



FCC CERTIFICATION TEST REPORT

FOR

Applicant : Seal Shield Corporation
Address : 3105 Riverside Avenue, Jacksonville, Florida, United States, 32205
Equipment under Test : Wireless Dongle
Model No : STM042WR
FCC ID : X7LSTM042WR
Manufacturer : Dongguan Togran Electronic Technology Co, Ltd.
Address : 262 Shidan Rd., 3rd Industrial Area, Juzhou, Shijie, Dongguan, Guangdong

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-22891499

Report No: DDT-F12031

Issued Date: 2012/05/12

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TEST REPORT DECLARE

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FCC ID : X7LSTM042WR

Manufacturer : Dongguan Togran Electronic Technology Co, Ltd.

Address : 262 Shidan Rd., 3rd Industrial Area, Juzhou, Shijie, Dongguan, Guangdong


Test Standard Used: FCC Rules and Regulations Part 15 Subpart C:2012

Test procedure used: ANSI C63.10:2009

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

| | | | |
|---|-----------------------|--|------------|
| Report No: | DDT-F12031 | | |
| Date of Test: | 2012/05/09—2012/05/09 | Date of Report: | 2012/05/12 |
| Approved & Authorized Signer : | | | |
| | |  | |
| | | Jamy Yu / Assistant Director | |

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

| EMISSION | | |
|--|---|-------------|
| Description of Test Item | Standard | Results |
| Power Line Conducted Emission Test | FCC Part 15C: 15.207 ANSI C63.10 :2009 | PASS |
| Radiated Emission Test | FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10 :2009 | PASS |
| Band Edge Compliance Test | FCC Part 15: 15.249 ANSI C63.10 :2009 | PASS |
| 20dB Bandwidth Test | FCC Part 15: 15.215 ANSI C63.10 :2009 | PASS |
| N/A is an abbreviation for Not Applicable. | | |

2. General test information

2.1. Description of EUT

| | | |
|--------------------------|---|---|
| EUT* Name | : | Wireless Dongle |
| Model Number | : | STM042WR |
| EUT function description | : | Please reference user manual of this device |
| Power supply | : | DC 5V from PC |
| FCC ID | : | X7LSTM042WR |
| FCC Operation frequency | : | 2402MHz -2476MHz |
| Modulation | : | GFSK |
| Antenna Type | : | “F” Shape PCB antenna, Gain: 0dBi |
| Date of Receipt | : | 2012/05/06 |
| Sample Type | : | Series production |

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

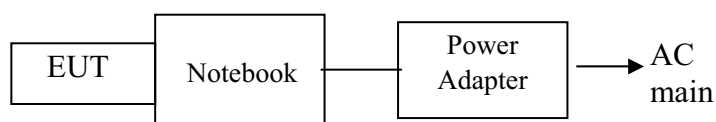
| Description of Accessories | Manufacturer | Model number or Type | Other |
|----------------------------|--------------|----------------------|-------|
| / | / | / | / |

Note: For USB Hub and Receiver of accessories of EUT were tested and reported in other reports.

2.3. Assistant equipment used for test

| Description of Assistant equipment | Manufacturer | Model number or Type | Other |
|------------------------------------|--------------|----------------------|-------|
| Notebook | LENOVO | X61S | / |
| Power adapter | LENOVO | 92P1107 | / |

2.4. Block diagram of EUT configuration for test



Note: A special test firmware was installed in the RF chip of EUT and which can exercise the EUT work in continues RF test mode at specified test channel as below:

| Tested mode, channel, and data rate information | | |
|---|---------|-----------------|
| Mode | Channel | Frequency (MHz) |
| Tx Mode | Low | 2402 |
| | Middle | 2441 |
| | High | 2476 |

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|--------------------|-----------|
| Temperature range: | 21-25°C |
| Humidity range: | 40-75% |
| Pressure range: | 86-106kPa |

2.6. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808 Tel: +86-0769-22891499

FCC Registration Number: 270092

2.7. Measurement uncertainty

| Test Item | Uncertainty |
|---|-----------------------|
| Uncertainty for Conduction emission test | 2.40dB |
| Uncertainty for Radiation Emission test (150KHz-30MHz) | 3.21dB |
| Uncertainty for Radiation Emission test (30MHz-1GHz) | 2.78 dB (Polarize: V) |
| | 3.20 dB (Polarize: H) |
| Uncertainty for Radiation Emission test (1GHz to 25GHz) | 2.08dB(Polarize: V) |
| | 2.56dB (Polarize: H) |
| Uncertainty for radio frequency | 1×10-9 |
| Uncertainty for conducted RF Power | 0.65dB |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 20dB Bandwidth

3.1. Test equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-------------------|--------------|-----------|--------------|------------|---------------|
| 1 | Spectrum analyzer | R&S | FSU | 1166.1660.26 | 2011/11/23 | 1Y |

3.2. Block diagram of test setup



3.3. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

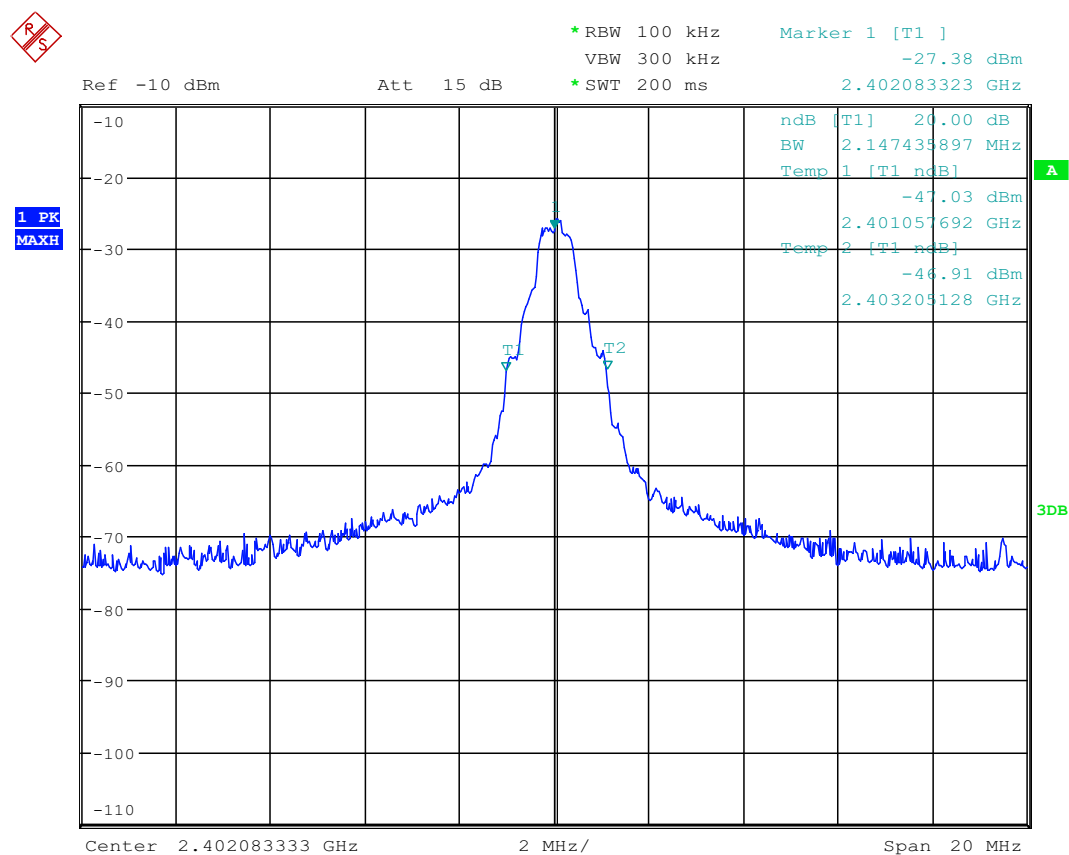
3.4. Test Procedure

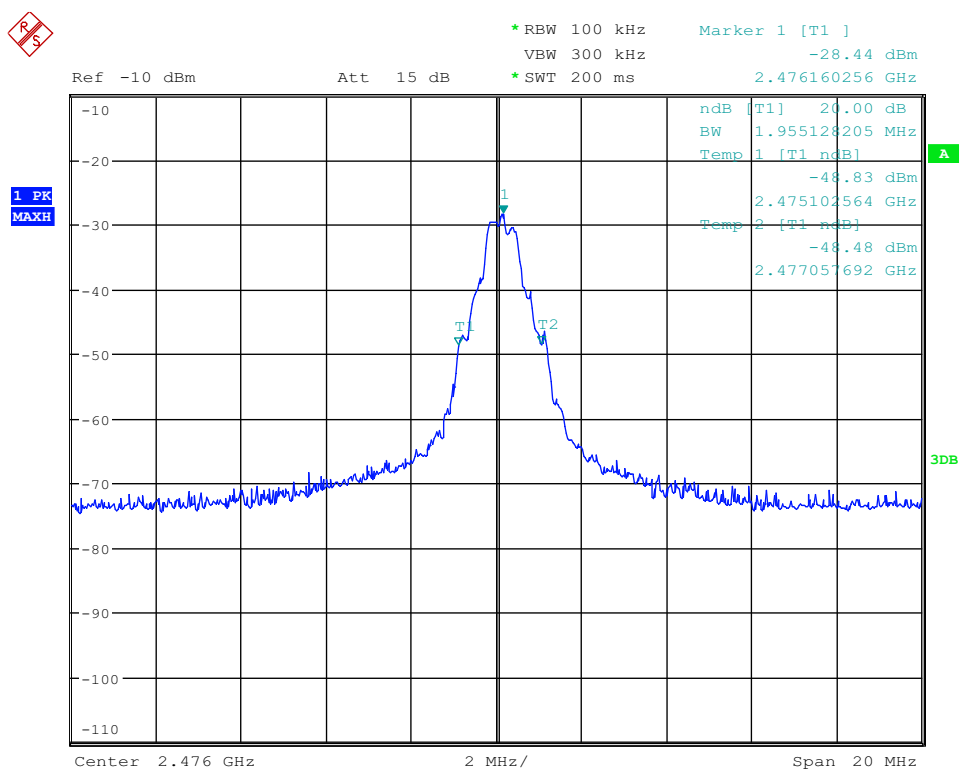
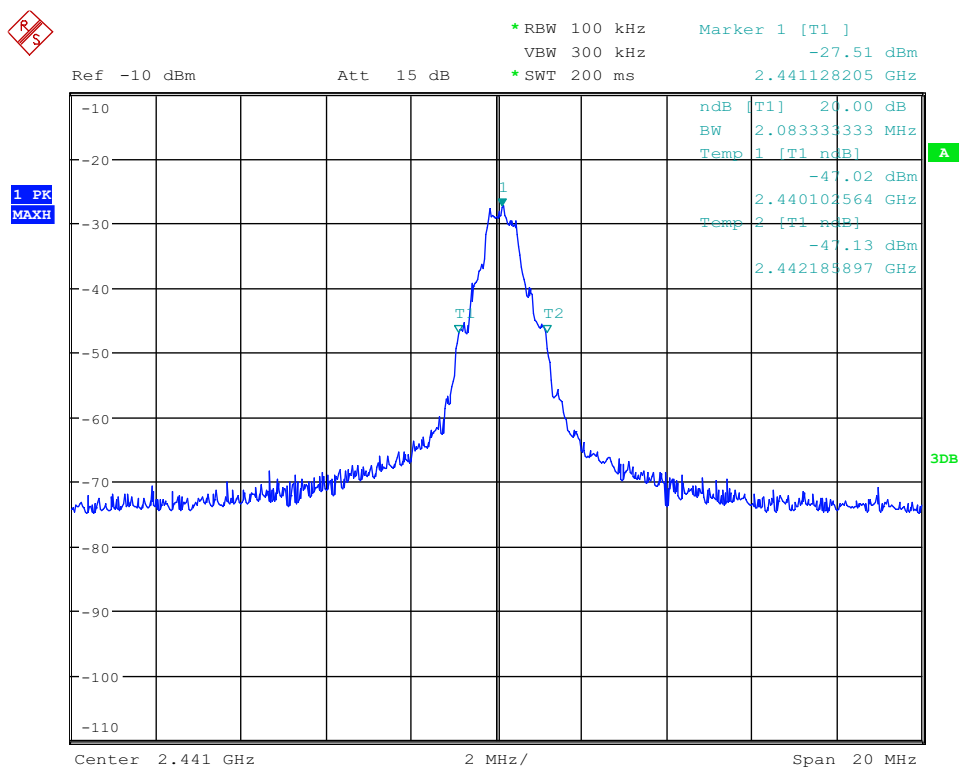
- (1) The EUT's RF signal was coupled to spectrum analyzer by a antenna connected to spectrum analyzer.
- (2) Configure EUT work in Tx mode as stated in clause 2.4.
- (3) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300 kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

3.5. Test Result

| EUT: Wireless Dongle M/N: STM042WR | | | | | |
|------------------------------------|------------|--------------|--------------------------|--------------|------------|
| Mode | Freq (MHz) | Result (MHz) | Limit (MHz) | Margin (MHz) | Conclusion |
| Tx Mode | 2402 | 2.147 | / | / | PASS |
| | 2441 | 2.083 | / | / | PASS |
| | 2476 | 1.955 | / | / | PASS |
| Test Date : 2012/05/09 | | | Test Engineer : Damon_Hu | | |

3.6. Original test data





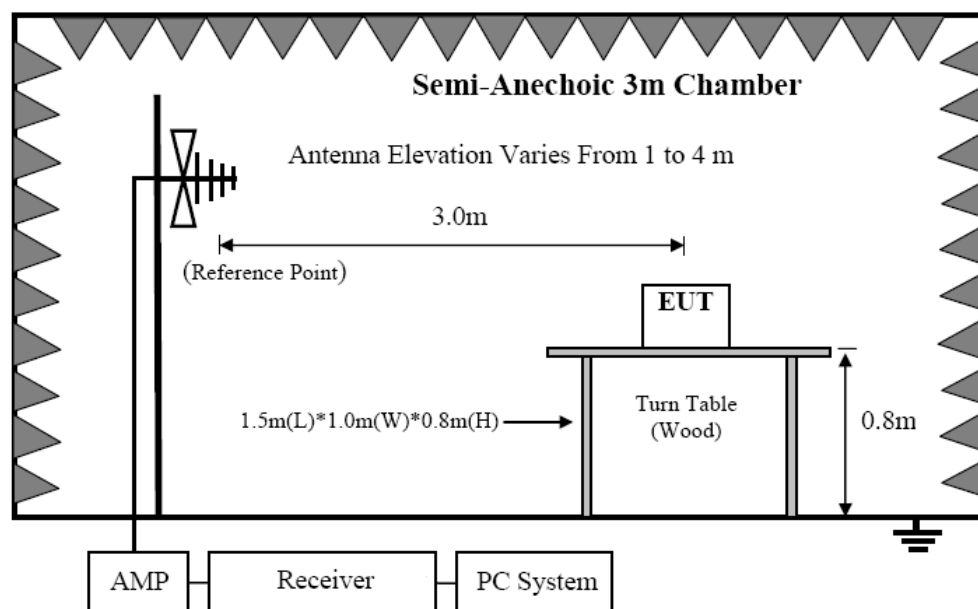
4. Radiated emission

4.1. Test equipment

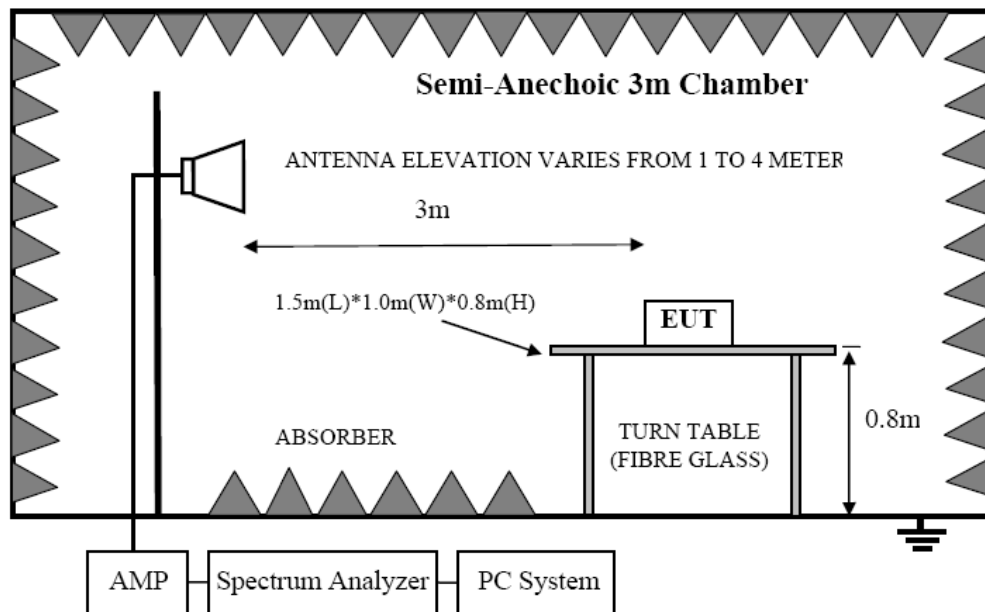
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|----------------------------|--------------|-----------|--------------|------------|---------------|
| 1 | EMI Test Receiver | R&S | ESU8 | 100316 | 2011/11/23 | 1Y |
| 2 | Spectrum analyzer | R&S | FSU | 1166.1660.26 | 2011/11/23 | 1Y |
| 3 | Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-462 | 2010/11/09 | 2 Y |
| 4 | Double Ridged Horn Antenna | R&S | HF907 | 100276 | 2011/01/16 | 2 Y |
| 5 | Pre-Amplifier | R&S | SCU-01 | 10049 | 2011/11/23 | 1Y |
| 6 | Pre-amplifier | A.H. | PAM0-0118 | 360 | 2011-12-20 | 1Y |
| 7 | RF Cable | R&S | R01 | 10403 | 2011/11/23 | 1Y |
| 8 | RF Cable | R&S | R02 | 10512 | 2011/11/23 | 1Y |
| 9 | Test software | R&S | EMC32 | / | / | / |

4.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.3. Limit

| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|--------------------|--|-----------------------------------|
| | | $\mu\text{V}/\text{m}$ | $\text{dB}(\mu\text{V})/\text{m}$ |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000MHz | 3 | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) | |
| Field Strength of Fundamental emission for 2.4GHz-2.4835GHz | 3 | 94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) 114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) | |
| Field Strength of Harmonics | 3 | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) | |

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

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 4.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.
- (8) For emissions below 1GHz, according explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1GHz, the final test was only performed with EUT working in Tx 244MHz mode.

4.5. Test result

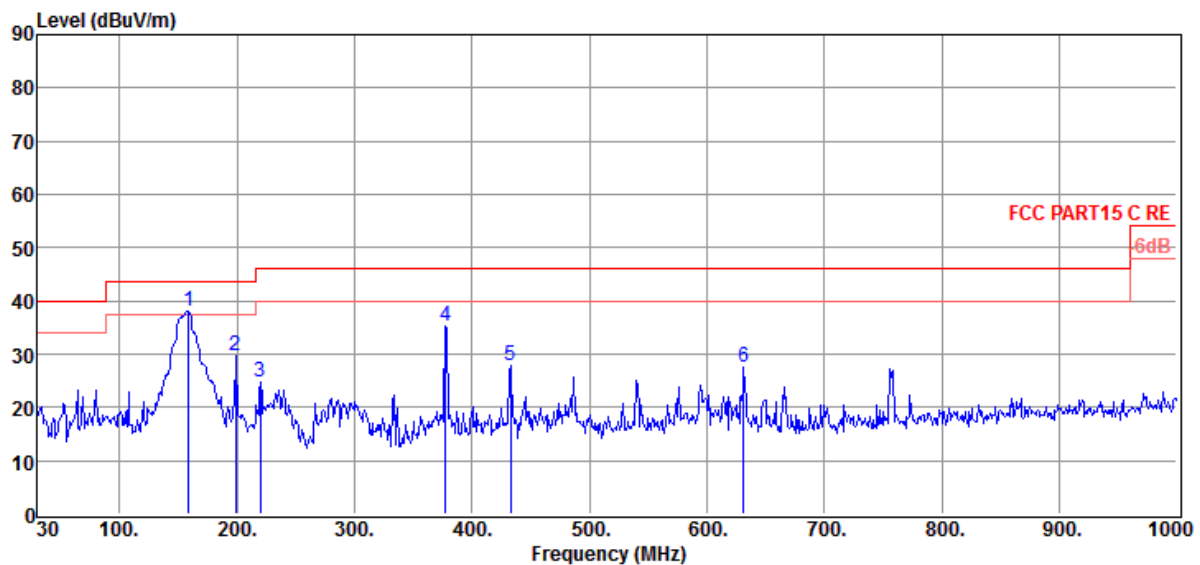
PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 KHz to 25GHz were comply with 15.209 limit.

Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2012 Test Data\S\05-11\RE.EM6**
Test Date : 05-09-2012 **Tested By** : Leo
EUT : Wireless Dongle **Model Number** : STM042WR
Power Supply : DC 5V from PC **Test Mode** : Tx Mode
Condition : Temp:24.5°C,Humi:55% **Antenna/Distance** : VULB 9163/3m/VERTICAL

Data : 24



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 159.01 | 71.56 | 8.67 | 43.74 | 1.57 | 38.06 | 43.50 | -5.44 | QP | VERTICAL |
| 2 | 198.78 | 61.17 | 10.57 | 43.72 | 1.75 | 29.77 | 43.50 | -13.73 | QP | VERTICAL |
| 3 | 220.12 | 55.56 | 11.20 | 43.70 | 1.80 | 24.86 | 46.00 | -21.14 | QP | VERTICAL |
| 4 | 377.26 | 61.70 | 14.59 | 43.60 | 2.54 | 35.23 | 46.00 | -10.77 | QP | VERTICAL |
| 5 | 432.55 | 53.07 | 15.54 | 43.47 | 2.67 | 27.81 | 46.00 | -18.19 | QP | VERTICAL |
| 6 | 631.40 | 48.79 | 18.57 | 43.09 | 3.35 | 27.62 | 46.00 | -18.38 | QP | VERTICAL |

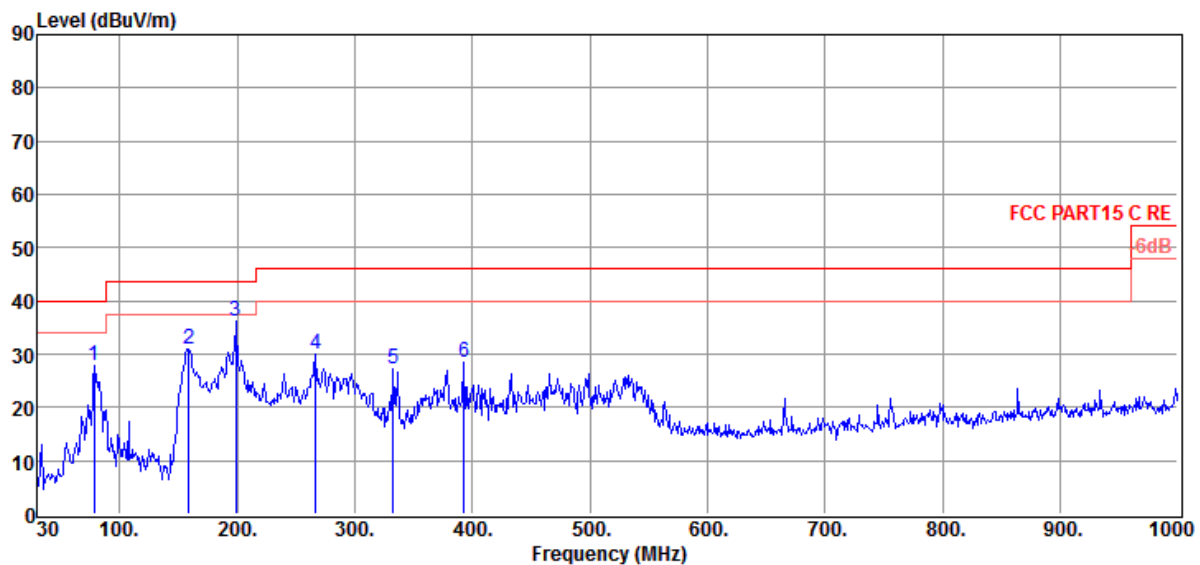
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2012 Test Data\S\05-11\RE.EM6**
Test Date : 05-09-2012 **Tested By** : Leo
EUT : Wireless Dongle **Model Number** : STM042WR
Power Supply : DC 5V from PC **Test Mode** : Tx Mode
Condition : Temp:24.5°C,Humi:55% **Antenna/Distance** : VULB 9163/3m/HORIZONTAL

Data : 25



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 78.50 | 62.85 | 7.80 | 43.79 | 1.05 | 27.91 | 40.00 | -12.09 | QP | HORIZONTAL |
| 2 | 159.01 | 64.46 | 8.67 | 43.74 | 1.57 | 30.96 | 43.50 | -12.54 | QP | HORIZONTAL |
| 3 | 198.78 | 67.52 | 10.57 | 43.72 | 1.75 | 36.12 | 43.50 | -7.38 | QP | HORIZONTAL |
| 4 | 266.68 | 59.19 | 12.30 | 43.69 | 2.10 | 29.90 | 46.00 | -16.10 | QP | HORIZONTAL |
| 5 | 332.64 | 54.91 | 13.80 | 43.65 | 2.29 | 27.35 | 46.00 | -18.65 | QP | HORIZONTAL |
| 6 | 392.78 | 54.60 | 14.97 | 43.58 | 2.58 | 28.57 | 46.00 | -17.43 | QP | HORIZONTAL |

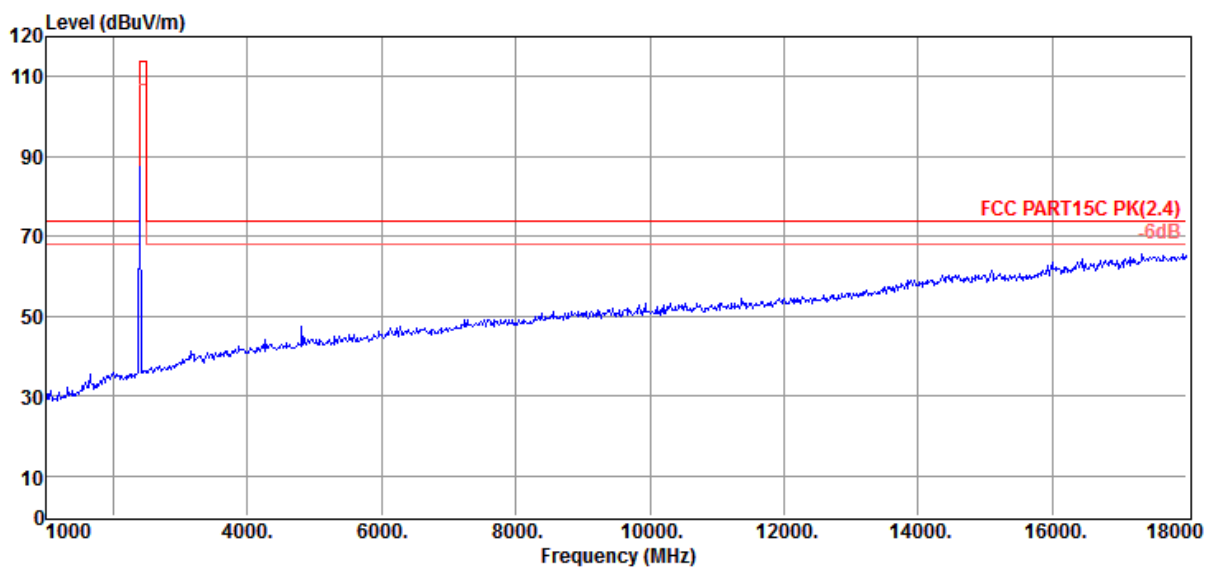
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 26



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

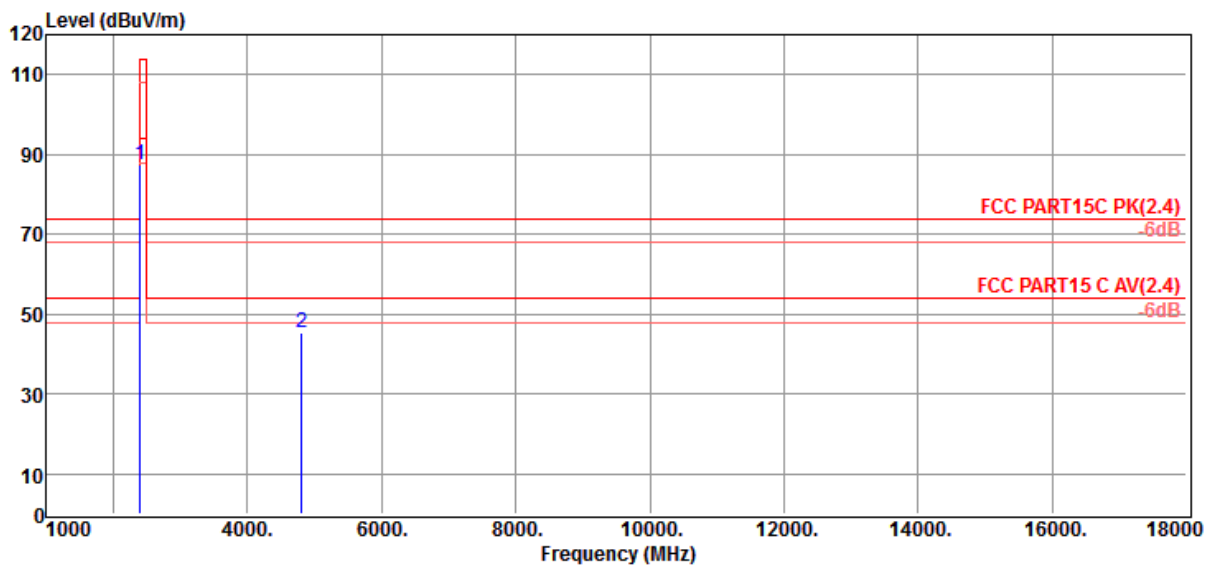
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 27



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2402.00 | 95.34 | 28.93 | 43.49 | 6.47 | 87.25 | 114.00 | -26.75 | Peak | HORIZONTAL |
| 2 | 4808.00 | 46.06 | 34.01 | 44.06 | 9.32 | 45.33 | 74.00 | -28.67 | Peak | HORIZONTAL |

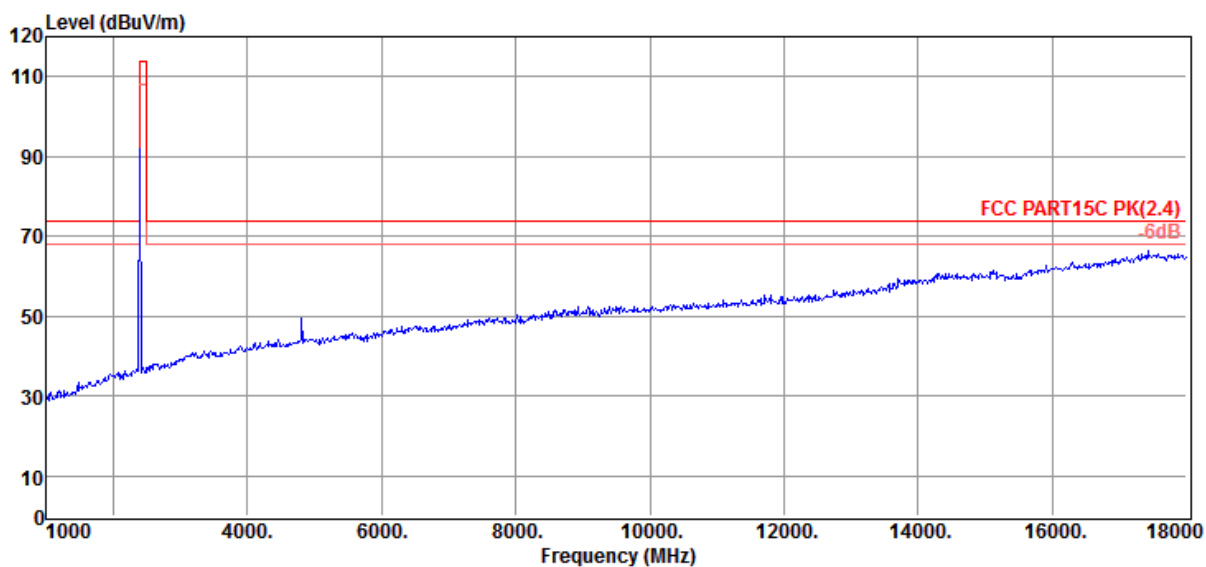
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 28



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

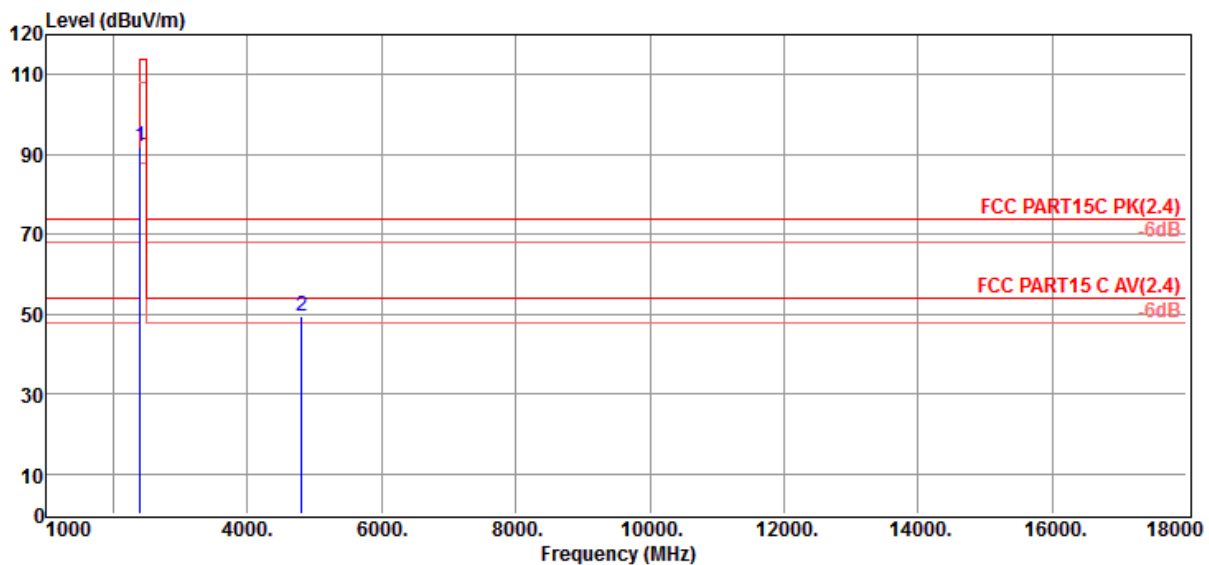
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 29



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2402.00 | 100.02 | 28.93 | 43.49 | 6.47 | 91.93 | 114.00 | -22.07 | Peak | VERTICAL |
| 2 | 4804.00 | 50.01 | 34.01 | 44.06 | 9.32 | 49.28 | 74.00 | -24.72 | Peak | VERTICAL |

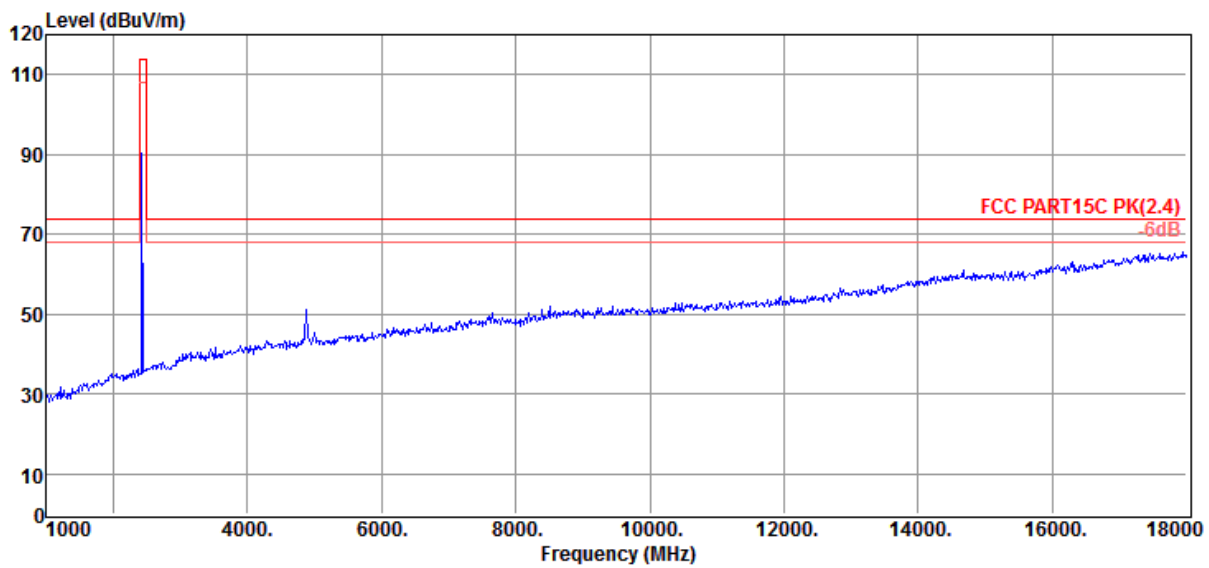
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2441MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 30



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

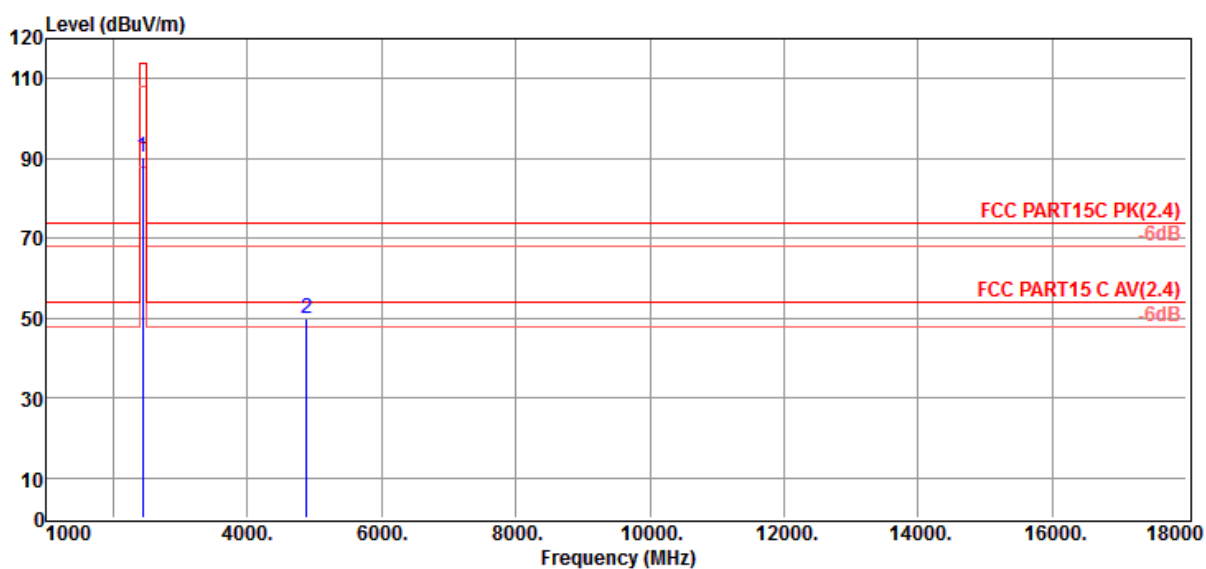
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2012 Test Data\S\05-11\RE.EM6**
Test Date : 05-09-2012 **Tested By** : Leo
EUT : Wireless Dongle **Model Number** : STM042WR
Power Supply : DC 5V from PC **Test Mode** : Tx Mode 2441MHz
Condition : Temp:24.5°C,Humi:55% **Antenna/Distance** : HF907 SN100276/3m/VERTICAL

Data : 31



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2441.00 | 98.20 | 29.03 | 43.49 | 6.53 | 90.27 | 114.00 | -23.73 | Peak | VERTICAL |
| 2 | 4882.00 | 50.42 | 34.29 | 44.03 | 9.41 | 50.09 | 74.00 | -23.91 | Peak | VERTICAL |

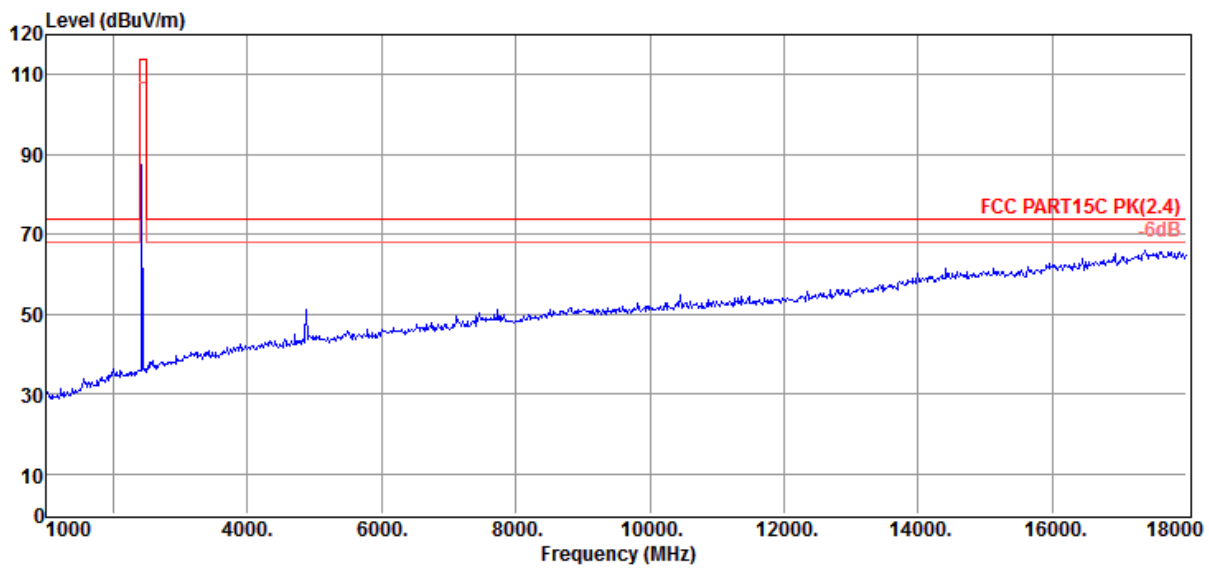
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2441MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 32



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

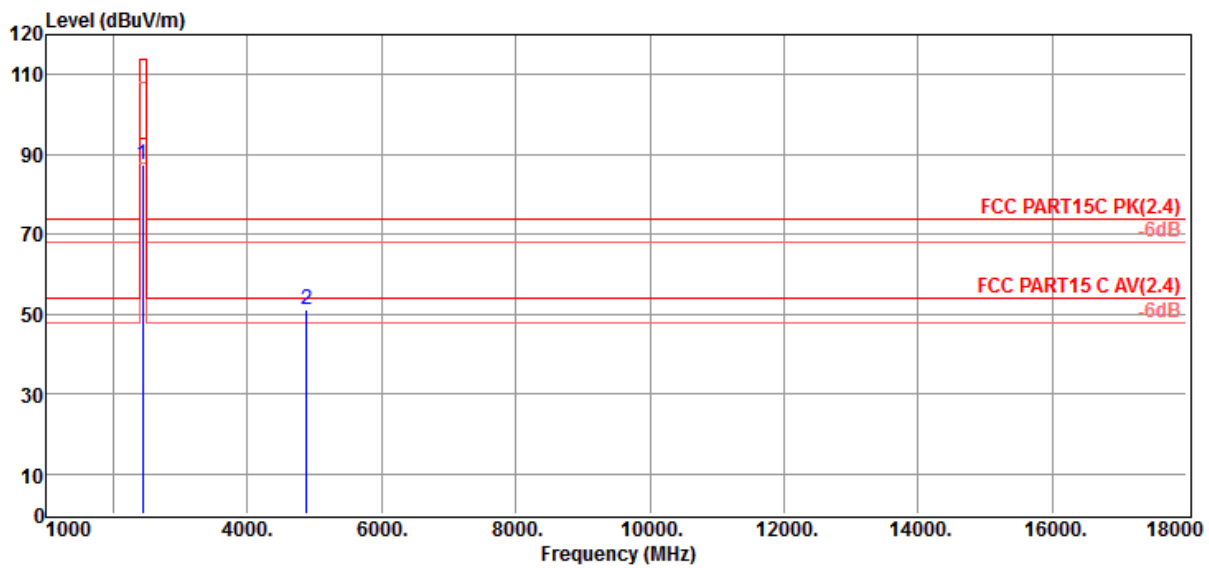
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2441MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 33



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2441.00 | 95.46 | 29.03 | 43.49 | 6.53 | 87.53 | 114.00 | -26.47 | Peak | HORIZONTAL |
| 2 | 4882.00 | 51.54 | 34.29 | 44.03 | 9.41 | 51.21 | 74.00 | -22.79 | Peak | HORIZONTAL |

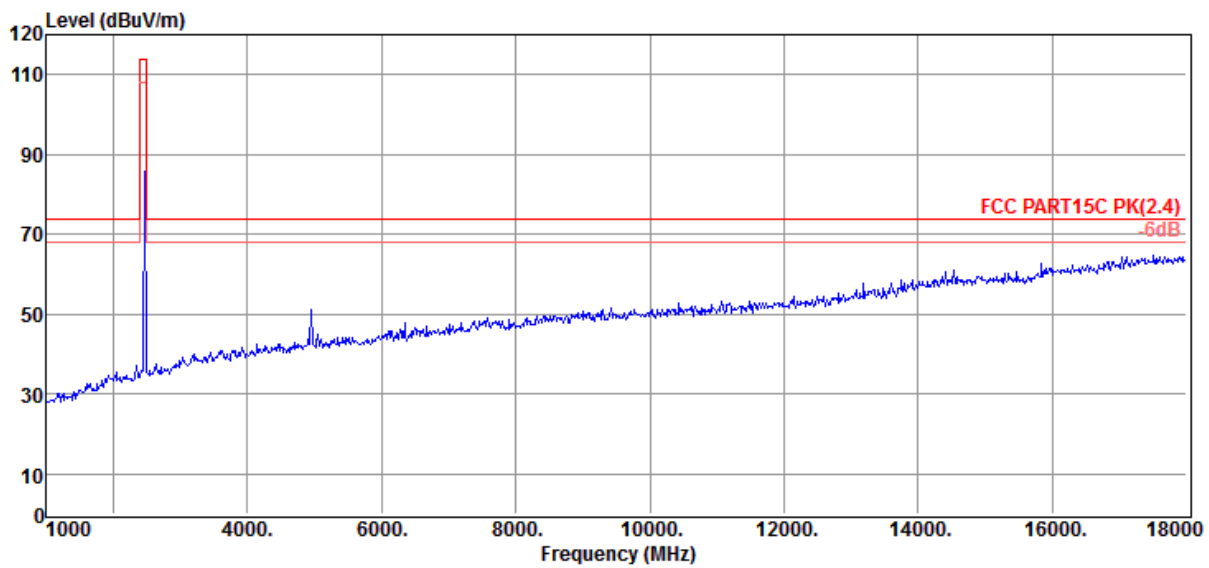
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 34



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

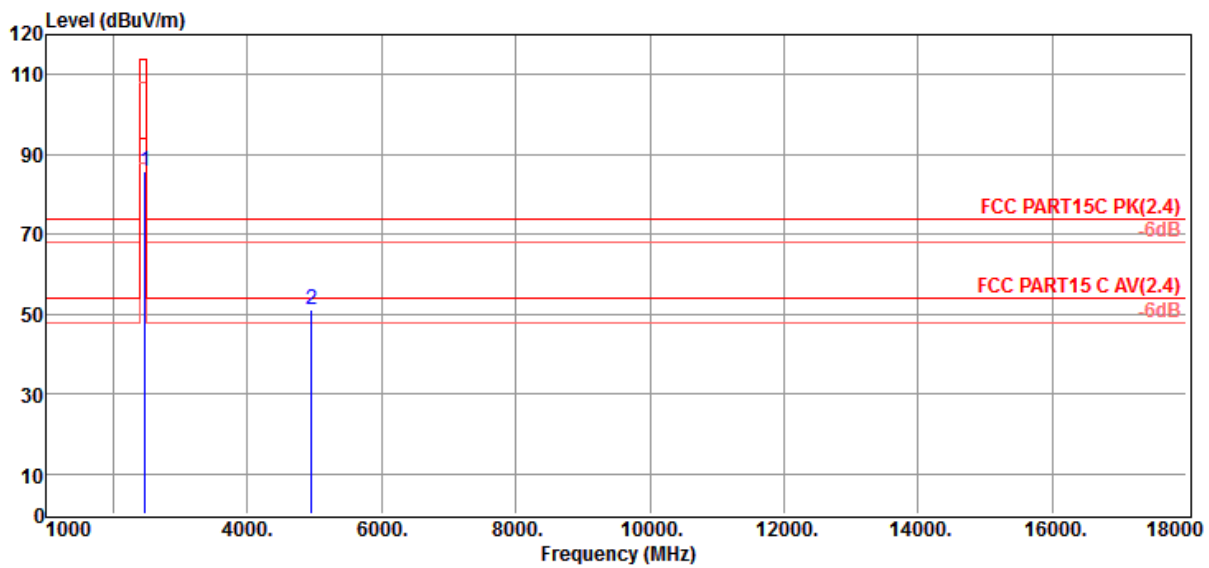
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 35



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2476.00 | 93.49 | 29.13 | 43.49 | 6.57 | 85.70 | 114.00 | -28.30 | Peak | HORIZONTAL |
| 2 | 4952.00 | 51.41 | 34.36 | 44.02 | 9.47 | 51.22 | 74.00 | -22.78 | Peak | HORIZONTAL |

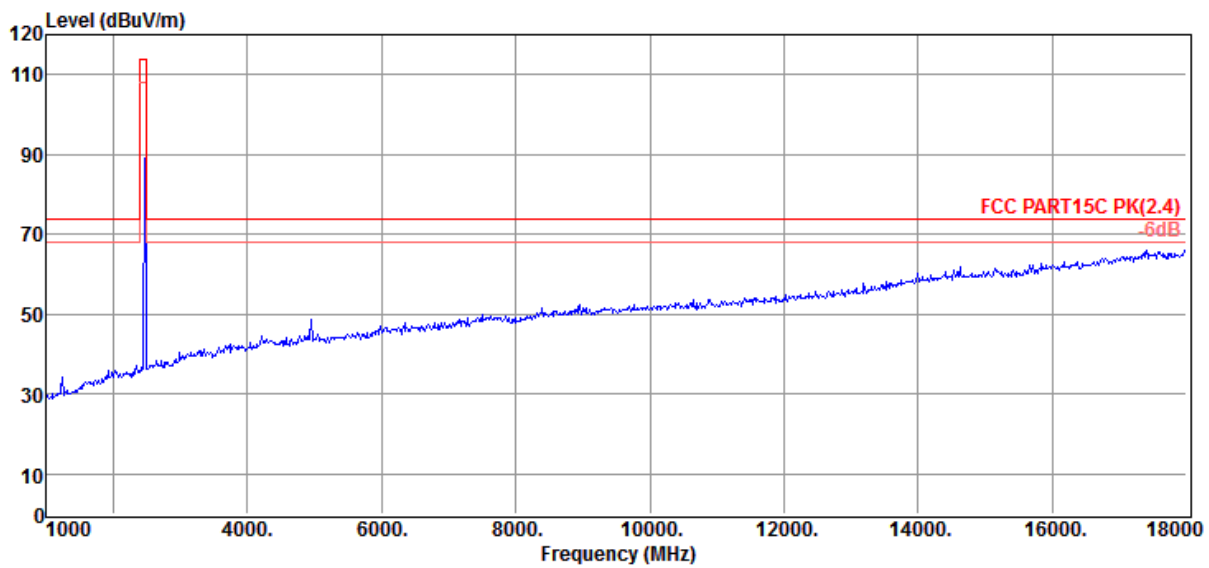
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 36



| Item | Freq | Read Level | Antenna Factor | PRM Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector | Polarization |
|--------|-------|------------|----------------|------------|------------|--------------|------------|------------|----------|--------------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | dB | dB | (dBμV/m) | (dBμV/m) | (dB) | | |

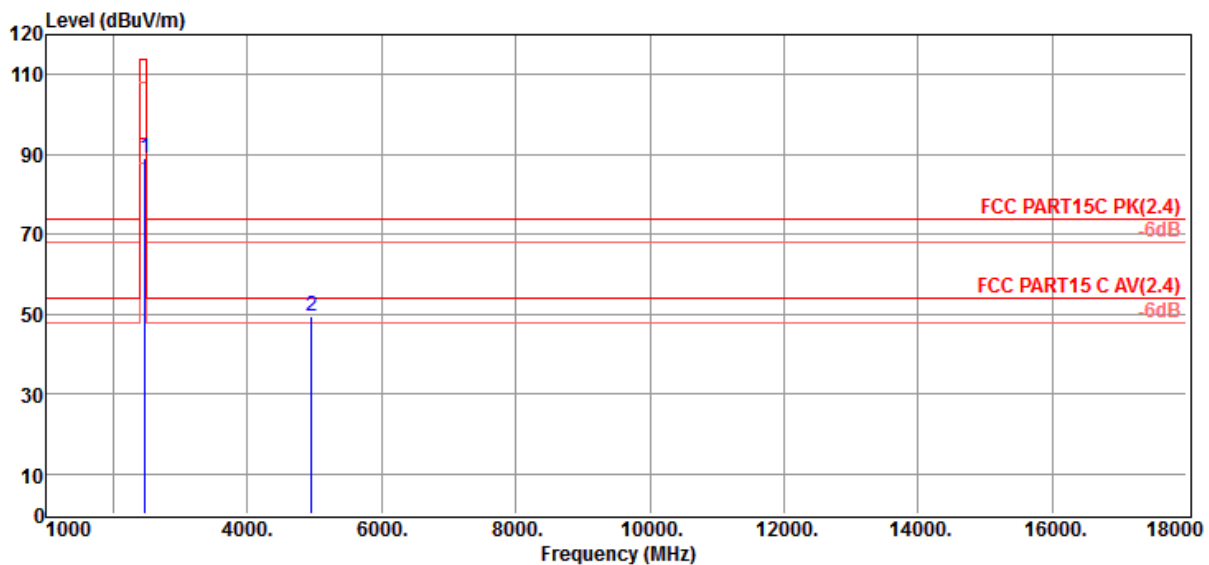
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 37



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2476.00 | 96.80 | 29.13 | 43.49 | 6.57 | 89.01 | 114.00 | -24.99 | Peak | VERTICAL |
| 2 | 4952.00 | 49.80 | 34.36 | 44.02 | 9.47 | 49.61 | 74.00 | -24.39 | Peak | VERTICAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

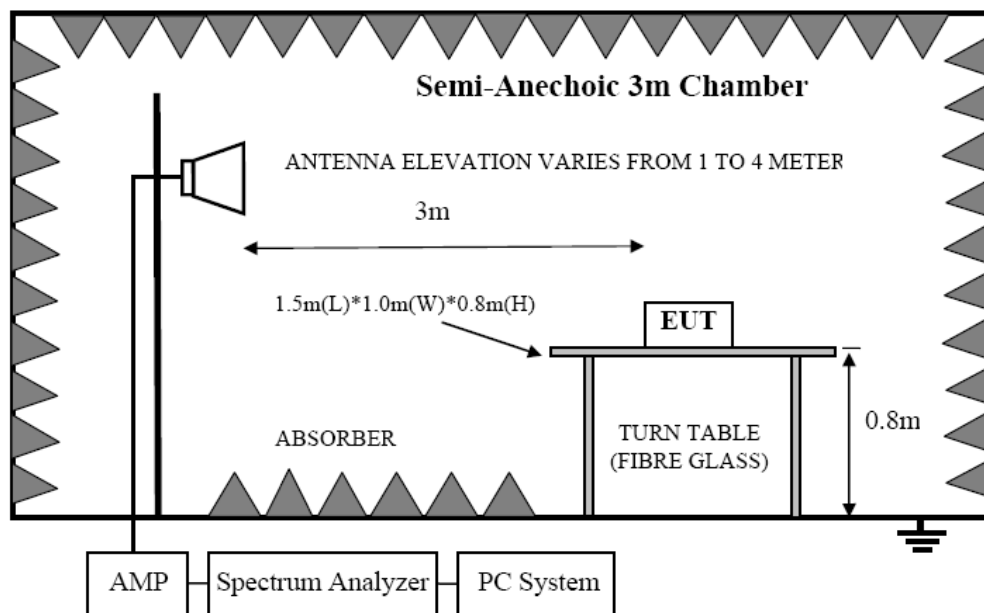
2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

5. Band Edge Compliance

5.1. Test equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|----------------------------|--------------|-----------|--------------|------------|---------------|
| 1 | EMI Test Receiver | R&S | ESU8 | 100316 | 2011/11/23 | 1Y |
| 2 | Spectrum analyzer | R&S | FSU | 1166.1660.26 | 2011/11/23 | 1Y |
| 3 | Trilog Broadband Antenna | Schwarzbeck | VULB9163 | 9163-462 | 2010/11/09 | 2 Y |
| 4 | Double Ridged Horn Antenna | R&S | HF907 | 100276 | 2011/01/16 | 2 Y |
| 5 | Pre-Amplifier | R&S | SCU-01 | 10049 | 2011/11/23 | 1Y |
| 6 | Pre-amplifier | A.H. | PAM0-0118 | 360 | 2011-12-20 | 1Y |
| 7 | RF Cable | R&S | R01 | 10403 | 2011/11/23 | 1Y |
| 8 | RF Cable | R&S | R02 | 10512 | 2011/11/23 | 1Y |
| 9 | Test software | R&S | EMC32 | / | / | / |

5.2. Block diagram of test setup



5.3. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz and 5725MHz to 5850MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

5.4. Test Procedure

Same with clause 8.4 except change investigated frequency range from 2310MHz to 2415MHz and 2475MHz to 2500MHz.

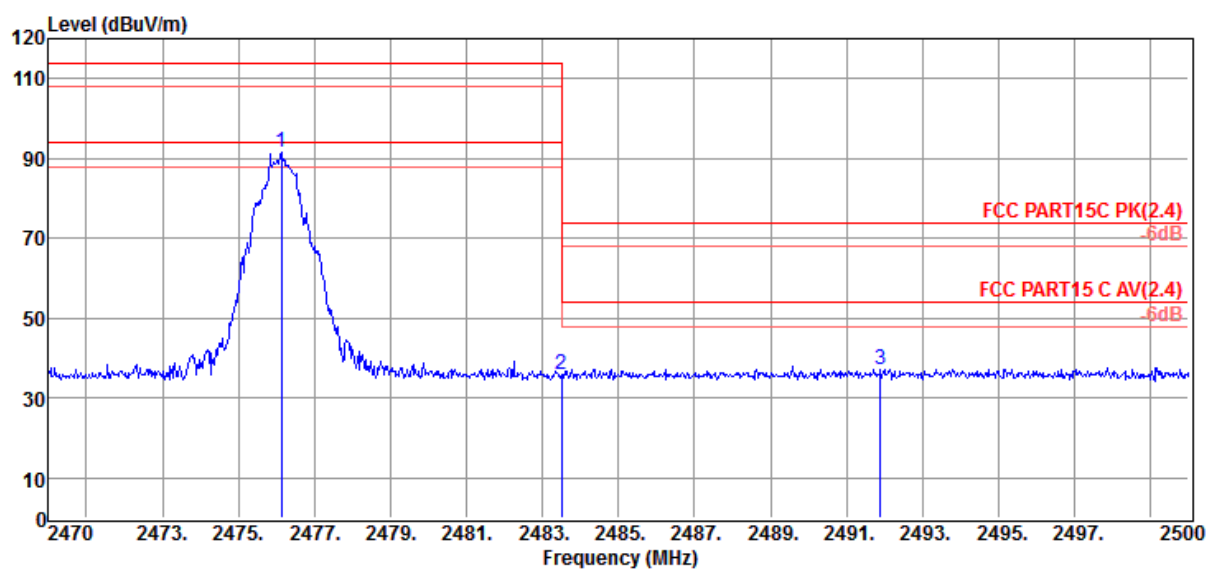
5.5. Test result

PASS. (See below detailed test result)

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 38



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2476.12 | 99.25 | 29.13 | 43.49 | 6.57 | 91.46 | 114.00 | -22.54 | Peak | VERTICAL |
| 2 | 2483.50 | 43.70 | 29.18 | 43.50 | 6.57 | 35.95 | 74.00 | -38.05 | Peak | VERTICAL |
| 3 | 2491.90 | 45.07 | 29.18 | 43.50 | 6.57 | 37.32 | 74.00 | -36.68 | Peak | VERTICAL |

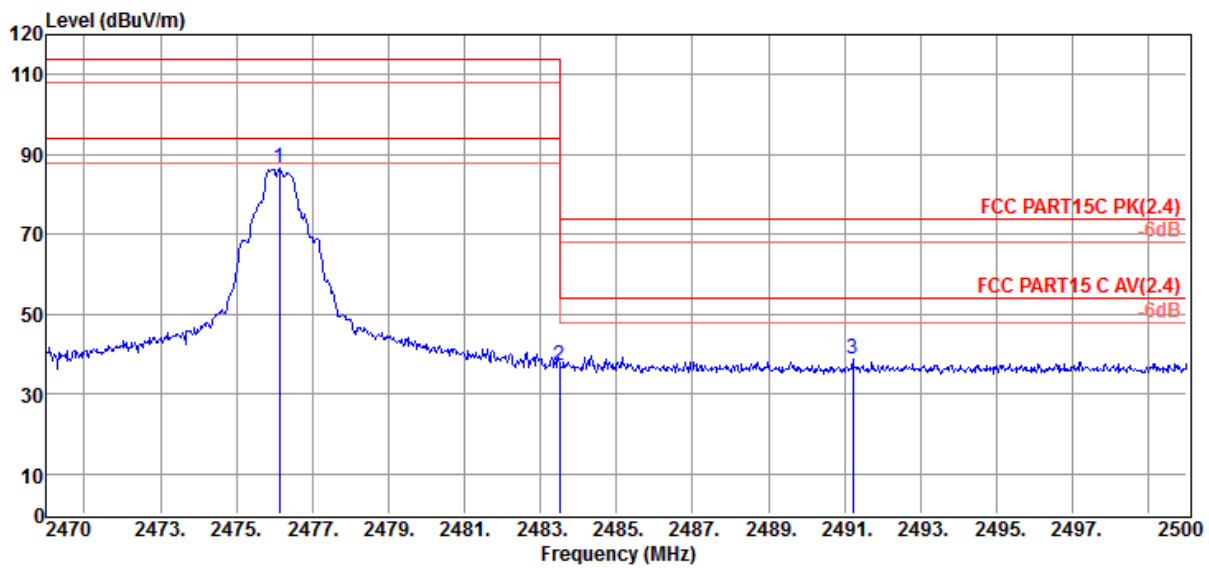
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2476MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 39



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2476.12 | 94.26 | 29.13 | 43.49 | 6.57 | 86.47 | 114.00 | -27.53 | Peak | HORIZONTAL |
| 2 | 2483.50 | 44.73 | 29.18 | 43.50 | 6.57 | 36.98 | 74.00 | -37.02 | Peak | HORIZONTAL |
| 3 | 2491.21 | 46.64 | 29.18 | 43.50 | 6.57 | 38.89 | 74.00 | -35.11 | Peak | HORIZONTAL |

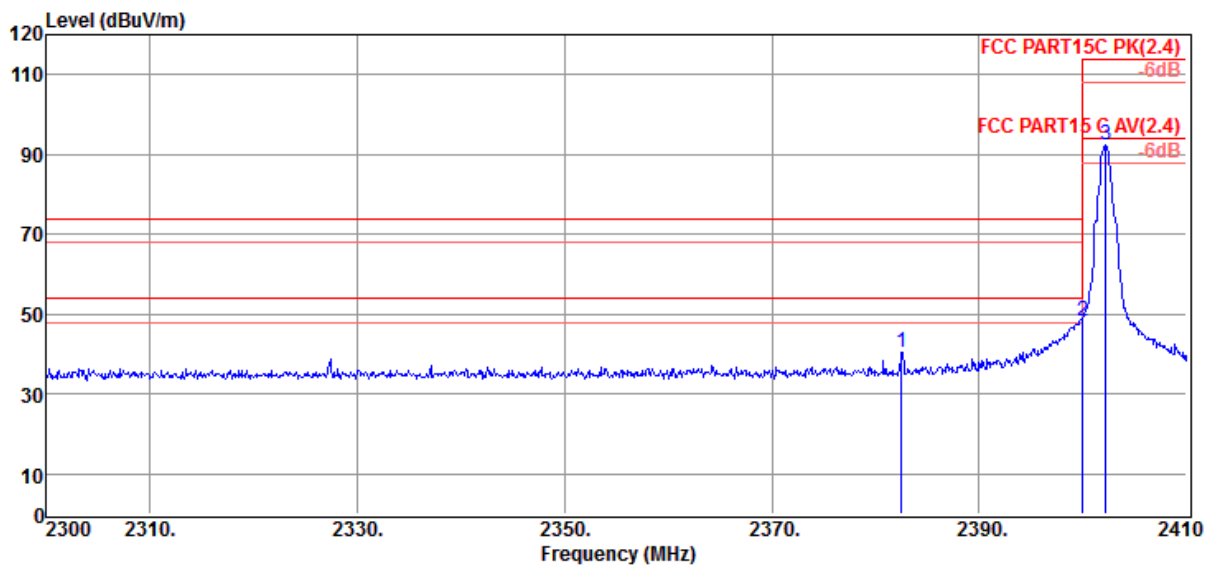
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/VERTICAL |

Data : 40



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2382.50 | 48.90 | 28.70 | 43.48 | 6.45 | 40.57 | 74.00 | -33.43 | Peak | VERTICAL |
| 2 | 2399.99 | 56.41 | 28.93 | 43.49 | 6.47 | 48.32 | 74.00 | -25.68 | Peak | VERTICAL |
| 3 | 2402.19 | 100.37 | 28.93 | 43.49 | 6.47 | 92.28 | 114.00 | -21.72 | Peak | VERTICAL |

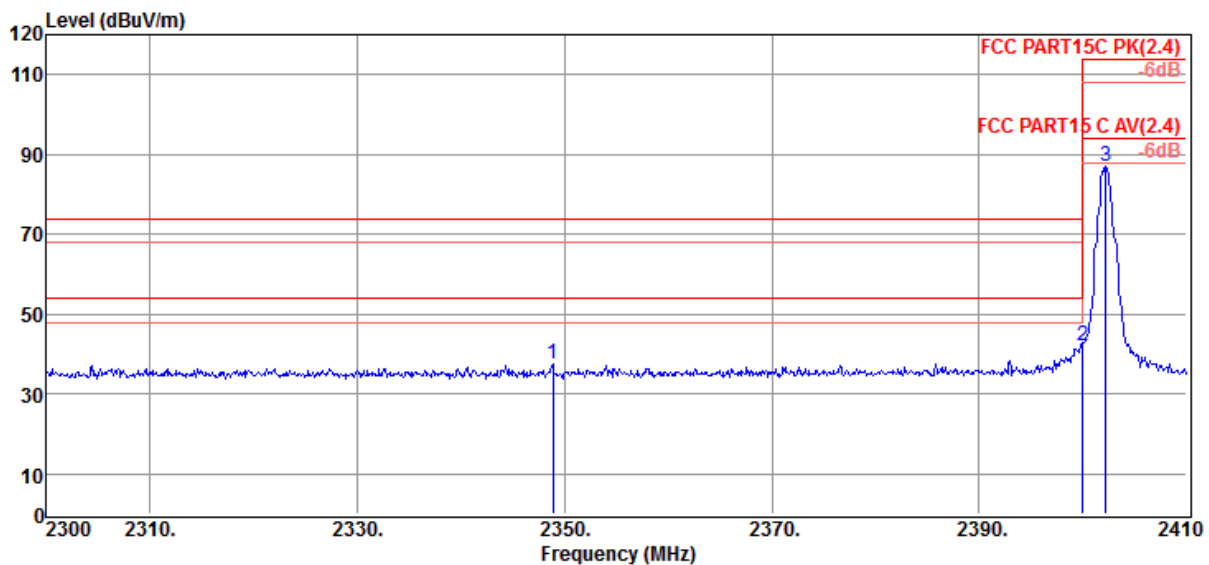
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

Radiated Emission Test Result

| | | |
|---------------------|------------------------|--|
| Test Site | : DDT 3m Chamber | E:\2012 Test Data\S\05-11\RE.EM6 |
| Test Date | : 05-09-2012 | Tested By : Leo |
| EUT | : Wireless Dongle | Model Number : STM042WR |
| Power Supply | : DC 5V from PC | Test Mode : Tx Mode 2402MHz |
| Condition | : Temp:24.5°C,Humi:55% | Antenna/Distance : HF907 SN100276/3m/HORIZONTAL |

Data : 41



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | Antenna Factor (dB/m) | PRM Factor dB | Cable Loss dB | Result Level (dBμV/m) | Limit Line (dBμV/m) | Over Limit (dB) | Detector | Polarization |
|----------------|---------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1 | 2348.84 | 45.97 | 28.44 | 43.47 | 6.39 | 37.33 | 74.00 | -36.67 | Peak | HORIZONTAL |
| 2 | 2399.99 | 50.23 | 28.93 | 43.49 | 6.47 | 42.14 | 74.00 | -31.86 | Peak | HORIZONTAL |
| 3 | 2402.19 | 95.22 | 28.93 | 43.49 | 6.47 | 87.13 | 114.00 | -26.87 | Peak | HORIZONTAL |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor

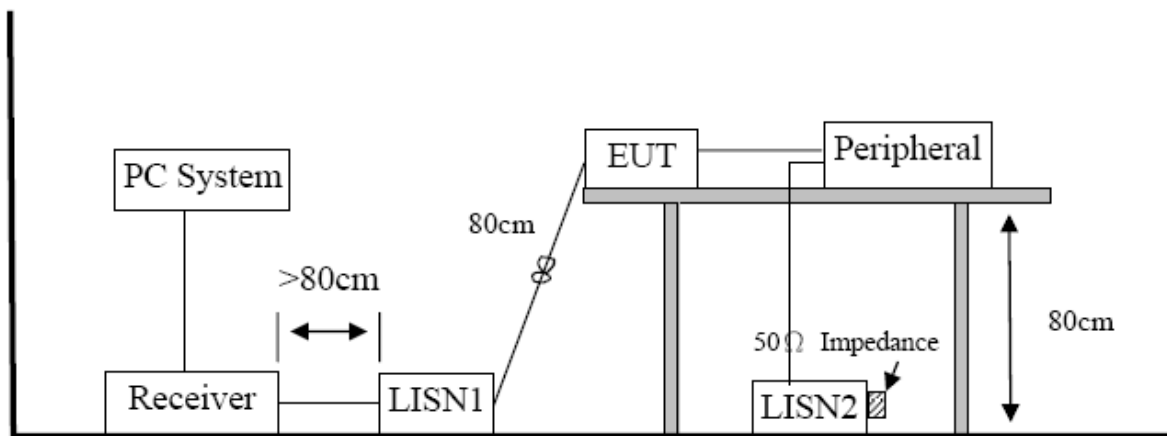
2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit

6. Power Line Conducted Emission

6.1. Test equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|---------------|--------------|-----------|------------|------------|---------------|
| 1 | Test Receiver | R&S | ESU8 | 100316 | 2011/11/23 | 1 Year |
| 2 | LISN 1 | R&S | ENV216 | 101109 | 2011/11/23 | 1 Year |
| 3 | LISN 2 | R&S | ESH2-Z5 | 100309 | 2011/11/23 | 1 Year |
| 4 | Pulse Limiter | R&S | ESH3-Z2 | 101242 | 2011/11/23 | 1 Year |
| 5 | Test software | Audix | E3 | / | / | / |

6.2. Block diagram of test setup



6.3. Power Line Conducted Emission Limits(Class B)

| Frequency | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
|-----------------|----------------------------|-------------------------|
| 150kHz ~ 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz ~ 5MHz | 56 | 46 |
| 5MHz ~ 30MHz | 60 | 50 |

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

6.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 6.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

6.5. Test Result

PASS. (See below detailed test result)

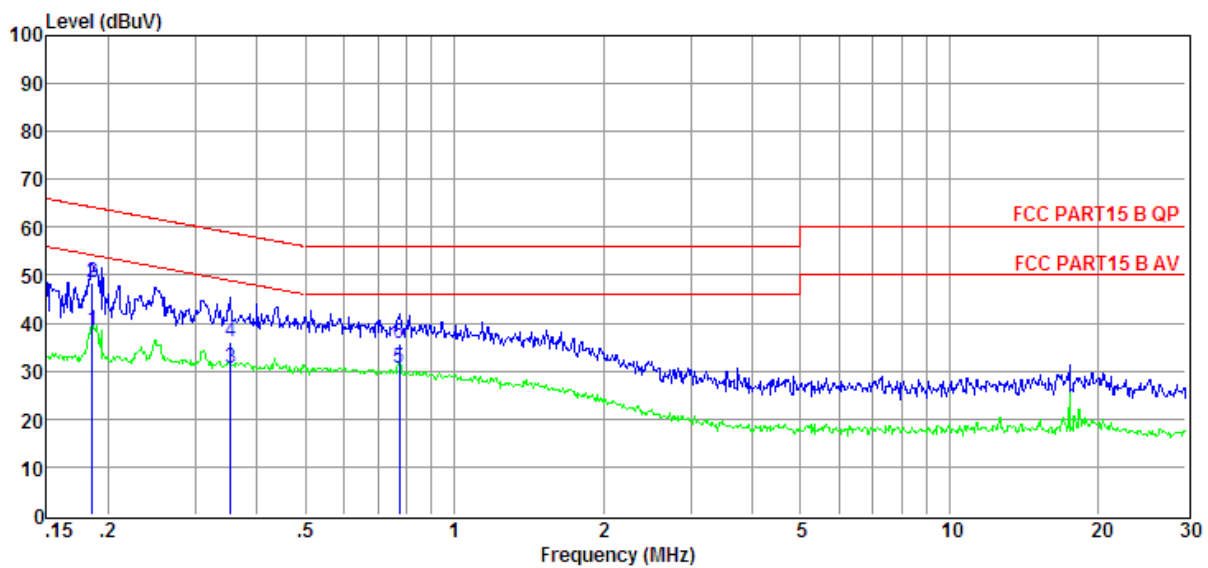
Note1: All emissions not reported below are too low against the prescribed limits.

Note2: "----" means average detection; "----" mans peak detection

Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\11.EM6**
Test Date : 05-09-2012 **Tested By** : Leo
EUT : Wireless Dongle **Model Number** : STM042WR
Power Supply : DC 5V from PC **Test Mode** : Tx Mode
Condition : Temp:24.5°C,Humi:55% **LISN** : ENV216/LINE
Memo :

Data : 36



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | LISN Factor (dB) | Cable Loss (dB) | Result Level (dBμV) | Limit Line (dBμV) | Over Limit (dB) | Detector | Phase |
|----------------|---------------|-------------------------|------------------------|-----------------------|---------------------------|-------------------------|-----------------------|----------|-------|
| 1 | 0.19 | 28.90 | 9.59 | 0.10 | 38.59 | 54.24 | -15.65 | Average | LINE |
| 2 | 0.19 | 38.88 | 9.59 | 0.10 | 48.57 | 64.24 | -15.67 | QP | LINE |
| 3 | 0.35 | 20.97 | 9.61 | 0.10 | 30.68 | 48.87 | -18.19 | Average | LINE |
| 4 | 0.35 | 26.30 | 9.61 | 0.10 | 36.01 | 58.87 | -22.86 | QP | LINE |
| 5 | 0.78 | 20.66 | 9.62 | 0.20 | 30.48 | 46.00 | -15.52 | Average | LINE |
| 6 | 0.78 | 25.86 | 9.62 | 0.20 | 35.68 | 56.00 | -20.32 | QP | LINE |

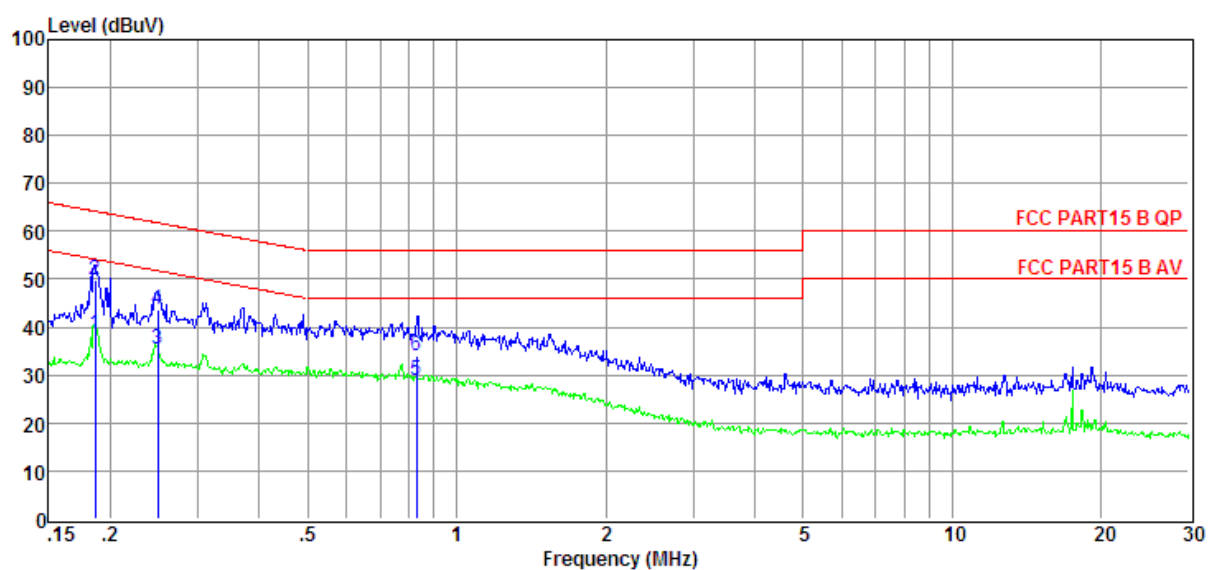
Note: 1. Result Level = Read Level + LISN Factor + Cable loss

2. If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\11.EM6**
Test Date : 05-09-2012 **Tested By** : Leo
EUT : Wireless Dongle **Model Number** : STM042WR
Power Supply : DC 5V from PC **Test Mode** : Tx Mode
Condition : Temp:24.5°C,Humi:55% **LISN** : ENV216/NEUTRAL
Memo :

Data : 38



| Item (Mark) | Freq (MHz) | Read Level (dBμV) | LISN Factor (dB) | Cable Loss (dB) | Result Level (dBμV) | Limit Line (dBμV) | Over Limit (dB) | Detector | Phase |
|----------------|---------------|-------------------------|------------------------|-----------------------|---------------------------|-------------------------|-----------------------|----------|---------|
| 1 | 0.19 | 28.86 | 9.66 | 0.10 | 38.62 | 54.20 | -15.58 | Average | NEUTRAL |
| 2 | 0.19 | 40.09 | 9.66 | 0.10 | 49.85 | 64.20 | -14.35 | QP | NEUTRAL |
| 3 | 0.25 | 25.68 | 9.66 | 0.10 | 35.44 | 51.78 | -16.34 | Average | NEUTRAL |
| 4 | 0.25 | 33.73 | 9.66 | 0.10 | 43.49 | 61.78 | -18.29 | QP | NEUTRAL |
| 5 | 0.83 | 19.01 | 9.64 | 0.20 | 28.85 | 46.00 | -17.15 | Average | NEUTRAL |
| 6 | 0.83 | 24.28 | 9.64 | 0.20 | 34.12 | 56.00 | -21.88 | QP | NEUTRAL |

Note: 1. Result Level = Read Level + LISN Factor + Cable loss

2. If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

7. Antenna Requirements

7.1. Limit

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.

7.2. Result

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