

FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT
For

WENZHOU MTLC ELECTRIC APPLIANCES CO., LTD.
Tiancheng Industrial Zone, Yueqing, Zhejiang 325608, China

FCC ID: ZZH-ZW1P

September 13, 2011

| | |
|--|---|
| This Report Concerns: Original Report | Equipment Type: Wireless Switch |
| Test Engineer: | Eric Li <i>Eric Li</i> |
| Report No.: | SHBST2011083106Y-1ER-3 |
| Receive EUT Date/Test Date: | September 7, 2011/ September 8-12, 2011 |
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1. GENERAL INFORMATION

1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BST, unless the applicant has authorized BST in writing to do so.

Test Facility -

The test site used to collect the radiated data is located on the address of

SinTek Laboratory Co.,Ltd.

(FCC Registered Test Site Number: 963441) on

No.7, Xinshidai Industrial, Guantian Village, Shiyan Town, Baoan District, Shenzhen, Guangdong 518108, China

The Test Site is constructed and calibrated to meet the FCC requirements.

1.2. Measurement Uncertainty

Available upon request.

2. PRODUCT DESCRIPTION

2.1. EUT Description

Description : Wireless Switch

Applicant : WENZHOU MTLC ELECTRIC APPLIANCES CO., LTD.
Tiancheng Industrial Zone, Yueqing, Zhejiang 325608, China

Model Number : ZW1P, ZW500D, ZWN-NS1K, ZWN-NS2K, ZWN-NS2AA,
ZWN-RS1A, ZWN-RS2A, ZWN-TS1, ZWNP-T

Trade Name : MTLC

Frequency : 908.42MHz

Number of Channels : 1

Power Supply : AC 120V/60Hz

2.2. Block Diagram of EUT Configuration

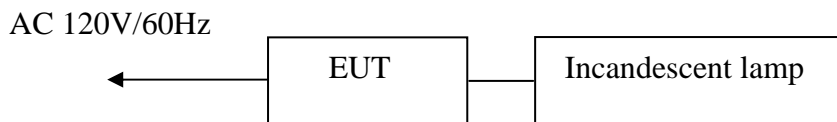


Figure 1 EUT Setup

2.3. Support Equipment List

| Name | Model No | S/N | Manufacturer | Used “ ” |
|------|----------|-----|--------------|-------------|
| -- | | | | |

2.4. Test Conditions

Temperature: 20~25
Relative Humidity: 50~63 %

3. FCC ID LABEL

FCC ID: ZZH-ZW1P

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.

Label Location on EUT

EUT View/ FCC ID Label Location



4. TEST RESULTS SUMMARY

FCC 15 Subpart C, Paragraph 15.249

| FCC Rules | Description of Test | Result |
|-------------------------------------|--|-----------|
| Section 15.207 | Conducted Emission | Compliant |
| Section 15.249(a) | The fundamental field strength and the harmonics | Compliant |
| Section 15.209 Section 15.249(d) | Radiated Emission | Compliant |
| Section 15.249(d) | Band Edge | Compliant |
| Section 15.203 | Antenna Requirement | Compliant |

Remark: "N/A" means "Not applicable".

Statement: All testing was performed using the test procedures found in ANSI C63.4 20003.

Modifications

No modification was made.

5. TEST EQUIPMENT USED

| Equipment/Facilities | Manufacturer | Model # | Serial no. | Date of Cal. | Cal. Interval |
|---------------------------------|--------------------|--------------|------------|---------------|---------------|
| Cable | Resenberger | N/A | NO.1 | Mar 10 , 2011 | 1 Year |
| Cable | SCHWARZBECK | N/A | NO.2 | Mar 10 , 2011 | 1 Year |
| Cable | SCHWARZBECK | N/A | NO.3 | Mar 10 , 2011 | 1 Year |
| LISN | Rohde & Schwarz | ESH3-Z5 | 100305 | Mar 10 , 2011 | 1 Year |
| 50 Coaxial Switch | ANRITSU CORP | MP59B | 6200283933 | Mar 10 , 2011 | 1 Year |
| EMI Test Receiver | Rohde & Schwarz | ESP13 | 100180 | Oct.11,2010 | 1 Year |
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100273 | Sep.10,2011 | 1 Year |
| 3m Semi-Anechoic Chamber | Albatross Projects | 9m×6m×6m | N/A | Feb.20,2011 | 1 Year |
| Signal Generator | FLUKE | PM5418 + Y/C | LO747012 | Feb.20,2011 | 1 Year |
| Signal Generator | FLUKE | PM5418TX | LO738007 | Feb.20,2011 | 1 Year |
| Loop Antenna | SCHWARZBECK | FMZB1516 | 113 | Jan.30,2011 | 1 Year |
| Trilog-Super Broadband Antenna | SCHWARZBECK | VULB9161 | 9161-4079 | Sep.22,2010 | 1 Year |
| Broad-Band Horn Antenna | SCHWARZBECK | BBHA9120D | 9120D-564 | Sep.22,2010 | 1 Year |
| Ultra Broadband Antenna | Rohde & Schwarz | HL-562 | 100110 | June.15,2011 | 1 Year |
| AMN | Rohde & Schwarz | ESH3-Z5 | 100196 | Oct.11,2010 | 1 Year |
| AMN | Rohde & Schwarz | ESH3-Z5 | 100197 | Oct.11,2010 | 1 Year |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | N/A | N/A | N/A |
| Power Meter | Rohde & Schwarz | NRVD | 100041 | Feb.20,2011 | 1 Year |
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | 100003 | Feb.20,2011 | 1 Year |
| Coaxial Cable with N-connectors | SCHWARZBECK | AK9515H | 95549 | Sep.22,2010 | 1 Year |
| Radio Communication Test Set | Rohde & Schwarz | CMS 54 | 846621/024 | Feb.20,2011 | 1 Year |
| Modulation Analyzer | Hewlett-Packard | 8901B | 2303A00362 | Feb.20,2011 | 1 Year |
| Absorbing clamp | Rohde & Schwarz | MDS-21 | N/A | Oct.11,2010 | 1 Year |

6. ANTENNA REQUIREMENT

6.1. 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.

6.2. ANTENNA CONNECTED CONSTRUCTION

According to § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The antenna used in this product is PCB antenna. The antenna is permanently attached. Refer to the product photo.

6.3. Result

Compliance

7. CONDUCTED POWER LINE TEST

7.1. Test Equipment

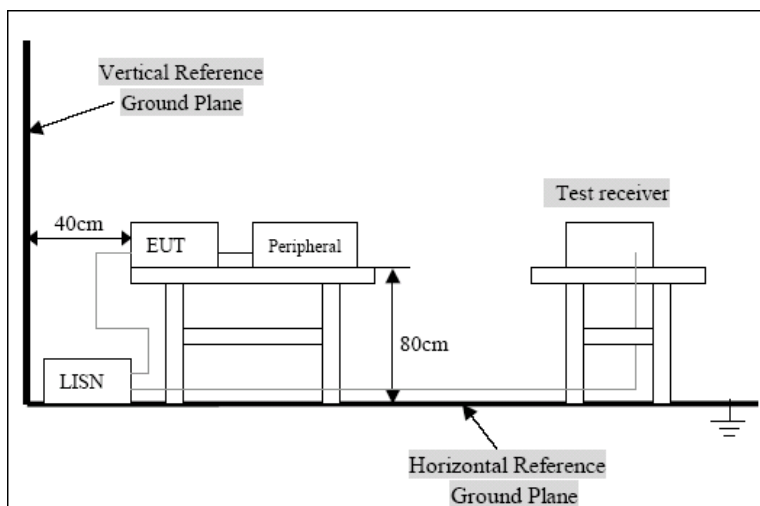
Please refer to section 5 this report.

7.2. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uh coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uh coupling impedance with 50ohm termination.

Both sides of A.C. Line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ASIN C63.4:2003 on conducted measurement. Conducted emissions were measured over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9KHz.

7.3. Test Setup



For the actual test configuration, please refer to the related items-Photos of testing

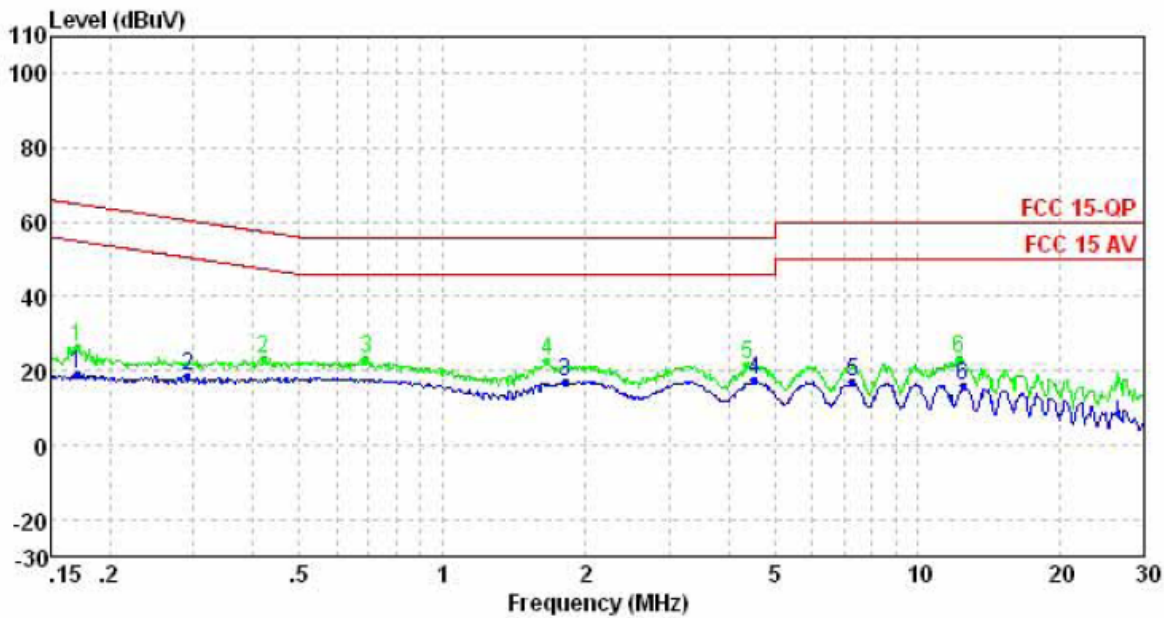
7.4. Conducted Power line Emission Limits

| FCC Part 15 Paragraph 15.207 (dBuV) | | |
|-------------------------------------|---------------|---------------|
| Frequency Range (MHZ) | Class A QP/AV | Class B QP/AV |
| 0.15-0.5 | 79/66 | 65-56/56-46 |
| 0.5-5.0 | 73/60 | 56-46 |
| 5.0-3.0 | 73/60 | 60-50 |

Note: In the above table, the tighter limit applies at the band edges.

7.5. Conducted Power Line Test Result

Pass



Condition:

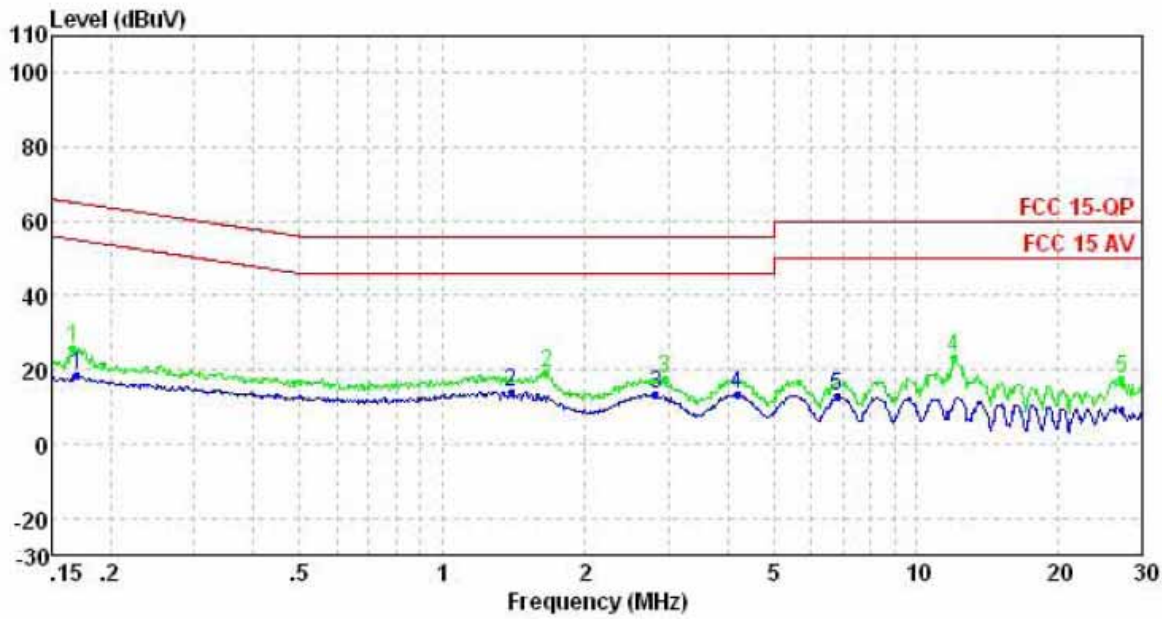
: RBW:9.000KHz VBW:30.000KHz

| | Freq | Level | Limit | Over | Remark | Pol/Phase |
|-------|-------|-------|-------|--------|---------|-----------|
| | MHz | dBuV | dBuV | dB | | |
| 1 | 0.17 | 19.22 | 54.94 | -35.72 | Average | LINE |
| 2 | 0.29 | 18.31 | 50.50 | -32.19 | Average | LINE |
| 3 Max | 1.82 | 17.16 | 46.00 | -28.84 | Average | LINE |
| 4 | 4.55 | 17.33 | 46.00 | -28.67 | Average | LINE |
| 5 | 7.29 | 16.84 | 50.00 | -33.16 | Average | LINE |
| 6 | 12.45 | 15.95 | 50.00 | -34.05 | Average | LINE |

Condition:

: RBW:9.000KHz VBW:30.000KHz

| | Freq | Level | Limit | Over | Remark | Pol/Phase |
|-------|-------|-------|-------|--------|--------|-----------|
| | MHz | dBuV | dBuV | dB | | |
| 1 | 0.17 | 26.47 | 64.94 | -38.47 | Peak | LINE |
| 2 | 0.42 | 23.29 | 57.42 | -34.13 | Peak | LINE |
| 3 Max | 0.69 | 23.08 | 56.00 | -32.92 | Peak | LINE |
| 4 | 1.66 | 22.79 | 56.00 | -33.21 | Peak | LINE |
| 5 | 4.38 | 21.60 | 56.00 | -34.40 | Peak | LINE |
| 6 | 12.25 | 23.19 | 60.00 | -36.81 | Peak | LINE |



Condition:

: RBW:9.000KHz VBW:30.000KHz

| | Freq | Level | Limit | Over | Remark | Pol/Phase |
|-------|------|-------|-------|--------|---------|-----------|
| | MHz | dBuV | dBuV | dB | | |
| 1 | 0.17 | 18.40 | 54.99 | -36.59 | Average | NEUTRAL |
| 2 | 1.40 | 14.07 | 46.00 | -31.93 | Average | NEUTRAL |
| 3 | 2.82 | 13.21 | 46.00 | -32.79 | Average | NEUTRAL |
| 4 Max | 4.20 | 13.17 | 46.00 | -32.83 | Average | NEUTRAL |
| 5 | 6.81 | 12.86 | 50.00 | -37.14 | Average | NEUTRAL |

Condition:

: RBW:9.000KHz VBW:30.000KHz

| | Freq | Level | Limit | Over | Remark | Pol/Phase |
|-------|-------|-------|-------|--------|--------|-----------|
| | MHz | dBuV | dBuV | dB | | |
| 1 | 0.17 | 25.91 | 65.12 | -39.21 | Peak | NEUTRAL |
| 2 | 1.66 | 18.98 | 56.00 | -37.02 | Peak | NEUTRAL |
| 3 | 2.95 | 17.71 | 56.00 | -38.29 | Peak | NEUTRAL |
| 4 Max | 12.00 | 23.21 | 60.00 | -36.79 | Peak | NEUTRAL |
| 5 | 27.13 | 17.60 | 60.00 | -42.40 | Peak | NEUTRAL |

8. RADIATED EMISSION TEST

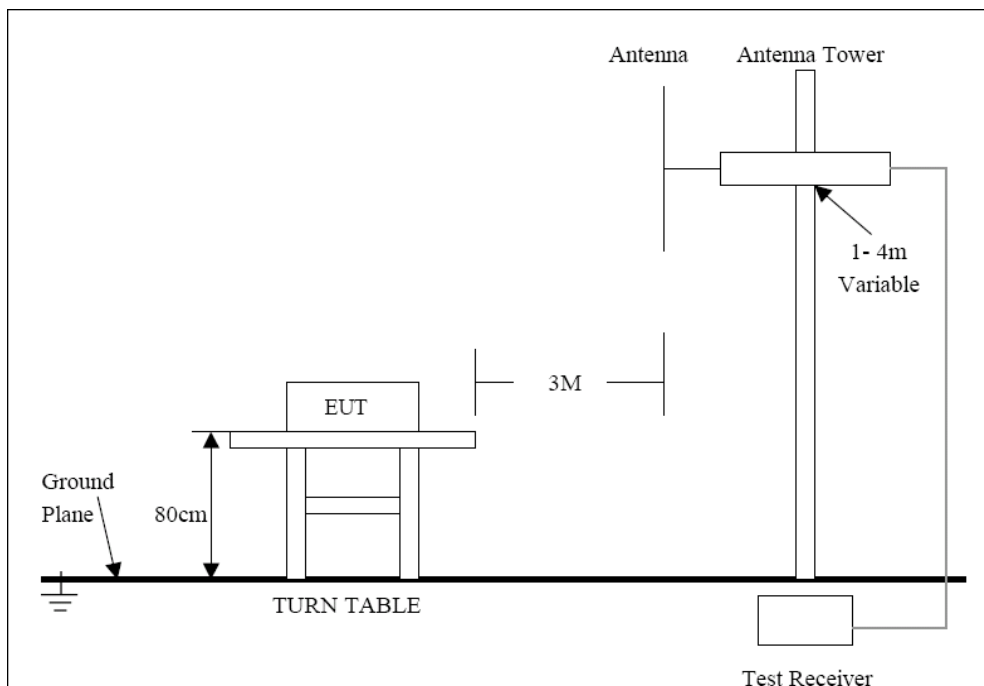
8.1. Test Equipment

Please refer to section 5 this report.

8.2. Test Procedure

1. The EUT was tested according C63.4-2003.The radiated test was performed at FCC Registration laboratory .
2. The EUT,peripherals were put on the turntable which table size od 1m×1.5m,table high 0.8m.All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30MHZ to 1 GHZ was investigated.All readings from 30MHZ to 1 GHZ are quasi-peak values with a resolution bandwidth of 120 KHZ. All readings are above 1GHZ ,prak values with a resolution bandwidth of 1 MHZ.Measurements were made at 3 merers.
4. The antenna high is varied from 1m to 4m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six(6)highest emissions to ensure EUT compliance is with all installation combinations.All data was recorded in the peak detection mode.Quasi-peak readings was performed only when an emission was found to be marginal (within -4 Db of specification limit),and are distinguished with a “QP”in the data table.
6. The antenna polarization:Vertical polarization and Horizontal polarization.
7. Through three orthogonal axes to determine which attitude and equipment arrangement produces the highest emission relative to the limit.

8.3. Radiated Test Setup



For the accrual test configuration,please refer to the related items-photos of Testing.

8.4. Radiated Emission Limit

All emission from a digital device,including any network of conductors and apparatus connected thereto,shall not exceed the level of field strength specified below :

A . FCC Part 15 Subpart C Paragraph 15.249(a) Limit

| Frequency (MHZ) | Distance (m) | Field Strength (dBuV/m) |
|-----------------|--------------|-------------------------|
| 30-88 | 3 | 40.0 |
| 88-*216 | 3 | 43.5 |
| 216-960 | 3 | 46.0 |
| ABOVE 960 | 3 | 54.0 |

- Note: (1) RF Voltage (dBuV)=20 log Voltage(uV)
 (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 (3) The emission limit in this paragraph os based on measurement instrumentation employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

B.Frequencies in restricted band are complied to limit on Paragraph 15.209.

| Fundamental Frequency (MHZ) | Field as trength of Fundamental(3m) | | | Field as trength of Harmonics(3m) | | |
|-----------------------------|-------------------------------------|--------|------------|-----------------------------------|--------|----------|
| | mV/m | dBuV/m | | uV/m | dBuV/m | |
| 902~928 | 50 | 94(AV) | 114(Peak) | 500 | 54(AV) | 74(Peak) |
| 2400~2483.5 | 50 | 94(AV) | 114(Peak) | 500 | 54(AV) | 74(Peak) |

- Note: (1) RF Voltage (dBuV)=20 log Voltage(uV)
 (2) In the Above Table,the tighter limit applies at the band edges.
 (3) Distaqnce refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

8.5. Radiated Emission Test Result

Pass

A. Fundamental Radiated Emissions Data

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|-----------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| Peak Detector: | | | | | |
| 908.396 | 26.947 | 65.100 | 92.046 | -21.954 | 114.000 |
| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
| Vertical | | | | | |
| Peak Detector: | | | | | |
| 908.440 | 28.639 | 57.000 | 85.639 | -28.361 | 114.000 |

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

B.Harmonics Radiated Emissions Data

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|-----------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| Peak Detector: | | | | | |
| 1816.840 | -4.025 | 46.000 | 41.975 | -32.025 | 74.000 |
| 2725.260 | 0.525 | 47.690 | 48.215 | -25.785 | 74.000 |
| 3633.680 | 0.488 | 44.680 | 45.168 | -28.832 | 74.000 |
| 4542.100 | 3.020 | 43.230 | 46.249 | -27.751 | 74.000 |
| 5450.520 | 4.414 | 42.580 | 46.994 | -27.006 | 74.000 |
| Vertical | | | | | |
| Peak Detector: | | | | | |
| 1816.840 | -3.025 | 49.790 | 46.765 | -27.235 | 74.000 |
| 2725.260 | -0.018 | 45.740 | 45.722 | -28.278 | 74.000 |
| 3633.680 | 0.617 | 45.130 | 45.747 | -28.253 | 74.000 |
| 4542.100 | 3.765 | 43.620 | 47.385 | -26.615 | 74.000 |
| 5450.520 | 5.776 | 43.040 | 48.816 | -25.184 | 74.000 |

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
4. Emissions attenuated more than 20 dB below the permissible value are not reported.

C. General Radiated Emissions Data

| Frequency | Correct | Reading | Measurement | Margin | Limit |
|-------------------|---------|---------|-------------|---------|--------|
| | Factor | Level | Level | | |
| MHz | dB | dBuV | dBuV/m | dB | dBuV/m |
| Horizontal | | | | | |
| 41.640 | -6.267 | 34.686 | 28.419 | -11.581 | 40.000 |
| 400.540 | 0.780 | 25.630 | 26.410 | -19.590 | 46.000 |
| 472.320 | 2.790 | 29.303 | 32.093 | -13.907 | 46.000 |
| 544.100 | 4.151 | 25.706 | 29.857 | -16.143 | 46.000 |
| 577.080 | 2.983 | 26.765 | 29.748 | -16.252 | 46.000 |
| 602.300 | 3.558 | 24.917 | 28.475 | -17.525 | 46.000 |
| Vertical | | | | | |
| 55.220 | -11.053 | 45.127 | 34.074 | -5.926 | 40.000 |
| 82.380 | -4.415 | 35.896 | 31.481 | -8.519 | 40.000 |
| 159.980 | -5.222 | 32.300 | 27.077 | -16.423 | 43.500 |
| 305.480 | -4.171 | 33.704 | 29.533 | -16.467 | 46.000 |
| 369.500 | -0.612 | 39.501 | 38.889 | -7.111 | 46.000 |
| 604.240 | 1.964 | 24.641 | 26.606 | -19.394 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor
3. Emissions attenuated more than 20 dB below the permissible value are not reported.

9. BAND EDGE

9.1. Test Equipment

Please refer to Section 5 this report.

9.2. Test Procedure

1. The EUT was tested according C63.4-2003.The radiated test was performed at FCC Registration laboratory .
2. The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.
- 3.As the radiation test ,set the Lowest and Highest Transmitting Channel,observed the outside band of 2400MHz to 2438.5MHz,than mark the higher-level emission for comparing with the FCC rules.

9.3. Band Edge FCC 15.249(d) Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating,the radio frequency power that is produced by the intentional radiator shall be at least 50dB

below that in the 100kHz bandwidth within the band that contains the desired power,based on either an RF conducted or a radited measurement,Attenuation below the general limits specified in Section 15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands as defined in Section 15.205(a),must also comply with the radiated emission limits specitfied in Section 15.209(a) (see Section 15.205(c)).

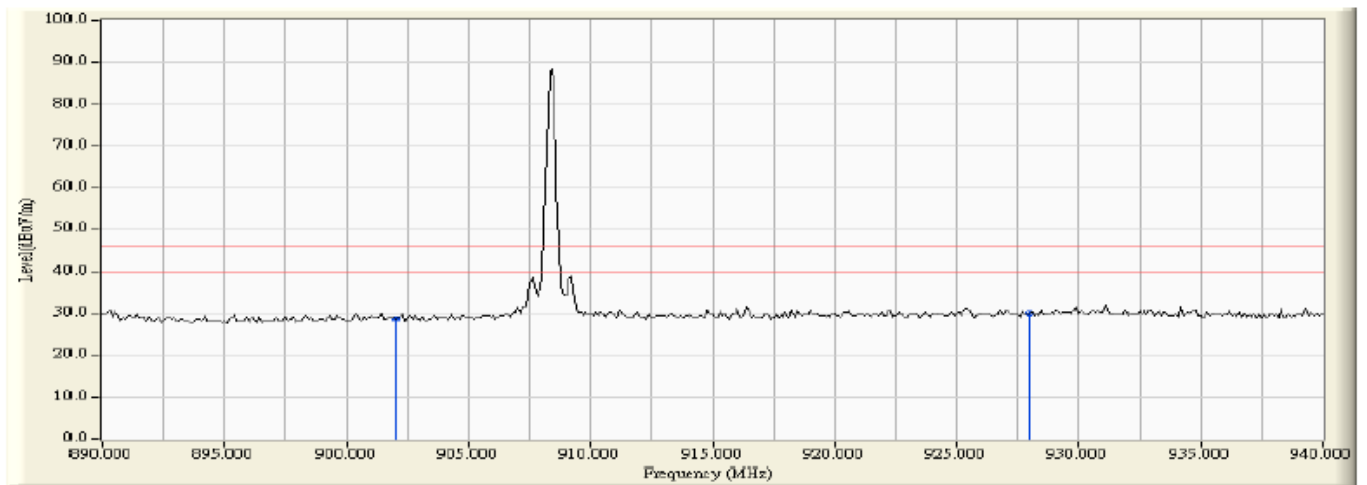
9.4. Band Edge Test Result

Pass

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Quasi-Peak Limit (dBuV/m) | Result |
|----------------|-----------------|---------------------|----------------------|-------------------------|---------------------------|--------|
| 01(Quasi-Peak) | 902.000 | 5.169 | 23.565 | 28.734 | 46.000 | Pass |
| 01(Quasi-Peak) | 928.000 | 6.365 | 23.780 | 30.145 | 46.000 | Pass |

Figure Channel 01: Horizontal (Quasi-Peak)



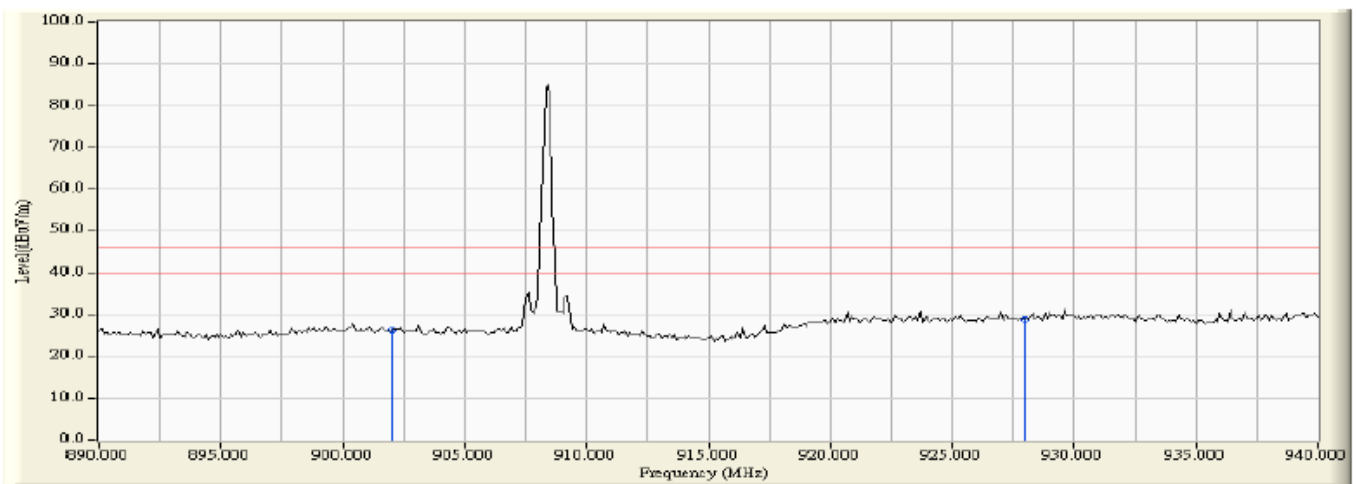
Note:

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

RF Radiated Measurement (Vertical):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Quasi-Peak Limit (dBuV/m) | Result |
|----------------|-----------------|---------------------|----------------------|-------------------------|---------------------------|--------|
| 01(Quasi-Peak) | 902.000 | 2.696 | 23.471 | 26.167 | 46.000 | Pass |
| 01(Quasi-Peak) | 928.000 | 5.677 | 23.334 | 29.011 | 46.000 | Pass |

Figure Channel 01: Vertical (Quasi-Peak)



Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.