



Hong Kong

FCC – Test report

Report Number : **60/790.14.004.01** Date of Issue: 15th May 2014

Model : **RAR213HG**

Product Type : **BLE connected IN/out thermo-hygrometer with clock**

Applicant : **IDT Technology Limited**

Address : **Block C,9/F., Kaiser Estate,Phase1,41 Man Yue Street, Hunghom, Kowloon , Hong Kong**

Production Facility : **IDT Technology Limited**

Address : **Block C,9/F., Kaiser Estate,Phase1,41 Man Yue Street, Hunghom, Kowloon , Hong Kong**

Test Result : **Positive** **Negative**

Total pages including Appendices : 29

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Report Number: **60/790.14.004.01**

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Rev. no.: 2.1



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2. Details about the Test Laboratory

Details about the Test Laboratory

Test site 1

Company name: TÜV SÜD HONG KONG LTD.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin
HK.

Telephone: 852 2776 1323

Fax: 852 2776 1372

Test site 2

Company name: Audix Technology(Shenzhen) Co., Ltd.
No.6,Ke Feng Road,Block 52,Shenzhen Science & Industry
Park,Nanshan,Shenzhen,Guangdong,China (518057)

Test site 3

Company name: TMC-Telecommunication Metrology Center of M.I.I.T
No 52 Hua Yuanbei Road, Haidian District, Beijing, P.R.China

3. Description of the Equipment Under Test

Description of the Equipment Under Test

| | |
|----------------------------|---|
| Product: | BLE connected IN/out thermo-hygrometer with clock |
| Model no.: | RAR213HG |
| Serial number: | NIL |
| Options and accessories: | NIL |
| FCC ID: | NMTRAR213HG-01 |
| Rated Voltage: | 3 VDC |
| Rated Current: | NIL |
| Rated Power: | NIL |
| Frequency: | 2402-2480MHz |
| RF Transmission Frequency: | 2402-2480MHz |
| Antenna gain: | 0 dBi |
| No. of Operated Channel: | 40 |
| Modulation: | GFSK |
| Description of the EUT: | Battery operated – 3V battery(2*AA) |



Hong Kong

4. Summary of Test Standards

| Test Standards | |
|---|--|
| FCC Part 15 Subpart C, Intentional Radiators, 10-1-12 Edition | PART 15 – RADIO FREQUENCY DEVICES Subpart C – Intentional Radiators |



5. Summary of Test Standards and Results

| Emission Tests | | | | | |
|--|-------|-----------|-------------------------------------|--------------------------|-------------------------------------|
| Test Condition | Pages | Test site | Test Result | | |
| | | | Pass | Fail | N/A |
| FCC§15.207(a) – AC Line Conducted Emissions | 8 | Site 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| FCC §2.1051 & §15.247(d) – Spurious Emissions at Antenna Terminals | 11 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.205, §15.209 & §15.247(d) – Spurious Radiated Emissions | 14 | Site 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.247(a)(2) – 6 dB Bandwidth | 18 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.247(b) – Peak Output Power | 21 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.247(d) – 100 kHz Bandwidth of Band Edges | 24 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.247(e) – Power Spectral Density | 26 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FCC §15.203 – Antenna Requirements | 29 | Site 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: NMTRAR213HG-01 complies with the FCC Part 15, Subpart C Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

SUMMARY:

All tests according to the regulations cited on page 6 were

- - Performed
- - **Not** Performed

The Equipment Under Test

- - **Fulfills** the general approval requirements.
- - **Does not** fulfill the general approval requirements.


Sample Received Date: 03rd April 2014

Testing Start Date: 04th April 2014

Testing End Date: 20th April 2014

- TÜV SÜD HONG KONG LTD. -

Reviewed by:


Edmond FUNG

Prepared by:


CHAN Kwong Ngai



Hong Kong

7. Emission Test Results

7.1 AC Line Conducted Emissions

Date of test : 15th April 2014

Test requirement : FCC §2.1051 & §15.247(d)

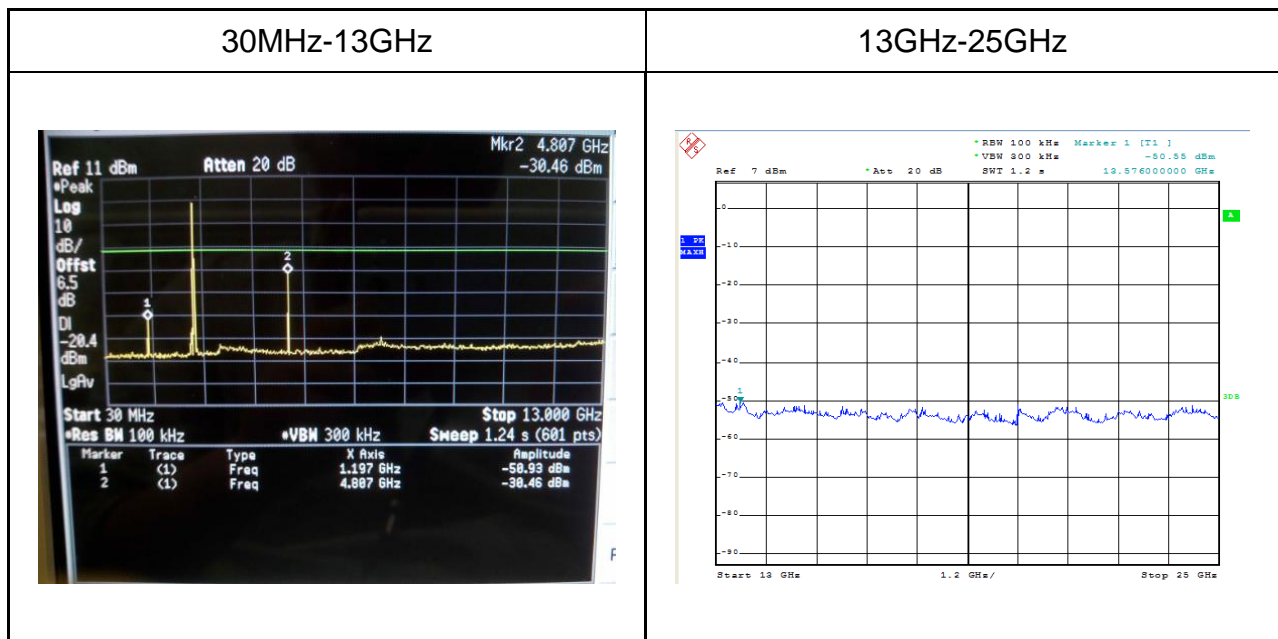
Test method : Conducted

Operating mode : Transmit mode

Remarks : NIL(Battery operated only)

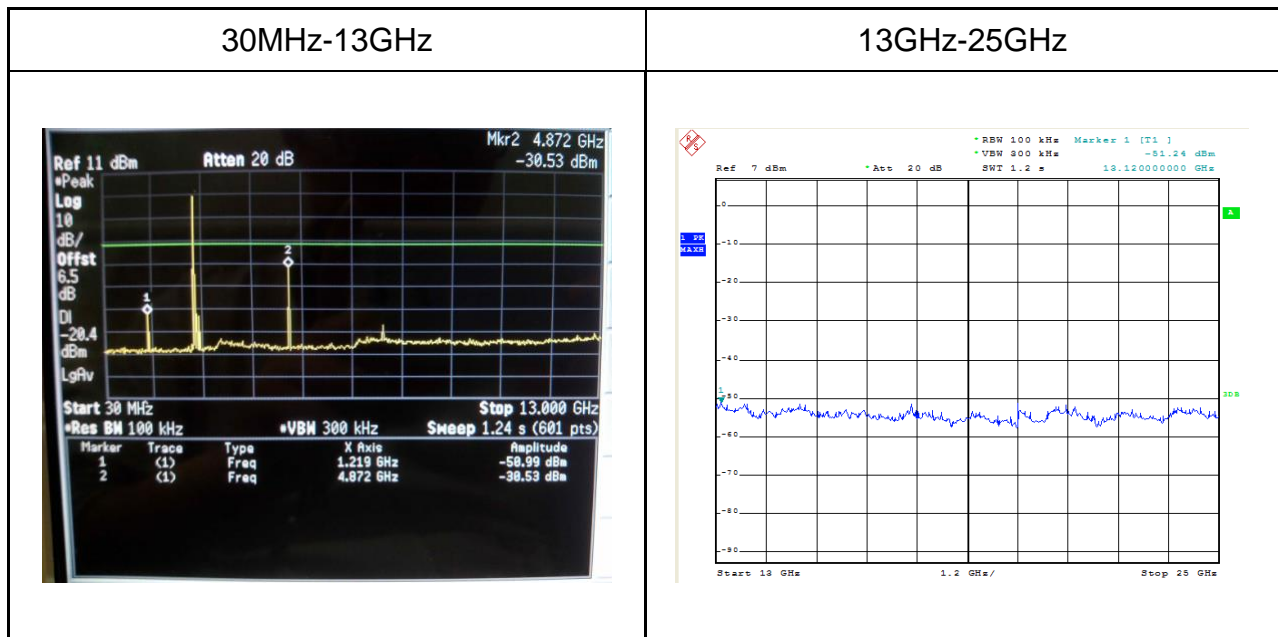
7.2 Spurious Emissions at Antenna Terminals

Date of test : 15th April 2014
 Test requirement : FCC §2.1051 & §15.247(d)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks : 30MHz-25GHz



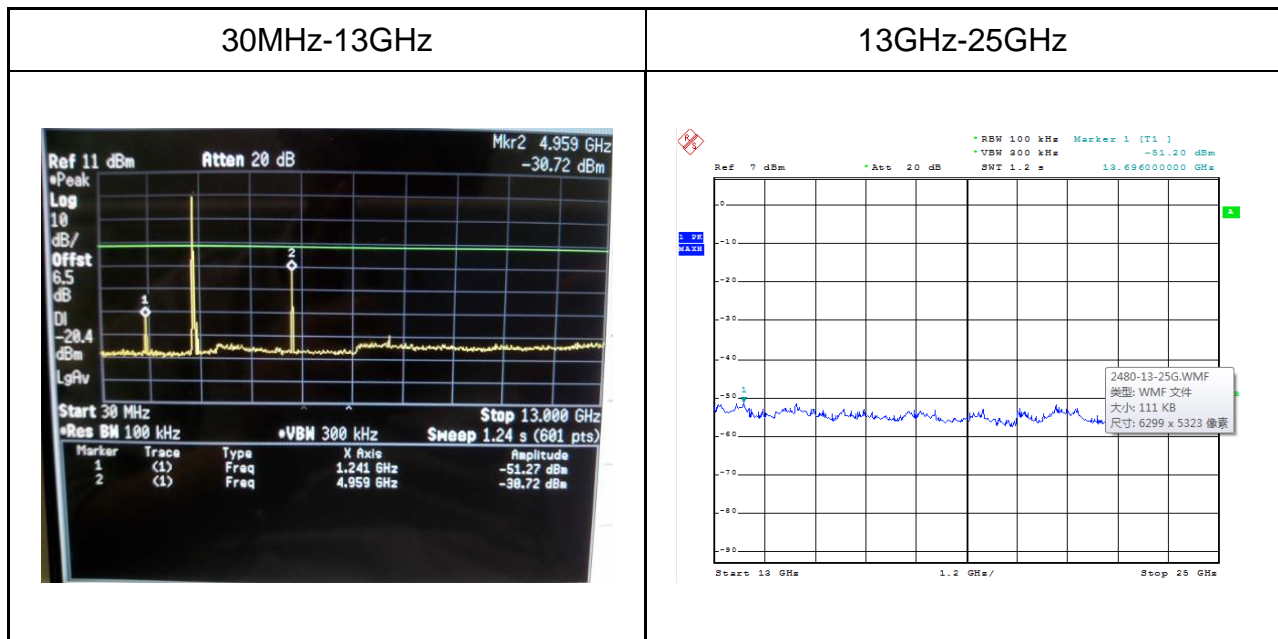
Remark: No emissions were detected below 30MHz.

Date of test : 15th April 2014
 Test requirement : FCC §2.1051 & §15.247(d)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks : 30MHz-25GHz



Remark: No emission were detected below 30MHz.

Date of test : 15th April 2014
 Test requirement : FCC §2.1051 & §15.247(d)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks : 30MHz-25GHz



Remark: No emission were detected below 30MHz.

7.3 Spurious Radiated Emissions

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2480MHz(worst case)
 Remarks : 9kHz-1GHz

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Polar. H / V |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|------------------|
| 490.92 | 52.4 | -29.8 | 22.6 | 46.0 | -23.4 | QP | H |
| 750.12 | 46.0 | -25.4 | 20.6 | 46.0 | -25.4 | QP | H |
| 760.86 | 45.3 | -25.3 | 20.0 | 46.0 | -26.0 | QP | H |
| 766.26 | 38.2 | -25.3 | 12.9 | 46.0 | -33.1 | QP | H |
| 908.16 | 39.6 | -23.4 | 16.2 | 46.0 | -29.8 | QP | H |
| 949.98 | 43.0 | -23.0 | 20.0 | 46.0 | -26.0 | QP | H |
| 490.92 | 53.4 | -30.6 | 22.8 | 46.0 | -23.2 | QP | V |
| 662.76 | 56.0 | -27.6 | 28.4 | 46.0 | -17.6 | QP | V |
| 674.16 | 38.4 | -27.5 | 10.9 | 46.0 | -35.1 | QP | V |
| 679.68 | 38.5 | -27.5 | 11.0 | 46.0 | -35.0 | QP | V |
| 687.24 | 52.2 | -27.6 | 24.6 | 46.0 | -21.4 | QP | V |
| 883.68 | 45.3 | -24.6 | 20.7 | 46.0 | -25.3 | QP | V |

Remark: All three frequencies (2042MHz、2440MHz and 2480MHz) were performed test, and the 2480MHz was the worst case.

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks : 1GHz-25GHz

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Polar. H / V |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|---------|------------------|
| 2402 | 82.8 | 1.8 | 84.6 | / | / | / | H |
| 2402 | 69.6 | 1.8 | 71.4 | / | / | / | H |
| 4804 | 41.8 | 5.8 | 47.6 | 74.0 | -26.4 | peak | H |
| 4804 | 30.9 | 5.8 | 36.7 | 54.0 | -17.3 | Average | H |
| 7206 | 40.1 | 6.8 | 46.9 | 74.0 | -27.1 | peak | H |
| 7206 | 30.2 | 6.8 | 37.0 | 54.0 | -17.0 | Average | H |
| 2402 | 96.3 | 1.8 | 98.1 | / | / | / | V |
| 2402 | 85.3 | 1.8 | 87.1 | / | / | / | V |
| 4804 | 63.0 | 5.8 | 68.8 | 74.0 | -5.2 | peak | V |
| 4804 | 45.2 | 5.8 | 51.0 | 54.0 | -3.0 | Average | V |
| 7206 | 40.9 | 6.8 | 47.7 | 74.0 | -26.3 | peak | V |
| 7206 | 30.3 | 6.8 | 37.1 | 54.0 | -16.9 | Average | V |

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks : 1GHz-25GHz

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Polar. H / V |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|---------|------------------|
| 2440 | 83.2 | 1.8 | 85.0 | / | / | / | H |
| 2440 | 70.0 | 1.8 | 71.8 | / | / | / | H |
| 4880 | 42.2 | 5.9 | 48.1 | 74.0 | -25.9 | peak | H |
| 4880 | 31.3 | 5.9 | 37.2 | 54.0 | -16.8 | Average | H |
| 7320 | 40.5 | 6.8 | 47.3 | 74.0 | -26.7 | peak | H |
| 7320 | 30.6 | 6.8 | 37.4 | 54.0 | -16.6 | Average | H |
| 2440 | 96.7 | 1.8 | 98.5 | / | / | / | V |
| 2440 | 85.7 | 1.8 | 87.5 | / | / | / | V |
| 4880 | 63.4 | 5.9 | 69.3 | 74.0 | -4.7 | peak | V |
| 4880 | 45.6 | 5.9 | 51.5 | 54.0 | -2.5 | Average | V |
| 7320 | 41.3 | 6.8 | 48.1 | 74.0 | -25.9 | peak | V |
| 7320 | 30.7 | 6.8 | 37.5 | 54.0 | -16.5 | Average | V |

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks : 1GHz-25GHz

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Polar. H / V |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|---------|------------------|
| 2480 | 83.3 | 1.9 | 85.2 | / | / | / | H |
| 2480 | 70.1 | 1.9 | 72.0 | / | / | / | H |
| 4960 | 42.3 | 5.9 | 48.2 | 74.0 | -25.8 | peak | H |
| 4960 | 31.4 | 5.9 | 37.3 | 54.0 | -16.7 | Average | H |
| 7440 | 40.6 | 6.8 | 47.4 | 74.0 | -26.6 | peak | H |
| 7440 | 30.7 | 6.8 | 37.5 | 54.0 | -16.5 | Average | H |
| 2480 | 96.7 | 1.9 | 98.6 | / | / | / | V |
| 2480 | 85.7 | 1.9 | 87.6 | / | / | / | V |
| 4960 | 63.5 | 5.9 | 69.4 | 74.0 | -4.6 | peak | V |
| 4960 | 45.7 | 5.9 | 51.6 | 54.0 | -2.4 | Average | V |
| 7440 | 41.4 | 6.8 | 48.2 | 74.0 | -25.8 | peak | V |
| 7440 | 30.8 | 6.8 | 37.6 | 54.0 | -16.4 | Average | V |

7.4 6dB Bandwidth

Date of test : 15th April 2014
 Test requirement : FCC §15.247(a)(2)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks : NIL

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

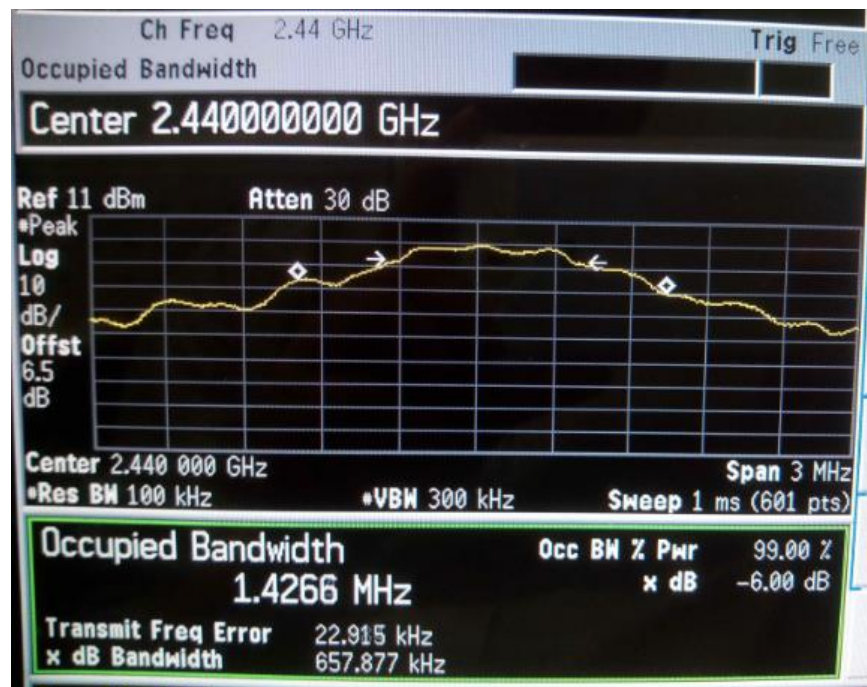
| Frequency (MHz) | 6dB Bandwidth (kHz) | Limit (kHz) |
|-----------------|---------------------|-------------|
| 2402 | 673.056 | >500 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(a)(2)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks : NIL

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

| Frequency (MHz) | 6dB Bandwidth (kHz) | Limit (kHz) |
|-----------------|---------------------|-------------|
| 2440 | 657.877 | >500 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(a)(2)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks : NIL

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

| Frequency (MHz) | 6dB Bandwidth (kHz) | Limit (kHz) |
|-----------------|---------------------|-------------|
| 2480 | 685.018 | >500 |

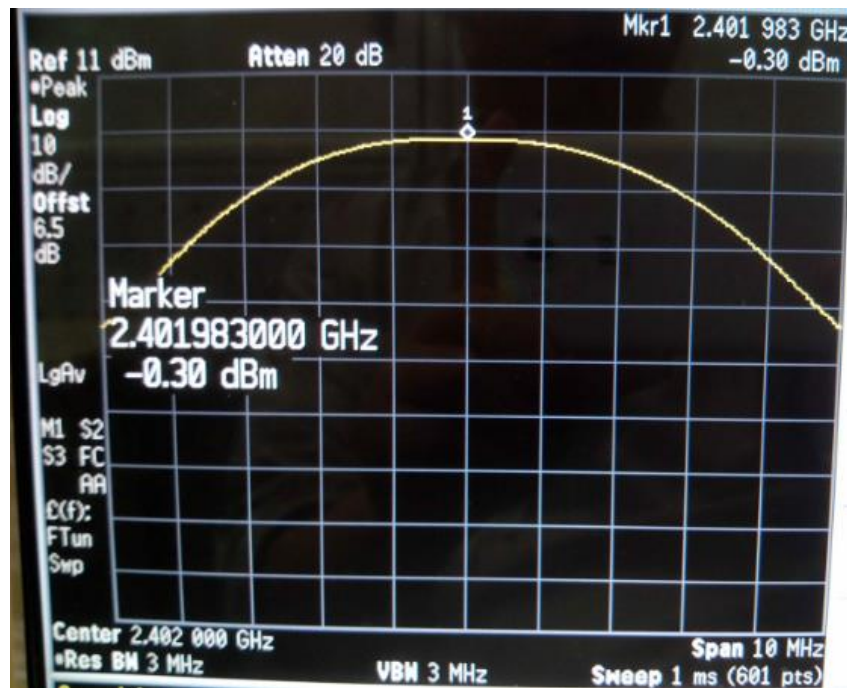


7.5 Peak Output Power Measurements

Date of test : 15th April 2014
 Test requirement : FCC §15.247(b)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

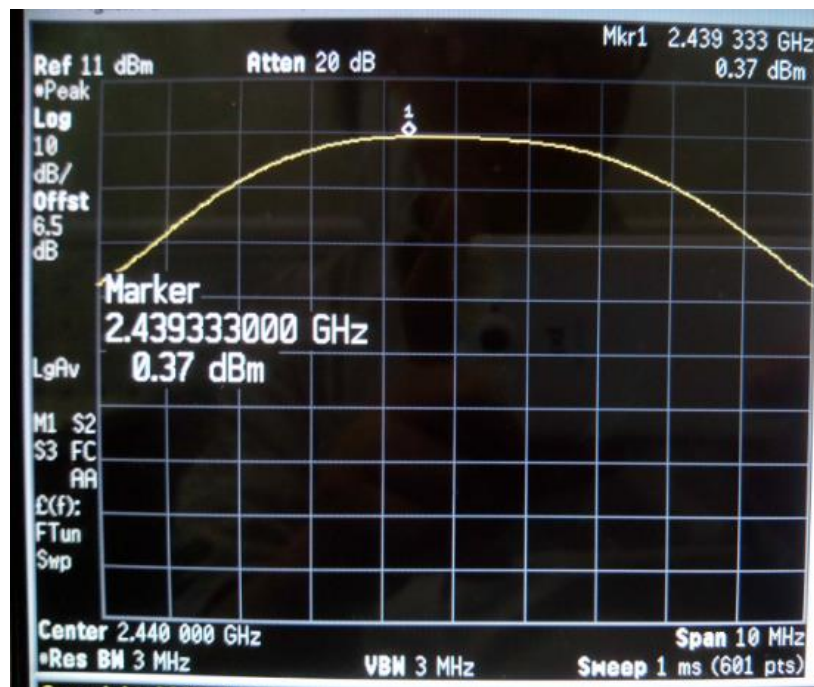
| Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) |
|-----------------|------------------------------|-------------|
| 2402 | -0.30 | 30 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(b)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

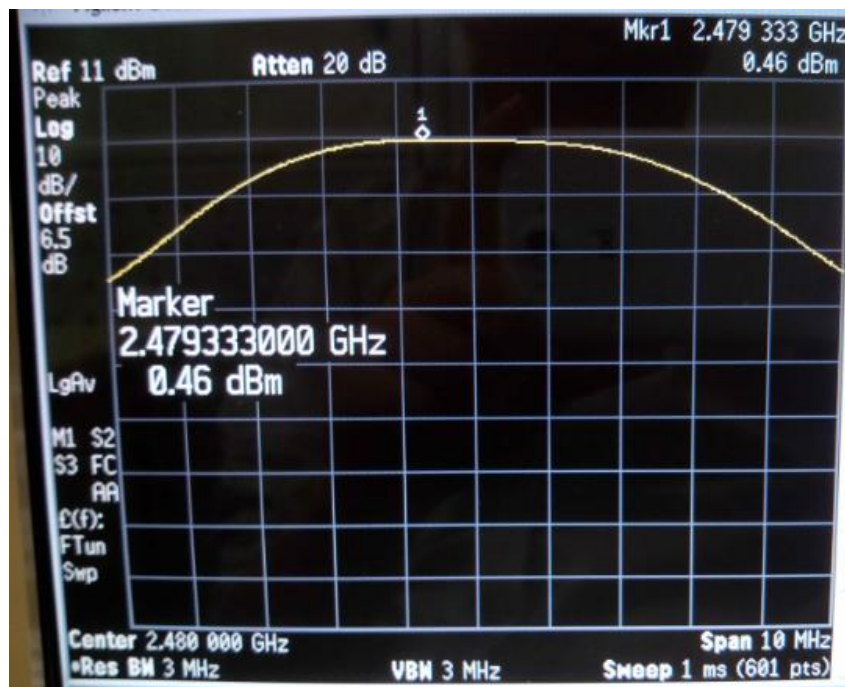
| Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) |
|-----------------|------------------------------|-------------|
| 2440 | 0.37 | 30 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(b)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

| Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) |
|-----------------|------------------------------|-------------|
| 2480 | 0.46 | 30 |

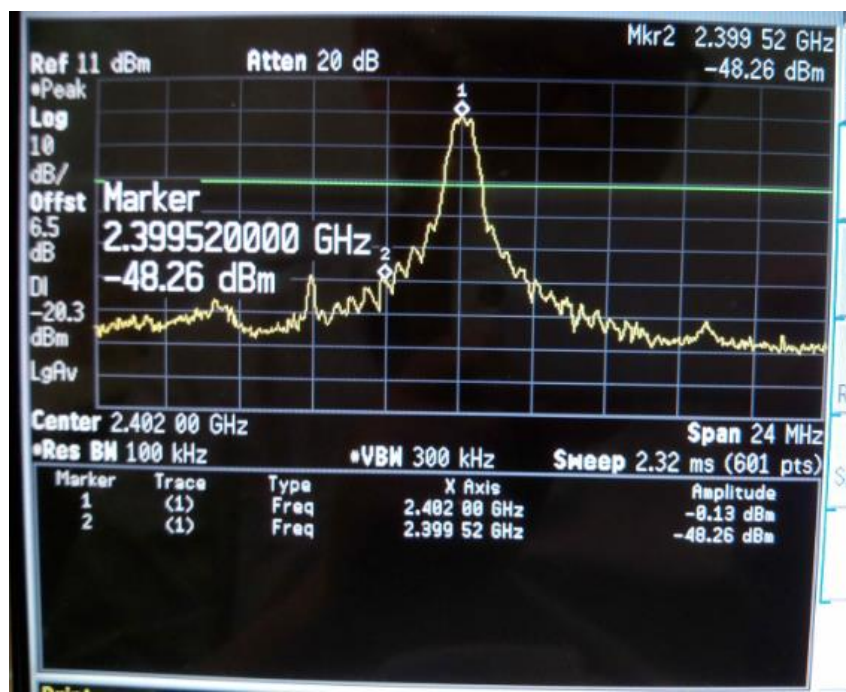


7.6 100 kHz Bandwidth of Band Edges

Date of test : 15th April 2014
 Test requirement : FCC §15.247(d)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

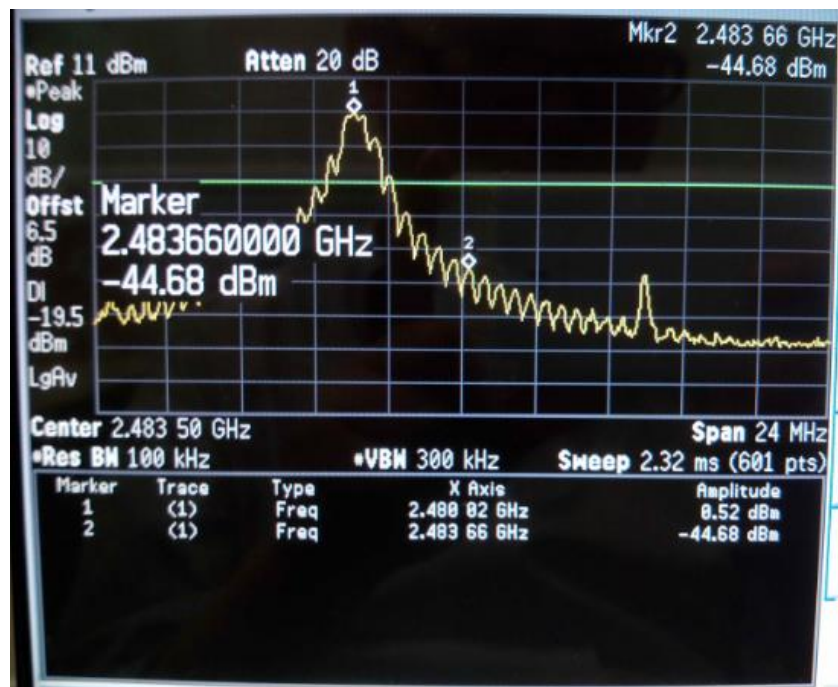
| Frequency (MHz) | Delta Peak to Band Emission (dB) | Limit (dB) |
|-----------------|----------------------------------|------------|
| 2402 | 48.13 | >20 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(d)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

| Frequency (MHz) | Delta Peak to Band Emission (dB) | Limit (dB) |
|-----------------|----------------------------------|------------|
| 2480 | 45.20 | >20 |

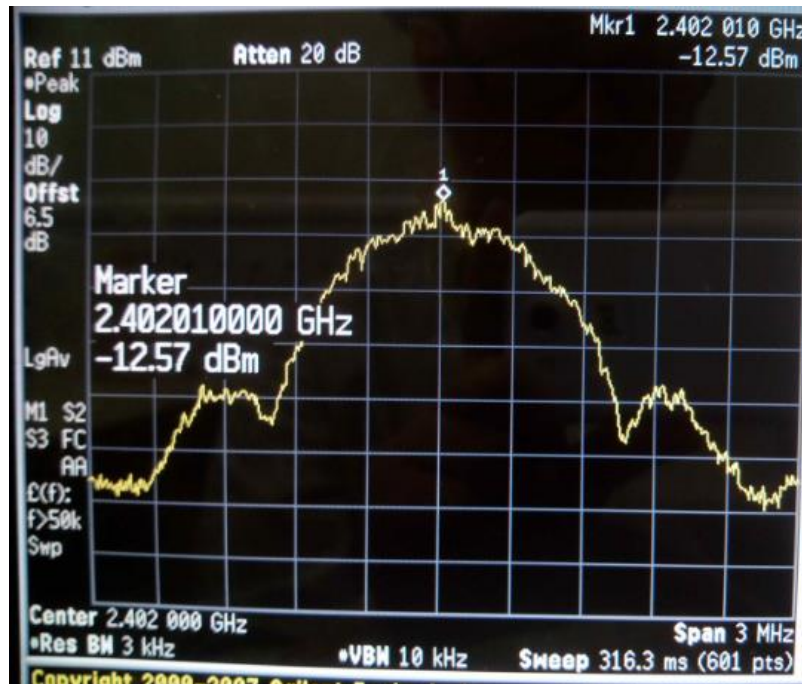


7.7 Power Spectral Density

Date of test : 15th April 2014
 Test requirement : FCC §15.247(e)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

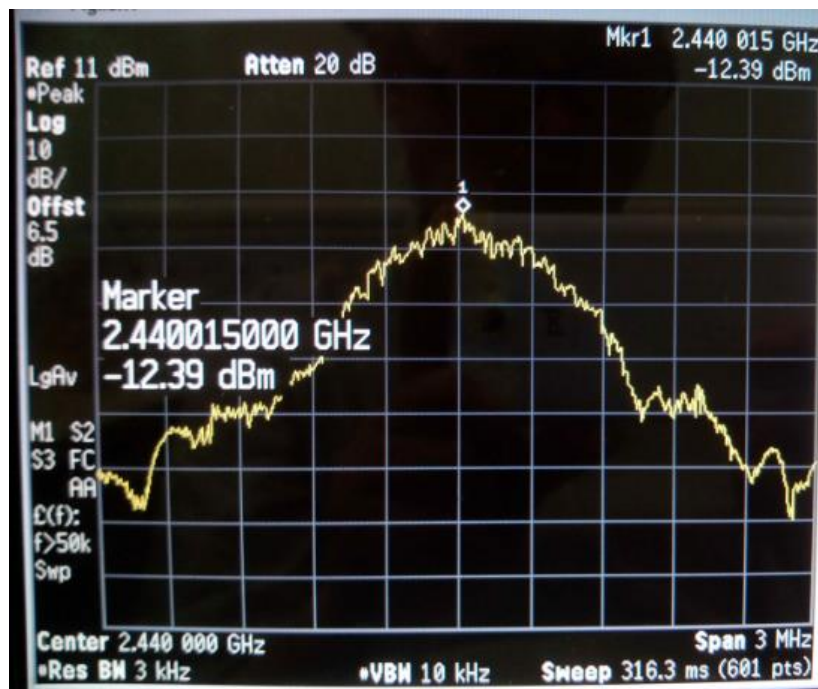
| Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) |
|-----------------|----------------|------------------|
| 2402 | -12.57 | <8 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(e)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

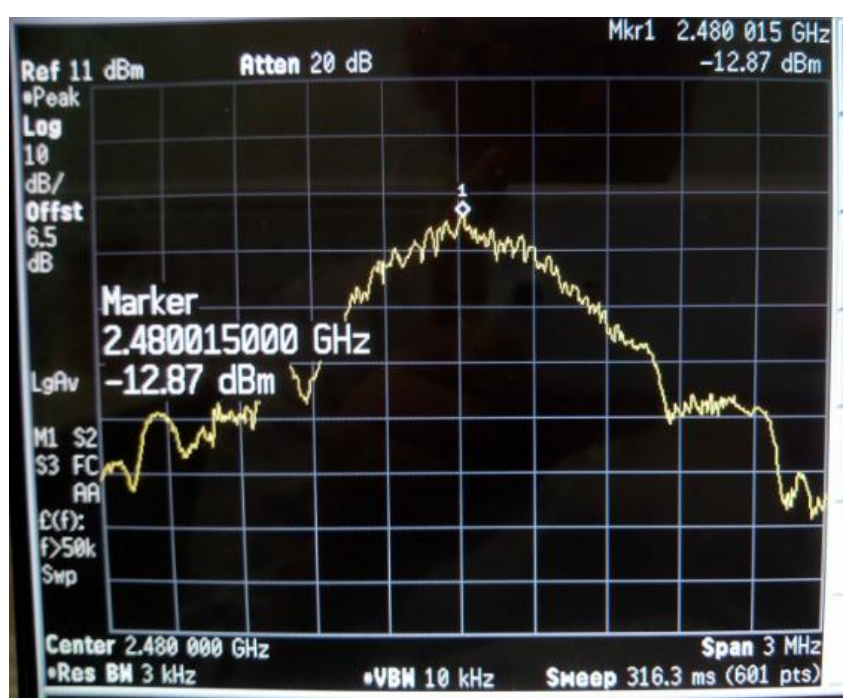
| Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) |
|-----------------|----------------|------------------|
| 2440 | -12.39 | <8 |



Date of test : 15th April 2014
 Test requirement : FCC §15.247(e)
 Test method : Conducted
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks :

| | |
|-------------------------------------|------------|
| Test Result | |
| <input checked="" type="checkbox"/> | Passed |
| <input type="checkbox"/> | Not Passed |

| Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) |
|-----------------|----------------|------------------|
| 2480 | -12.87 | <8 |





7.8 Antenna Requirement

Limit

For intentional device, 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. And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connector Construction

The antenna used in this product is PCB antenna. And the maximum Gain of this antenna is 0.0 dBi.

8. Test Equipment List

Radiated Emission Test

| DESCRIPTION | Type No. | Serial No. | Calibrated date | Calibrated until |
|------------------------|--------------|------------|-----------------|------------------|
| Antenna | VULB9163 | 9163 330 | 2014.02.25 | 2015.02.24 |
| Antenna | 3117 | 00066577 | 2014.04.02 | 2015.04.01 |
| Antenna | 3160-09 | 00118388 | 2013.09.06 | 2014.09.05 |
| Loop Antenna | 6512 | 29604 | 2013.09.25 | 2014.09.24 |
| Spectrum Analyzer | E4440A | US42220815 | 2013.06.14 | 2014.06.13 |
| Spectrum Analyzer | FSP 40 | 100378 | 2013.12.23 | 2014.12.22 |
| EMI Test Receiver | ESCI | 100701 | 2013.08.04 | 2014.08.03 |
| Spectrum Analyzer | FSV40 | 100903 | 2014.01.27 | 2015.01.26 |
| Test Cable | SUCOFLEX 104 | MY2320/4 | 2014.02.18 | 2015.02.17 |
| Amplifier | 150A250 | 326446 | 2014.03.19 | 2015.03.17 |
| Temp. & Humid. Chamber | FACT5-2.0 | 4166 | 2013.11.22 | 2014.11.21 |

9. System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

| Items | | Extended Uncertainty |
|-------|----------------------------------|---|
| RE | Field strength (dB μ V/m) | U=3.59dB (9kHz-30MHz) U=5.08dB (30MHz-1GHz) U=4.56dB (1GHz-18GHz) U=4.42dB (18GHz-25GHz) |
| CE | Disturbance Voltage (dB μ V) | U=2.7dB |