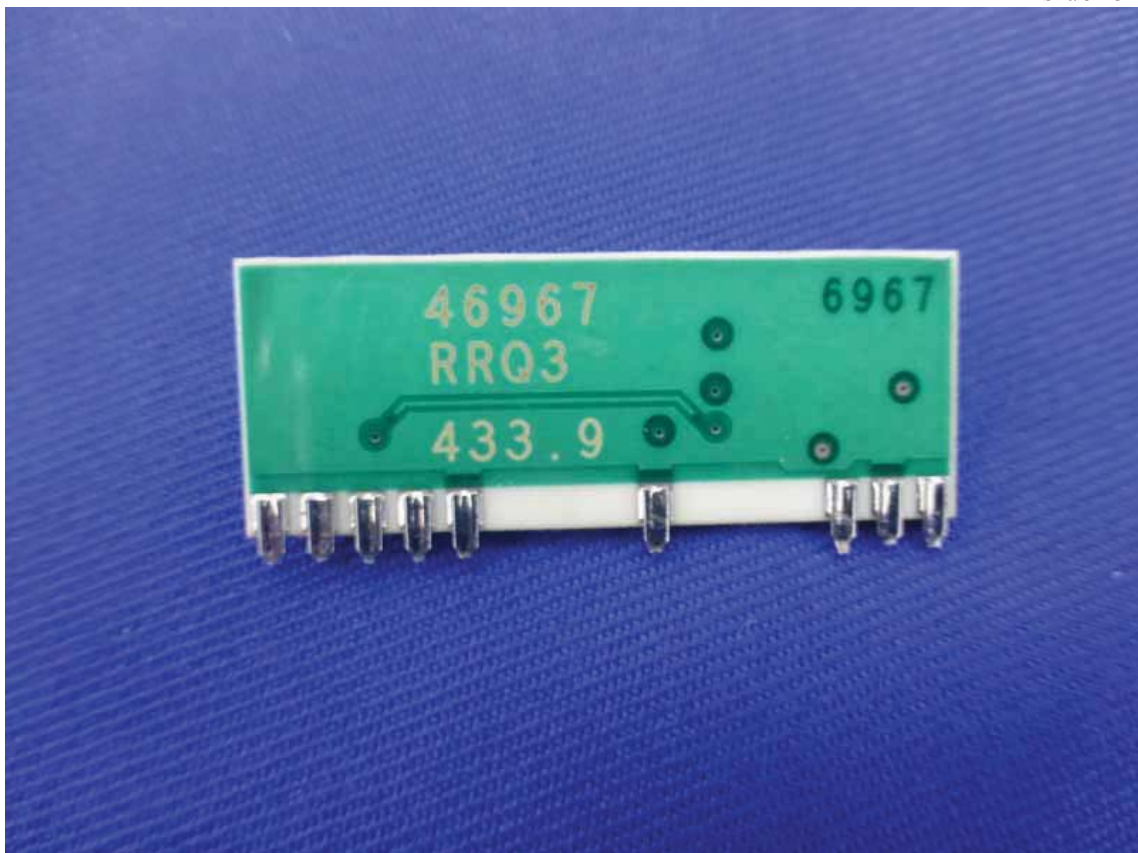


Figure 15
Inside of the EUT

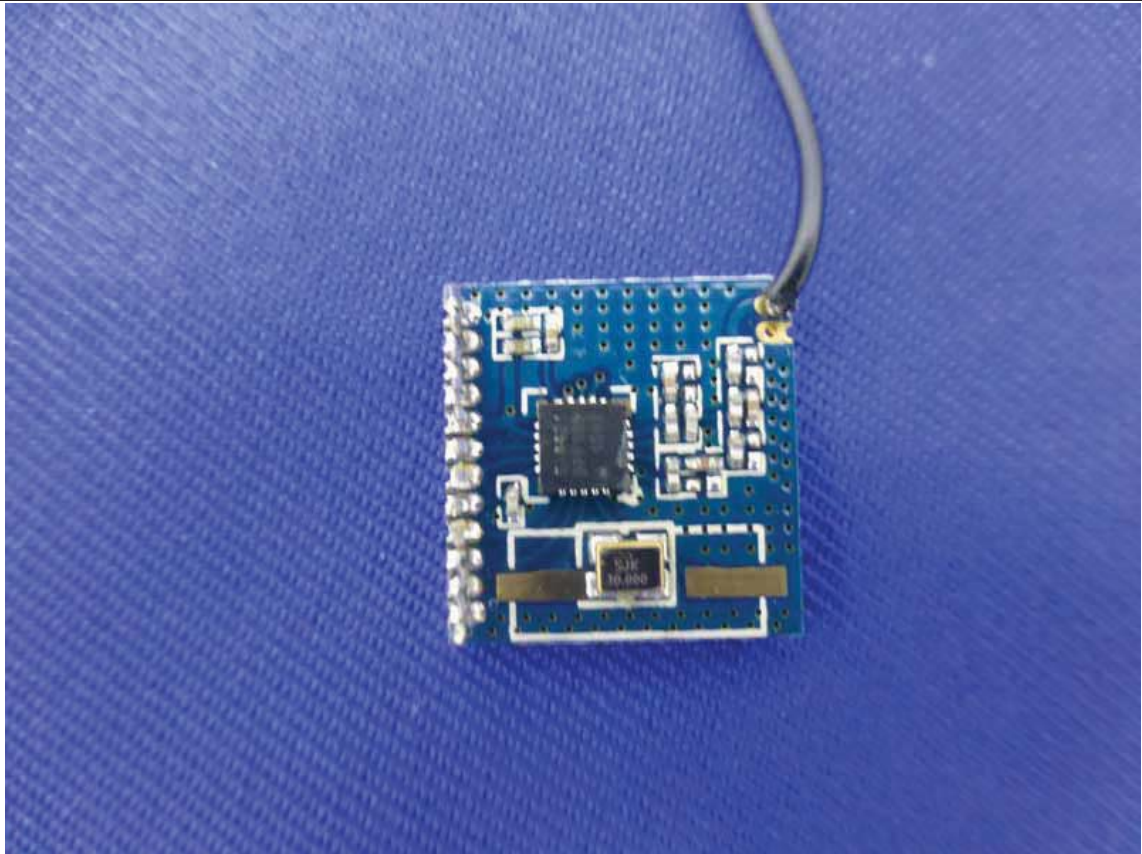


Figure 16
Inside of the EUT

