

FCC

RF

TEST REPORT

ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.



FOR  
**pointing device**

ISSUED TO  
Shenzhen Chang Ju Technology Co., Ltd

A-513, No.168, Baoyuan Rd., BaoAn District, Shenzhen City, China



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Date Dec 06, 2019

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Date Dec 06, 2019

Report No.: BL-SZ1990087-402

EUT Name: pointing device

Model Name: UWB-03S

Brand Name: N/A

Test Standard: 47 CFR Part 15 Subpart F

FCC ID: 2AUJG-UWB-03S

Test Conclusion: Pass

Test Date: Sep. 09, 2019 ~ Nov. 30, 2019

Date of Issue: Dec. 06, 2019

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**Revision History**

| <u>Version</u> | <u>Issue Date</u>    | <u>Revisions</u>     |
|----------------|----------------------|----------------------|
| <u>Rev. 01</u> | <u>Dec. 06, 2019</u> | <u>Initial Issue</u> |

**TABLE OF CONTENTS**

|       |                                                          |    |
|-------|----------------------------------------------------------|----|
| 1     | ADMINISTRATIVE DATA (GENERAL INFORMATION) .....          | 5  |
| 1.1   | Identification of the Testing Laboratory .....           | 5  |
| 1.2   | Identification of the Responsible Testing Location ..... | 5  |
| 1.3   | Laboratory Condition .....                               | 5  |
| 1.4   | Announce .....                                           | 5  |
| 2     | PRODUCT INFORMATION .....                                | 6  |
| 2.1   | Applicant .....                                          | 6  |
| 2.2   | Manufacturer .....                                       | 6  |
| 2.3   | Factory Information .....                                | 6  |
| 2.4   | General Description for Equipment under Test (EUT) ..... | 6  |
| 2.5   | Technical Information .....                              | 7  |
| 3     | SUMMARY OF TEST RESULTS.....                             | 8  |
| 3.1   | Test Standards.....                                      | 8  |
| 3.2   | Verdict .....                                            | 8  |
| 4     | GENERAL TEST CONFIGURATIONS.....                         | 9  |
| 4.1   | Test Environments .....                                  | 9  |
| 4.2   | Test Equipment List .....                                | 9  |
| 4.3   | Measurement Uncertainty .....                            | 9  |
| 4.4   | Description of Test Setup .....                          | 10 |
| 4.4.1 | For AC Power Supply Port Test .....                      | 10 |
| 4.4.2 | For Radiated Test (Below 30 MHz) .....                   | 10 |
| 4.4.3 | For Radiated Test (30 MHz-1 GHz) .....                   | 11 |
| 4.4.4 | For Radiated Test (Above 1 GHz).....                     | 11 |
| 5     | TEST ITEMS.....                                          | 12 |

|         |                                               |    |
|---------|-----------------------------------------------|----|
| 5.1     | Antenna Requirements .....                    | 12 |
| 5.1.1   | Relevant Standards.....                       | 12 |
| 5.1.2   | Antenna Anti-Replacement Construction .....   | 12 |
| 5.1.3   | Antenna Gain .....                            | 12 |
| 5.2     | Conducted Emission .....                      | 13 |
| 5.2.1   | Limit.....                                    | 13 |
| 5.2.2   | Test Setup.....                               | 13 |
| 5.2.3   | Test Procedure.....                           | 13 |
| 5.2.4   | Test Result .....                             | 13 |
| 5.3     | UWB Bandwidth .....                           | 14 |
| 5.3.1   | Limit.....                                    | 14 |
| 5.3.2   | Test Setup.....                               | 14 |
| 5.3.3   | Test Procedure.....                           | 14 |
| 5.3.4   | Test Result .....                             | 14 |
| 5.4     | Radiated Emissions .....                      | 15 |
| 5.4.1   | Limit.....                                    | 15 |
| 5.4.2   | Test Setup.....                               | 15 |
| 5.4.3   | Test Procedure.....                           | 15 |
| 5.4.4   | Test Result .....                             | 16 |
| 5.5     | Radiated Emissions in GPS Bands.....          | 17 |
| 5.5.1   | Limit.....                                    | 17 |
| 5.5.2   | Test Setup.....                               | 17 |
| 5.5.3   | Test Procedure.....                           | 17 |
| 5.5.4   | Test Result .....                             | 17 |
| 5.6     | Peak Emissions within a 50MHz Bandwidth ..... | 18 |
| 5.6.1   | Limit.....                                    | 18 |
| 5.6.2   | Test Setup.....                               | 18 |
| 5.6.3   | Test Procedure.....                           | 18 |
| 5.6.4   | Test Result .....                             | 18 |
| ANNEX A | TEST RESULT .....                             | 19 |
| A.1     | Conducted Emission .....                      | 19 |

|         |                                               |    |
|---------|-----------------------------------------------|----|
| A.2     | UWB Bandwidth .....                           | 27 |
| A.3     | Radiated Emissions .....                      | 31 |
| A.4     | Radiated Emissions in GPS Bands .....         | 47 |
| A.5     | Peak Emissions within a 50MHz Bandwidth ..... | 55 |
| ANNEX B | TEST SETUP PHOTOS .....                       | 56 |
| ANNEX C | EUT EXTERNAL PHOTOS .....                     | 56 |
| ANNEX D | EUT INTERNAL PHOTOS .....                     | 56 |

## 1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

### 1.1 Identification of the Testing Laboratory

|              |                                                                                                                                 |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| Company Name | Shenzhen BALUN Technology Co., Ltd.                                                                                             |
| Address      | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Phone Number | +86 755 6685 0100                                                                                                               |

### 1.2 Identification of the Responsible Testing Location

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Location             | Shenzhen BALUN Technology Co., Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Address                   | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Accreditation Certificate | <p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.</p> <p>The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p> |
| Description               | All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

### 1.3 Laboratory Condition

|                           |                    |
|---------------------------|--------------------|
| Ambient Temperature       | 20°C to 25°C       |
| Ambient Relative Humidity | 45% to 55%         |
| Ambient Pressure          | 100 kPa to 102 kPa |

### 1.4 Announce

- (1) The test report reference to the report template version v1.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

## 2 PRODUCT INFORMATION

### 2.1 Applicant

|           |                                                                  |
|-----------|------------------------------------------------------------------|
| Applicant | Shenzhen Chang Ju Technology Co., Ltd                            |
| Address   | A-513, No.168, Baoyuan Rd., BaoAn District, Shenzhen City, China |

### 2.2 Manufacturer

|              |     |
|--------------|-----|
| Manufacturer | N/A |
| Address      | N/A |

### 2.3 Factory Information

|              |     |
|--------------|-----|
| Manufacturer | N/A |
| Address      | N/A |

### 2.4 General Description for Equipment under Test (EUT)

|                                           |                 |
|-------------------------------------------|-----------------|
| EUT Name                                  | pointing device |
| Under Test Model Name                     | UWB-03S         |
| Series Model Name                         | N/A             |
| Description of Model name differentiation | N/A             |
| Hardware Version                          | UWB-03S         |
| Software Version                          | N/A             |
| Dimensions (Approx.)                      | N/A             |
| Weight (Approx.)                          | N/A             |

## 2.5 Technical Information

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Network and Wireless connectivity | WIFI 802.11b, 802.11g, 802.11n<br>UWB |
|-----------------------------------|---------------------------------------|

The requirement for the following technical information of the EUT was tested in this report:

|                     |                                                                                                                          |
|---------------------|--------------------------------------------------------------------------------------------------------------------------|
| Modulation Type     | UWB                                                                                                                      |
| Product Type        | <input type="checkbox"/> Mobile<br><input type="checkbox"/> Portable<br><input checked="" type="checkbox"/> Fix Location |
| Operating Frequency | 3.5GHz-6.5GHz                                                                                                            |
| Antenna Type        | Dipole Antenna                                                                                                           |
| Antenna Gain        | 2 dBi                                                                                                                    |

All channel was listed on the following table:

| Channel number | Centre Frequency (MHz) | Bandwidth (MHz) |
|----------------|------------------------|-----------------|
| 1              | 3494.4                 | 499.2           |
| 2              | 3993.6                 | 499.2           |
| 3              | 4492.8                 | 499.2           |
| 5              | 6489.6                 | 499.2           |

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

| No. | Identity                                          | Document Title                                                     |
|-----|---------------------------------------------------|--------------------------------------------------------------------|
| 1   | 47 CFR Part 15,<br>Subpart F<br>(10-1-18 Edition) | Ultra - Wideband Operation                                         |
| 2   | ANSI C63.10-2013                                  | American National Standard for Testing Unlicensed Wireless Devices |

#### 3.2 Verdict

| No. | Description                              | FCC Part No.     | Test Result | Verdict              |
|-----|------------------------------------------|------------------|-------------|----------------------|
| 1   | Antenna Requirement                      | 15.203           | --          | Pass <sup>Note</sup> |
| 2   | Conducted Emission                       | 15.207           | ANNEX A.1   | Pass                 |
| 3   | UWB Bandwidth                            | 15.517(b)        | ANNEX A.2   | Pass                 |
| 4   | Radiated Emissions                       | 15.517(c)/15.209 | ANNEX A.3   | Pass                 |
| 5   | Radiated Emissions in GPS Bands          | 15.517(d)        | ANNEX A.4   | Pass                 |
| 6   | Peak Emissions within a 50 MHz Bandwidth | 15.517(e)        | ANNEX A.5   | Pass                 |

Note: Please refer to section 5.1

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Environments

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

|                            |                         |                |
|----------------------------|-------------------------|----------------|
| Relative Humidity          | 45% to 55%              |                |
| Atmospheric Pressure       | 100 kPa to 102 kPa      |                |
| Temperature                | NT (Normal Temperature) | +22°C to +25°C |
| Working Voltage of the EUT | NV (Normal Voltage)     | 5.2 V          |

### 4.2 Test Equipment List

| Description                       | Manufacturer               | Model             | Serial No. | Cal. Date  | Cal. Due   |
|-----------------------------------|----------------------------|-------------------|------------|------------|------------|
| EMI Receiver                      | KEYSIGHT                   | N9010B            | MY57110309 | 2019.06.13 | 2020.06.12 |
|                                   |                            |                   |            |            |            |
| LISN                              | SCHWARZBECK                | NSLK 8127         | 8127-687   | 2019.07.04 | 2020.07.03 |
| Shielded Enclosure                | YiHeng Electronic Co., Ltd | 3.4m*3.1m*2.8m    | N/A        | 2018.08.16 | 2021.08.15 |
| EMI Receiver                      | KEYSIGHT                   | N9038A            | MY53220118 | 2019.10.29 | 2020.10.28 |
| EMI Receiver                      | ROHDE&SCHWARZ              | ESRP              | 101036     | 2019.06.13 | 2020.06.12 |
| Spectrum Analyzer                 | ROHDE&SCHWARZ              | FSV-40            | 103118     | 2019.06.13 | 2020.06.12 |
| Test Antenna-Loop(9 kHz-30 MHz)   | SCHWARZBECK                | FMZB 1519         | 1519-037   | 2019.10.29 | 2021.10.28 |
| Test Antenna-Bi-Log(30 MHz-1 GHz) | SCHWARZBECK                | VULB 9163         | 9163-624   | 2018.08.22 | 2020.08.21 |
| Test Antenna-Horn(1-18 GHz)       | SCHWARZBECK                | BBHA 9120D        | 9120D-1148 | 2018.07.11 | 2020.07.10 |
| Test Antenna-Horn (18-40 GHz)     | A-INFO                     | LB-180400KF       | J211060273 | 2019.01.06 | 2021.01.05 |
| Anechoic Chamber                  | RAINFORD                   | 9m*6m*6m          | N/A        | 2017.02.21 | 2020.02.20 |
| Anechoic Chamber                  | EMC Electronic Co., Ltd    | 20.10*11.60*7.35m | N/A        | 2018.08.08 | 2021.08.07 |
| Test Software                     | BALUN                      | BL410_E           | V19.918    | --         | --         |

### 4.3 Measurement Uncertainty

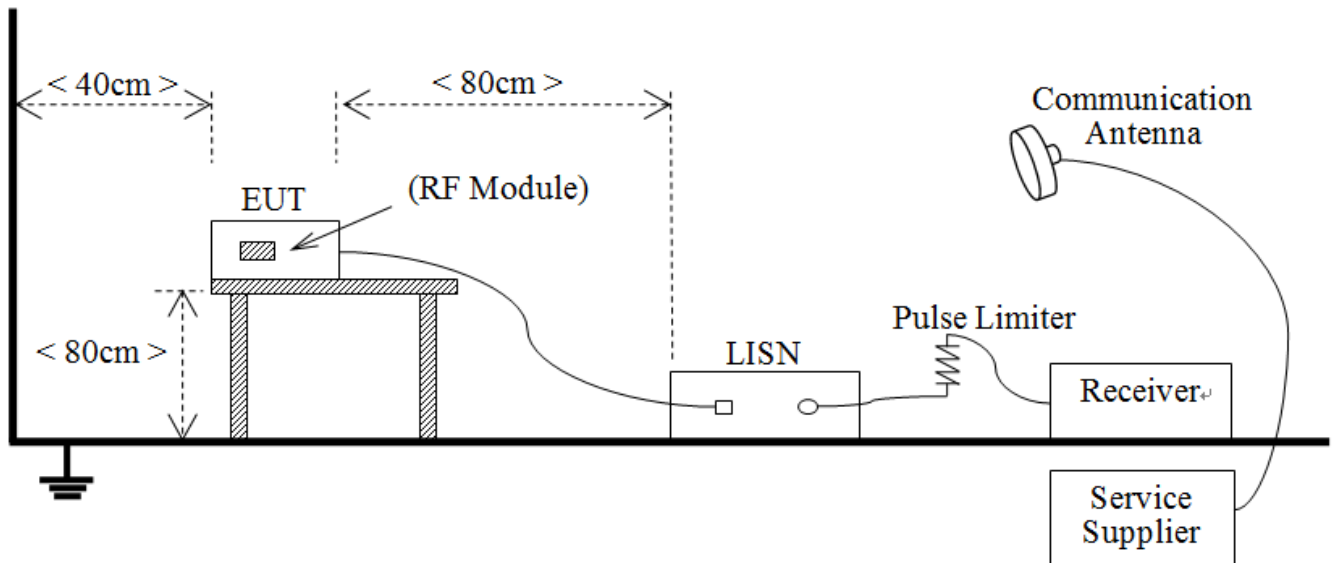
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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

| Measurement                        | Value   |
|------------------------------------|---------|
| Conducted emissions (9 kHz-30 MHz) | 2.96 dB |
| Radiated emissions (9 kHz-30 MHz)  | 3.76 dB |
| Radiated emissions (30 MHz-1 GHz)  | 3.66 dB |
| Radiated emissions (1 GHz-18 GHz)  | 5.57 dB |
| Radiated emissions (18 GHz-40 GHz) | 6.12 dB |

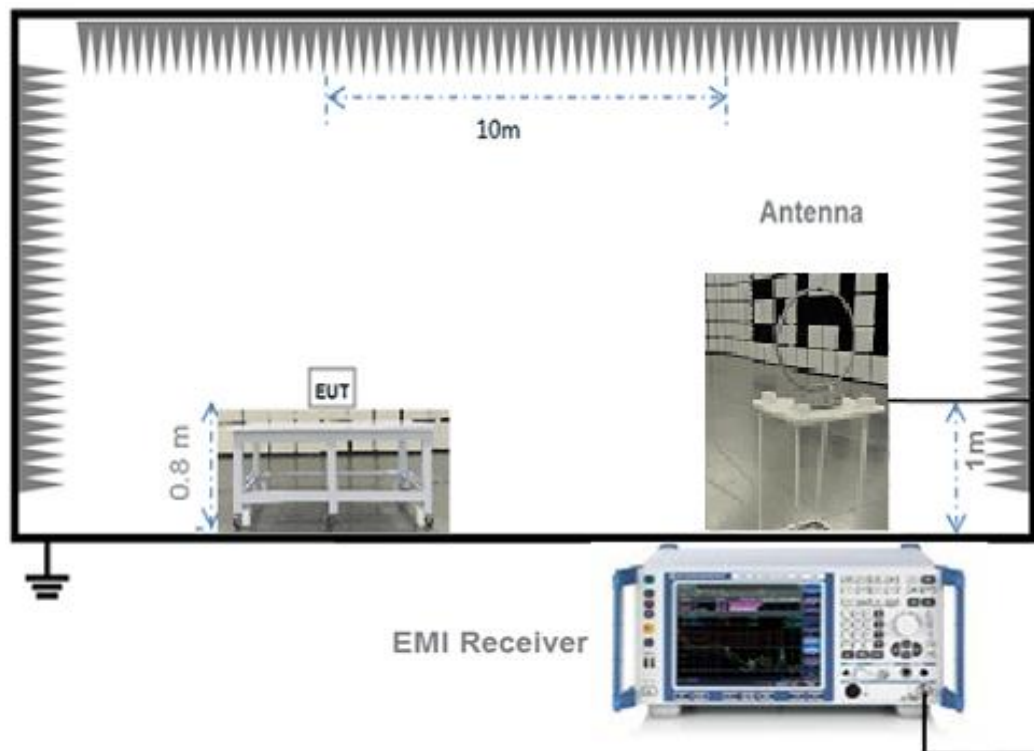
#### 4.4 Description of Test Setup

##### 4.4.1 For AC Power Supply Port Test



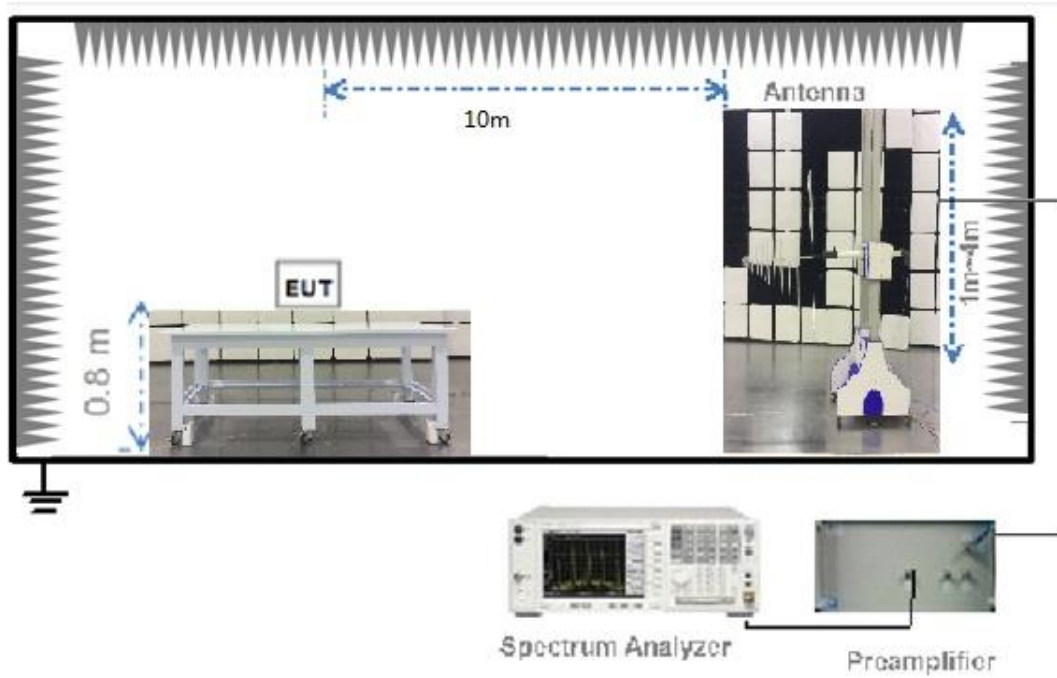
(Diagram 1)

##### 4.4.2 For Radiated Test (Below 30 MHz)



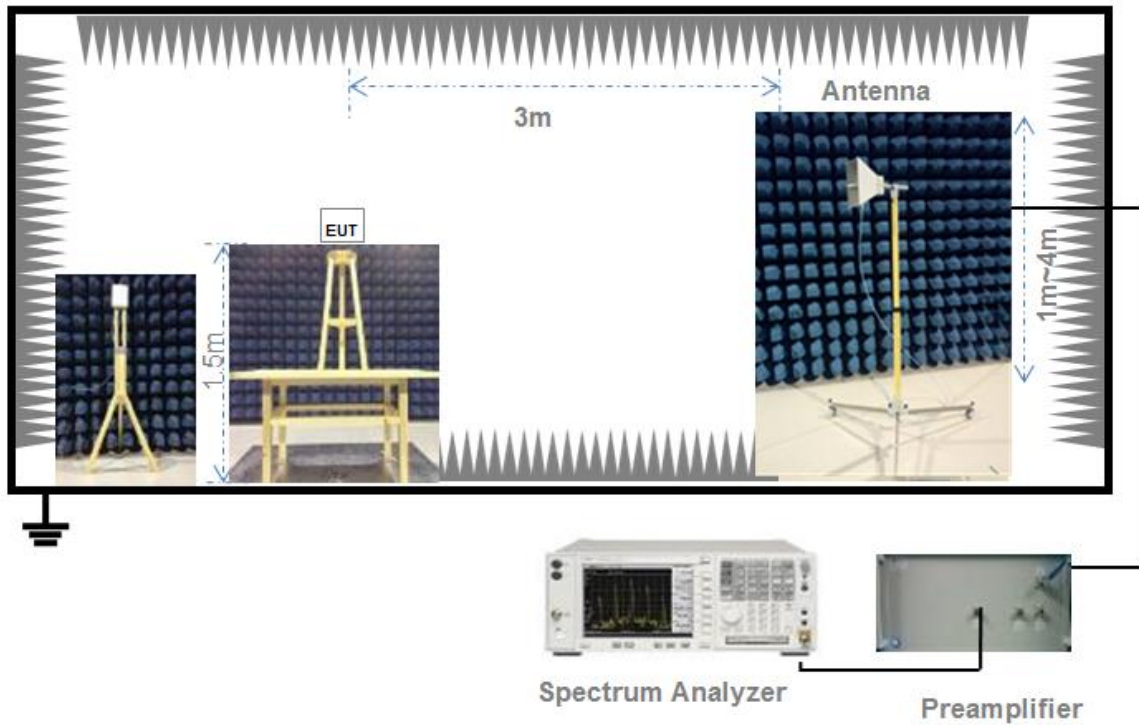
(Diagram 2)

#### 4.4.3 For Radiated Test (30 MHz-1 GHz)



(Diagram 3)

#### 4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

## 5 TEST ITEMS

### 5.1 Antenna Requirements

#### 5.1.1 Relevant Standards

FCC §15.203 & 15.247(b)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

#### 5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

| Protected Method                        | Description                            |
|-----------------------------------------|----------------------------------------|
| The antenna is embedded in the product. | An embedded-in antenna design is used. |

| Reference Documents | Item                                     |
|---------------------|------------------------------------------|
| Photo               | Please refer to the EUT Photo documents. |

#### 5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 5.2 Conducted Emission

### 5.2.1 Limit

FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

| Frequency range<br>(MHz) | Conducted Limit (dB $\mu$ V) |          |
|--------------------------|------------------------------|----------|
|                          | Quai-peak                    | Average  |
| 0.15 - 0.50              | 66 to 56                     | 56 to 46 |
| 0.50 - 5                 | 56                           | 46       |
| 0.50 - 30                | 60                           | 50       |

### 5.2.2 Test Setup

See section 4.4.1 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

### 5.2.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

### 5.2.4 Test Result

Please refer to ANNEX A.1.

## 5.3 UWB Bandwidth

### 5.3.1 Limit

FCC §15.503(d)

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

FCC §15.517(b)

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

### 5.3.2 Test Setup

See section 4.4.4 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.3.3 Test Procedure

Use the following spectrum analyzer settings:

RBW = 1 MHz

VBW  $\geq$  3 MHz

Sweep = auto

Detector function = RMS

Trace = max hold

### 5.3.4 Test Result

Please refer to ANNEX A.2.

## 5.4 Radiated Emissions

### 5.4.1 Limit

#### FCC §15.517(c)

The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

| Frequency in MHz | EIPR in dBm |
|------------------|-------------|
| 960–1610         | -75.3       |
| 1610–1990        | -53.3       |
| 1990–3100        | -51.3       |
| 3100–10600       | -41.3       |
| Above 10600      | -51.3       |

#### FCC §15.209

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Measurement Distance(m) |
|-----------------|------------------------------------|-------------------------|
| 0.009 - 0.490   | 2400/F(kHz)                        | 300                     |
| 0.490 - 1.705   | 24000/F(kHz)                       | 30                      |
| 1.705 - 30.0    | 30                                 | 30                      |
| 30 - 88         | 100                                | 3                       |
| 88 - 216        | 150                                | 3                       |
| 216 - 960       | 200                                | 3                       |
| Above 960       | 500                                | 3                       |

### 5.4.2 Test Setup

See section 4.4.2 to 4.4.4 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.4.3 Test Procedure

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The height of the antenna was varied from 1 to 4 meters. For each suspected emissions, the antenna tower was scan (from 1m to 4m) and the the turntables was turned (from 0° to 360° ) to find the maximum reading.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

9 kHz to 960 MHz:

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz

VBW = 300 kHz

Sweep time = auto

Detector function = peak (Margin which is less than 3 dB will be repeated one by one using the quasi-peak)

Trace = max hold

960 MHz to 40 GHz:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz

VBW = 3 MHz

Sweep time = 1s

Detector function = RMS

Trace = max hold

#### 5.4.4 Test Result

Please refer to ANNEX A.3.

## 5.5 Radiated Emissions in GPS Bands

### 5.5.1 Limit

FCC §15.517(d)

In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

| Frequency in MHz | EIPR in dBm |
|------------------|-------------|
| 1164–1240        | -85.3       |
| 1559–1610        | -85.3       |

### 5.5.2 Test Setup

See section 4.4.4 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.5.3 Test Procedure

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The height of the antenna was varied from 1 to 4 meters. For each suspected emissions, the antenna tower was scan (from 1m to 4m) and the the turntables was turned (from 0° to 360° ) to find the maximum reading.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 kHz

VBW = 3 kHz

Sweep time = 1s

Detector function = RMS

Trace = max hold

### 5.5.4 Test Result

Please refer to ANNEX A.4.

## 5.6 Peak Emissions within a 50MHz Bandwidth

### 5.6.1 Limit

FCC §15.517(e)

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in §15.521.

It is acceptable to employ an RBW of less than 50 MHz (but no less than 1 MHz) when performing the required peak power measurements. When this approach is employed, the peak emissions EIRP limit (0 dBm / 50 MHz) is converted to a limit commensurate with the RBW by employing a  $[20 \log (RBW/50 \text{ MHz})]$  relationship. For example, the peak power limit could be expressed in a 1 MHz bandwidth as follows in Equation :

$$\text{EIRP}_{1 \text{ MHz}} = \text{EIRP}_{50 \text{ MHz}} + 20 \log (1 \text{ MHz} / 50 \text{ MHz}) = 0 \text{ dBm} + (- 34 \text{ dBm}) = -34 \text{ dBm}$$

### 5.6.2 Test Setup

See section 4.4.4 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.6.3 Test Procedure

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The height of the antenna was varied from 1 to 4 meters. For each suspected emissions, the antenna tower was scan (from 1m to 4m) and the the turntables was turned (from 0° to 360° ) to find the maximum reading.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz

VBW = 3 MHz

Sweep = auto

Detector function = peak

Trace = max hold

### 5.6.4 Test Result

Please refer to ANNEX A.5.

## ANNEX A TEST RESULT

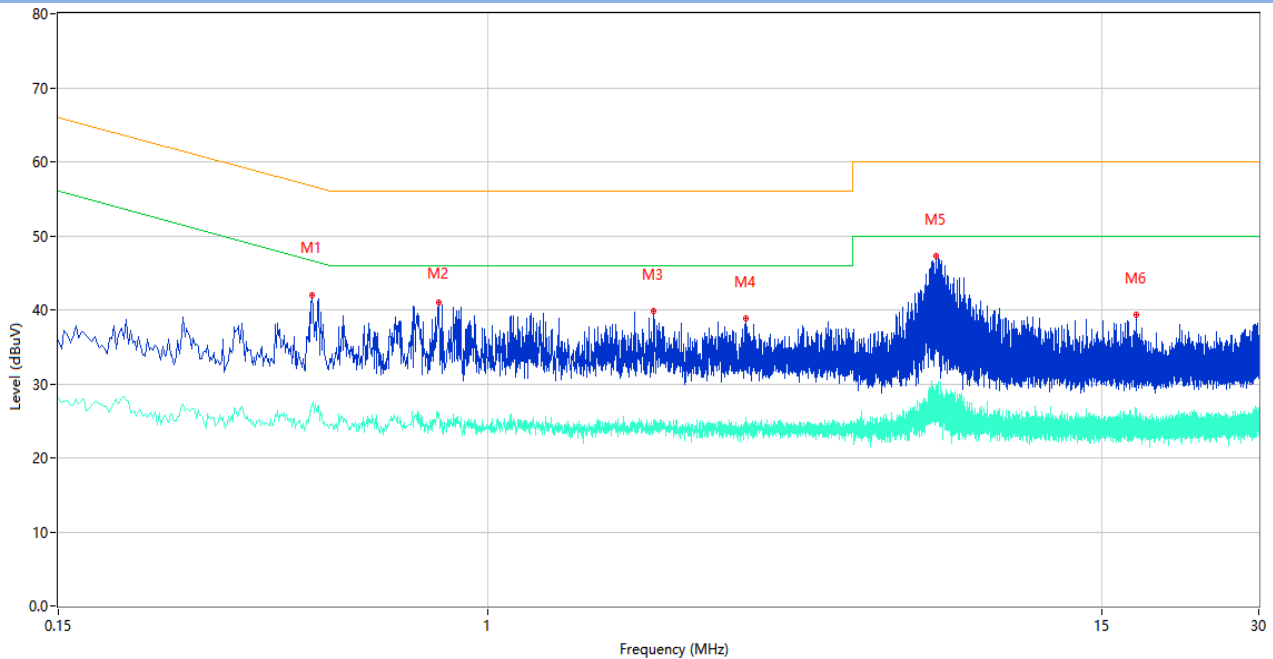
### A.1 Conducted Emission

Note: The EUT is working in the Normal link mode.

#### Test Data and Plots

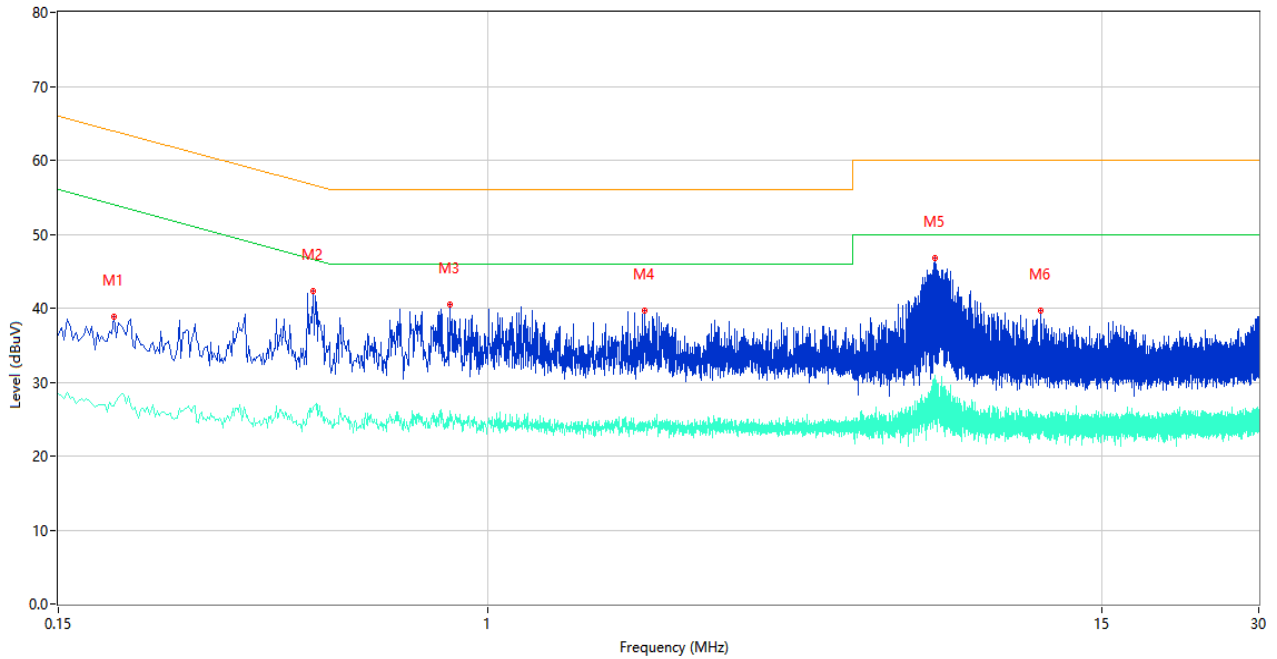
##### CH1

##### PHASE L



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.460           | 42.00          | 10.30       | 56.69        | -14.69          | Peak     | L    | Pass    |
| 1** | 0.460           | 27.05          | 10.30       | 46.69        | -19.64          | AV       | L    | Pass    |
| 2   | 0.804           | 41.01          | 10.27       | 56.00        | -14.99          | Peak     | L    | Pass    |
| 2** | 0.804           | 25.51          | 10.27       | 46.00        | -20.49          | AV       | L    | Pass    |
| 3   | 2.074           | 39.77          | 10.26       | 56.00        | -16.23          | Peak     | L    | Pass    |
| 3** | 2.074           | 25.18          | 10.26       | 46.00        | -20.82          | AV       | L    | Pass    |
| 4   | 3.120           | 38.79          | 10.28       | 56.00        | -17.21          | Peak     | L    | Pass    |
| 4** | 3.120           | 25.39          | 10.28       | 46.00        | -20.61          | AV       | L    | Pass    |
| 5   | 7.238           | 47.23          | 10.35       | 60.00        | -12.77          | Peak     | L    | Pass    |
| 5** | 7.238           | 28.03          | 10.35       | 50.00        | -21.97          | AV       | L    | Pass    |
| 6   | 17.488          | 39.31          | 10.48       | 60.00        | -20.69          | Peak     | L    | Pass    |
| 6** | 17.488          | 24.42          | 10.48       | 50.00        | -25.58          | AV       | L    | Pass    |

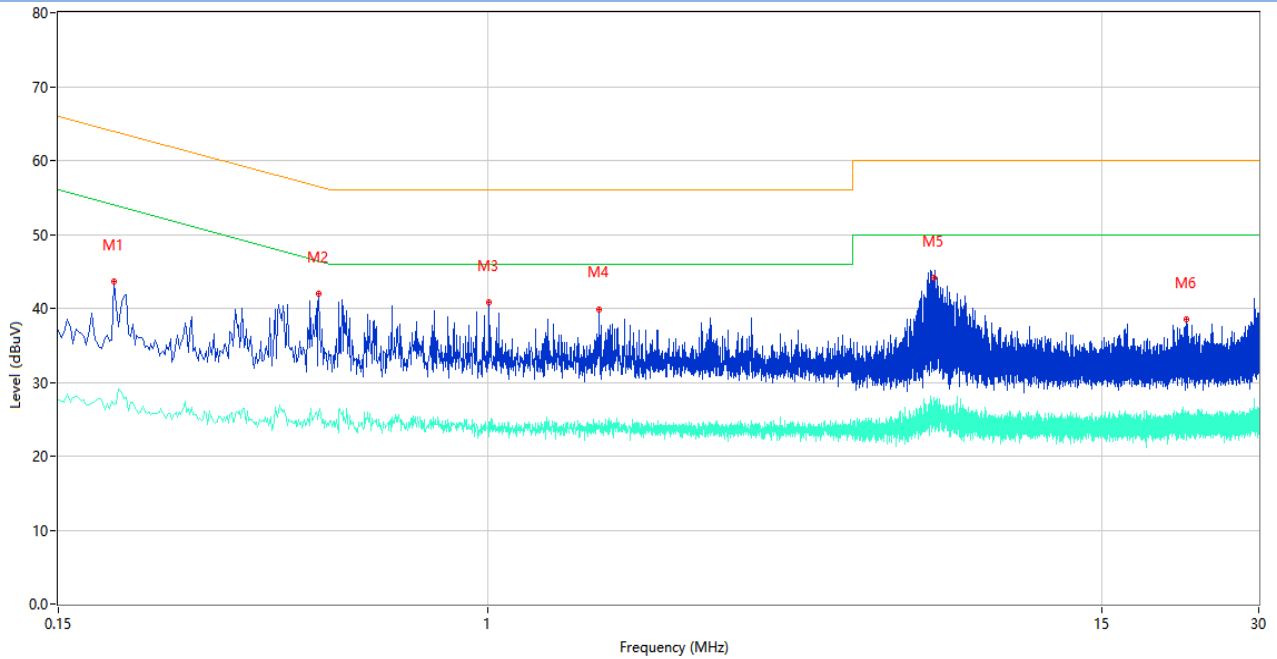
# PHASE N



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.192           | 38.79          | 10.38       | 63.95        | -25.16          | Peak     | N    | Pass    |
| 1** | 0.192           | 26.76          | 10.38       | 53.95        | -27.19          | AV       | N    | Pass    |
| 2   | 0.462           | 42.29          | 10.30       | 56.66        | -14.37          | Peak     | N    | Pass    |
| 2** | 0.462           | 26.44          | 10.30       | 46.66        | -20.22          | AV       | N    | Pass    |
| 3   | 0.844           | 40.43          | 10.25       | 56.00        | -15.57          | Peak     | N    | Pass    |
| 3** | 0.844           | 26.16          | 10.25       | 46.00        | -19.84          | AV       | N    | Pass    |
| 4   | 1.998           | 39.67          | 10.26       | 56.00        | -16.33          | Peak     | N    | Pass    |
| 4** | 1.998           | 23.39          | 10.26       | 46.00        | -22.61          | AV       | N    | Pass    |
| 5   | 7.176           | 46.77          | 10.35       | 60.00        | -13.23          | Peak     | N    | Pass    |
| 5** | 7.176           | 28.88          | 10.35       | 50.00        | -21.12          | AV       | N    | Pass    |
| 6   | 11.436          | 39.72          | 10.38       | 60.00        | -20.28          | Peak     | N    | Pass    |
| 6** | 11.436          | 24.02          | 10.38       | 50.00        | -25.98          | AV       | N    | Pass    |

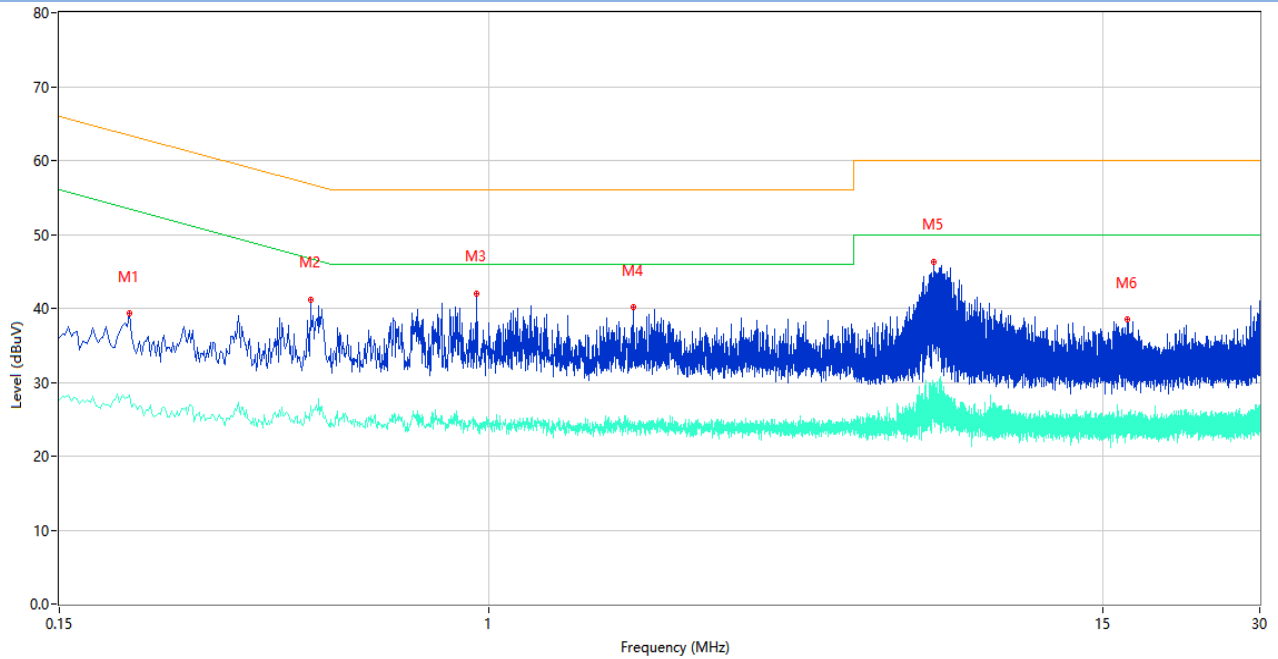
## CH2

### PHASE L



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.192           | 43.66          | 10.38       | 63.95        | -20.29          | Peak     | L    | Pass    |
| 1** | 0.192           | 26.89          | 10.38       | 53.95        | -27.06          | AV       | L    | Pass    |
| 2   | 0.474           | 41.96          | 10.30       | 56.44        | -14.48          | Peak     | L    | Pass    |
| 2** | 0.474           | 25.77          | 10.30       | 46.44        | -20.67          | AV       | L    | Pass    |
| 3   | 1.004           | 40.78          | 10.23       | 56.00        | -15.22          | Peak     | L    | Pass    |
| 3** | 1.004           | 24.64          | 10.23       | 46.00        | -21.36          | AV       | L    | Pass    |
| 4   | 1.632           | 39.91          | 10.26       | 56.00        | -16.09          | Peak     | L    | Pass    |
| 4** | 1.632           | 23.88          | 10.26       | 46.00        | -22.12          | AV       | L    | Pass    |
| 5   | 7.160           | 44.11          | 10.34       | 60.00        | -15.89          | Peak     | L    | Pass    |
| 5** | 7.160           | 27.87          | 10.34       | 50.00        | -22.13          | AV       | L    | Pass    |
| 6   | 21.836          | 38.53          | 10.59       | 60.00        | -21.47          | Peak     | L    | Pass    |
| 6** | 21.836          | 25.02          | 10.59       | 50.00        | -24.98          | AV       | L    | Pass    |

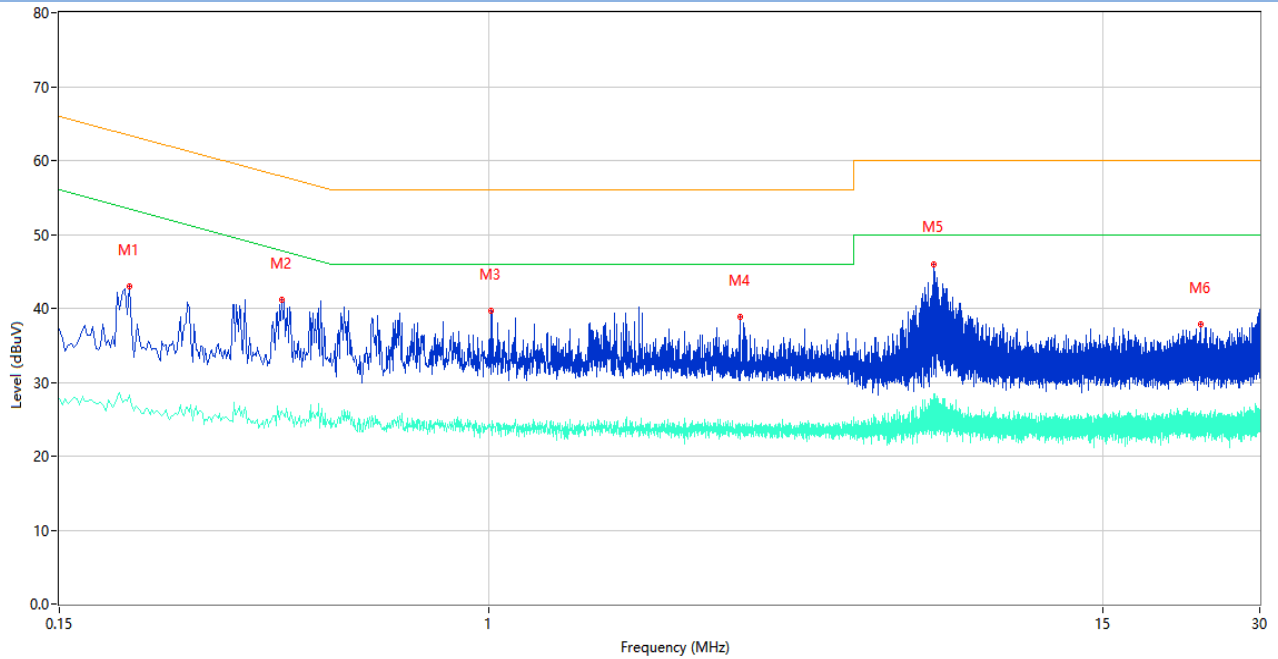
# PHASE N



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.204           | 39.34          | 10.38       | 63.45        | -24.11          | Peak     | N    | Pass    |
| 1** | 0.204           | 28.19          | 10.38       | 53.45        | -25.26          | AV       | N    | Pass    |
| 2   | 0.454           | 41.23          | 10.30       | 56.80        | -15.57          | Peak     | N    | Pass    |
| 2** | 0.454           | 26.75          | 10.30       | 46.80        | -20.05          | AV       | N    | Pass    |
| 3   | 0.948           | 42.05          | 10.24       | 56.00        | -13.95          | Peak     | N    | Pass    |
| 3** | 0.948           | 24.25          | 10.24       | 46.00        | -21.75          | AV       | N    | Pass    |
| 4   | 1.886           | 40.24          | 10.25       | 56.00        | -15.76          | Peak     | N    | Pass    |
| 4** | 1.886           | 24.31          | 10.25       | 46.00        | -21.69          | AV       | N    | Pass    |
| 5   | 7.116           | 46.33          | 10.34       | 60.00        | -13.67          | Peak     | N    | Pass    |
| 5** | 7.116           | 26.97          | 10.34       | 50.00        | -23.03          | AV       | N    | Pass    |
| 6   | 16.692          | 38.57          | 10.45       | 60.00        | -21.43          | Peak     | N    | Pass    |
| 6** | 16.692          | 25.50          | 10.45       | 50.00        | -24.50          | AV       | N    | Pass    |

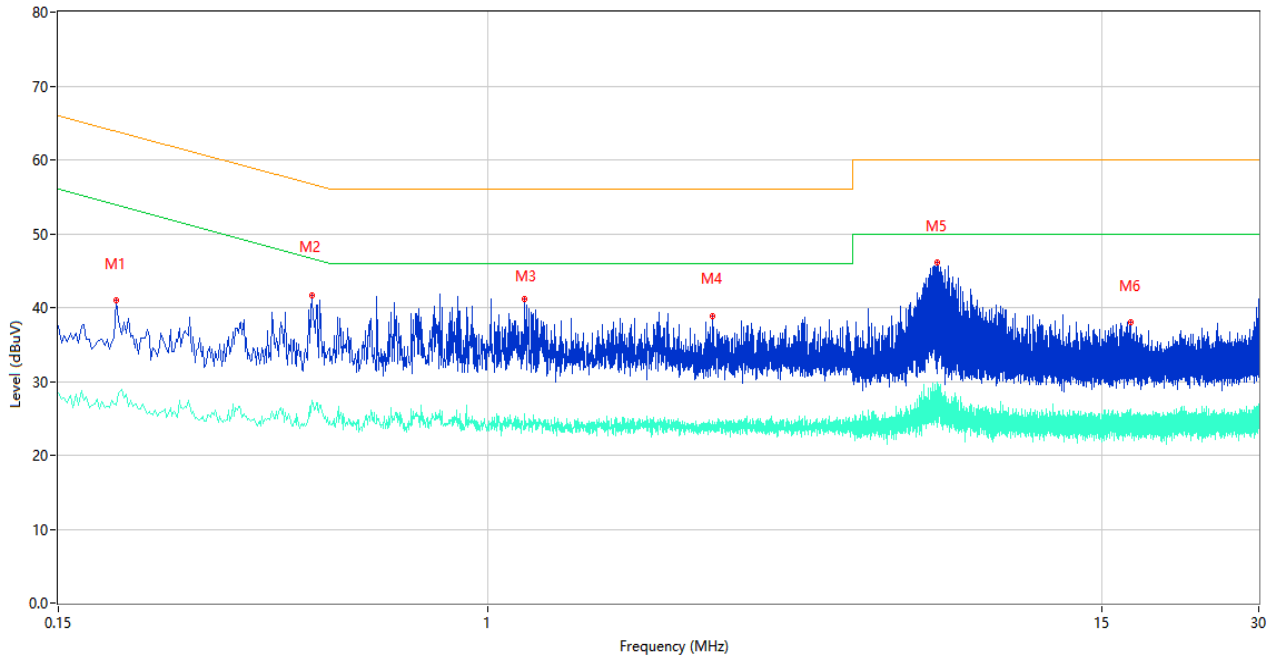
### CH3

#### PHASE L



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.204           | 42.90          | 10.38       | 63.45        | -20.55          | Peak     | L    | Pass    |
| 1** | 0.204           | 28.34          | 10.38       | 53.45        | -25.11          | AV       | L    | Pass    |
| 2   | 0.400           | 41.17          | 10.31       | 57.85        | -16.68          | Peak     | L    | Pass    |
| 2** | 0.400           | 26.12          | 10.31       | 47.85        | -21.73          | AV       | L    | Pass    |
| 3   | 1.006           | 39.70          | 10.23       | 56.00        | -16.30          | Peak     | L    | Pass    |
| 3** | 1.006           | 23.88          | 10.23       | 46.00        | -22.12          | AV       | L    | Pass    |
| 4   | 3.032           | 38.79          | 10.28       | 56.00        | -17.21          | Peak     | L    | Pass    |
| 4** | 3.032           | 24.10          | 10.28       | 46.00        | -21.90          | AV       | L    | Pass    |
| 5   | 7.110           | 45.94          | 10.34       | 60.00        | -14.06          | Peak     | L    | Pass    |
| 5** | 7.110           | 28.43          | 10.34       | 50.00        | -21.57          | AV       | L    | Pass    |
| 6   | 23.154          | 37.83          | 10.62       | 60.00        | -22.17          | Peak     | L    | Pass    |
| 6** | 23.154          | 24.28          | 10.62       | 50.00        | -25.72          | AV       | L    | Pass    |

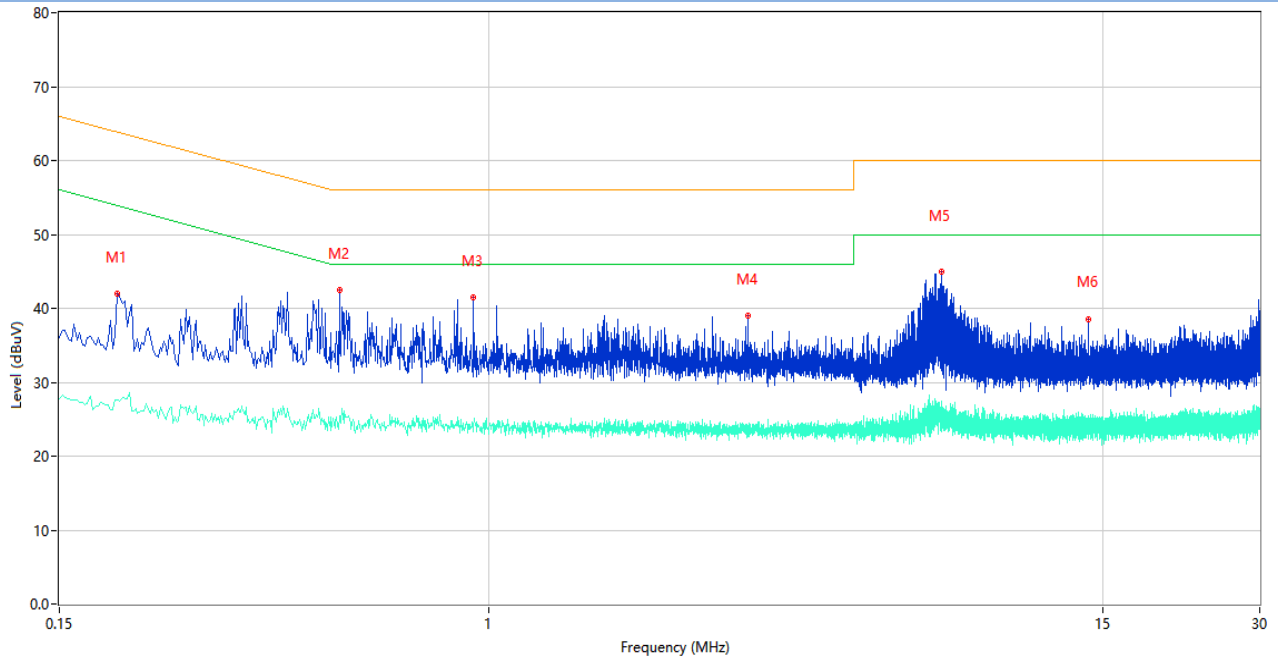
# PHASE N



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.194           | 40.94          | 10.38       | 63.86        | -22.92          | Peak     | N    | Pass    |
| 1** | 0.194           | 26.85          | 10.38       | 53.86        | -27.01          | AV       | N    | Pass    |
| 2   | 0.460           | 41.71          | 10.30       | 56.69        | -14.98          | Peak     | N    | Pass    |
| 2** | 0.460           | 27.36          | 10.30       | 46.69        | -19.33          | AV       | N    | Pass    |
| 3   | 1.174           | 41.16          | 10.24       | 56.00        | -14.84          | Peak     | N    | Pass    |
| 3** | 1.174           | 25.61          | 10.24       | 46.00        | -20.39          | AV       | N    | Pass    |
| 4   | 2.694           | 38.86          | 10.28       | 56.00        | -17.14          | Peak     | N    | Pass    |
| 4** | 2.694           | 24.57          | 10.28       | 46.00        | -21.43          | AV       | N    | Pass    |
| 5   | 7.248           | 46.19          | 10.35       | 60.00        | -13.81          | Peak     | N    | Pass    |
| 5** | 7.248           | 29.88          | 10.35       | 50.00        | -20.12          | AV       | N    | Pass    |
| 6   | 17.082          | 38.08          | 10.46       | 60.00        | -21.92          | Peak     | N    | Pass    |
| 6** | 17.082          | 24.45          | 10.46       | 50.00        | -25.55          | AV       | N    | Pass    |

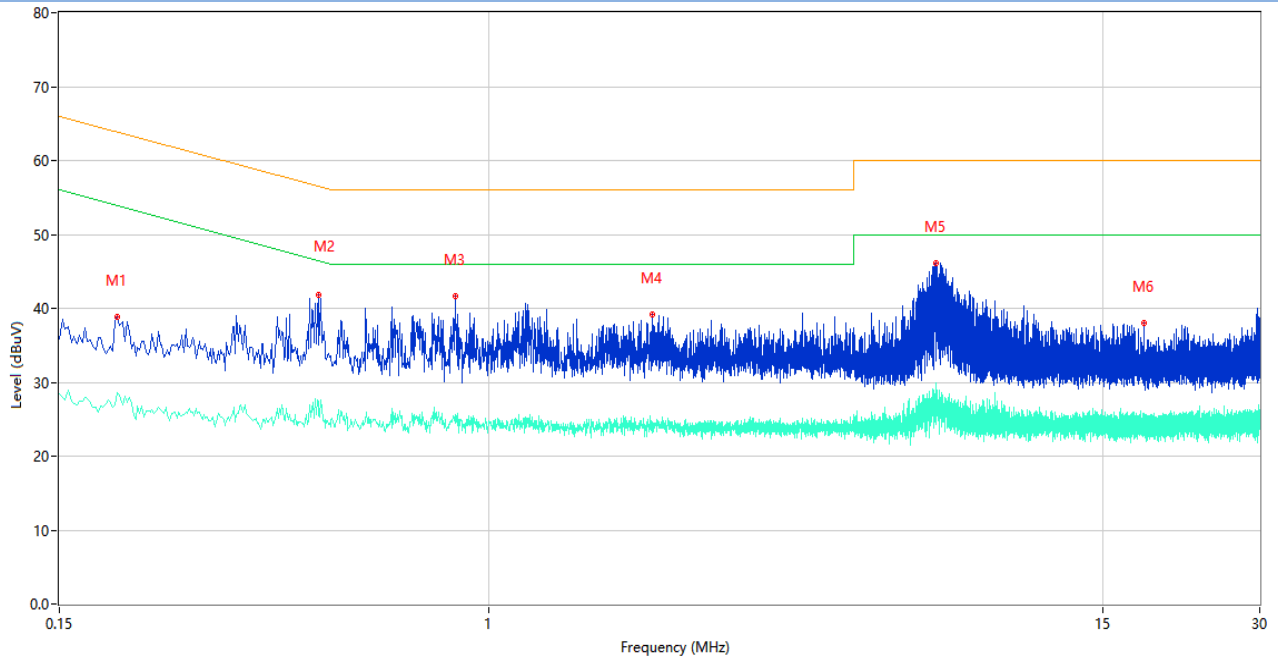
## CH5

## PHASE L



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.194           | 42.02          | 10.38       | 63.86        | -21.84          | Peak     | L    | Pass    |
| 1** | 0.194           | 27.61          | 10.38       | 53.86        | -26.25          | AV       | L    | Pass    |
| 2   | 0.516           | 42.41          | 10.30       | 56.00        | -13.59          | Peak     | L    | Pass    |
| 2** | 0.516           | 25.49          | 10.30       | 46.00        | -20.51          | AV       | L    | Pass    |
| 3   | 0.934           | 41.42          | 10.24       | 56.00        | -14.58          | Peak     | L    | Pass    |
| 3** | 0.934           | 24.48          | 10.24       | 46.00        | -21.52          | AV       | L    | Pass    |
| 4   | 3.132           | 38.94          | 10.28       | 56.00        | -17.06          | Peak     | L    | Pass    |
| 4** | 3.132           | 24.19          | 10.28       | 46.00        | -21.81          | AV       | L    | Pass    |
| 5   | 7.364           | 44.88          | 10.34       | 60.00        | -15.12          | Peak     | L    | Pass    |
| 5** | 7.364           | 24.62          | 10.34       | 50.00        | -25.38          | AV       | L    | Pass    |
| 6   | 14.098          | 38.55          | 10.40       | 60.00        | -21.45          | Peak     | L    | Pass    |
| 6** | 14.098          | 23.37          | 10.40       | 50.00        | -26.63          | AV       | L    | Pass    |

# PHASE N



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.194           | 38.78          | 10.38       | 63.86        | -25.08          | Peak     | N    | Pass    |
| 1** | 0.194           | 28.66          | 10.38       | 53.86        | -25.20          | AV       | N    | Pass    |
| 2   | 0.470           | 41.76          | 10.30       | 56.51        | -14.75          | Peak     | N    | Pass    |
| 2** | 0.470           | 27.37          | 10.30       | 46.51        | -19.14          | AV       | N    | Pass    |
| 3   | 0.860           | 41.58          | 10.24       | 56.00        | -14.42          | Peak     | N    | Pass    |
| 3** | 0.860           | 25.61          | 10.24       | 46.00        | -20.39          | AV       | N    | Pass    |
| 4   | 2.056           | 39.10          | 10.27       | 56.00        | -16.90          | Peak     | N    | Pass    |
| 4** | 2.056           | 24.68          | 10.27       | 46.00        | -21.32          | AV       | N    | Pass    |
| 5   | 7.170           | 46.10          | 10.35       | 60.00        | -13.90          | Peak     | N    | Pass    |
| 5** | 7.170           | 29.29          | 10.35       | 50.00        | -20.71          | AV       | N    | Pass    |
| 6   | 18.024          | 38.04          | 10.49       | 60.00        | -21.96          | Peak     | N    | Pass    |
| 6** | 18.024          | 23.82          | 10.49       | 50.00        | -26.18          | AV       | N    | Pass    |

## A.2 UWB Bandwidth

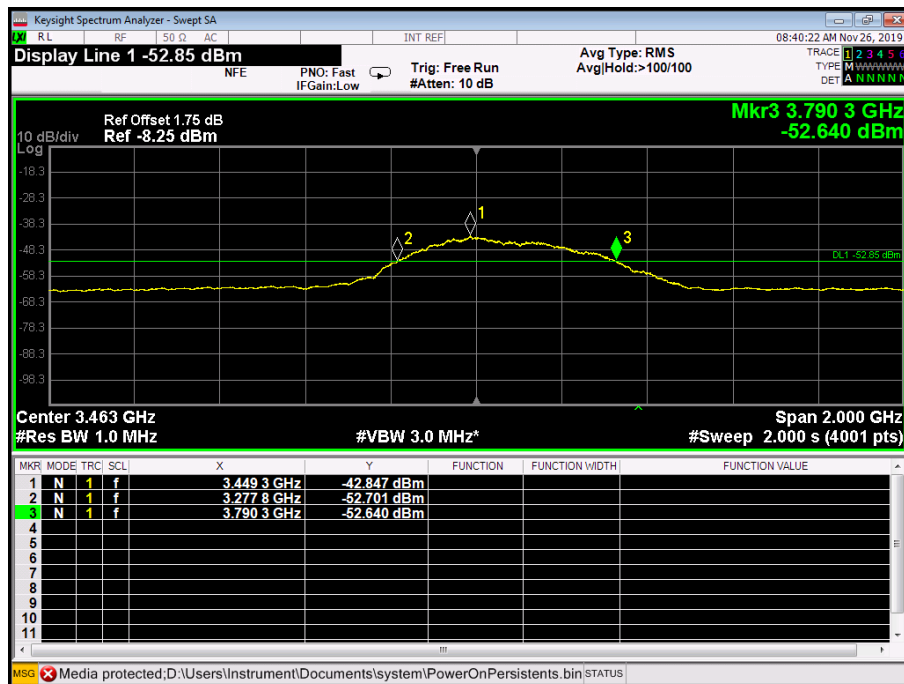
CH1

Test Data

| F <sub>L</sub><br>(MHz) | F <sub>H</sub><br>(MHz) | Fractional bandwidth<br>$2*(F_H-F_L)/(F_H+F_L)$ | UWB Bandwidth<br>(MHz) | Limit<br>(MHz)                                                     | Verdict |
|-------------------------|-------------------------|-------------------------------------------------|------------------------|--------------------------------------------------------------------|---------|
| 3277.8                  | 3790.3                  | 0.15                                            | 512.50                 | Fractional bandwidth $\geq 0.2$ or<br>UWB Bandwidth $\geq 500$ MHz | Pass    |

Test plots

UWB Bandwidth



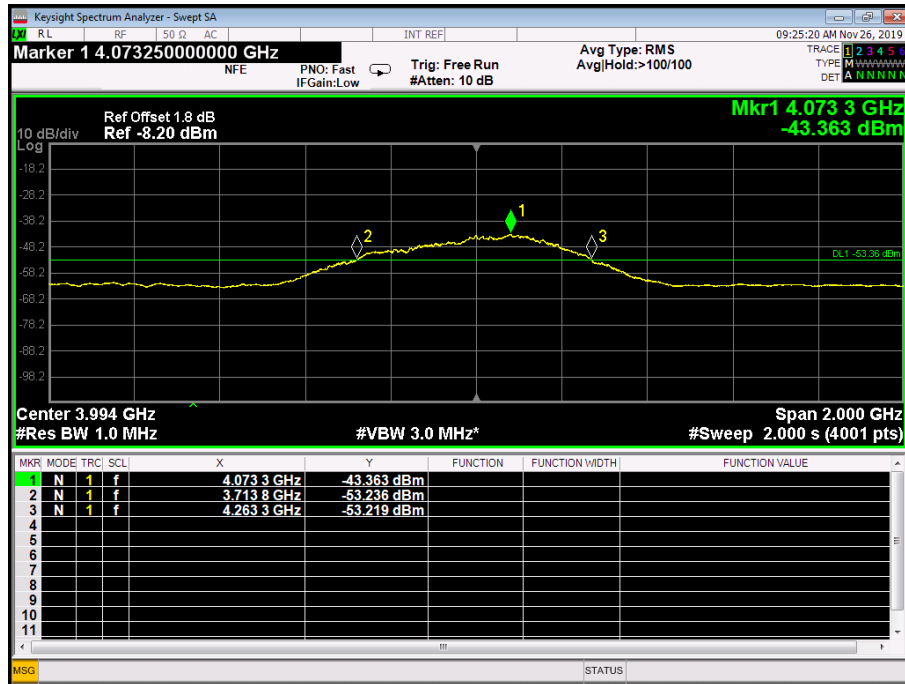
## CH2

### Test Data

| $F_L$<br>(MHz) | $F_H$<br>(MHz) | Fractional bandwidth<br>$2*(F_H-F_L)/(F_H+F_L)$ | UWB Bandwidth<br>(MHz) | Limit<br>(MHz)                                                     | Verdict |
|----------------|----------------|-------------------------------------------------|------------------------|--------------------------------------------------------------------|---------|
| 3713.8         | 4263.3         | 0.14                                            | 549.50                 | Fractional bandwidth $\geq 0.2$ or<br>UWB Bandwidth $\geq 500$ MHz | Pass    |

### Test plots

#### UWB Bandwidth



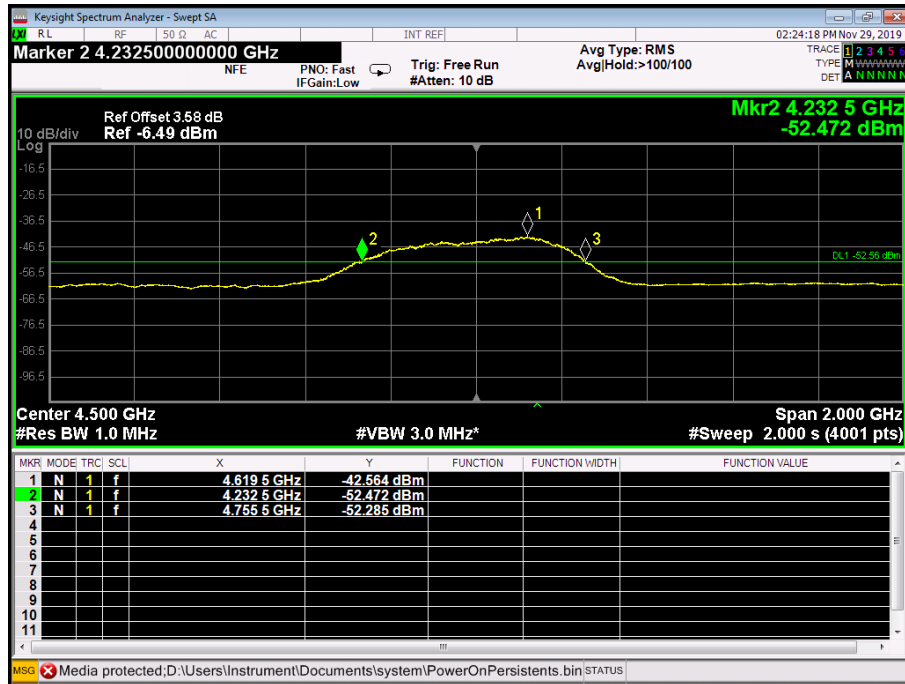
### CH3

#### Test Data

| $F_L$<br>(MHz) | $F_H$<br>(MHz) | Fractional bandwidth<br>$2*(F_H-F_L)/(F_H+F_L)$ | UWB Bandwidth<br>(MHz) | Limit<br>(MHz)                                                     | Verdict |
|----------------|----------------|-------------------------------------------------|------------------------|--------------------------------------------------------------------|---------|
| 4232.5         | 4755.5         | 0.12                                            | 523.00                 | Fractional bandwidth $\geq 0.2$ or<br>UWB Bandwidth $\geq 500$ MHz | Pass    |

#### Test plots

##### UWB Bandwidth



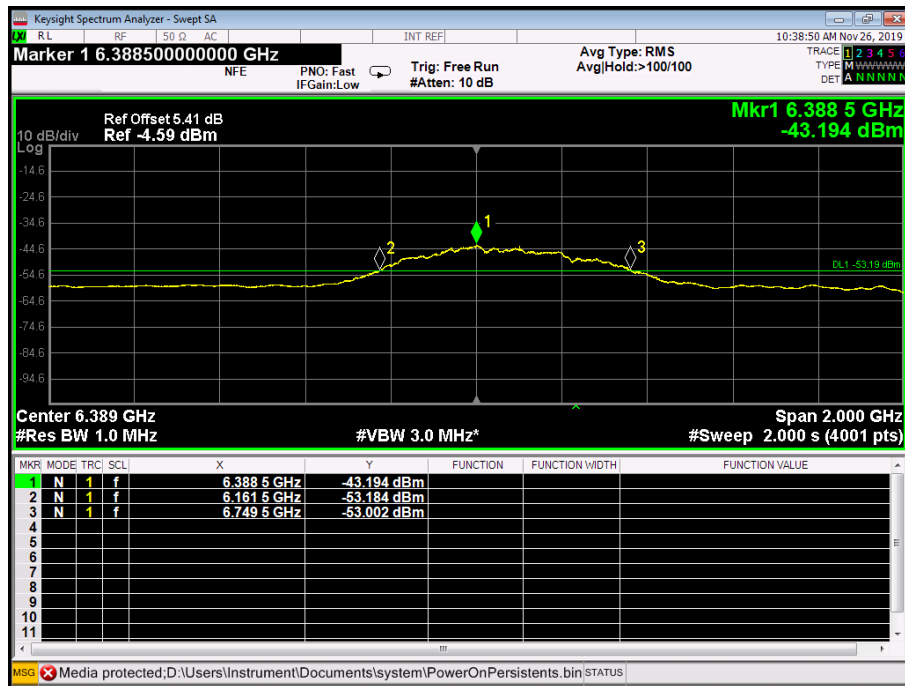
## CH5

### Test Data

| $F_L$<br>(MHz) | $F_H$<br>(MHz) | Fractional bandwidth<br>$2*(F_H-F_L)/(F_H+F_L)$ | UWB Bandwidth<br>(MHz) | Limit<br>(MHz)                                                     | Verdict |
|----------------|----------------|-------------------------------------------------|------------------------|--------------------------------------------------------------------|---------|
| 6161.5         | 6749.5         | 0.09                                            | 588.00                 | Fractional bandwidth $\geq 0.2$ or<br>UWB Bandwidth $\geq 500$ MHz | Pass    |

### Test plots

#### UWB Bandwidth



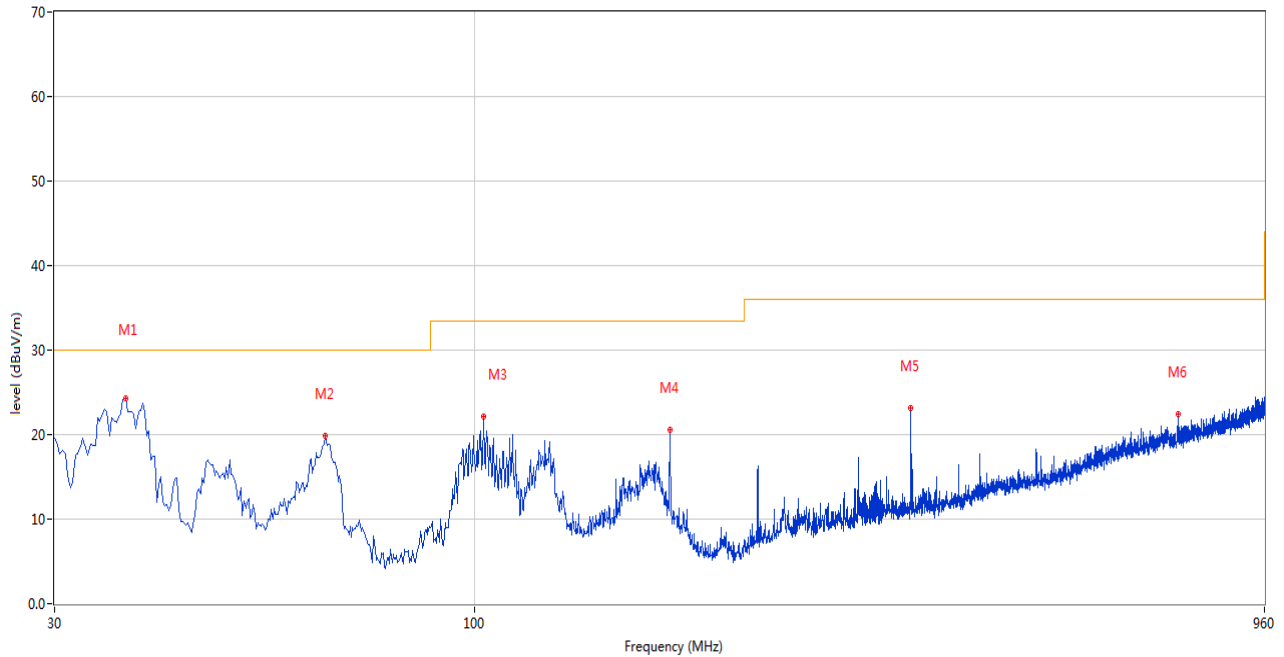
### A.3 Radiated Emissions

Note <sup>1</sup>: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.209 was not reported.

Test Data and Plots (30 MHz to 960 MHz)

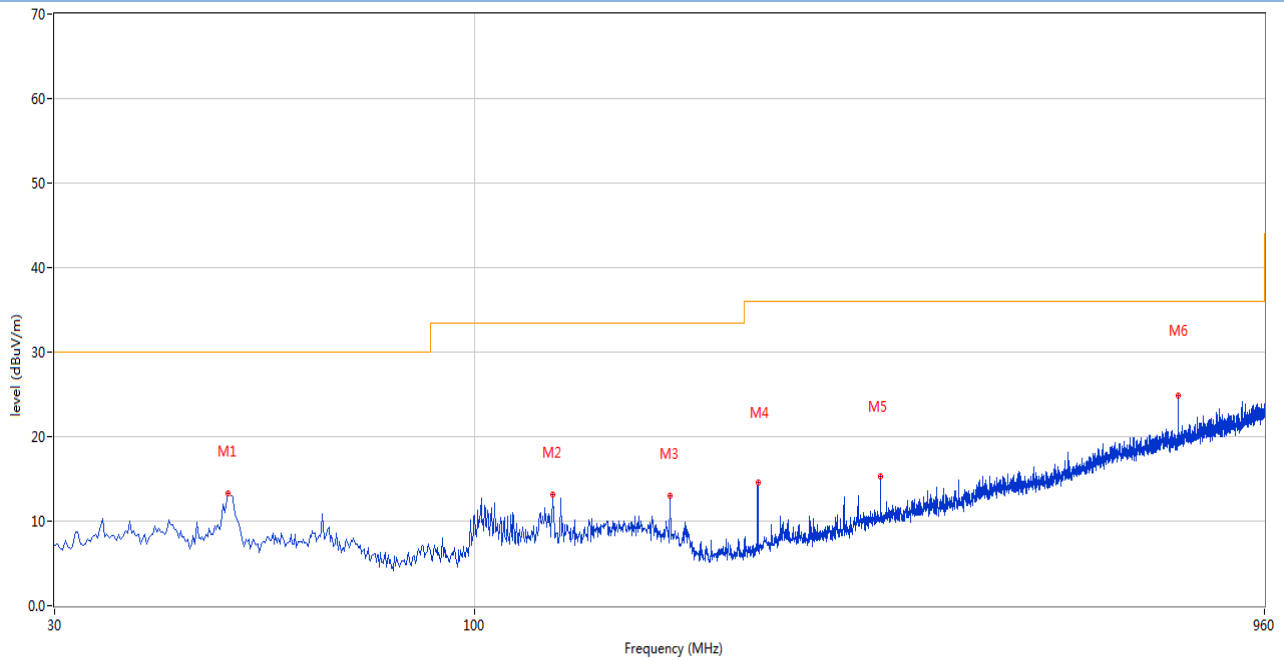
CH1

30 MHz to 960 MHz, ANT V



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|----------|---------|
| 1   | 36.741          | 24.26            | -27.18      | 30.0           | -5.74           | Peak     | 29.00          | 100         | Vertical | Pass    |
| 2   | 65.099          | 19.83            | -28.84      | 30.0           | -10.17          | Peak     | 167.00         | 200         | Vertical | Pass    |
| 3   | 102.522         | 22.13            | -29.91      | 33.5           | -11.37          | Peak     | 300.00         | 100         | Vertical | Pass    |
| 4   | 174.811         | 20.58            | -27.43      | 33.5           | -12.92          | Peak     | 237.00         | 100         | Vertical | Pass    |
| 5   | 348.445         | 23.08            | -24.27      | 36.0           | -12.92          | Peak     | 237.00         | 200         | Vertical | Pass    |
| 6   | 749.873         | 22.47            | -14.90      | 36.0           | -13.53          | Peak     | 161.00         | 400         | Vertical | Pass    |

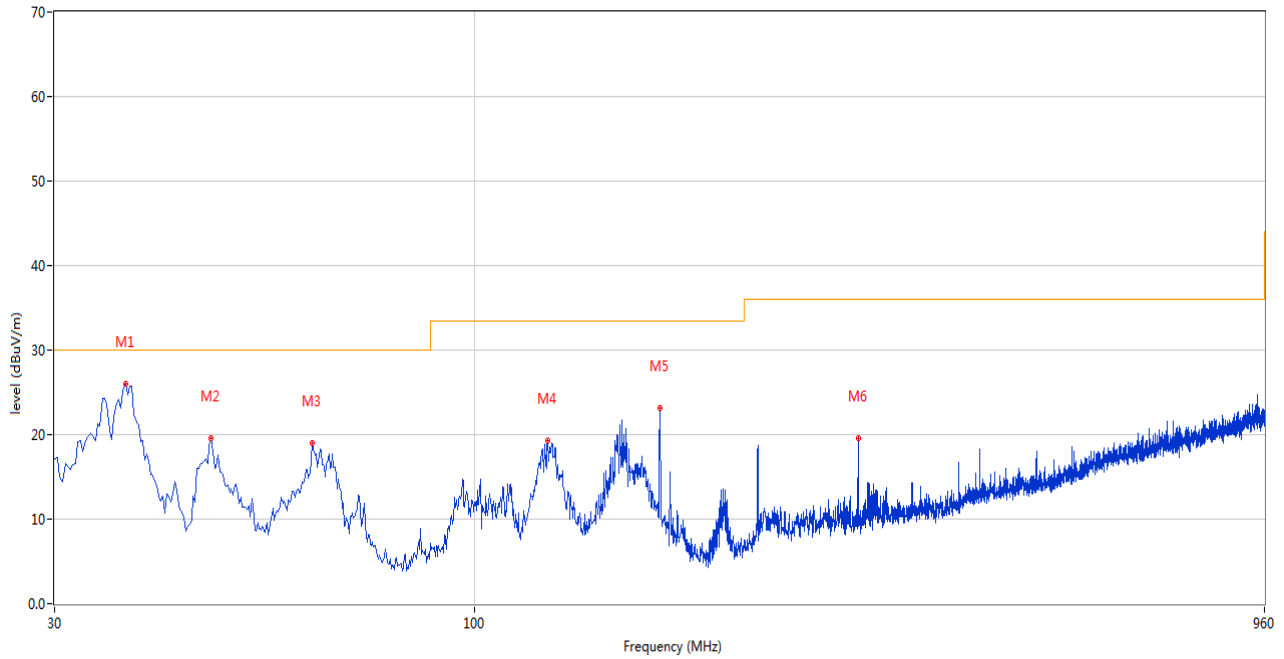
## 30 MHz to 960 MHz, ANT H



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna    | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|------------|---------|
| 1   | 49.293          | 13.30            | -27.34      | 30.0           | -16.70          | Peak     | 85.00          | 100         | Horizontal | Pass    |
| 2   | 124.836         | 13.16            | -27.66      | 33.5           | -20.34          | Peak     | 10.00          | 400         | Horizontal | Pass    |
| 3   | 174.811         | 12.99            | -27.43      | 33.5           | -20.51          | Peak     | 306.00         | 300         | Horizontal | Pass    |
| 4   | 225.019         | 14.54            | -28.27      | 36.0           | -21.46          | Peak     | 287.00         | 400         | Horizontal | Pass    |
| 5   | 319.855         | 15.32            | -25.32      | 36.0           | -20.68          | Peak     | 360.00         | 400         | Horizontal | Pass    |
| 6   | 749.873         | 24.87            | -14.90      | 36.0           | -11.13          | Peak     | 287.00         | 300         | Horizontal | Pass    |

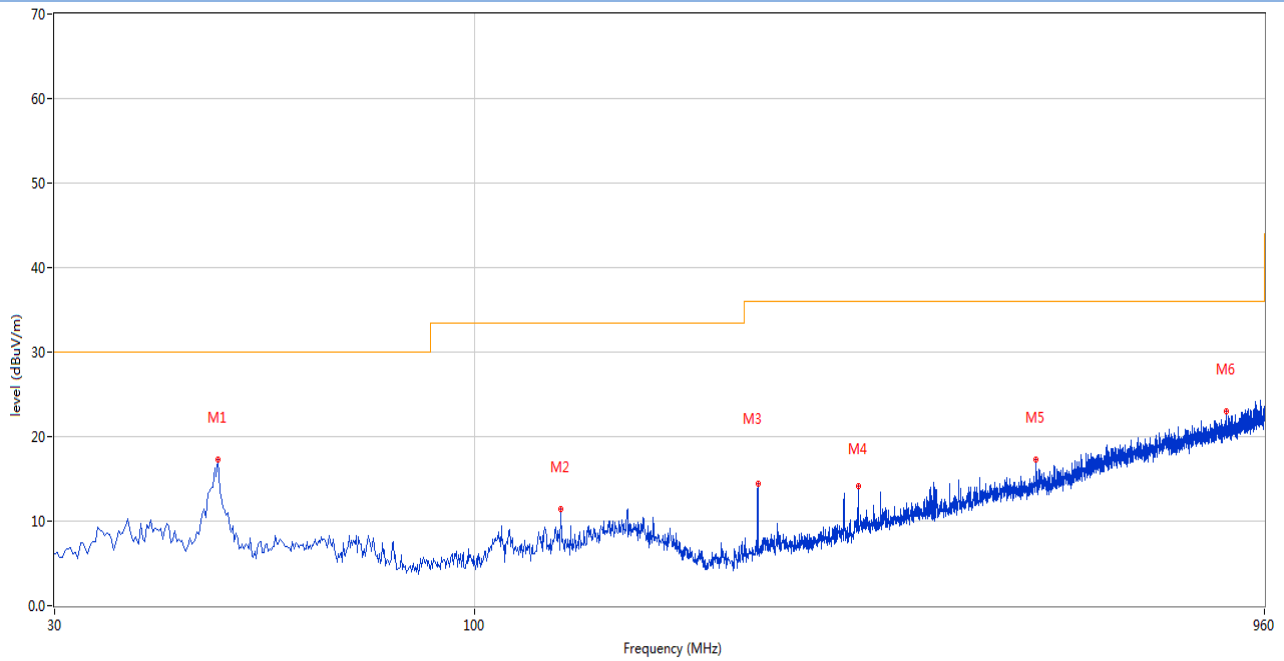
## CH2

30 MHz to 960 MHz, ANT V



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|----------|---------|
| 1   | 36.741          | 26.05            | -27.18      | 30.0           | -3.95           | Peak     | 10.00          | 100         | Vertical | Pass    |
| 2   | 46.968          | 19.55            | -27.04      | 30.0           | -10.45          | Peak     | 73.00          | 200         | Vertical | Pass    |
| 3   | 62.774          | 18.94            | -28.40      | 30.0           | -11.06          | Peak     | 117.00         | 100         | Vertical | Pass    |
| 4   | 123.209         | 19.34            | -27.87      | 33.5           | -14.16          | Peak     | 193.00         | 300         | Vertical | Pass    |
| 5   | 170.162         | 23.21            | -26.74      | 33.5           | -10.29          | Peak     | 360.00         | 300         | Vertical | Pass    |
| 6   | 299.865         | 19.53            | -25.89      | 36.0           | -16.47          | Peak     | 300.00         | 100         | Vertical | Pass    |

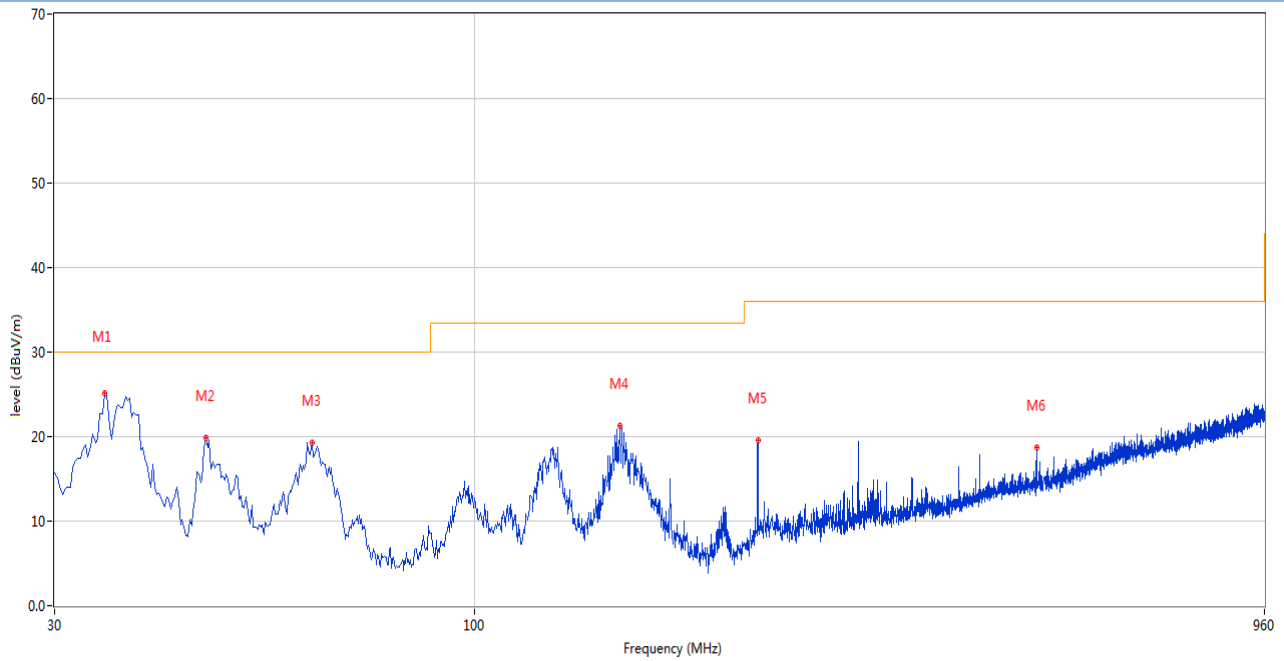
## 30 MHz to 960 MHz, ANT H



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna    | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|------------|---------|
| 1   | 47.898          | 17.34            | -27.16      | 30.0           | -12.66          | Peak     | 16.00          | 100         | Horizontal | Pass    |
| 2   | 127.858         | 11.38            | -27.34      | 33.5           | -22.12          | Peak     | 73.00          | 100         | Horizontal | Pass    |
| 3   | 225.019         | 14.47            | -28.27      | 36.0           | -21.53          | Peak     | 268.00         | 200         | Horizontal | Pass    |
| 4   | 299.865         | 14.20            | -25.89      | 36.0           | -21.80          | Peak     | 111.00         | 200         | Horizontal | Pass    |
| 5   | 499.068         | 17.30            | -20.66      | 36.0           | -18.70          | Peak     | 136.00         | 100         | Horizontal | Pass    |
| 6   | 859.818         | 22.93            | -13.26      | 36.0           | -13.07          | Peak     | 79.00          | 200         | Horizontal | Pass    |

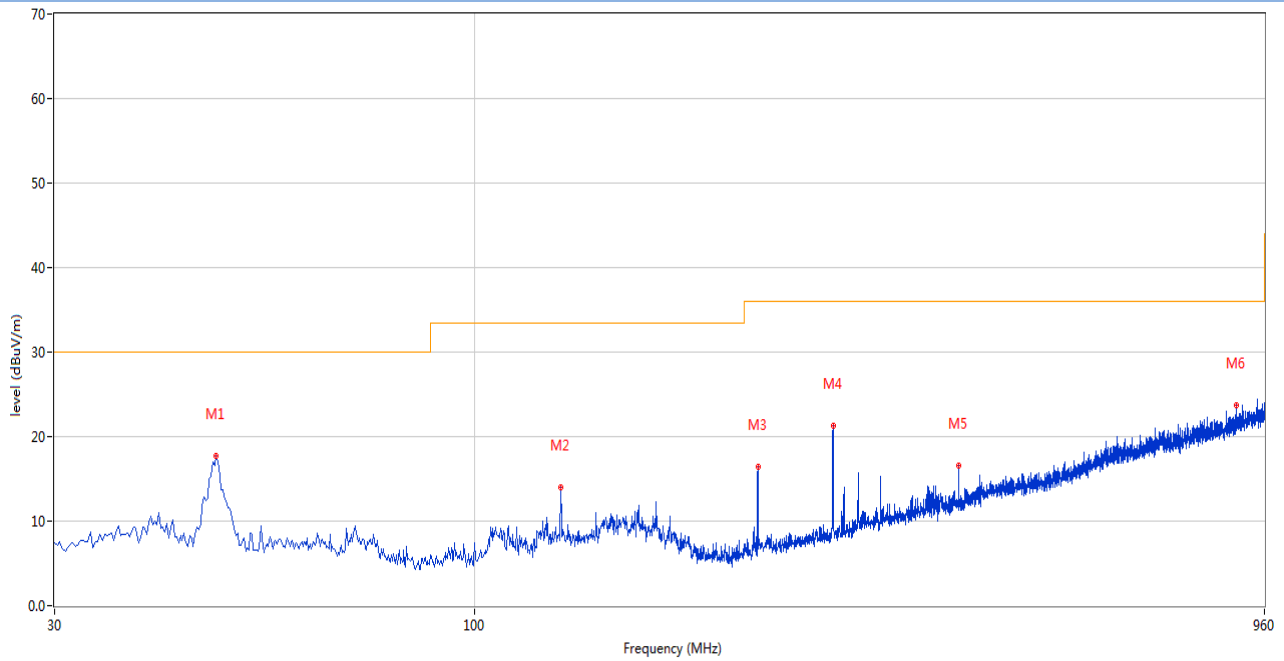
### CH3

30 MHz to 960 MHz, ANT V



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|----------|---------|
| 1   | 34.649          | 25.10            | -27.37      | 30.0           | -4.90           | Peak     | 22.00          | 100         | Vertical | Pass    |
| 2   | 46.271          | 19.83            | -27.09      | 30.0           | -10.17          | Peak     | 0.00           | 300         | Vertical | Pass    |
| 3   | 62.774          | 19.35            | -28.40      | 30.0           | -10.65          | Peak     | 104.00         | 200         | Vertical | Pass    |
| 4   | 151.335         | 21.23            | -26.02      | 33.5           | -12.27          | Peak     | 262.00         | 100         | Vertical | Pass    |
| 5   | 225.019         | 19.64            | -28.27      | 36.0           | -16.36          | Peak     | 350.00         | 100         | Vertical | Pass    |
| 6   | 499.998         | 18.65            | -20.62      | 36.0           | -17.35          | Peak     | 155.00         | 300         | Vertical | Pass    |

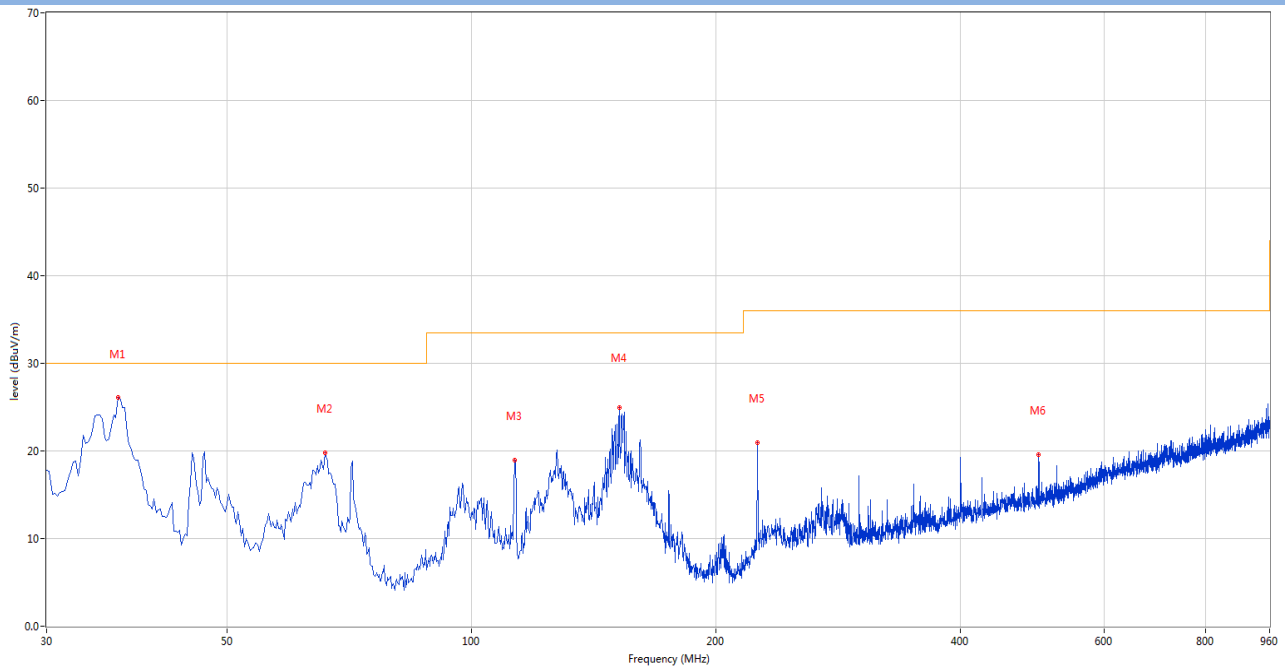
## 30 MHz to 960 MHz, ANT H



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna    | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|------------|---------|
| 1   | 47.666          | 17.65            | -27.12      | 30.0           | -12.35          | Peak     | 98.00          | 100         | Horizontal | Pass    |
| 2   | 127.858         | 14.05            | -27.34      | 33.5           | -19.45          | Peak     | 167.00         | 100         | Horizontal | Pass    |
| 3   | 225.019         | 16.39            | -28.27      | 36.0           | -19.61          | Peak     | 262.00         | 300         | Horizontal | Pass    |
| 4   | 278.945         | 21.24            | -26.29      | 36.0           | -14.76          | Peak     | 155.00         | 200         | Horizontal | Pass    |
| 5   | 400.047         | 16.62            | -23.17      | 36.0           | -19.38          | Peak     | 256.00         | 200         | Horizontal | Pass    |
| 6   | 887.013         | 23.72            | -12.83      | 36.0           | -12.28          | Peak     | 0.00           | 200         | Horizontal | Pass    |

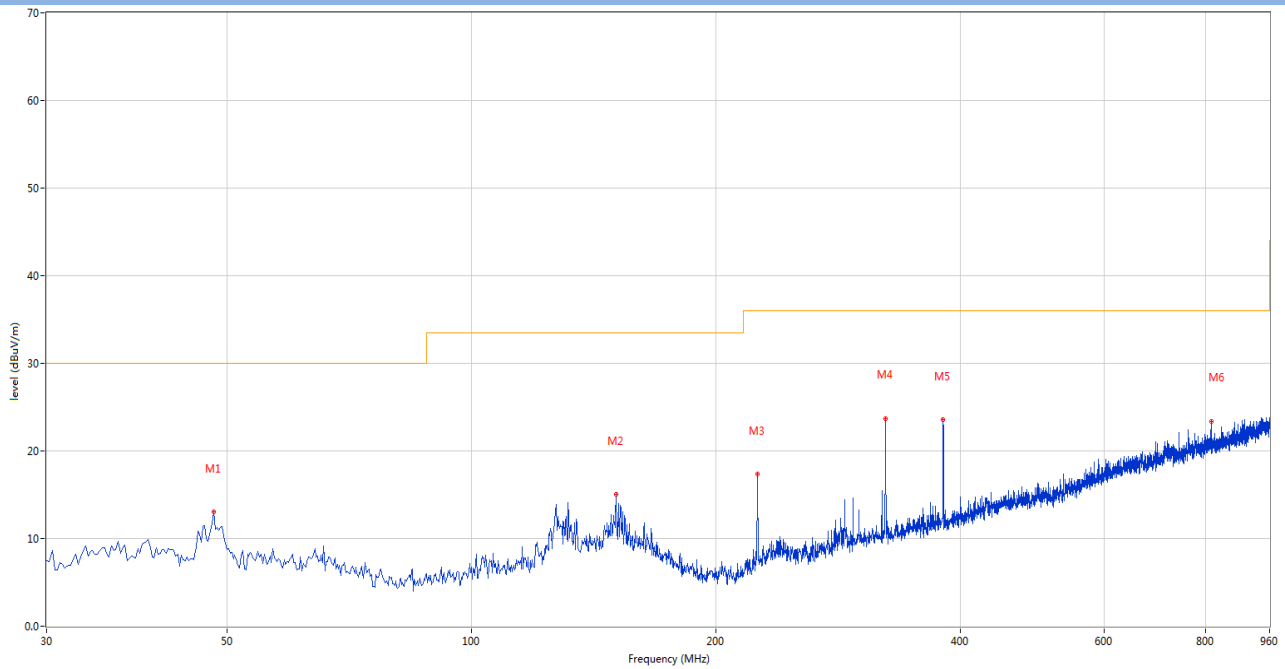
## CH5

30 MHz to 960 MHz, ANT V



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|----------|---------|
| 1   | 36.741          | 26.07            | -27.18      | 30.0           | -3.93           | Peak     | 98.00          | 100         | Vertical | Pass    |
| 2   | 66.028          | 19.81            | -29.06      | 30.0           | -10.19          | Peak     | 249.00         | 200         | Vertical | Pass    |
| 3   | 112.982         | 18.99            | -28.77      | 33.5           | -14.51          | Peak     | 0.00           | 300         | Vertical | Pass    |
| 4   | 152.032         | 24.91            | -25.98      | 33.5           | -8.59           | Peak     | 287.00         | 100         | Vertical | Pass    |
| 5   | 225.019         | 20.96            | -28.27      | 36.0           | -15.04          | Peak     | 161.00         | 100         | Vertical | Pass    |
| 6   | 499.068         | 19.61            | -20.66      | 36.0           | -16.39          | Peak     | 155.00         | 300         | Vertical | Pass    |

## 30 MHz to 960 MHz, ANT H

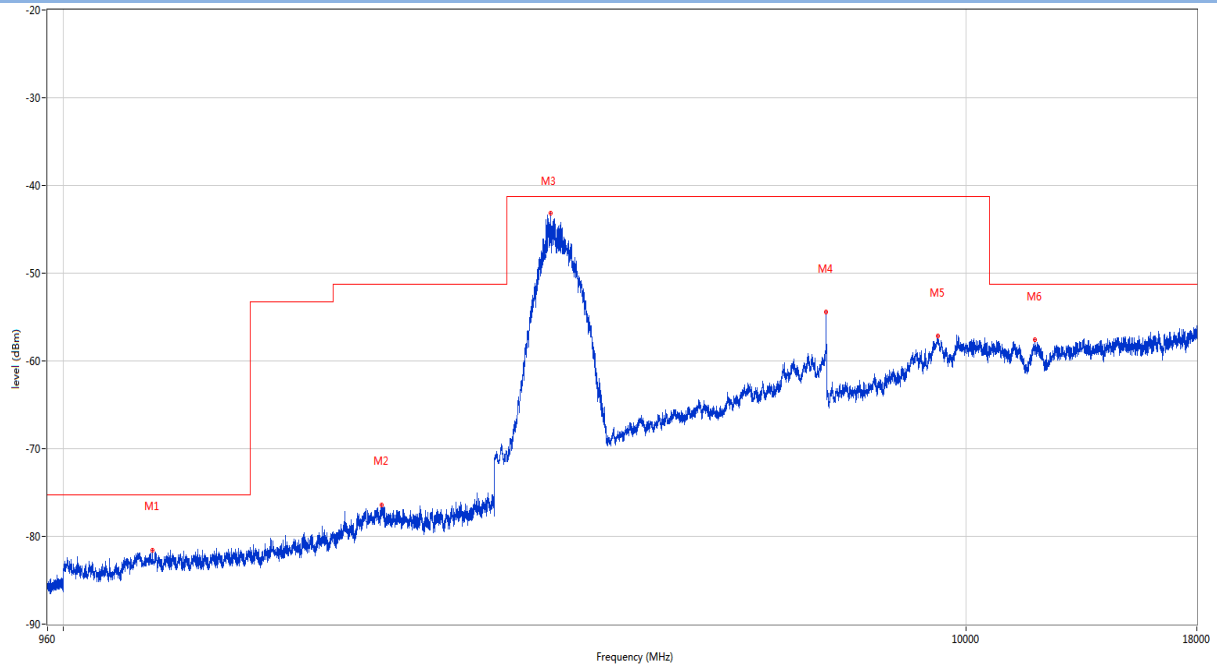


| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna    | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|------------|---------|
| 1   | 48.130          | 13.00            | -27.19      | 30.0           | -17.00          | Peak     | 360.00         | 300         | Horizontal | Pass    |
| 2   | 150.637         | 15.08            | -25.99      | 33.5           | -18.42          | Peak     | 274.00         | 400         | Horizontal | Pass    |
| 3   | 225.019         | 17.36            | -28.27      | 36.0           | -18.64          | Peak     | 243.00         | 400         | Horizontal | Pass    |
| 4   | 323.342         | 23.72            | -24.76      | 36.0           | -12.28          | Peak     | 117.00         | 200         | Horizontal | Pass    |
| 5   | 380.755         | 23.58            | -23.50      | 36.0           | -12.42          | Peak     | 117.00         | 200         | Horizontal | Pass    |
| 6   | 813.097         | 23.41            | -13.81      | 36.0           | -12.59          | Peak     | 275.00         | 100         | Horizontal | Pass    |

## Test Data and Plots (960 MHz to 18 GHz)

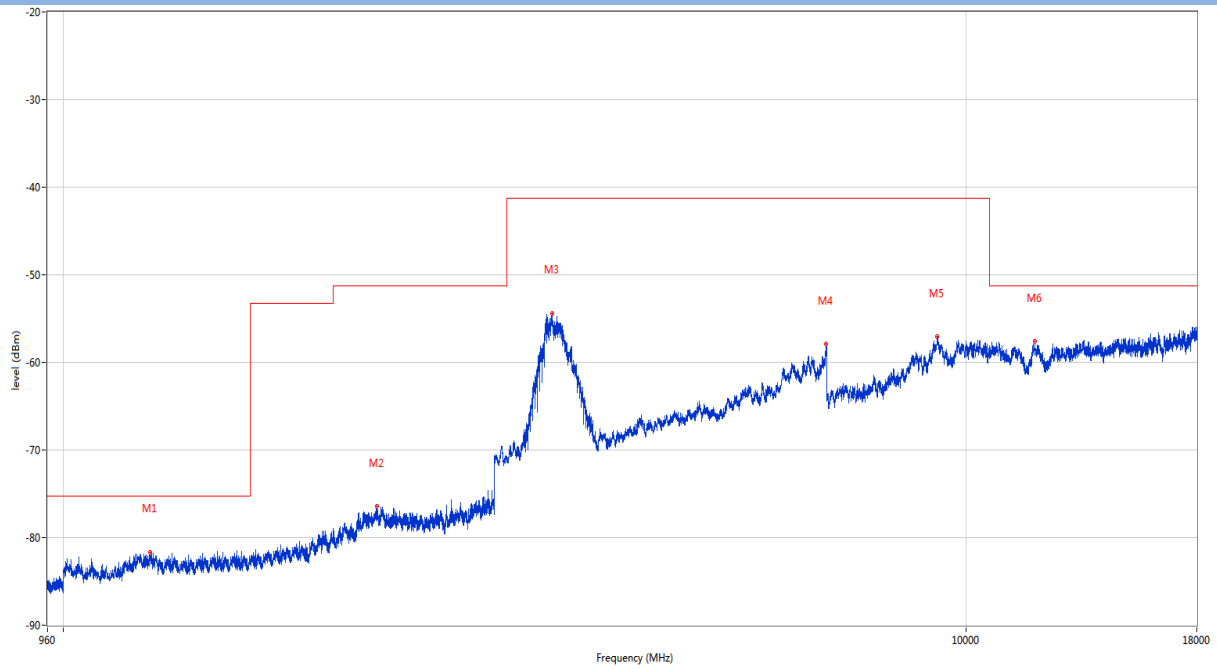
### CH1

960 MHz to 18 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1254.000        | -81.59       | -15.07      | -75.3          | -6.29           | 166.00    | Vertical | Vertical | Pass    |
| 2250.500        | -76.42       | -9.36       | -51.3          | -25.12          | 63.00     | Vertical | Vertical | Pass    |
| 3450.000        | -43.02       | -5.38       | -41.3          | -1.72           | 328.00    | Vertical | Vertical | Pass    |
| 6990.000        | -54.43       | 6.59        | -41.3          | -13.13          | 339.00    | Vertical | Vertical | Pass    |
| 9292.812        | -57.19       | 10.31       | -41.3          | -15.89          | 75.00     | Vertical | Vertical | Pass    |
| 11909.063       | -57.58       | 10.90       | -51.3          | -6.28           | 360.00    | Vertical | Vertical | Pass    |

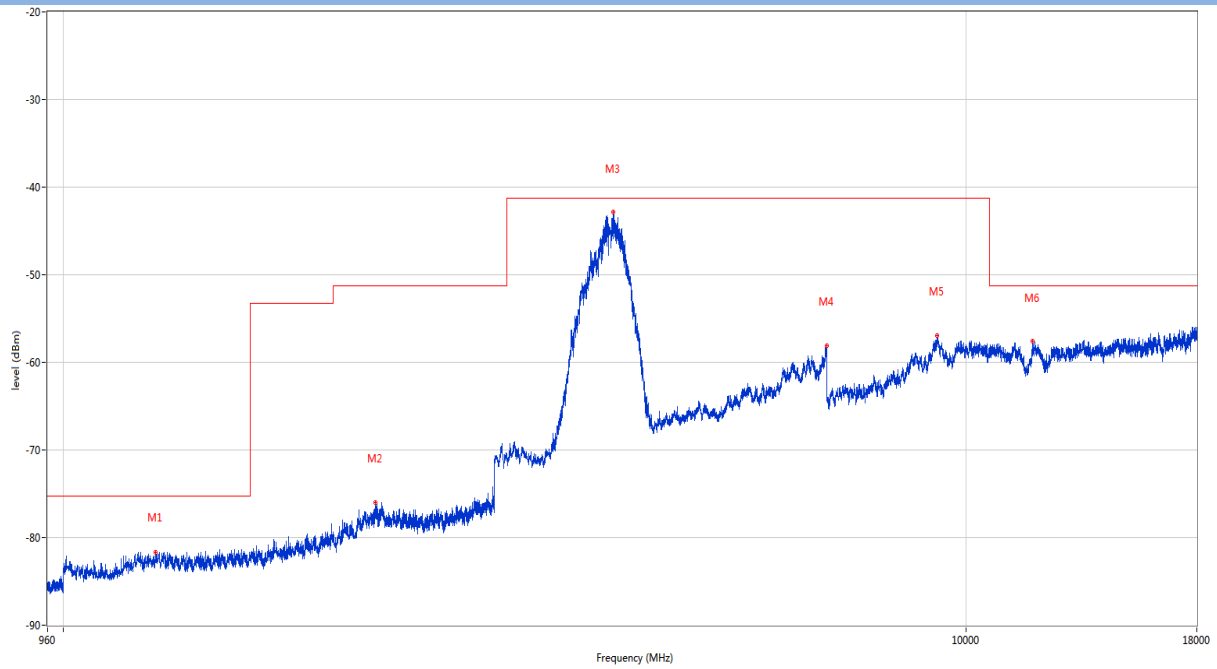
## 960 MHz to 18 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1246.500        | -81.66       | -15.17      | -75.3          | -6.36           | 271.00    | Horizontal | Vertical | Pass    |
| 2225.500        | -76.46       | -9.77       | -51.3          | -25.16          | 360.00    | Horizontal | Vertical | Pass    |
| 3474.000        | -54.37       | -4.87       | -41.3          | -13.07          | 14.00     | Horizontal | Vertical | Pass    |
| 6990.000        | -57.85       | 6.59        | -41.3          | -16.55          | 34.00     | Horizontal | Vertical | Pass    |
| 9285.625        | -57.06       | 10.09       | -41.3          | -15.76          | 151.00    | Horizontal | Vertical | Pass    |
| 11910.500       | -57.62       | 10.88       | -51.3          | -6.32           | 280.00    | Horizontal | Vertical | Pass    |

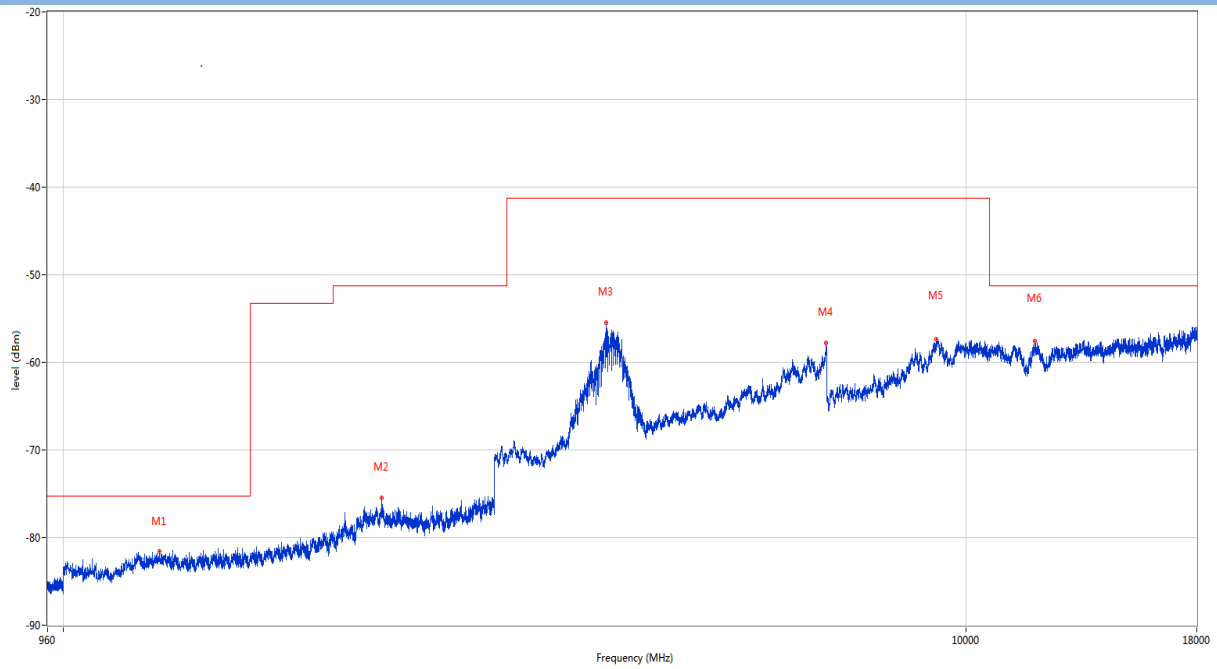
## CH2

960 MHz to 18 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1265.000        | -81.72       | -14.54      | -75.3          | -6.42           | 357.00    | Vertical | Vertical | Pass    |
| 2215.000        | -75.97       | -10.02      | -51.3          | -24.67          | 253.00    | Vertical | Vertical | Pass    |
| 4061.000        | -42.86       | -2.81       | -41.3          | -1.56           | 333.00    | Vertical | Vertical | Pass    |
| 6999.000        | -58.09       | 6.67        | -41.3          | -16.79          | 266.00    | Vertical | Vertical | Pass    |
| 9271.250        | -56.92       | 9.78        | -41.3          | -15.62          | 287.00    | Vertical | Vertical | Pass    |
| 11831.437       | -57.60       | 9.87        | -51.3          | -6.30           | 48.00     | Vertical | Vertical | Pass    |

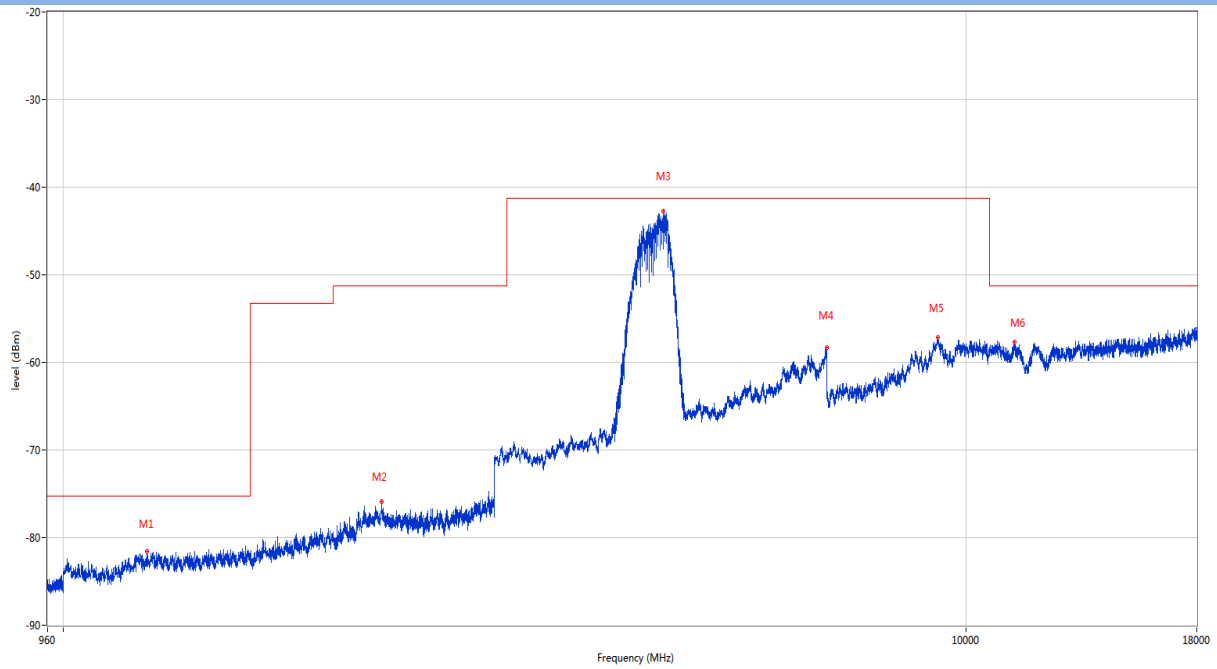
## 960 MHz to 18 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1276.000        | -81.56       | -14.67      | -75.3          | -6.26           | 313.00    | Horizontal | Vertical | Pass    |
| 2252.000        | -75.51       | -9.68       | -51.3          | -24.21          | 74.00     | Horizontal | Vertical | Pass    |
| 3993.000        | -55.51       | -3.20       | -41.3          | -14.21          | 352.00    | Horizontal | Vertical | Pass    |
| 6995.000        | -57.76       | 6.62        | -41.3          | -16.46          | 48.00     | Horizontal | Vertical | Pass    |
| 9256.875        | -57.34       | 9.59        | -41.3          | -16.04          | 2.00      | Horizontal | Vertical | Pass    |
| 11903.313       | -57.59       | 11.00       | -51.3          | -6.29           | 62.00     | Horizontal | Vertical | Pass    |

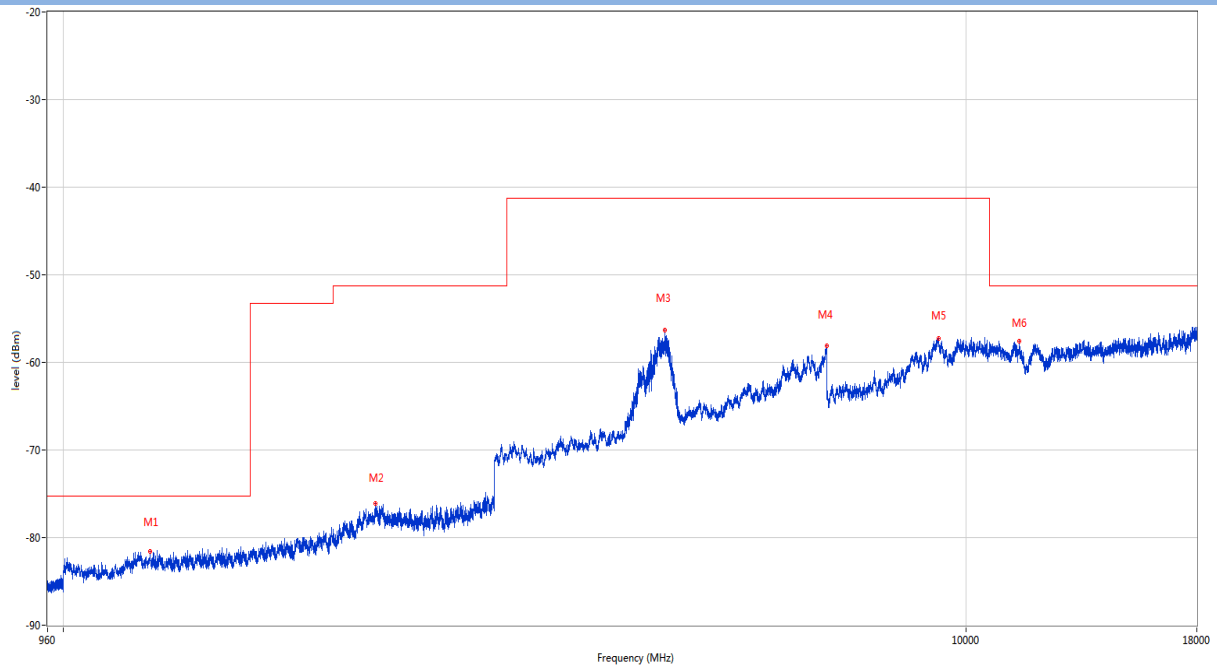
### CH3

960 MHz to 18 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1238.000        | -81.53       | -15.23      | -75.3          | -6.23           | 352.00    | Vertical | Vertical | Pass    |
| 2250.500        | -75.86       | -9.36       | -51.3          | -24.56          | 198.00    | Vertical | Vertical | Pass    |
| 4620.000        | -42.75       | -1.90       | -41.3          | -1.45           | 344.00    | Vertical | Vertical | Pass    |
| 6998.000        | -58.30       | 6.68        | -41.3          | -17.00          | 169.00    | Vertical | Vertical | Pass    |
| 9298.562        | -57.19       | 10.49       | -41.3          | -15.89          | 1.00      | Vertical | Vertical | Pass    |
| 11316.813       | -57.68       | 10.14       | -51.3          | -6.38           | 360.00    | Vertical | Vertical | Pass    |

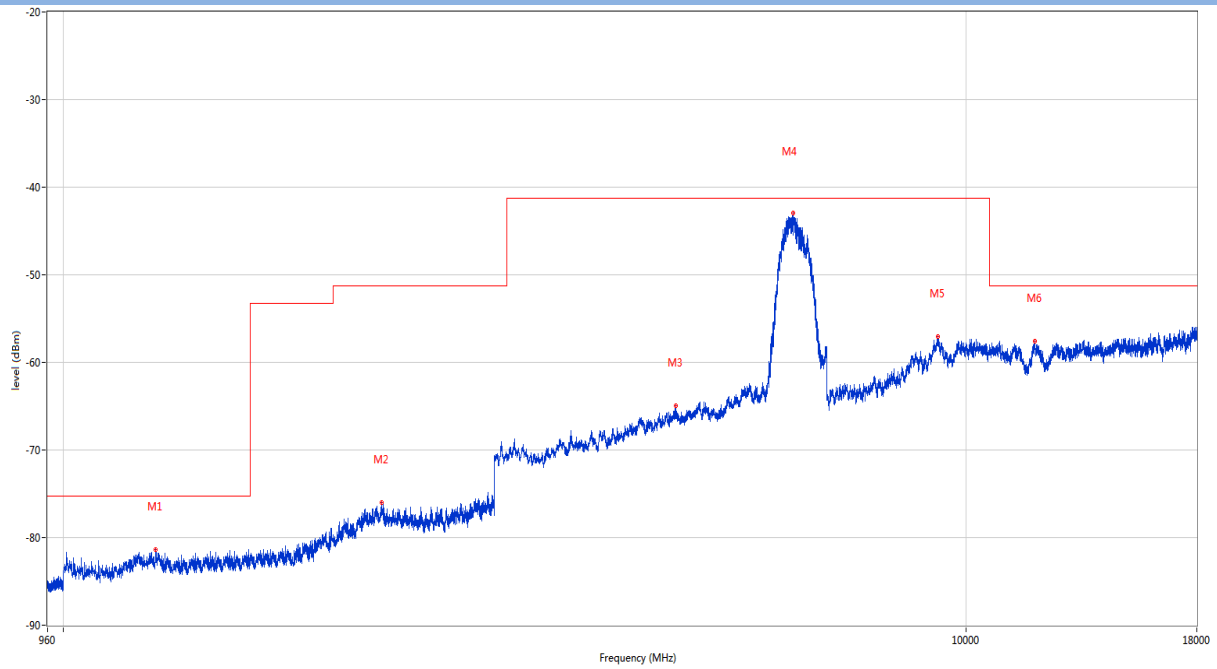
## 960 MHz to 18 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1246.000        | -81.60       | -15.25      | -75.3          | -6.30           | 360.00    | Horizontal | Vertical | Pass    |
| 2217.000        | -76.10       | -10.12      | -51.3          | -24.80          | 186.00    | Horizontal | Vertical | Pass    |
| 4639.000        | -56.32       | -1.19       | -41.3          | -15.02          | 126.00    | Horizontal | Vertical | Pass    |
| 6998.000        | -58.13       | 6.68        | -41.3          | -16.83          | 162.00    | Horizontal | Vertical | Pass    |
| 9312.938        | -57.30       | 10.26       | -41.3          | -16.00          | 269.00    | Horizontal | Vertical | Pass    |
| 11447.625       | -57.57       | 9.28        | -51.3          | -6.27           | 74.00     | Horizontal | Vertical | Pass    |

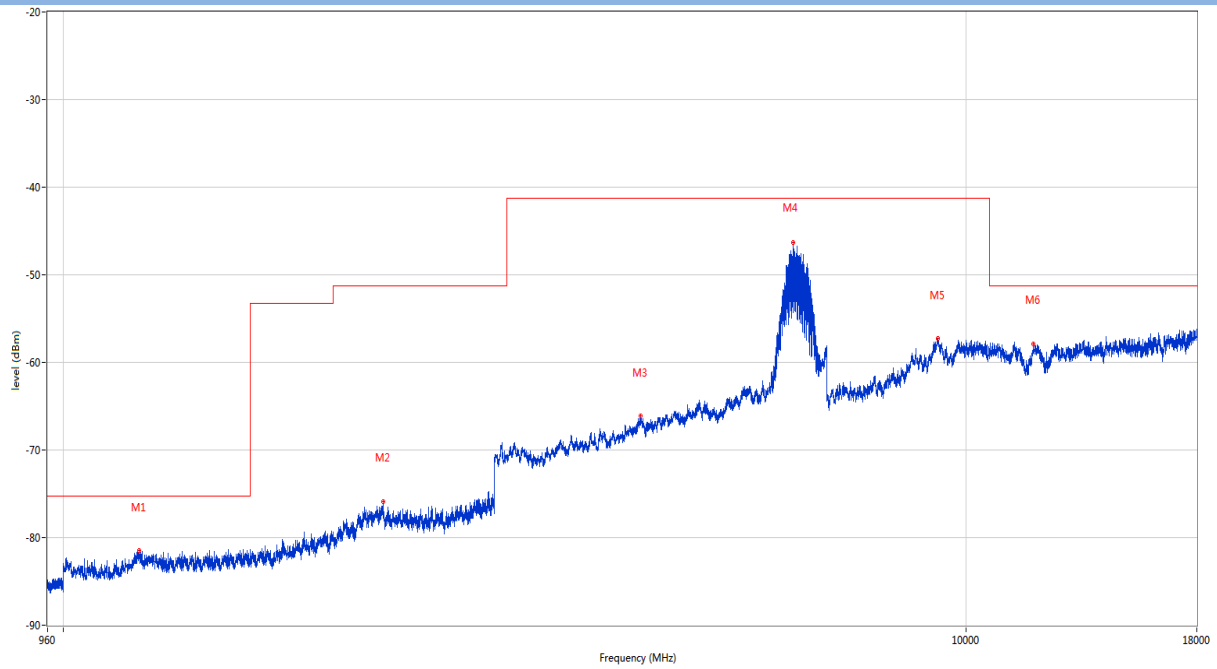
# CH5

960 MHz to 18 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1264.500        | -81.35       | -14.53      | -75.3          | -6.05           | 300.00    | Vertical | Vertical | Pass    |
| 2250.500        | -76.04       | -9.36       | -51.3          | -24.74          | 38.00     | Vertical | Vertical | Pass    |
| 4768.000        | -64.96       | -0.51       | -41.3          | -23.66          | 338.00    | Vertical | Vertical | Pass    |
| 6382.000        | -42.81       | 2.92        | -41.3          | -1.51           | 43.00     | Vertical | Vertical | Pass    |
| 9294.250        | -57.06       | 10.36       | -41.3          | -15.76          | 99.00     | Vertical | Vertical | Pass    |
| 11914.812       | -57.60       | 10.80       | -51.3          | -6.30           | 130.00    | Vertical | Vertical | Pass    |

## 960 MHz to 18 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1213.500        | -81.47       | -14.57      | -75.3          | -6.17           | 246.00    | Horizontal | Vertical | Pass    |
| 2258.000        | -75.87       | -9.78       | -51.3          | -24.57          | 182.00    | Horizontal | Vertical | Pass    |
| 4355.000        | -66.11       | -0.41       | -41.3          | -24.81          | 345.00    | Horizontal | Vertical | Pass    |
| 6435.000        | -46.31       | 4.18        | -41.3          | -5.01           | 304.00    | Horizontal | Vertical | Pass    |
| 9298.562        | -57.30       | 10.49       | -41.3          | -16.00          | 21.00     | Horizontal | Vertical | Pass    |
| 11867.375       | -57.85       | 10.53       | -51.3          | -6.55           | 261.00    | Horizontal | Vertical | Pass    |

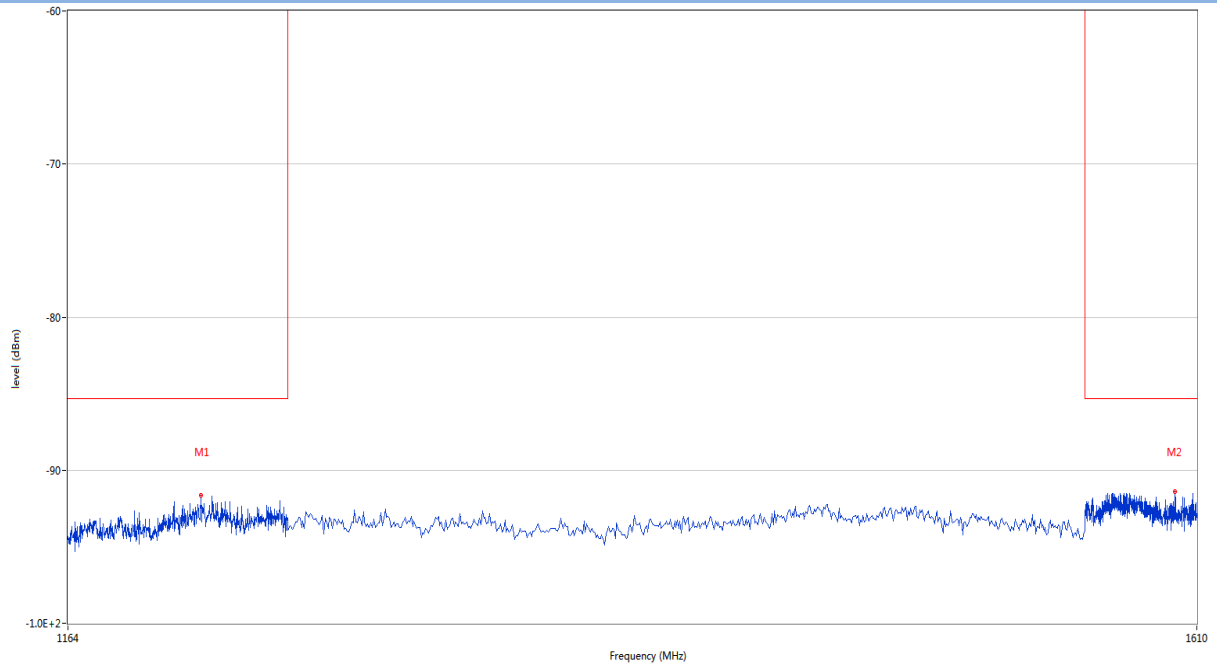
Note: The Radiated Emissions from 18G-40G is noise only, do not show in the report.

## A.4 Radiated Emissions in GPS Bands

### Test Data and Plot

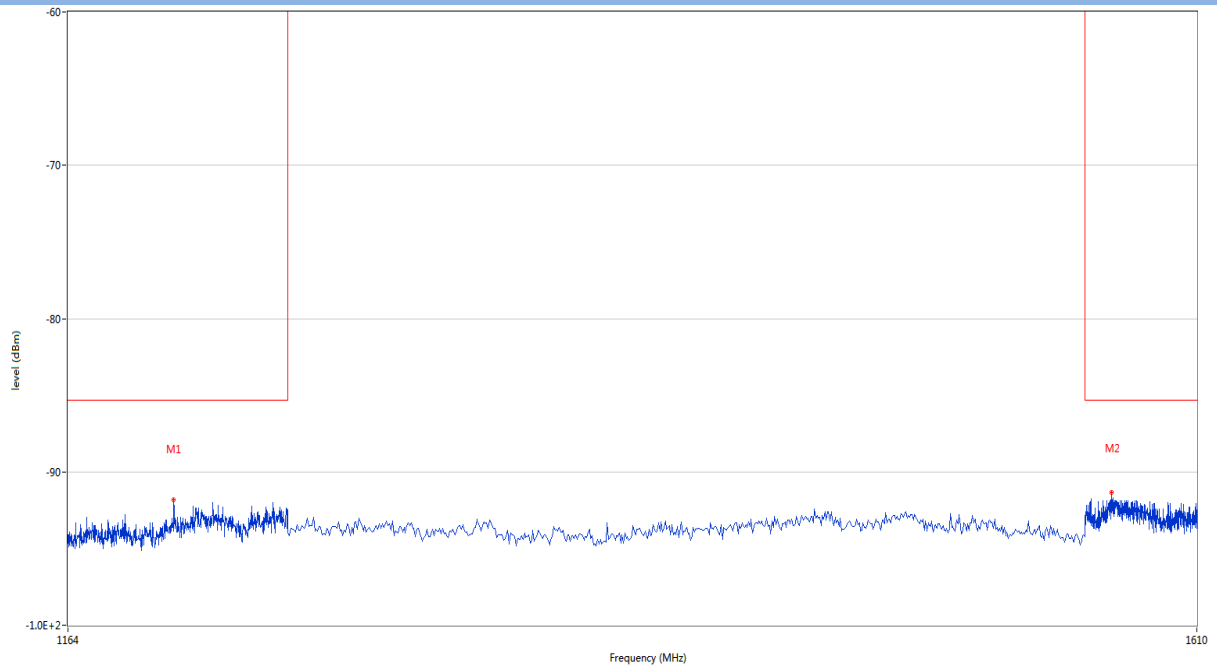
#### CH1

1.164 GHz to 1.61 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1209.473        | 91.99        | -7.41       | -85.3          | -6.69           | 234.00    | Vertical | Vertical | Pass    |
| 1600.055        | 91.85        | -7.76       | -85.3          | -6.55           | 316.00    | Vertical | Vertical | Pass    |

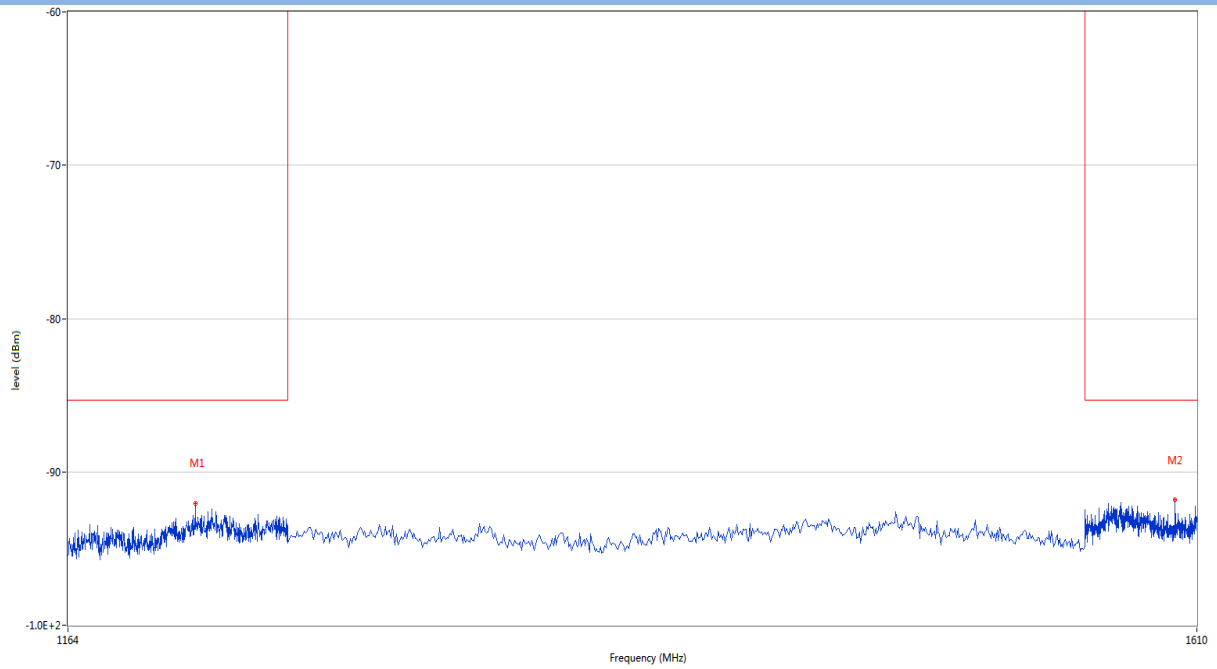
## 1.164 GHz to 1.61 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1200.100        | -92.01       | -7.41       | -85.3          | -6.71           | 118.00    | Horizontal | Vertical | Pass    |
| 1571.495        | -91.98       | -7.54       | -85.3          | -6.68           | 258.00    | Horizontal | Vertical | Pass    |

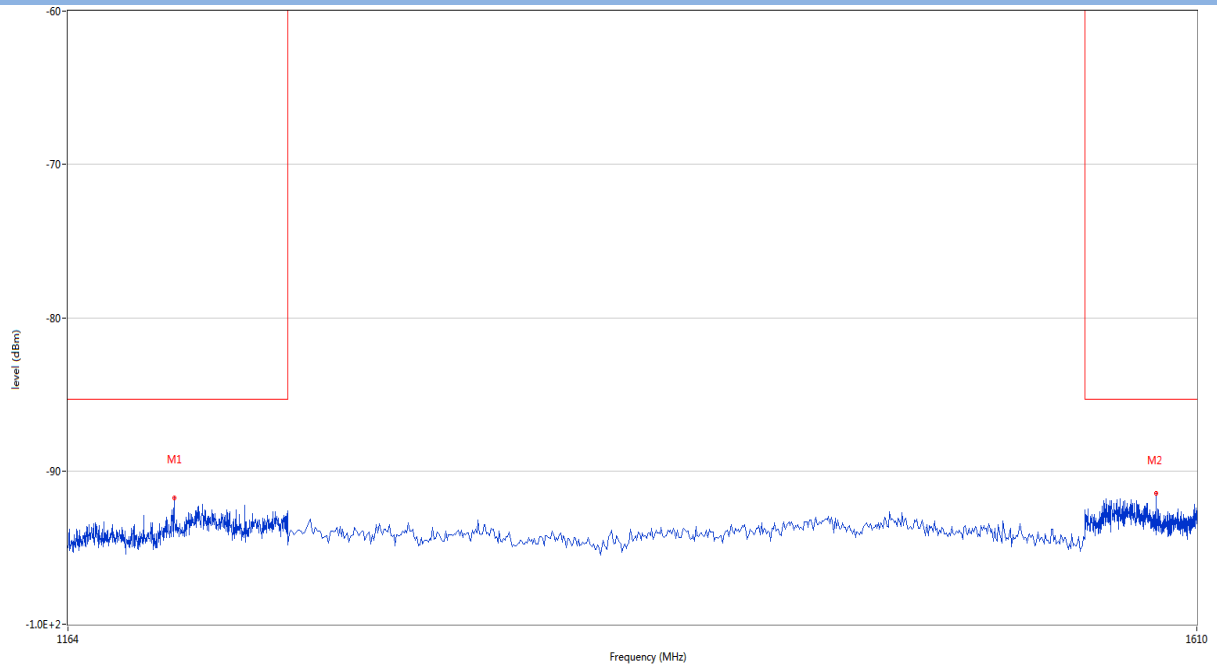
## CH2

1.164 GHz to 1.61 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1207.320        | 92.05        | -7.53       | -85.3          | -6.75           | 199.00    | Vertical | Vertical | Pass    |
| 1600.055        | 92.02        | -7.76       | -85.3          | -6.72           | 358.00    | Vertical | Vertical | Pass    |

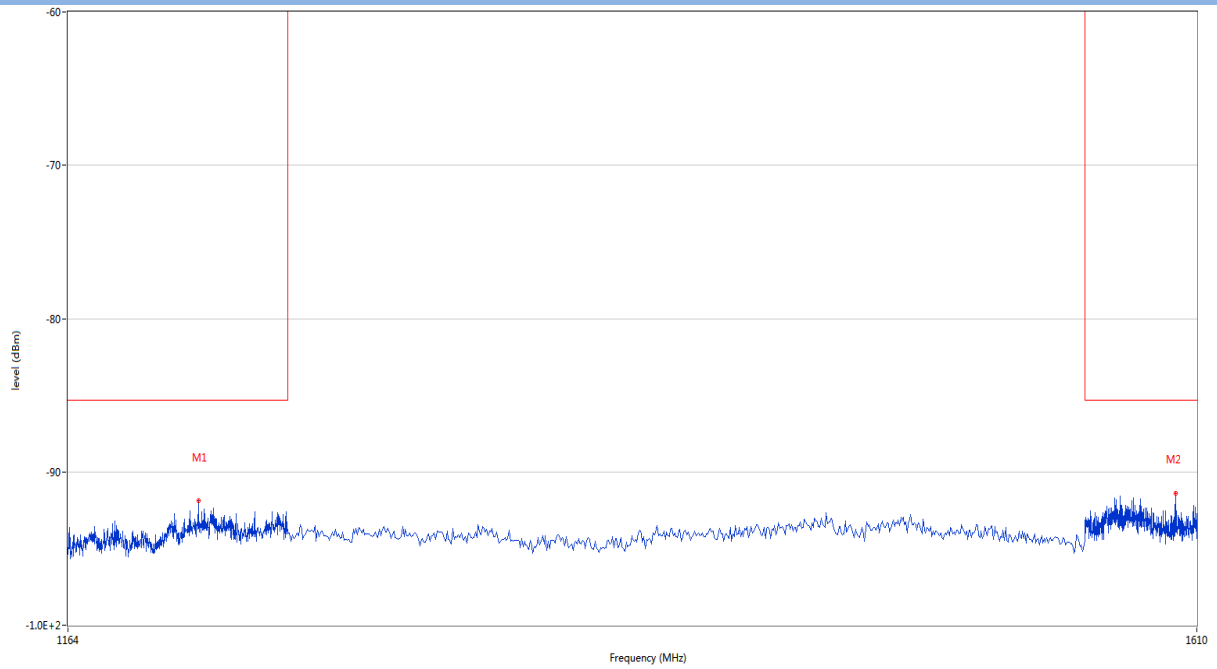
## 1.164 GHz to 1.61 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1200.100        | 92.03        | -7.41       | -85.3          | -6.73           | 166.00    | Horizontal | Vertical | Pass    |
| 1591.215        | 91.97        | -7.73       | -85.3          | -6.67           | 152.00    | Horizontal | Vertical | Pass    |

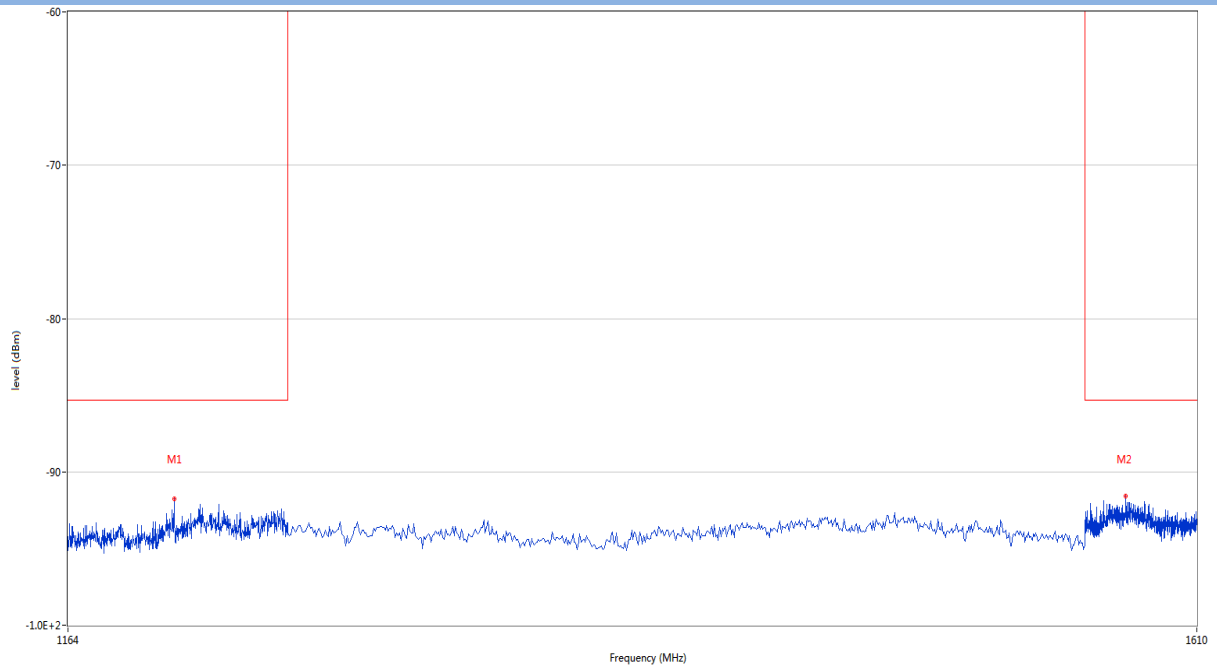
### CH3

1.164 GHz to 1.61 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1208.460        | 91.99        | -7.46       | -85.3          | -6.69           | 233.00    | Vertical | Vertical | Pass    |
| 1600.055        | 91.84        | -7.76       | -85.3          | -6.54           | -3.00     | Vertical | Vertical | Pass    |

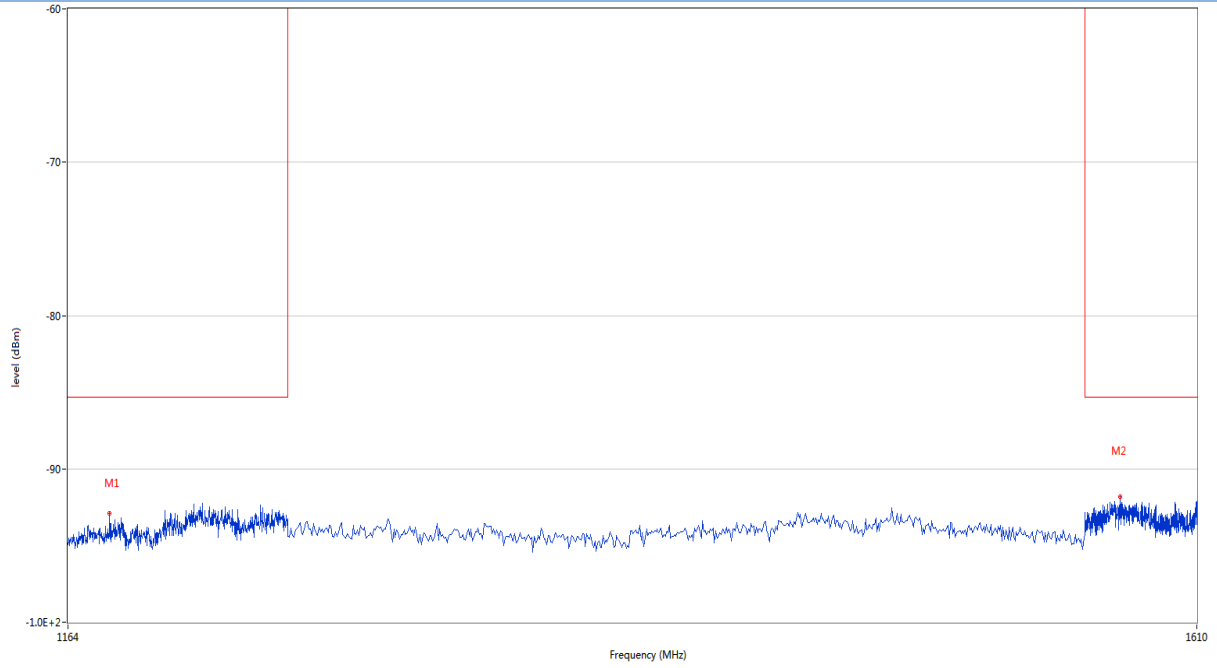
## 1.164 GHz to 1.61 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1200.100        | 92.08        | -7.41       | -85.3          | -6.78           | 164.00    | Horizontal | Vertical | Pass    |
| 1577.445        | 92.01        | -7.78       | -85.3          | -6.71           | 215.00    | Horizontal | Vertical | Pass    |

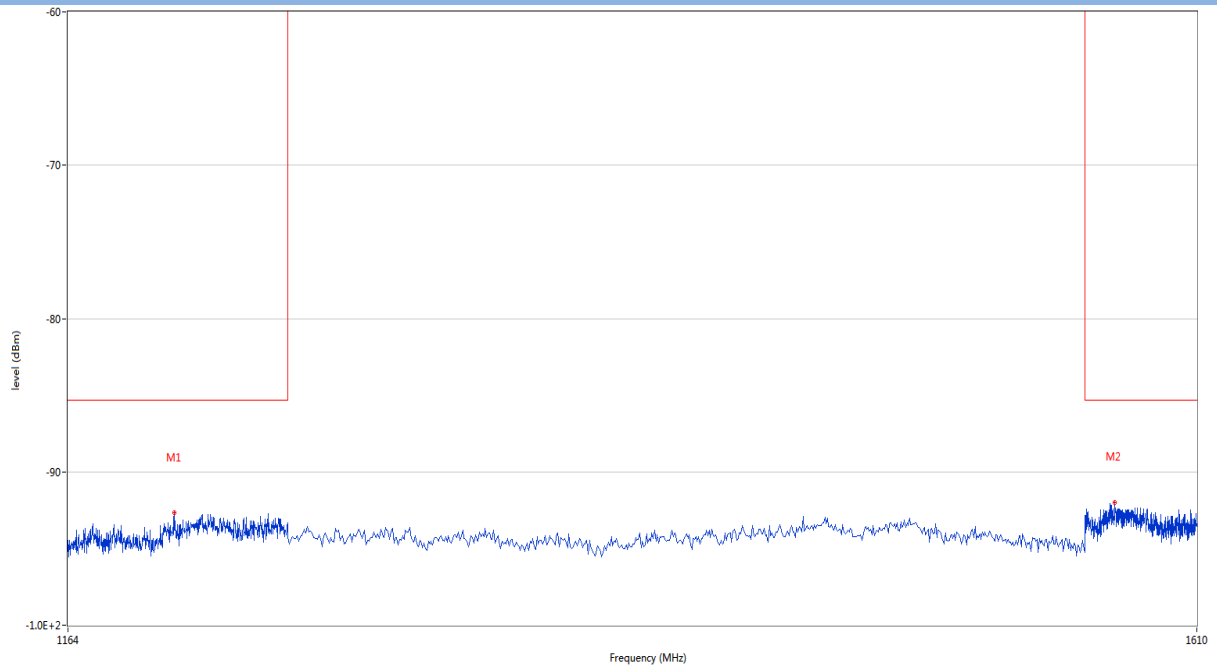
# CH5

1.164 GHz to 1.61 GHz, ANT V



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|----------|----------|---------|
| 1178.060        | 92.45        | -8.34       | -85.3          | -7.15           | 90.00     | Vertical | Vertical | Pass    |
| 1575.065        | 92.04        | -7.84       | -85.3          | -6.74           | -1.00     | Vertical | Vertical | Pass    |

## 1.164 GHz to 1.61 GHz, ANT H



| Frequency (MHz) | Result (dBm) | Factor (dB) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | EUT      | Verdict |
|-----------------|--------------|-------------|----------------|-----------------|-----------|------------|----------|---------|
| 1200.100        | 92.75        | -7.41       | -85.3          | -7.45           | 166.00    | Horizontal | Vertical | Pass    |
| 1572.600        | 92.23        | -7.46       | -85.3          | -6.93           | 50.00     | Horizontal | Vertical | Pass    |

## A.5 Peak Emissions within a 50MHz Bandwidth

### Test Data and Plot

#### ANT V

| Test Mode | Frequency (MHz) | Result (dBm) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT      | Verdict |
|-----------|-----------------|--------------|----------------|-----------------|-----------|----------|---------|
| 1         | 3450.00         | -36.82       | -34.00         | -2.82           | 328.00    | Vertical | Pass    |
| 2         | 4061.00         | -36.76       | -34.00         | -2.76           | 333.00    | Vertical | Pass    |
| 3         | 4620.00         | -36.55       | -34.00         | -2.55           | 344.00    | Vertical | Pass    |
| 4         | 6382.00         | -36.61       | -34.00         | -2.61           | 43.00     | Vertical | Pass    |

#### ANT H

| Test Mode | Frequency (MHz) | Result (dBm) | PK Limit (dBm) | Over Limit (dB) | Table (o) | ANT        | Verdict |
|-----------|-----------------|--------------|----------------|-----------------|-----------|------------|---------|
| 1         | 3474.00         | -48.17       | -34.00         | -14.17          | 14.00     | Horizontal | Pass    |
| 2         | 3993.00         | -49.21       | -34.00         | -15.21          | 352.00    | Horizontal | Pass    |
| 3         | 4639.00         | -50.02       | -34.00         | -16.02          | 126.00    | Horizontal | Pass    |
| 4         | 6435.00         | -41.81       | -34.00         | -7.81           | 304.00    | Horizontal | Pass    |

## **ANNEX B TEST SETUP PHOTOS**

Please refer the document “BL-SZ1990087-AE-2.PDF”.

## **ANNEX C EUT EXTERNAL PHOTOS**

Please refer the document “BL-SZ1990087-AW.PDF”.

## **ANNEX D EUT INTERNAL PHOTOS**

Please refer the document “BL-SZ1990087-AI.PDF”.

--END OF REPORT--