

TEST REPORT

of

FCC Part 15 Subpart C

New Application; Class I PC; Class II PC

Product : **Sapphire Blue Optical Mouse**

Brand: **GIGABYTE**

Model: **GM-AIRE M73**

Model Difference: **N/A**

FCC ID: **JCK28713AIREM73**

FCC Rule Part: **§15.249**

Applicant: **GIGA-BYTE Technology Co., Ltd.**

Address: **No.6, Bao Chiang Road, Hsin-Tien Dist., New Taipei City 231, Taiwan**

Test Performed by:

International Standards Laboratory

<Lung-Tan LAB>

*Site Registration No.

BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

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Report No.: **ISL-13LR149FC**

Issue Date : **2013/08/16**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

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VERIFICATION OF COMPLIANCE

Applicant: GIGA-BYTE Technology Co., Ltd.
Product Description: Sapphire Blue Optical Mouse
Brand Name: GIGABYTE
FCC ID: JCK28713AIREM73
FCC Rule Part: §15.249
Model No.: GM-AIRE M73
Model Difference: N/A
Date of test: 2013/08/13 ~2013/08/15
Date of EUT Received: 2013/08/13

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:



Date:

2013/08/16

Dion Chang / Engineer

Prepared By:



Date:

2013/08/16

Gigi Yeh / Specialist

Approved By:



Date:

2013/08/16

Vincent Su / Technical Manager

Version

| Version No. | Date | Description |
|-------------|------------|------------------------------|
| 00 | 2013/08/16 | Initial creation of document |
| | | |

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1 GENERAL INFORMATION

1.1 Product Description

| | |
|----------------------|---|
| Product Name: | Sapphire Blue Optical Mouse |
| Brand Name: | GIGABYTE |
| Model Name: | GM-AIRE M73 |
| Model Difference: | N/A |
| Operation Frequency: | 2408MHz 2410 MHz 2412 MHz 2414 MHz 2416 MHz 2418 MHz 2420 MHz 2422 MHz 2424 MHz 2426 MHz 2428 MHz 2430 MHz 2432MHz 2434 MHz 2436 MHz 2438 MHz 2440 MHz 2442 MHz 2444 MHz 2446 MHz 2448 MHz 2450 MHz 2452 MHz 2454 MHz 2456 MHz 2458 MHz 2460 MHz 2462 MHz 2464 MHz 2466 MHz 2468 MHz 2470 MHz 2472 MHz 2474 MHz |
| Channel number: | 34 channels |
| Modulation Type: | FSK |
| Power Supply: | 1.5V dc form 1*AAA battery |
| Antenna Designation: | Printed Antenna |

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **JCK28713AIREM73** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd., Lung-Tan Hsiang, Tao Yuan County 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number is: TW1036, Canada Registration Number: 4067B-3.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2 System Test Configuration

2.1 EUT Configuration

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

2.2 EUT Exercise

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

2.4 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|------------------------------|-----------------|--------------|------------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Conduction 04-1 Cable | WOKEN | CFD 300-NL | Conduction 04 -1 | 09/10/2012 | 09/10/2013 |
| EMI Receiver 16 | Rohde & Schwarz | ESCI | 101221 | 06/13/2013 | 06/13/2014 |
| LISN 18 | ROHDE & SCHWARZ | ENV216 | 101424 | 03/13/2013 | 03/13/2014 |
| LISN 19 | ROHDE & SCHWARZ | ENV216 | 101425 | 03/13/2013 | 03/13/2014 |

| Chamber 14(966) | | | | | |
|-------------------------------|---------------|------------------------------|---------------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Spectrum Analyzer 21(26.5GHz) | Agilent | N9010A | MY49060537 | 07/18/2013 | 07/17/2014 |
| Spectrum Analyzer 20(6.5GHz) | Agilent | E4443A | MY48250315 | 05/26/2013 | 05/25/2014 |
| Spectrum Analyzer 22(43GHz) | R&S | FSU43 | 100143 | 05/03/2013 | 05/02/2014 |
| Loop Antenna9K-30M | A.H.SYSTEM | SAS-564 | 294 | 03/07/2013 | 03/06/2015 |
| Bilog Antenna30-1G | Schaffner | CBL 6112B | 2756 | 01/11/2013 | 01/10/2014 |
| Horn antenna1-18G(06) | EMCO | 3117 | 0006665 | 10/15/2012 | 10/14/2013 |
| Horn antenna26-40G(05) | Com-power | AH-640 | 100A | 01/09/2013 | 01/08/2015 |
| Horn antenna18-26G(04) | Com-power | AH-826 | 081001 | 05/15/2013 | 05/14/2015 |
| Preamplifier9-1000M | HP | 8447D | NA | 02/19/2013 | 02/18/2014 |
| Preamplifier1-18G | MITEQ | AFS44-001018 00-25-10P-44 | 1329256 | 07/18/2013 | 07/17/2014 |
| Preamplifier1-26G | EM | EM01M26G | NA | 02/26/2013 | 02/25/2014 |
| Preamplifier26-40G | MITEQ | JS-26004000-2 7-5A | 818471 | 05/08/2013 | 05/07/2015 |
| Cable1-18G | HUBER SUHNER | Sucoflex 106 | NA | 09/07/2012 | 09/06/2013 |
| Cable UP to 1G | HUBER SUHNER | RG 214/U | NA | 10/08/2012 | 10/07/2013 |
| SUCOFLEX 1GHz~40GHz cable | HUBER SUHNER | Sucoflex 102 | 27963/2&3742 1/2 | 09/21/2011 | 09/20/2013 |
| 2.4G Filter | Micro-Tronics | Brm50702 | 76 | 12/27/2012 | 12/26/2013 |

2.5 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

| Frequency (MHz) | Conducted Limit (dBuV) | |
|--------------------|------------------------|---------|
| | Quasi-Peak | Average |
| 0.15 – 0.5 | 66 - 56 | 56 - 46 |
| 0.5 – 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

(2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

| Frequency (MHz) | Field strength of Fundamental | Field strength of Harmonics | Distance (m) |
|--------------------|----------------------------------|--------------------------------|--------------|
| 902 - 928 | 50 mV/m (94dBuV/m) | 500 uV/m (54dBuV/m) | 3 |
| 2400 – 2483.5 | 50 mV/m (94dBuV/m) | 500 uV/m (54dBuV/m) | 3 |
| 5725 – 5875 | 50 mV/m (94dBuV/m) | 500 uV/m (54dBuV/m) | 3 |
| 24.0 – 24.25 GHz | 250 mV/m (107.95dBuV/m) | 2500 uV/m (67.95dBuV/m) | 3 |

(3) Radiated Emission 15.249 (d)

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

| Frequency (MHz) | Field strength μV/m | Distance (m) | Field strength at 3m dBμV/m |
|--------------------|------------------------|--------------|--------------------------------|
| 1.705-30 | 30 | 30 | 69.54 |
| 30-88 | 100 | 3 | 40 |
| 88-216 | 150 | 3 | 43.5 |
| 216-960 | 200 | 3 | 46 |
| Above 960 | 500 | 3 | 54 |

(4) Radiated Emission 15.249(e)

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.

2.6 Configuration of Tested System

Fig. 2-1 Configuration of Radiated Emission Test

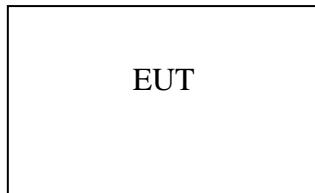


Table 2-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/ Type No. | Series No. | Data Cable | Power Cord |
|------|-----------|-----------|--------------------|------------|------------|------------|
| 1 | N/A | | | | | |

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

3 Summary of Test Results

| FCC Rules | Description Of Test | Result |
|------------------|-----------------------------|-----------|
| §15.207 | Conducted Emission | N/A |
| §15.249(a)(d)(e) | Radiated Emission | Compliant |
| §15.215 (c) | 20dB band width Measurement | Compliant |

4 Description of test modes

The EUT has been tested under operating condition with new battery.

The EUT is staying in continuous transmitting mode

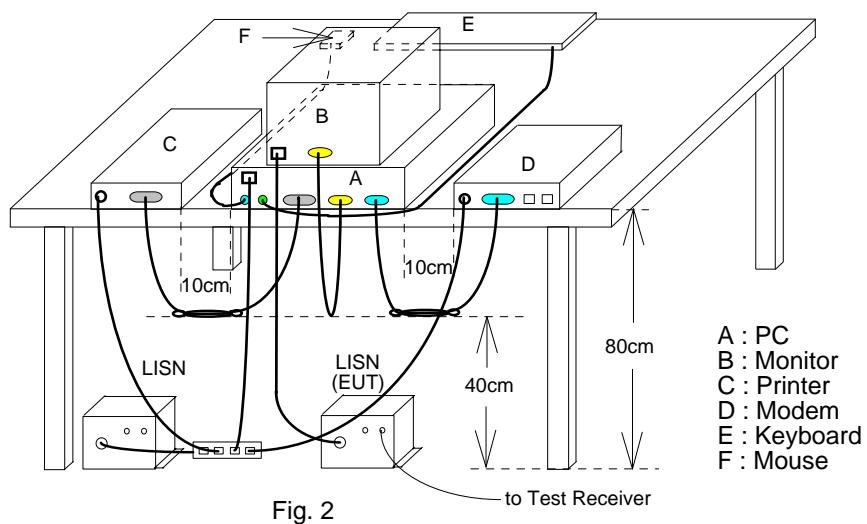
Channel low (2408MHz)、mid (2440MHz) and high (2474MHz) with highest data rate are chosen for full testing.

5 Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

Refer to section 2.4 in this report

5.4 Measurement Result:

N/A.

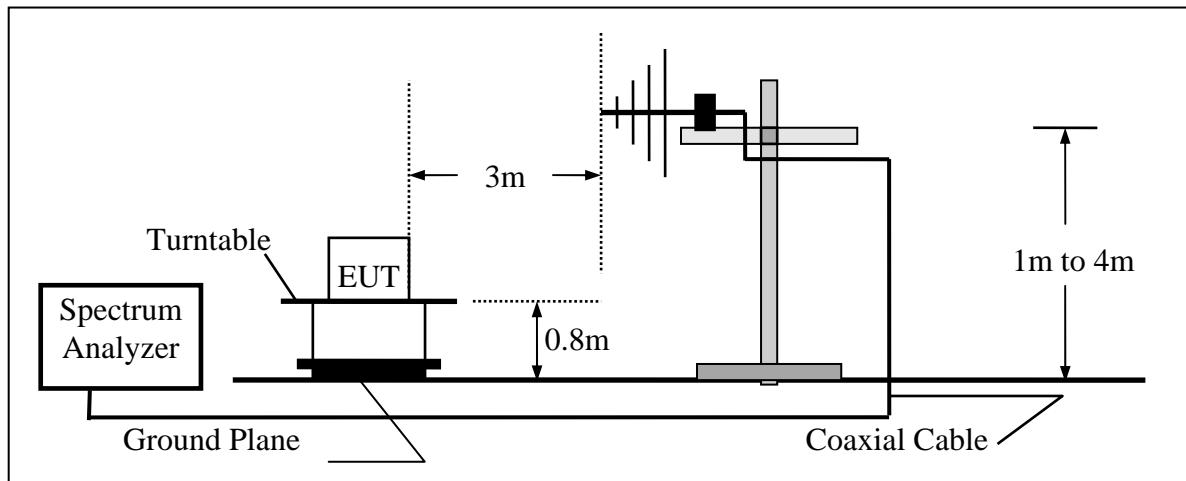
6 Radiated Emission Test

6.1 Measurement Procedure

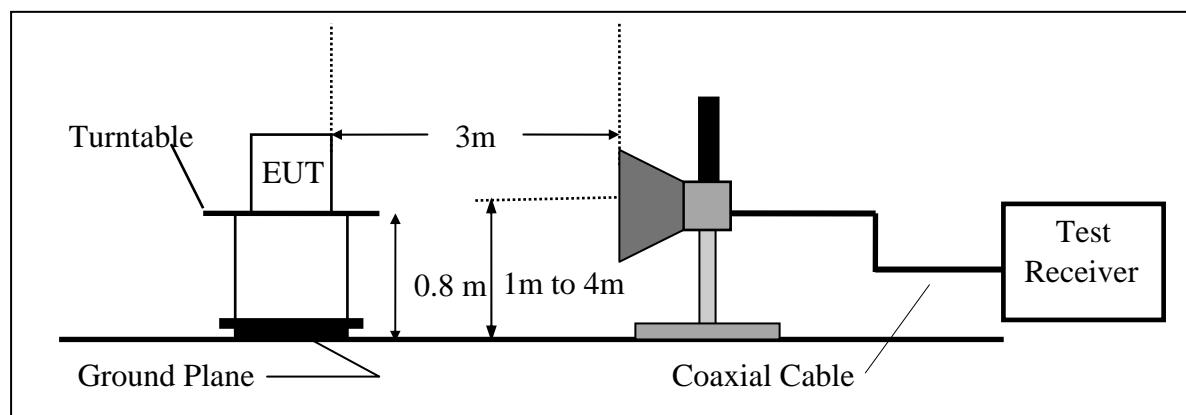
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



6.3 Measurement Equipment Used:

Refer to section 2.4 in this report

6.4 Field Strength Calculation

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

$$\mathbf{FS = RA + AF + CL - AG}$$

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

6.5 Measurement Result

Fundamental Measurement Result

Operation Mode : TX CH Low, Mid, High
 Test Date : 2013/08/13
 Fundamental Frequency : 2408, 2440, 2474MHz
 Test By : Dino
 Temp : 25 °C
 Hum. : 60%

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 2408.00 | 93.67 | -6.97 | 86.70 | 114.00 | -27.30 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 2408.00 | 98.53 | -6.97 | 91.56 | 94.00 | -2.44 | Average | HORIZONTAL |
| 2 | 2408.00 | 101.82 | -6.97 | 94.85 | 114.00 | -19.15 | Peak | HORIZONTAL |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 2440.00 | 93.55 | -6.90 | 86.65 | 114.00 | -27.35 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 2440.00 | 98.21 | -6.90 | 91.31 | 94.00 | -2.69 | Average | HORIZONTAL |
| 2 | 2440.00 | 101.50 | -6.90 | 94.60 | 114.00 | -19.40 | Peak | HORIZONTAL |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 2474.00 | 92.82 | -6.83 | 85.99 | 114.00 | -28.01 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 2474.00 | 98.03 | -6.83 | 91.20 | 94.00 | -2.80 | Average | HORIZONTAL |
| 2 | 2474.00 | 101.32 | -6.83 | 94.49 | 114.00 | -19.51 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (below 1GHz)

| | | | |
|-----------------------|-------------|-----------|--------------|
| Operation Mode | : TX CH Low | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2408 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 152.22 | 24.72 | -13.32 | 11.40 | 43.50 | -32.10 | Peak | VERTICAL |
| 2 | 300.63 | 24.95 | -12.13 | 12.82 | 46.00 | -33.18 | Peak | VERTICAL |
| 3 | 465.53 | 26.38 | -8.84 | 17.54 | 46.00 | -28.46 | Peak | VERTICAL |
| 4 | 565.44 | 26.03 | -7.03 | 19.00 | 46.00 | -27.00 | Peak | VERTICAL |
| 5 | 757.50 | 25.26 | -3.00 | 22.26 | 46.00 | -23.74 | Peak | VERTICAL |
| 6 | 840.92 | 26.21 | -2.18 | 24.03 | 46.00 | -21.97 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 288.02 | 28.03 | -12.42 | 15.61 | 46.00 | -30.39 | Peak | HORIZONTAL |
| 2 | 335.55 | 29.29 | -11.35 | 17.94 | 46.00 | -28.06 | Peak | HORIZONTAL |
| 3 | 623.64 | 29.45 | -5.71 | 23.74 | 46.00 | -22.26 | Peak | HORIZONTAL |
| 4 | 755.56 | 26.44 | -3.02 | 23.42 | 46.00 | -22.58 | Peak | HORIZONTAL |
| 5 | 873.90 | 25.29 | -1.57 | 23.72 | 46.00 | -22.28 | Peak | HORIZONTAL |
| 6 | 984.48 | 28.49 | -0.08 | 28.41 | 54.00 | -25.59 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

| | | | |
|-----------------------|-------------|-----------|--------------|
| Operation Mode | : TX CH Mid | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2440 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 286.08 | 25.31 | -12.46 | 12.85 | 46.00 | -33.15 | Peak | VERTICAL |
| 2 | 574.17 | 26.48 | -6.80 | 19.68 | 46.00 | -26.32 | Peak | VERTICAL |
| 3 | 667.29 | 26.60 | -5.01 | 21.59 | 46.00 | -24.41 | Peak | VERTICAL |
| 4 | 755.56 | 26.08 | -3.02 | 23.06 | 46.00 | -22.94 | Peak | VERTICAL |
| 5 | 916.58 | 26.03 | -0.78 | 25.25 | 46.00 | -20.75 | Peak | VERTICAL |
| 6 | 967.99 | 25.60 | -0.18 | 25.42 | 54.00 | -28.58 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 262.80 | 26.23 | -13.51 | 12.72 | 46.00 | -33.28 | Peak | HORIZONTAL |
| 2 | 482.02 | 25.96 | -8.68 | 17.28 | 46.00 | -28.72 | Peak | HORIZONTAL |
| 3 | 565.44 | 26.19 | -7.03 | 19.16 | 46.00 | -26.84 | Peak | HORIZONTAL |
| 4 | 743.92 | 25.32 | -3.23 | 22.09 | 46.00 | -23.91 | Peak | HORIZONTAL |
| 5 | 829.28 | 26.68 | -2.32 | 24.36 | 46.00 | -21.64 | Peak | HORIZONTAL |
| 6 | 984.48 | 27.03 | -0.08 | 26.95 | 54.00 | -27.05 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

| | | | |
|-----------------------|--------------|-----------|--------------|
| Operation Mode | : TX CH High | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2474 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 159.01 | 25.58 | -13.25 | 12.33 | 43.50 | -31.17 | Peak | VERTICAL |
| 2 | 329.73 | 25.35 | -11.44 | 13.91 | 46.00 | -32.09 | Peak | VERTICAL |
| 3 | 497.54 | 26.53 | -8.54 | 17.99 | 46.00 | -28.01 | Peak | VERTICAL |
| 4 | 629.46 | 26.46 | -5.62 | 20.84 | 46.00 | -25.16 | Peak | VERTICAL |
| 5 | 788.54 | 26.58 | -2.75 | 23.83 | 46.00 | -22.17 | Peak | VERTICAL |
| 6 | 915.61 | 25.50 | -0.81 | 24.69 | 46.00 | -21.31 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 335.55 | 29.05 | -11.35 | 17.70 | 46.00 | -28.30 | Peak | HORIZONTAL |
| 2 | 512.09 | 26.10 | -8.25 | 17.85 | 46.00 | -28.15 | Peak | HORIZONTAL |
| 3 | 647.89 | 29.61 | -5.33 | 24.28 | 46.00 | -21.72 | Peak | HORIZONTAL |
| 4 | 755.56 | 26.32 | -3.02 | 23.30 | 46.00 | -22.70 | Peak | HORIZONTAL |
| 5 | 924.34 | 27.34 | -0.67 | 26.67 | 46.00 | -19.33 | Peak | HORIZONTAL |
| 6 | 984.48 | 27.13 | -0.08 | 27.05 | 54.00 | -26.95 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

| | | | |
|-----------------------|-------------|-----------|--------------|
| Operation Mode | : TX CH Low | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2408 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 4816.00 | 43.56 | 1.29 | 44.85 | 74.00 | -29.15 | Peak | VERTICAL |
| 2 | 7224.00 | 43.92 | 7.93 | 51.85 | 74.00 | -22.15 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 4816.00 | 47.21 | 1.29 | 48.50 | 74.00 | -25.50 | Peak | HORIZONTAL |
| 2 | 7224.00 | 42.93 | 7.93 | 50.86 | 74.00 | -23.14 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

| | | | |
|-----------------------|-------------|-----------|--------------|
| Operation Mode | : TX CH Mid | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2440 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 4880.00 | 44.62 | 1.48 | 46.10 | 74.00 | -27.90 | Peak | VERTICAL |
| 2 | 7320.00 | 44.16 | 8.03 | 52.19 | 74.00 | -21.81 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 4880.00 | 47.27 | 1.48 | 48.75 | 74.00 | -25.25 | Peak | HORIZONTAL |
| 2 | 7320.00 | 40.32 | 8.03 | 48.35 | 74.00 | -25.65 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

| | | | |
|-----------------------|--------------|-----------|--------------|
| Operation Mode | : TX CH High | Test Date | : 2013/08/13 |
| Fundamental Frequency | : 2474 MHz | Test By | : Dino |
| Temp | : 25 °C | Hum. | : 60% |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 4948.00 | 41.16 | 1.70 | 42.86 | 74.00 | -31.14 | Peak | VERTICAL |
| 2 | 7422.00 | 41.37 | 8.13 | 49.50 | 74.00 | -24.50 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 4948.00 | 44.22 | 1.70 | 45.92 | 74.00 | -28.08 | Peak | HORIZONTAL |
| 2 | 7422.00 | 37.22 | 8.13 | 45.35 | 74.00 | -28.65 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (Band Edge)

Operation Mode : Band Edge Test Date : 2013/08/13
 Temp./Hum. : 25 °C / : 60% Test By : Dino

CH Low

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 2396.60 | 60.20 | -6.99 | 53.21 | 74.00 | -20.79 | Peak | VERTICAL |
| 2 | 2400.00 | 53.44 | -6.99 | 46.45 | 74.00 | -27.55 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 2396.50 | 55.78 | -6.99 | 48.79 | 54.00 | -5.21 | Average | HORIZONTAL |
| 2 | 2396.50 | 67.17 | -6.99 | 60.18 | 74.00 | -13.82 | Peak | HORIZONTAL |
| 3 | 2400.00 | 49.09 | -6.99 | 42.10 | 54.00 | -11.90 | Average | HORIZONTAL |
| 4 | 2400.00 | 60.47 | -6.99 | 53.48 | 74.00 | -20.52 | Peak | HORIZONTAL |

CH High

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 2483.50 | 53.00 | -6.81 | 46.19 | 74.00 | -27.81 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 2483.50 | 48.39 | -6.81 | 41.58 | 54.00 | -12.42 | Average | HORIZONTAL |
| 2 | 2483.50 | 59.77 | -6.81 | 52.96 | 74.00 | -21.04 | Peak | HORIZONTAL |
| 3 | 2484.25 | 49.46 | -6.81 | 42.65 | 54.00 | -11.35 | Average | HORIZONTAL |
| 4 | 2484.25 | 60.84 | -6.81 | 54.03 | 74.00 | -19.97 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

7 20 dB Band Width Measurement

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span =10MHz.
4. Set SPA Max hold. Mark peak, -20dB.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

7.4 Measurement Results:

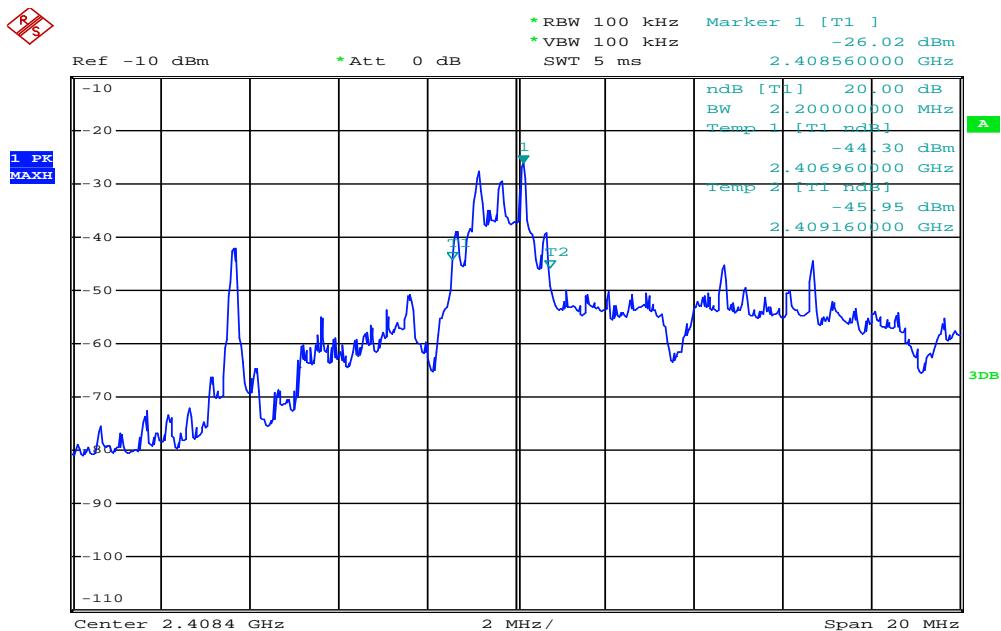
2408 Channel = 2.200MHz

2440 Channel = 2.200MHz

2474 Channel = 2.280MHz

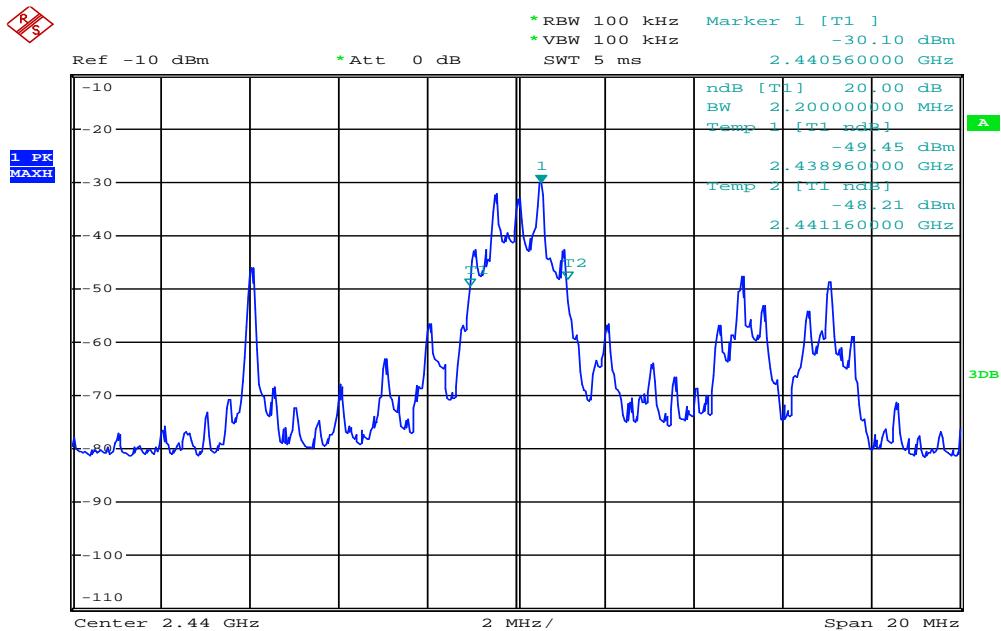
Refer to attached data chart.

20dB Bandwidth Test Data CH-Low



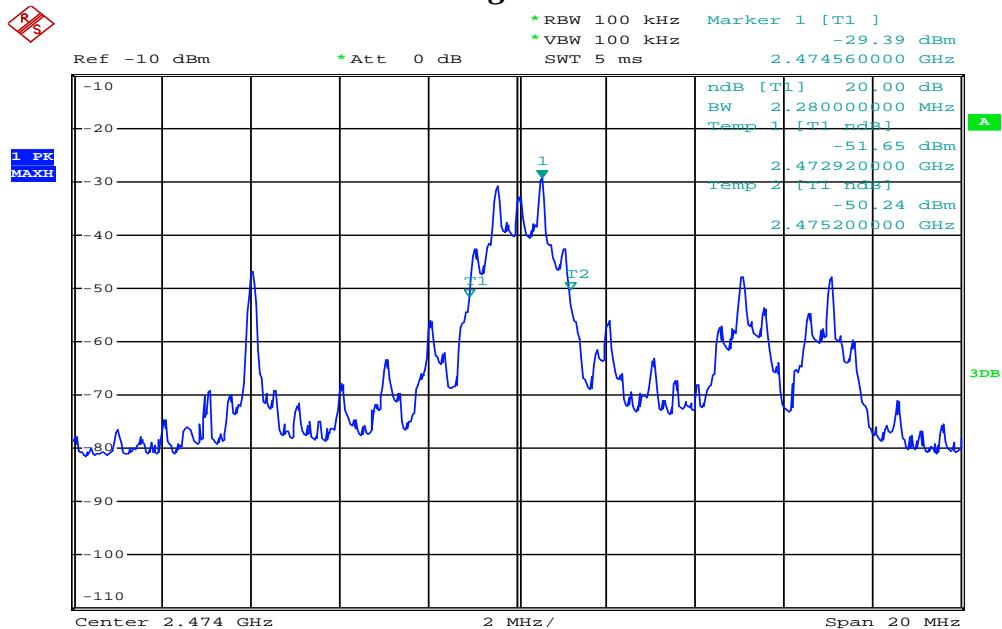
Date: 12.AUG.2013 15:47:09

20dB Bandwidth Test Data CH-Mid



Date: 12.AUG.2013 15:47:54

20dB Bandwidth Test Data CH-High



Date: 12.AUG.2013 15:48:39