



*Accredited Testing Laboratory under the terms of ISO/IEC 17025*



# ***DECLARATION OF CONFORMITY***

**FCC RULES PARTS 2 & 15**

**CLASS B PERSONAL COMPUTERS AND PERIPHERALS**

*for*

**PRODUCT: RESIDENTIAL GATEWAY**

**"MODEL NAME: QUANTUM T9"**

**"MULTIPLE MODEL NAME: QUANTUM T7, QUANTUM T5"**

**AUTHORIZED**

**HUMAX Co., Ltd.**

**Humax Venture Tower Seohyun Dong, Bundang Gu271-2 463-050, SEONGANM SHI, GYEONGGI DO, REPUBLIC OF KOREA**

**September 13, 2017**

## **SUMMARY**

**The above equipment complies with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4: 2014**

***This is only valid in connection with Test Report: E179R-D062***

**The ONETECH Corp., has been accredited as a Conformity Assessment Body (CAB) with designation number, KR0013 from the FCC.**

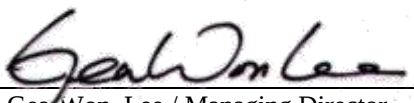
# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

**Test Report No.** : E179R-D062  
**AGR No.** : A178A-264  
**Applicant** : HUMAX Co., Ltd.  
**Address** : Humax Venture Tower Seohyun Dong, Bundang Gu271-2 463-050, SEONGANM SHI, GYEONGGI DO, REPUBLIC OF KOREA  
**Manufacturer** : HUMAX Co., Ltd.  
**Address** : Humax Venture Tower Seohyun Dong, Bundang Gu271-2 463-050, SEONGANM SHI, GYEONGGI DO, REPUBLIC OF KOREA  
**Type of Equipment** : Residential Gateway - Class B personal computers and peripherals  
**Model Name** : QUANTUM T9  
**Multiple Model Name** : QUANTUM T7, QUANTUM T5  
**Serial number** : N/A  
**Total page of Report** : 25 pages (including this page)  
**Date of Incoming** : August 17, 2017  
**Date of Issuing** : September 13, 2017

## SUMMARY

The equipment complies with the requirement of *FCC CFR 47 PART 15 SUBPART B Class B, Section 15.101*.  
 This test report contains only the results of a single test of the sample supplied for the examination.  
 It is not a general valid assessment of the features of the respective products of the mass-production.

Reviewed by:   
 Jae-Beom, Cho / Asst. Chief Engineer  
 ONETECH Corp.

Approved by:   
 Gea Won, Lee / Managing Director  
 ONETECH Corp.

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**Revision History**

| Rev. No. | Issued Report No. | Issued Date        | Revisions     | Effect Section |
|----------|-------------------|--------------------|---------------|----------------|
| 0        | E179R-D062        | September 13, 2017 | Initial Issue | All            |
|          |                   |                    |               |                |

## 1. VERIFICATION OF COMPLIANCE

|              |                                                                                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant    | : HUMAX Co., Ltd.<br>Humax Venture Tower Seohyun Dong, Bundang Gu271-2 463-050, SEONGANM SHI, GYEONGGI DO,<br>REPUBLIC OF KOREA                                       |
| Manufacturer | : HUMAX Co., Ltd.<br>Humax Venture Tower Seohyun Dong, Bundang Gu271-2 463-050, SEONGANM SHI, GYEONGGI DO,<br>REPUBLIC OF KOREA                                       |
| Factory 1    | : SMTronics Co., Ltd.<br>199, Seonggok-ro, Danwon-Gu, Ansan-si, Gyeonggi-Do, Korea                                                                                    |
| Factory 2    | : SONGHA DIGITAL Co., Ltd.<br>413-1, Dunjeon-ri, Pogok-eup, Cheoin-gu, Yongin-City, Gyeonggi-Do, Republic of Korea                                                    |
| Factory 3    | : J & H Tech Co., Ltd.<br>41-16, Cheoinseong-ro, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17118, Korea                                                         |
| Factory 4    | : Assel sp. Z o.o.<br>Ul. Batalionow Chlopskich 1 83-000 Pruszcz, Poland                                                                                              |
| Factory 5    | : HPL sp. Z o.o.<br>Ul. Przemyslowa 4 97-400 Belchatow, Poland                                                                                                        |
| Factory 6    | : FLEXTRONICS ELECTRONICS TECHNOLOGY (SHENZHEN) CO LTD<br>89# Yong Fu Road, Tong Fu Yu Industrial Park, Fu Yong Town, Bao An District, Shenzhen,<br>518103.P.R.China. |
| Factory 7    | : Kinpo Electronics (China) Co.,Ltd.<br>SHA TOU VILLAGE,CHANG AN TOWN,DONG GUAN CITY,GUAN DONG<br>PROVINCE,CHINA                                                      |
| Factory 8    | : CAL-COMP ELECTRONICS(THAILAND) PUBLIC CO. LTD<br>(Branch 00002) 138 MOO4, Petchasem Road, Sapang, Kaow-Yoi, Petchaburi 76140 Thailand                               |

Model Name : QUANTUM T9  
Brand Name : N/A  
Date : September 13, 2017

|                                                         |                                              |
|---------------------------------------------------------|----------------------------------------------|
| DEVICE TYPE                                             | Class B personal computers and peripherals   |
| E.U.T. DESCRIPTION                                      | Residential Gateway - Unintentional Radiator |
| THIS REPORT CONCERNS                                    | Original Grant                               |
| MEASUREMENT PROCEDURES                                  | ANSI C63.4: 2014                             |
| TYPE OF EQUIPMENT TESTED                                | Pre-Production                               |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | Declaration of Conformity                    |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC PART 15 (CLASS B)                        |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE | None                                         |
| FINAL TEST WAS CONDUCTED ON                             | 10 m, semi anechoic chamber                  |

- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Product Description

The HUMAX Co., Ltd., Model QUANTUM T9 (referred to as the EUT in this report) is a Residential Gateway. Product specification described herein was obtained from product data sheet or user's manual.

|                        |                                          |                                                                    |                       |                       |
|------------------------|------------------------------------------|--------------------------------------------------------------------|-----------------------|-----------------------|
| CHASSIS TYPE           | Plastic                                  |                                                                    |                       |                       |
| OPERATING<br>FREQUENCY | 5 GHz<br>(5 150 MHz<br>~ 5 250 MHz)      | 802.11a/n(HT20)                                                    | Lower-sub band        | 5 180 MHz ~ 5 240 MHz |
|                        |                                          | 802.11n(HT40)                                                      | Lower-sub band        | 5 190 MHz ~ 5 230 MHz |
|                        |                                          | 802.11ac(VHT80)                                                    | Lower-sub band        | 5 210 MHz             |
|                        | 5 GHz Band<br>(5 725 MHz<br>~ 5 850 MHz) | 802.11a/n(HT20)                                                    | 5 745 MHz ~ 5 825 MHz |                       |
|                        |                                          | 802.11n(HT40)                                                      | 5 755 MHz ~ 5 795 MHz |                       |
|                        |                                          | 802.11ac(VHT80)                                                    | 5 775 MHz             |                       |
|                        | 2.4 GHz Band                             | 802.11b/g/n(HT20)                                                  | 2 412 MHz ~ 2 472 MHz |                       |
|                        |                                          | 802.11n(HT40)                                                      | 2 422 MHz ~ 2 462 MHz |                       |
| ELECTRICAL RATING      | EUT                                      | DC 12 V $\overline{=}$ , 2.5 A                                     |                       |                       |
|                        | AC ADAPTER                               | Input: 100-240 V~, 50/60 Hz<br>Output: 12 V $\overline{=}$ , 2.5 A |                       |                       |
| EXTERNAL TERMINALS     | DC IN, WAN, LAN 1, LAN 2, USB            |                                                                    |                       |                       |

### 2.2 Model Differences

The following lists consist of the added model and their differences.

| Model Name | Differences                                                                                               | Tested                              |
|------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------|
| QUANTUM T9 | Basic Model<br>(2.4 GHz: 3Tx3Rx, 5 GHz: 4Tx4Rx)                                                           | <input checked="" type="checkbox"/> |
| QUANTUM T7 | These models are identical to the basic model except for the Antenna.<br>(2.4 GHz: 3Tx3Rx, 5 GHz: 3Tx3Rx) | <input type="checkbox"/>            |
| QUANTUM T5 | These models are identical to the basic model except for the Antenna.<br>(2.4 GHz: 2Tx2Rx, 5 GHz: 3Tx3Rx) | <input type="checkbox"/>            |

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

## 2.4 Test System Details

The model numbers for all the equipments, which were used in the tested system, is:

| Model              | Manufacturer                        | Description               | Connected to |
|--------------------|-------------------------------------|---------------------------|--------------|
| QUANTUM T9         | HUMAX Co., Ltd.                     | Residential Gateway (EUT) | -            |
| ADS-30FD-12 12030E | SHENZHEN HONOR ELECTRONIC CO., LTD. | Adapter                   | EUT          |
| PLSU6K-008004      | TOSHIBA                             | Notebook PC (1)           | EUT          |
| 80XH               | LENOVO PC HK Limited                | Notebook PC (2)           | EUT          |
| -                  | Sandisk                             | USB Memory                | EUT          |

## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2014. Radiated testing was performed at a distance of 10 m from EUT to the antenna.

## 2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) - Registration No. R-4112/ C-14617/ G-10666/ T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER | MODEL/PART NUMBER | FCC ID |
|-------------|--------------|-------------------|--------|
| MAIN BOARD  | N/A          | N/A               | N/A    |

#### 3.2 Mode of operation during the test

- . The EUT was connected two notebook pc to WAN, LAN port each and then checked the ping test during the test.
- . Input power condition during the measurements was AC 120 V~, 60 Hz.

#### 3.3 Cable Description

| Ports Name | Shielded | Ferrite Bead | Metal Shell | Length (m) | Connected to    |
|------------|----------|--------------|-------------|------------|-----------------|
| DC IN      | Y        | N            | N           | 1.5        | Adapter         |
| WAN        | N        | N            | N           | 3.0        | Notebook PC (2) |
| LAN (1)    | N        | N            | N           | 3.0        | Notebook PC (1) |
| LAN (2)    | N        | N            | N           | 3.0        | LINE            |
| USB        | N        | N            | N           | -          | USB Memory      |

#### 3.4 Equipment Modifications

- . None.

#### 3.5 Configuration of Test System

Line Conducted Test: The EUT was connected to LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2014 7.3.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2014 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 10 m semi anechoic chamber.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated.

| Operation Mode     | The Worst operating condition (Please check one only) |
|--------------------|-------------------------------------------------------|
| WAN, LAN Ping Test | X                                                     |

### 4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated.

| Operation Mode     | The Worst operating condition (Please check one only) |
|--------------------|-------------------------------------------------------|
| WAN, LAN Ping Test | X                                                     |

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

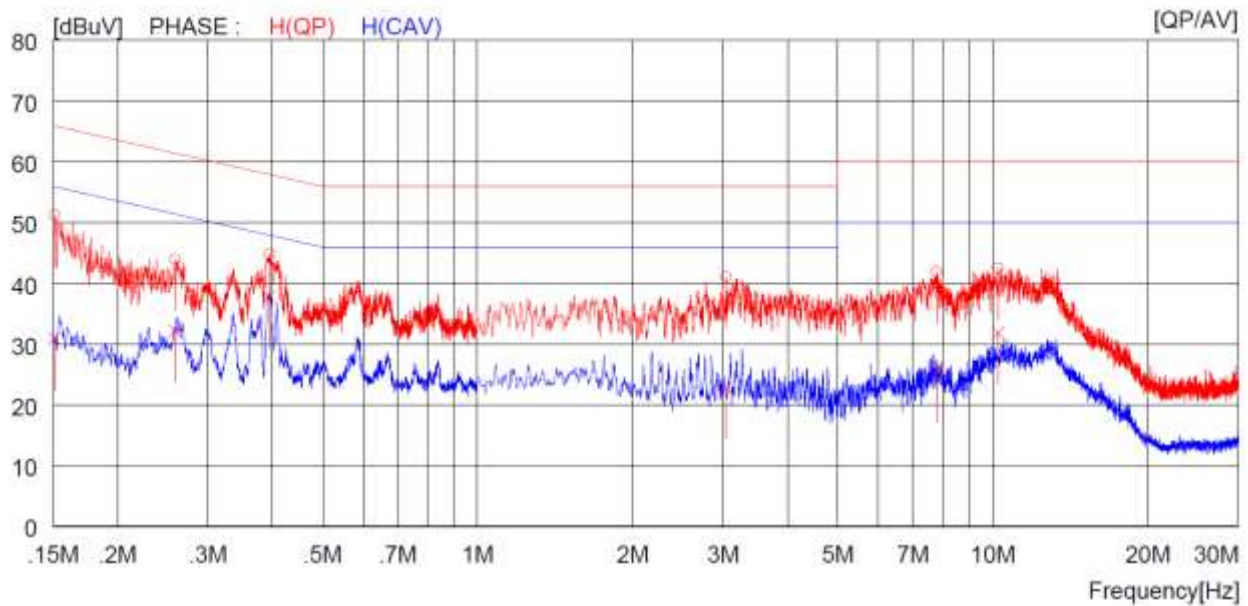
### 5.1 Conducted Emission Test

#### 5.1.1 Test data

Humidity Level : 51.0 % R.H. Temperature: 23.9 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)  
Type of Test : CLASS B  
Result : PASSED BY 10.2 dB at 0.39500 MHz under CISPR-Average detector mode on HOT Line

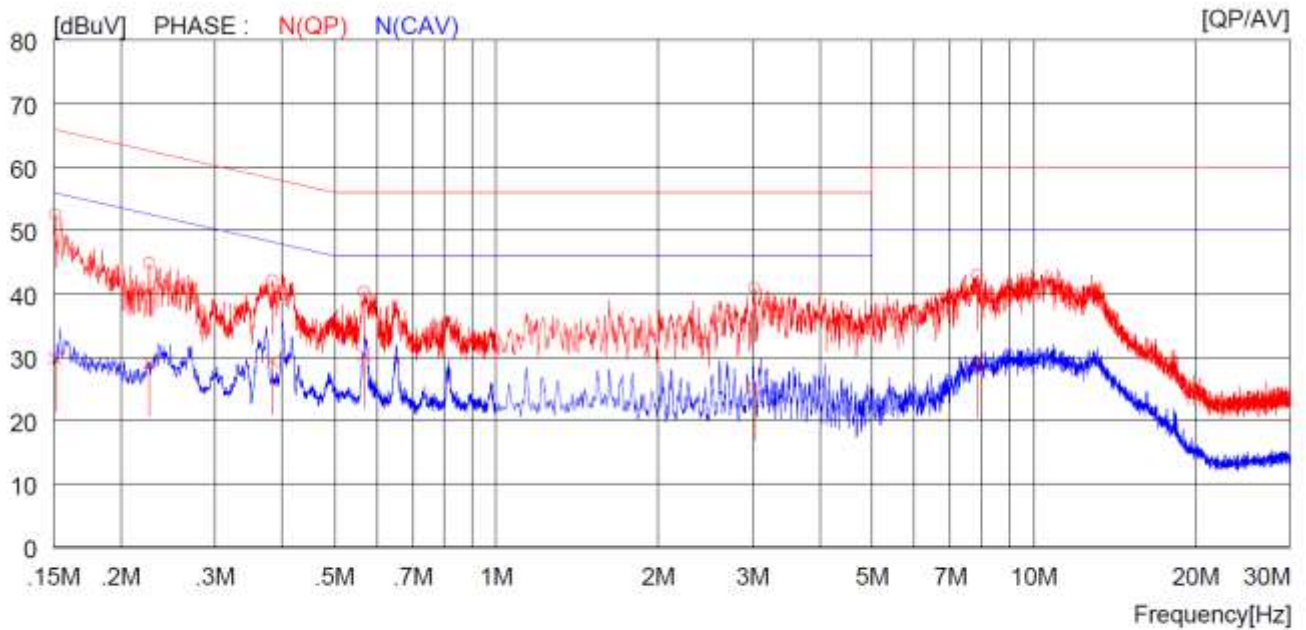
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EUT : QUANTUM T9 Date: August 22, 2017  
Detector : Q.P (6 dB Bandwidth: 9 kHz)  
Tested Line : HOT LINE



| NO | FREQ<br>[MHz] | READING      |              | C.FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE   |
|----|---------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                  | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |         |
| 1  | 0.15100       | 41.2         | ----         | 10.0             | 51.2         | ----         | 65.9         | ----         | 14.7         | ----         | H (QP)  |
| 2  | 0.25900       | 34.0         | ----         | 10.0             | 44.0         | ----         | 61.5         | ----         | 17.5         | ----         | H (QP)  |
| 3  | 0.39500       | 34.9         | ----         | 10.0             | 44.9         | ----         | 58.0         | ----         | 13.1         | ----         | H (QP)  |
| 4  | 3.03600       | 30.8         | ----         | 10.2             | 41.0         | ----         | 56.0         | ----         | 15.0         | ----         | H (QP)  |
| 5  | 7.79500       | 31.6         | ----         | 10.3             | 41.9         | ----         | 60.0         | ----         | 18.1         | ----         | H (QP)  |
| 6  | 10.24000      | 32.1         | ----         | 10.4             | 42.5         | ----         | 60.0         | ----         | 17.5         | ----         | H (QP)  |
| 7  | 0.15100       | ----         | 21.0         | 10.0             | ----         | 31.0         | ----         | 55.9         | ----         | 24.9         | H (CAV) |
| 8  | 0.25900       | ----         | 22.2         | 10.0             | ----         | 32.2         | ----         | 51.5         | ----         | 19.3         | H (CAV) |
| 9  | 0.39500       | ----         | 27.8         | 10.0             | ----         | 37.8         | ----         | 48.0         | ----         | 10.2         | H (CAV) |
| 10 | 3.03600       | ----         | 12.7         | 10.2             | ----         | 22.9         | ----         | 46.0         | ----         | 23.1         | H (CAV) |
| 11 | 7.79500       | ----         | 15.4         | 10.3             | ----         | 25.7         | ----         | 50.0         | ----         | 24.3         | H (CAV) |
| 12 | 10.24000      | ----         | 21.5         | 10.4             | ----         | 31.9         | ----         | 50.0         | ----         | 18.1         | H (CAV) |

Tested Line : NEUTRAL LINE



| NO | FREQ<br>[MHz] | READING      |              | C.FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE  |
|----|---------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                  | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |        |
| 1  | 0.15100       | 42.5         | ----         | 10.0             | 52.5         | ----         | 65.9         | ----         | 13.4         | ----         | N(QP)  |
| 2  | 0.22600       | 34.9         | ----         | 10.0             | 44.9         | ----         | 62.6         | ----         | 17.7         | ----         | N(QP)  |
| 3  | 0.38300       | 32.1         | ----         | 10.0             | 42.1         | ----         | 58.2         | ----         | 16.1         | ----         | N(QP)  |
| 4  | 0.56800       | 30.2         | ----         | 10.1             | 40.3         | ----         | 56.0         | ----         | 15.7         | ----         | N(QP)  |
| 5  | 3.02000       | 30.7         | ----         | 10.2             | 40.9         | ----         | 56.0         | ----         | 15.1         | ----         | N(QP)  |
| 6  | 7.85500       | 32.6         | ----         | 10.3             | 42.9         | ----         | 60.0         | ----         | 17.1         | ----         | N(QP)  |
| 7  | 0.15100       | ----         | 19.8         | 10.0             | ----         | 29.8         | ----         | 55.9         | ----         | 26.1         | N(CAV) |
| 8  | 0.22600       | ----         | 19.1         | 10.0             | ----         | 29.1         | ----         | 52.6         | ----         | 23.5         | N(CAV) |
| 9  | 0.38300       | ----         | 19.4         | 10.0             | ----         | 29.4         | ----         | 48.2         | ----         | 18.8         | N(CAV) |
| 10 | 0.56800       | ----         | 20.3         | 10.1             | ----         | 30.4         | ----         | 46.0         | ----         | 15.6         | N(CAV) |
| 11 | 3.02000       | ----         | 15.0         | 10.2             | ----         | 25.2         | ----         | 46.0         | ----         | 20.8         | N(CAV) |
| 12 | 7.85500       | ----         | 18.7         | 10.3             | ----         | 29.0         | ----         | 50.0         | ----         | 21.0         | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Song-Ho, Moon / Engineer

## 5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

### 5.2.1 Test data for below 1 GHz

#### 5.2.1.1 Test data

Humidity Level : 58.2 % R.H.

Temperature: 23.4 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)

Type of Test : CLASS B

Result : PASSED BY 4.5 dB at 60.070 MHz

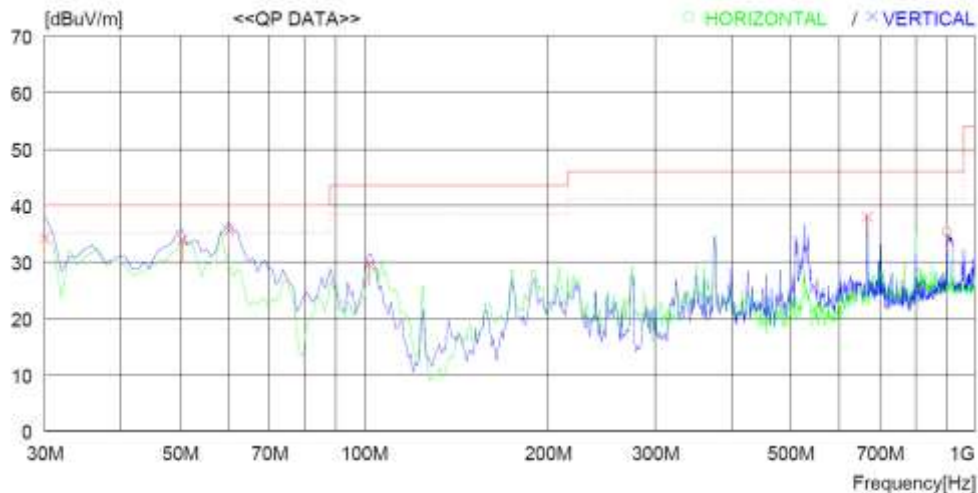
EUT : QUANTUM T9

Date: August 31, 2017

Frequency Range : 30 MHz ~ 1 000 MHz

Detector : Q.P (6 dB Bandwidth: 120 kHz)

Distance : 3 m



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 900.079 | 38.8    | 22.1   | 7.0  | 32.6 | 35.3     | 46.0     | 10.7   | 100     | 0     |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 2                      | 30.000  | 53.6    | 12.3   | 1.4  | 33.1 | 34.2     | 40.0     | 5.8    | 100     | 23    |
| 3                      | 50.370  | 51.1    | 14.1   | 1.7  | 33.1 | 33.8     | 40.0     | 6.2    | 200     | 3     |
| 4                      | 60.070  | 53.5    | 13.2   | 1.9  | 33.1 | 35.5     | 40.0     | 4.5    | 100     | 111   |
| 5                      | 101.780 | 47.9    | 12.2   | 2.4  | 33.0 | 29.5     | 43.5     | 14.0   | 200     | 72    |
| 6                      | 666.316 | 46.0    | 19.6   | 5.9  | 33.5 | 38.0     | 46.0     | 8.0    | 200     | 114   |

Remark: Margin (dB) = Limit – Result and Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

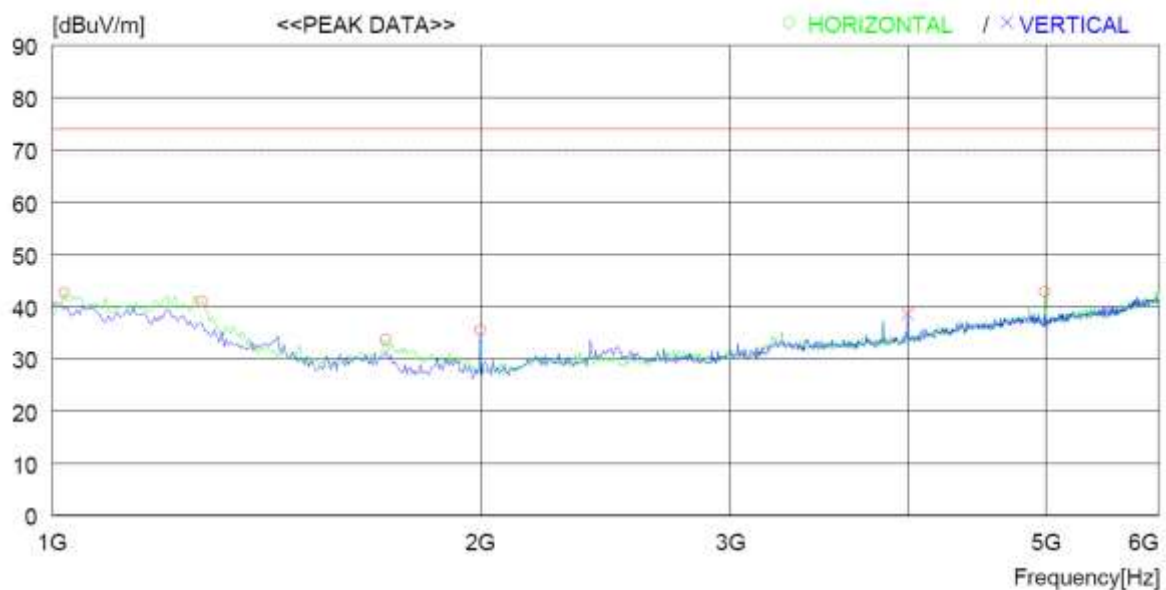
Tested by: Song-Ho, Moon / Engineer

## 5.2.2 Test data for above 1 GHz

### 5.2.2.1 Test data

Humidity Level : 52.4 % R.H. Temperature: 23.4 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (g)  
Type of Test : CLASS B  
Result : PASSED BY 14.9 dB at 4 990.001 MHz under CISPR-Average mode

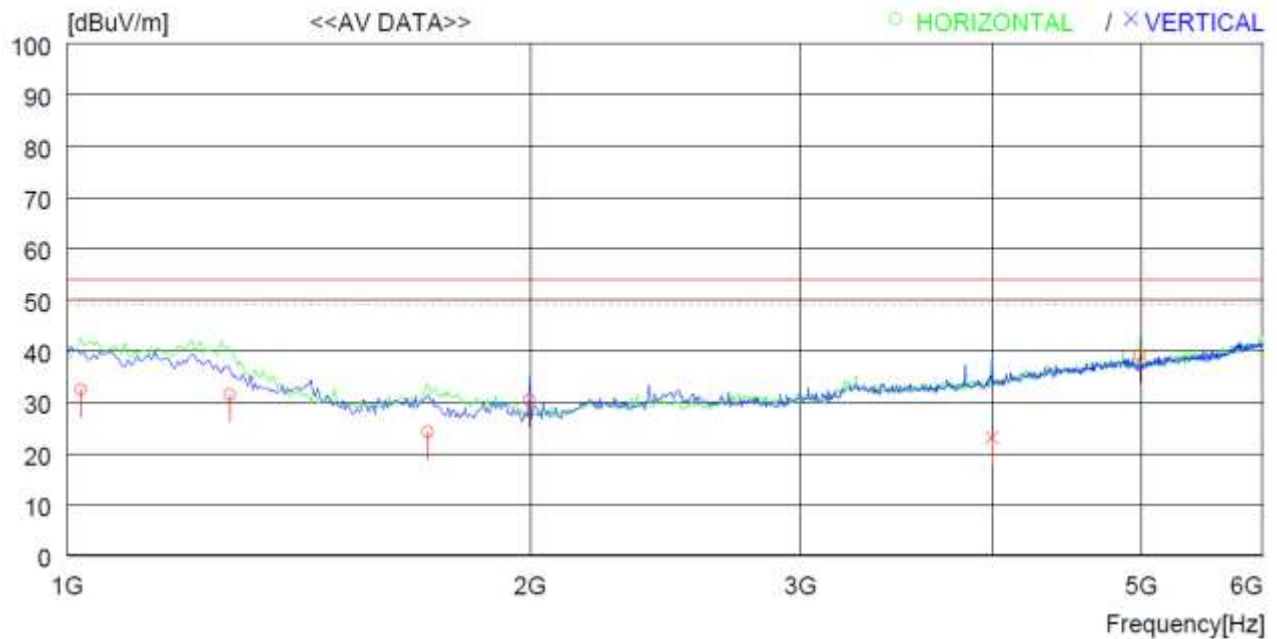
EUT : QUANTUM T9 Date: September 11, 2017  
Frequency Range : 1 000 MHz ~ 6 000 MHz  
Detector : Peak and CISPR Average (6 dB Bandwidth: 1 MHz)  
Distance : 3 m



| No.                    | FREQ<br>[MHz] | READING<br>PEAK<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                           |                       |              |              |                    |                   |                |                 |                |
| 1                      | 1020.000      | 50.2                      | 25.2                  | 7.0          | 39.8         | 42.6               | 74.0              | 31.4           | 300             | 359            |
| 2                      | 1275.000      | 48.1                      | 24.9                  | 7.8          | 39.9         | 40.9               | 74.0              | 33.1           | 370             | 275            |
| 3                      | 1715.000      | 39.8                      | 24.6                  | 9.1          | 39.9         | 33.6               | 74.0              | 40.4           | 100             | 359            |
| 4                      | 2000.000      | 39.2                      | 26.2                  | 10.0         | 40.0         | 35.4               | 74.0              | 38.6           | 200             | 58             |
| 5                      | 4990.000      | 35.7                      | 31.3                  | 16.3         | 40.6         | 42.7               | 74.0              | 31.3           | 200             | 219            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 6                      | 3995.000      | 34.7                      | 29.7                  | 14.7         | 40.5         | 38.6               | 74.0              | 35.4           | 200             | 359            |

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.



| No.                  | FREQ<br>[MHz] | READING<br>AV<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|----------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ---- Horizontal ---- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                    | 1020.105      | 40.4                    | 24.8                  | 7.0          | 39.8         | 32.4               | 54.0              | 21.6           | 300             | 359            |
| 2                    | 1275.230      | 38.5                    | 25.1                  | 7.8          | 39.9         | 31.5               | 54.0              | 22.5           | 370             | 275            |
| 3                    | 1715.030      | 29.6                    | 25.4                  | 9.1          | 39.9         | 24.2               | 54.0              | 29.8           | 100             | 359            |
| 4                    | 1999.058      | 34.8                    | 25.6                  | 10.0         | 40.0         | 30.4               | 54.0              | 23.6           | 200             | 58             |
| 5                    | 4990.001      | 32.2                    | 31.2                  | 16.3         | 40.6         | 39.1               | 54.0              | 14.9           | 200             | 219            |
| ---- Vertical ----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 6                    | 3995.044      | 19.3                    | 29.6                  | 14.7         | 40.5         | 23.1               | 54.0              | 30.9           | 200             | 359            |

Remark: Margin (dB) = Limit – Result and Result = Reading CISPR Average + Antenna Factor + Loss – Gain  
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Song-Ho, Moon / Engineer

## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses.

|             |                     |                |
|-------------|---------------------|----------------|
| +           | Meter reading       | (dB $\mu$ V)   |
| +           | Cable Loss          | (dB)           |
| +           | Antenna Factor      | (dB/m)         |
|             |                     | <hr/>          |
| =           | Corrected Reading   | (dB $\mu$ V/m) |
|             |                     |                |
| Margin (dB) |                     |                |
|             | Specification Limit | (dB $\mu$ V/m) |
| -           | Corrected Reading   | (dB $\mu$ V/m) |
|             |                     | <hr/>          |
| =           | dB Relative to Spec | ( $\pm$ dB)    |

## 7. LIST OF TEST EQUIPMENT

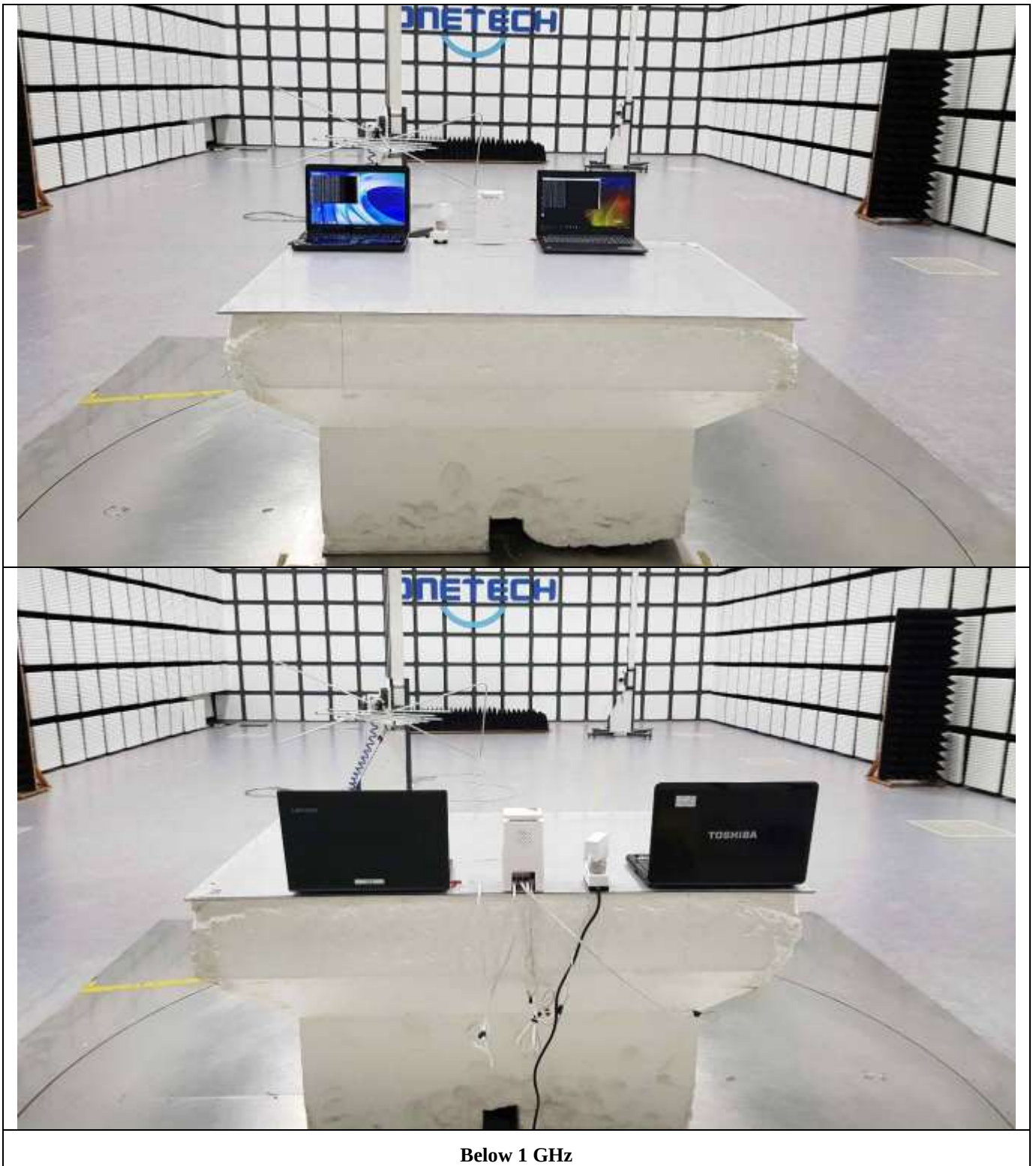
| No. | EQUIPMENTS               | MFR.            | MODEL                 | SER. NO.               | LAST CAL      | DUE CAL   | USE                                 |
|-----|--------------------------|-----------------|-----------------------|------------------------|---------------|-----------|-------------------------------------|
| 1.  | Test receiver            | R & S           | ESCI                  | 101420                 | Apr. 03, 2017 | One Year  | <input type="checkbox"/>            |
| 2.  |                          |                 | ESPI                  | 101278                 | Nov. 01, 2016 | One Year  | <input checked="" type="checkbox"/> |
| 3.  |                          |                 | ESCI                  | 101013                 | Apr. 04, 2017 | One Year  | <input type="checkbox"/>            |
| 4.  |                          |                 | ESR                   | 101470                 | Feb. 08, 2017 | One Year  | <input checked="" type="checkbox"/> |
| 5.  |                          |                 | ESI                   | 8355336/011            | Nov. 02, 2016 | One Year  | <input type="checkbox"/>            |
| 6.  | Pulse Limiter            | ROHDE & SCHWARZ | ESH3Z2                | 357.8810.52            | Jun. 13, 2017 | One Year  | <input checked="" type="checkbox"/> |
| 7.  | Amplifier                | Sonoma          | 310N                  | 312544                 | Apr. 04, 2017 | One Year  | <input checked="" type="checkbox"/> |
| 8.  |                          | Instrument      | 310N                  | 312545                 | Apr. 04, 2017 | One Year  | <input type="checkbox"/>            |
| 9.  |                          | Hewlett Packard | 8447D                 | 2944A07777             | Apr. 04, 2017 | One Year  | <input type="checkbox"/>            |
| 10. | TRILOG Broadband Antenna | Schwarzbeck     | VULB9163              | 9163-419               | Aug. 05, 2016 | Two Years | <input checked="" type="checkbox"/> |
| 11. |                          |                 | VULB9163              | 9163-255               | May. 20, 2016 | Two Years | <input type="checkbox"/>            |
| 12. | Horn Antenna             | Schwarzbeck     | BBHA9120D             | BBHA9120D295           | Aug 16, 2017  | Two Years | <input checked="" type="checkbox"/> |
| 13. | Signal Conditioning unit | ROHDE & SCHWARZ | SCU 18                | 102209                 | May 30, 2017  | One Year  | <input checked="" type="checkbox"/> |
| 14. | LISN                     | EMCO            | 3825/2                | 9109-1867              | Apr. 07, 2017 | One Year  | <input type="checkbox"/>            |
| 15. |                          |                 |                       | 9109-1869              | Apr. 06, 2017 | One Year  | <input type="checkbox"/>            |
| 16. |                          | Schwarzbeck     | NSLK 8126             | 8126-480               | Nov. 02, 2016 | One Year  | <input type="checkbox"/>            |
| 17. |                          |                 | NSLK 8126             | 8126-404               | Apr. 03, 2017 | One Year  | <input checked="" type="checkbox"/> |
| 18. |                          |                 | NSLK 8126             | 8126-479               | Nov. 02, 2016 | One Year  | <input checked="" type="checkbox"/> |
| 19. |                          | AFJ             | LT 32C                | 32031306157            | Apr. 04, 2017 | One Year  | <input type="checkbox"/>            |
| 20. | Controller               | Innco System    | CO3000                | CO3000/904 /37211215/L | N/A           | N/A       | <input checked="" type="checkbox"/> |
| 21. |                          |                 | CO2000                | CO2000/619             | N/A           | N/A       | <input type="checkbox"/>            |
| 22. | Turn Table               | Innco System    | DT3000                | 930611                 | N/A           | N/A       | <input checked="" type="checkbox"/> |
| 23. |                          |                 | DT5000-3t-Teagplatten | N/A                    | N/A           | N/A       | <input type="checkbox"/>            |
| 24. | Antenna Master           | Innco System    | MA-4000XPET           | MA4000/509 /37211215/L | N/A           | N/A       | <input checked="" type="checkbox"/> |
| 25. |                          |                 | MA4000-EP             | MA4000/332 /27030611/L | N/A           | N/A       | <input type="checkbox"/>            |

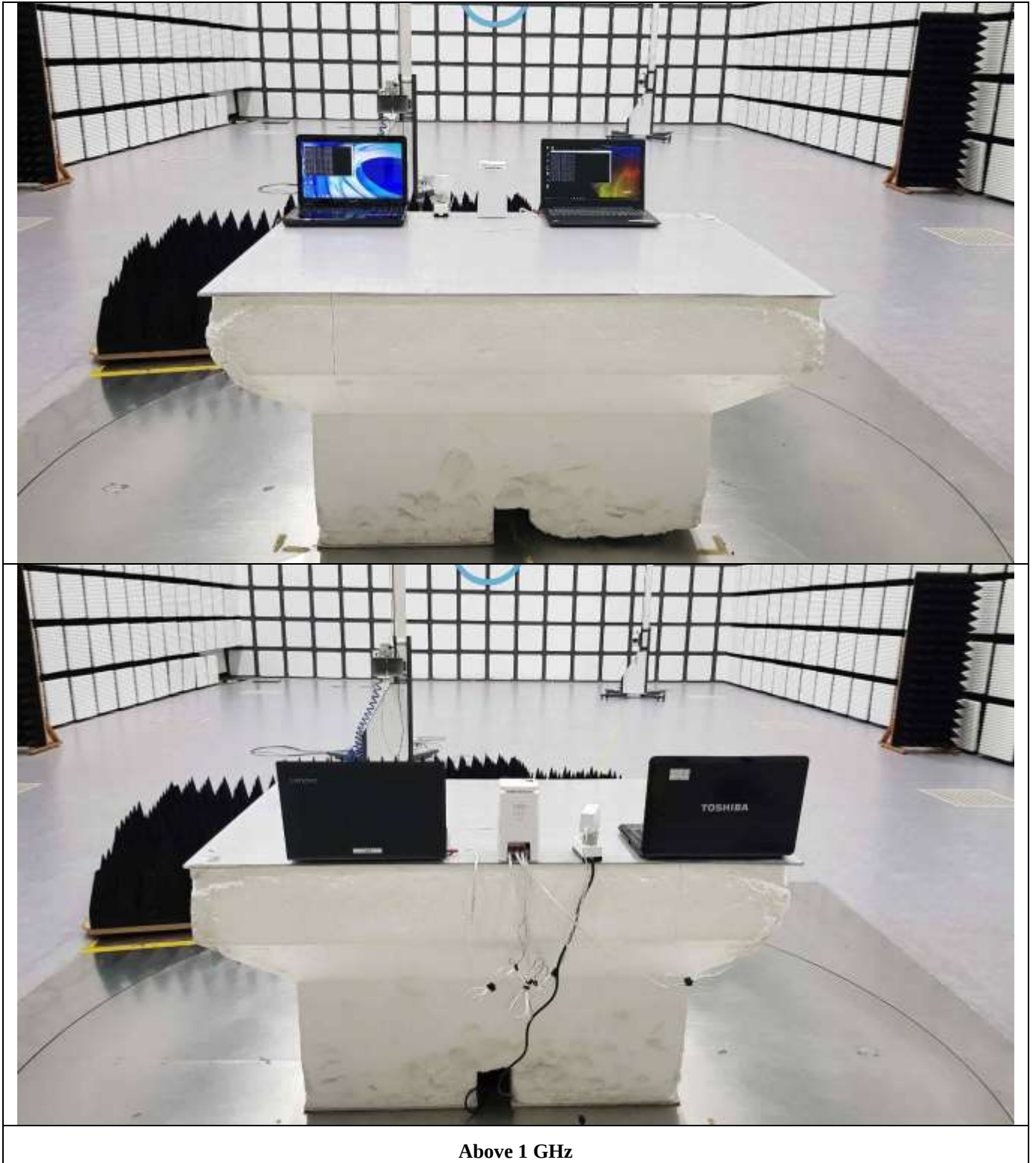
Remark: Mark ☒ mean used equipment.

**APPENDIX I - TEST SET-UP PHOTOS: (Conducted emission)**

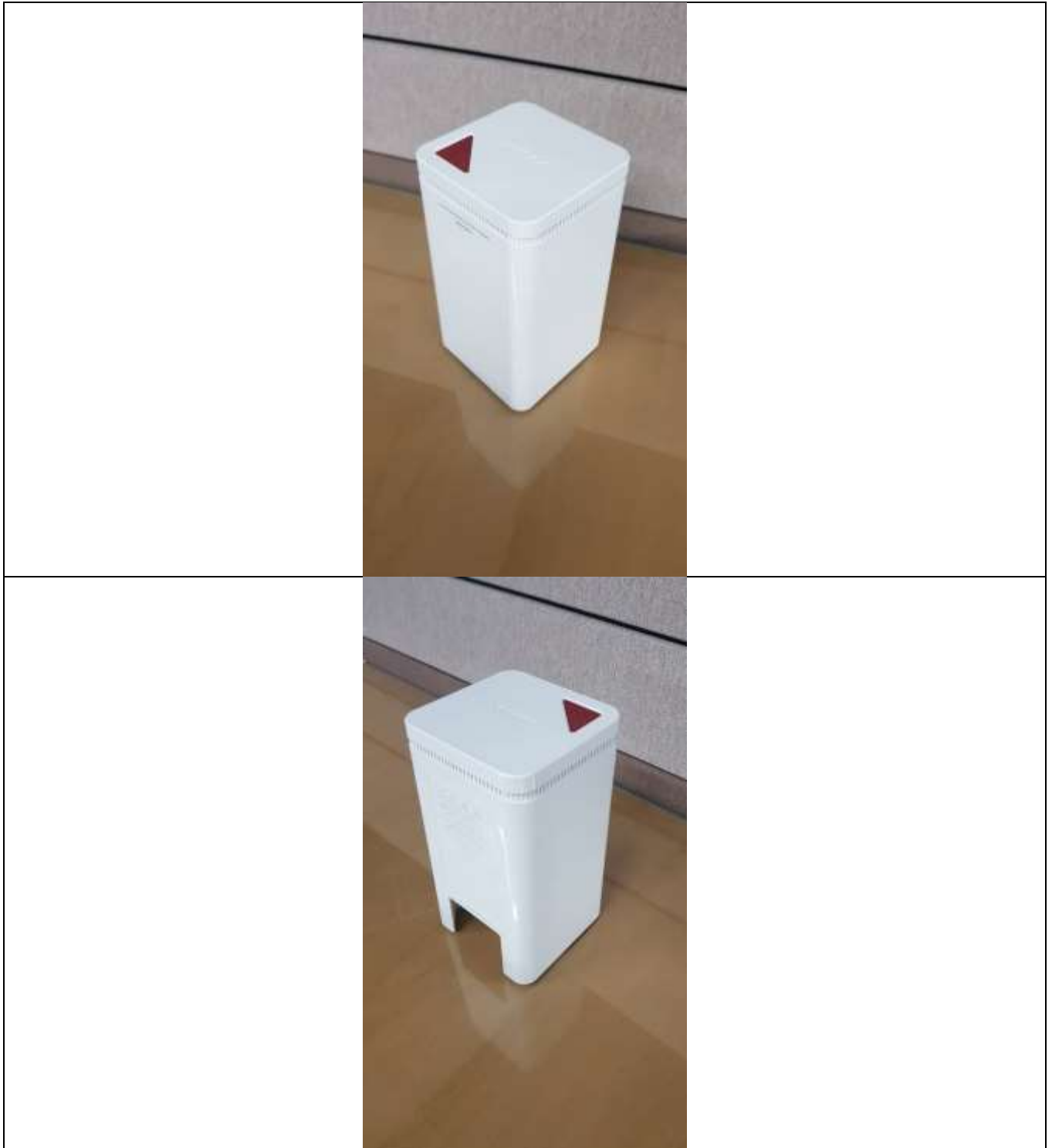


## APPENDIX II - TEST SET-UP PHOTOS: (Radiated emission)





### APPENDIX III - PHOTOGRAPHS REPORT









## APPENDIX IV - IDENTIFICATION LABEL

(Proposed format to be included in the user's manual)

### DECLARATION OF CONFORMITY

|                              |                                              |
|------------------------------|----------------------------------------------|
| <b>PRODUCT NAME</b>          | : Residential Gateway                        |
| <b>MODEL NUMBER</b>          | : QUANTUM T9                                 |
| <b>FCC RULES</b>             | : Tested to comply with FCC Part 15, Class B |
| <b>OPERATING ENVIRONMENT</b> | : FOR HOME OR OFFICE USE                     |

#### FCC COMPLIANCE STATEMENT:

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.

#### INFORMATION TO USER:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one more of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

#### CAUTION:

Any changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment

#### THE PARTY RESPONSIBLE FOR PRODUCT COMPLIANCE

(YOUR CORPORATE NAME)

(STREET, CITY, STATE, USA)

(TELEPHONE NO: (XXX) YYY-ZZZZ)

(ABOVE NAME AND ADDRESS MUST BE LOCATED WITHIN THE UNITED STATES)

## APPENDIX V - DECLARATION OF CONFORMITY LABELLING REQUIREMENTS

The labelling requirements for a device subject to the DoC procedure are specified in Section 15.19(b). The label should include the FCC logo along with the Trade Name and Model Number, which satisfies the unique identifier requirement of Section 2.1074 if it represents the identical equipment tested for DoC compliance. For personal computers assembled from authorized components, the following additional text must also be included: “Assembled from tested components,” “Complete system not tested.”

| §15.19(b)(1)(i) Products subject to authorization under a Declaration of Conformity shall be labelled as follows: | §15.19(b)(1)(ii) If a personal computer is authorized based on assembly using separately authorized components: |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|                                  |                               |

When the device is so small or for such use that it is not practicable to place the statement specified under paragraph 15.19(b)(1) on it, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instruction manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.

The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase. "Permanently affixed" means that the label is etched, engraved, stamped, silkscreened, indelibly printed or otherwise permanently marked on a permanent attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.