



# FCC RADIO TEST REPORT

Applicant : Allied Telesis K.K.

Address : 2nd. TOC Bldg. 721-11 Nishi-Gotanda, Shinagawa-ku,  
Tokyo Japan, 141-0031

Equipment : 802.11ac wave2 2x2 2.4G/5G/ wireless AP

Model No. : AT-TQ1402, AT-TQm1402

Trade Name : Allied Telesis

FCC ID : RSL-TQ1402

## I HEREBY CERTIFY THAT :

The sample was received on Dec. 12, 2018 and the testing was carried out on Jan. 29, 2019 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Tested by:

Spree Yei / Engineer

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory



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History of this test report

| Report No.  | Issue Date    | Description |
|-------------|---------------|-------------|
| TEFE1804234 | Feb. 12, 2019 | Original    |
|             |               |             |
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## 1. Summary of Test Procedure and Test Results

### 1.1. Applicable Standards

**ANSI C63.4:2014**

**ANSI C63.10:2013**

**FCC Rules and Regulations Part 15 Subpart E §15.407**

**First R&O 14-30**

**KDB662911**

**KDB789033**

**KDB644545**

| FCC Rule               | Description of Test                    | Result |
|------------------------|----------------------------------------|--------|
| 15.203                 | Antenna Requirement                    | Pass   |
| 15.207(a)              | AC Power Line Conducted Emission       | Pass   |
| 15.407(b)<br>15.209    | Radiated Spurious Emission             | Pass   |
| 15.407(a)              | 26 dB Occupied Bandwidth               | Pass   |
| 15.407                 | 6 dB Bandwidth                         | Pass   |
| 15.407<br>(a) & (a)(3) | Average Power                          | Pass   |
| 15.407(a)              | Output and PPSD                        | Pass   |
| 15.407(g)              | Frequency Stability                    | Pass   |
| 15.407(c)              | Automatically Discontinue Transmission | Pass   |
| 2.1091                 | Radio Frequency Exposure               | Pass   |



## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

|                        |                                                                                                                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment              | 802.11ac wave2 2x2 2.4G/5G/ wireless AP                                                                                                                                                                                                            |
| Model No.              | AT-TQ1402, AT-TQm1402                                                                                                                                                                                                                              |
| Brand Name             | Allied Telesis                                                                                                                                                                                                                                     |
| Product Description    | Please refer to User's Manual.                                                                                                                                                                                                                     |
| Connecting I/O Port(s) | Please refer to User's Manual.                                                                                                                                                                                                                     |
| AC Adapter             | Adapter Brand: APD<br>Model No.: WA-24Q12R<br>I/P: AC 100-240V~, 50-60Hz, 0.7A Max.<br>O/P: DC 12V, 2.0A                                                                                                                                           |
| PoE                    | 48V/0.4A                                                                                                                                                                                                                                           |
| Memo                   | A1                                                                                                                                                                                                                                                 |
| Frequency Range        | 802.11b/g/n/ac: 2400-2483.5MHz<br>802.11a/n/ac: 5150MHz-5250MHz, 5725MHz-5850MHz                                                                                                                                                                   |
| Modulation Type        | DSSS, OFDM                                                                                                                                                                                                                                         |
| Data Rate              | 2.4GHz:<br>802.11b: 1, 2, 5.5, 11Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps<br>802.11n: MCS0 – MCS15, HT20/40<br>5GHz:<br>802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps<br>802.11n: MCS0 – MCS15, HT20/40<br>802.11ac: MCS0 – MCS9, VHT20/40/80 |
| Antenna Type           | 2.4GHz: PIFA Antenna / 5GHz: Dipole Antenna                                                                                                                                                                                                        |
| Antenna Gain           | 2400-2483.5MHz: ANT A: 1.9dBi, ANT B: 1.8dBi<br>5150-5250MHz: ANT A: 3.7dBi, ANT B: 2.9dBi<br>5725-5850MHz: ANT A: 3.7dBi, ANT B: 3.7dBi                                                                                                           |

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



## 2.2. Carrier Frequency of Channels

Band 1: 5150MHz-5250MHz

802.11a, 802.11n HT20, 802.11ac VHT20

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| <b>*36</b> | <b>5180</b>    | <b>*44</b> | <b>5220</b>    |
| 40         | 5200           | <b>*48</b> | <b>5240</b>    |

802.11n HT40, 802.11ac VHT40

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| <b>*38</b> | <b>5190</b>    | <b>*46</b> | <b>5230</b>    |

802.11ac VHT80

| Channel    | Frequency(MHz) |
|------------|----------------|
| <b>*42</b> | <b>5210</b>    |

Band 4: 5725MHz -5850MHz

802.11a, 802.11n HT20, 802.11ac VHT20

| Channel     | Frequency(MHz) | Channel     | Frequency(MHz) |
|-------------|----------------|-------------|----------------|
| <b>*149</b> | <b>5745</b>    | 161         | 5805           |
| 153         | 5765           | <b>*165</b> | <b>5825</b>    |
| <b>*157</b> | <b>5785</b>    |             |                |

802.11n HT40, 802.11ac VHT40

| Channel     | Frequency(MHz) | Channel     | Frequency(MHz) |
|-------------|----------------|-------------|----------------|
| <b>*151</b> | <b>5755</b>    | <b>*159</b> | <b>5795</b>    |

802.11ac VHT80

| Channel     | Frequency(MHz) |
|-------------|----------------|
| <b>*155</b> | <b>5775</b>    |

Note: Channels remarked \* are selected to perform test.



### 2.3. Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The complete test system included remote workstation and EUT for RF test. The remote workstation included Notebook.
- An executive program, "QRCT: Ver 3.0.219.0" was executed to transmit and receive data via WLAN.
- The following test modes were performed for the test:

| Conducted Emissions from the AC mains power ports                                     |                                               |
|---------------------------------------------------------------------------------------|-----------------------------------------------|
| Test Mode                                                                             | Operating Description                         |
| 1                                                                                     | 802.11a (6Mbps)                               |
| 2                                                                                     | 802.11ac VHT20 (6.5Mbps)                      |
| 3                                                                                     | 802.11ac VHT40 (13.5Mbps)                     |
| 4                                                                                     | 802.11ac VHT80 (29.3Mbps)                     |
| caused "Test Mode 1" generated the worst case, it was reported as the final data.     |                                               |
| Radiation Emissions (30MHz ~ 1GHz)                                                    |                                               |
| Test Mode                                                                             | Operating Description                         |
| 1                                                                                     | 802.11a (6Mbps), Power from Adapter           |
| 2                                                                                     | 802.11ac VHT20 (6.5Mbps), Power from Adapter  |
| 3                                                                                     | 802.11ac VHT40 (13.5Mbps), Power from Adapter |
| 4                                                                                     | 802.11ac VHT80 (29.3Mbps), Power from Adapter |
| 5                                                                                     | 802.11a (6Mbps), Power from PoE               |
| 6                                                                                     | 802.11ac VHT20 (6.5Mbps), Power from PoE      |
| 7                                                                                     | 802.11ac VHT40 (13.5Mbps), Power from PoE     |
| 8                                                                                     | 802.11ac VHT80 (29.3Mbps), Power from PoE     |
| caused "Test Mode 1 & 5" generated the worst case, it was reported as the final data. |                                               |
| Radiation Emissions (1GHz ~ 40GHz)                                                    |                                               |
| Test Mode                                                                             | Operating Description                         |
| 1                                                                                     | 802.11a (6Mbps)                               |
| 2                                                                                     | 802.11ac VHT20 (6.5Mbps)                      |
| 3                                                                                     | 802.11ac VHT40 (13.5Mbps)                     |
| 4                                                                                     | 802.11ac VHT80 (29.3Mbps)                     |

Note: Non-Beamforming was used for the test result.

### 2.4. Description of Test System

| Device             | Manufacturer | Model No. | Description                    |
|--------------------|--------------|-----------|--------------------------------|
| Remote workstation |              |           |                                |
| Notebook           | ASUS         | P2430U    | Power Cable, Unshielding, 1.8m |

Use Cable:

| Cable   | Quantity | Description       |
|---------|----------|-------------------|
| Network | 1        | Unshielding, 1.2m |





## 2.5. General Information of Test

|                               |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site                     | <b>Cerpass Technology Corporation Test Laboratory</b><br>Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.)<br>Tel:+886-3-3226-888<br>Fax:+886-3-3226-881<br>Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C.<br>Tel: +886-2-2663-8582 |                                                                                                                                                                              |
|                               | FCC                                                                                                                                                                                                                                                                                                            | TW1079, TW1061, TW1439                                                                                                                                                       |
|                               | IC                                                                                                                                                                                                                                                                                                             | 4934E-1, 4934E-2                                                                                                                                                             |
|                               | VCCI                                                                                                                                                                                                                                                                                                           | T-2205 for Telecommunication Test<br>C-4663 for Conducted emission test<br>R-4399, R-4218 for Radiated emission test<br>G-10812, G-10813 for radiated disturbance above 1GHz |
| Frequency Range Investigated: | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 40,000MHz                                                                                                                                                                                                                                        |                                                                                                                                                                              |
| Test Distance:                | The test distance of radiated emission from antenna to EUT is 3 M.                                                                                                                                                                                                                                             |                                                                                                                                                                              |

## 2.6. Measurement Uncertainty

| Measurement Item                         | Uncertainty |
|------------------------------------------|-------------|
| Radiated Spurious Emission(9KHz~30MHz)   | ±5.007dB    |
| Radiated Spurious Emission(30MHz~1GHz)   | ±5.157dB    |
| Radiated Spurious Emission(1GHz~18GHz)   | ±6.383dB    |
| Radiated Spurious Emission(18GHz~40GHz)  | ±6.648dB    |
| Conducted Spurious Emission              | ±1.253dB    |
| 6dB Bandwidth                            | ±6.89%      |
| Power Spectral Density                   | ±0.630dB    |
| 26 dB Occupied Bandwidth                 | ±6.10%      |
| Frequency Stability                      | ±375KHz     |
| Channel Frequencies Separation           | ±6.10%      |
| 20dB Bandwidth                           | ±6.12%      |
| Dwell Time                               | ±1.34%      |
| Peak Output Power(Conducted Power Meter) | ±0.86dB     |
| Temperature                              | ±1.2°C      |
| Humidity                                 | ±2.7%       |
| Channel Move Time                        | ±4.53%      |
| Channel Closing Transmission Time        | ±6.61%      |
| Threshold                                | ±0.631dB    |
| Non occupancy period                     | ±1.17%      |



### 3. Test Equipment and Ancillaries Used for Tests

| Instrument                           | Manufacturer         | Model No.   | Serial No.      | Calibration Date | Valid Date |
|--------------------------------------|----------------------|-------------|-----------------|------------------|------------|
| Bilog Antenna                        | Schwarzbeck          | VULB9168    | 275             | 2018/09/17       | 2019/09/16 |
| Active Loop Antenna                  | EMCO                 | 6507        | 40855           | 2018/05/22       | 2019/05/21 |
| Horn Antenna                         | EMCO                 | 3115        | 31589           | 2018/04/02       | 2019/04/01 |
| Horn Antenna                         | EMCO                 | 3116        | 31974           | 2018/09/07       | 2019/09/06 |
| EMI Receiver                         | ROHDE & SCHWARZ      | ESCI 3      | 101402          | 2018/02/23       | 2019/02/22 |
| Spectrum Analyzer                    | ROHDE & SCHWARZ      | FSP40       | 100047          | 2018/03/20       | 2019/03/19 |
| Preamplifier                         | EM Electronics corp. | EM330       | 60660           | 2018/03/08       | 2019/03/07 |
| Preamplifier                         | EMC INSTRUMENTS      | EMC051845SE | 980333          | 2018/09/18       | 2019/09/17 |
| BLUETOOTH TESTER                     | ROHDE & SCHWARZ      | CBT         | 101133          | 2018/04/02       | 2019/04/01 |
| Cable-3in1-(30M-1G )                 | HARBOUR INDUSTRIES   | LL142       | CCE1315         | 2018/04/20       | 2019/04/19 |
| Cable-0.5m-(1G-40 G)                 | Rapidtek             | 40GHZ 50CM  | 38MS-38MS50314  | 2018/03/27       | 2019/03/26 |
| Cable-1m-(1G-40G)                    | Rapidtek             | 40GHZ 300CM | 38MS-38MS300314 | 2018/03/27       | 2019/03/26 |
| Cable-6m-(1G-40G)                    | Rapidtek             | 40GHZ 800CM | 38MS-38MS800314 | 2018/03/27       | 2019/03/26 |
| E3                                   | AUDIX                | v8.2014-8-6 | RK-000529       | NA               | NA         |
| Spectrum Analyzer                    | ROHDE & SCHWARZ      | VULB9168    | 275             | 2018/09/17       | 2019/09/16 |
| BLUETOOTH TESTER                     | ROHDE & SCHWARZ      | 6507        | 40855           | 2018/05/22       | 2019/05/21 |
| Attenuator                           | KEYSIGHT             | 3115        | 31589           | 2018/04/02       | 2019/04/01 |
| TEMP & HUMI CHAMBER                  | T-MACHINE            | 3116        | 31974           | 2018/09/07       | 2019/09/06 |
| Power Sensor                         | Anritsu              | ESCI 3      | 101402          | 2018/02/23       | 2019/02/22 |
| EMI Receiver                         | ROHDE & SCHWARZ      | ESCI 3      | 100443          | 2018/03/15       | 2019/03/14 |
| Line Impedance Stabilization Network | Schwarzbeck          | NSLK 8127   | 8127-740        | 2018/06/13       | 2019/06/12 |
| Pulse Limiter                        | ROHDE & SCHWARZ      | ESH3-Z2     | 101933          | 2018/09/04       | 2019/09/03 |
| E3                                   | AUDIX                | v8.2014-8-6 | RK-000529       | NA               | NA         |



## 4. Antenna Requirements

### 4.1. Standard Applicable

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.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.2. Antenna Construction and Directional Gain

|              |                                                                                                                                          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type | 2.4GHz: PIFA Antenna / 5GHz: Dipole Antenna                                                                                              |
| Antenna Gain | 2400-2483.5MHz: ANT A: 1.9dBi, ANT B: 1.8dBi<br>5150-5250MHz: ANT A: 3.7dBi, ANT B: 2.9dBi<br>5725-5850MHz: ANT A: 3.7dBi, ANT B: 3.7dBi |

#### (Non-Beamforming)

|                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2400-2483.5MHz                                                                                                                                       |
| For Power directional gain= $G_{ant} = 1.90 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT]$<br>= 4.86 (dBi) |
| 5150-5250MHz                                                                                                                                         |
| For Power directional gain= $G_{ant} = 3.70 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT]$<br>= 6.32 (dBi) |
| 5725-5850MHz                                                                                                                                         |
| For Power directional gain= $G_{ant} = 3.70 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT]$<br>= 6.71 (dBi) |

#### (Beamforming)

|                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5150-5250MHz                                                                                                                                                                                    |
| For Power directional gain= $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT] = 6.32 \text{ (dBi)}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT] = 6.32 \text{ (dBi)}$ |
| 5725-5850MHz                                                                                                                                                                                    |
| For Power directional gain= $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT] = 6.71 \text{ (dBi)}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / NANT] = 6.71 \text{ (dBi)}$ |



## 5. Test of AC Power Line Conducted Emission

### 5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

| Frequency (MHz) | Quasi Peak (dB $\mu$ V) | Average (dB $\mu$ V) |
|-----------------|-------------------------|----------------------|
| 0.15 – 0.5      | 66-56*                  | 56-46*               |
| 0.5 – 5.0       | 56                      | 46                   |
| 5.0 – 30.0      | 60                      | 50                   |

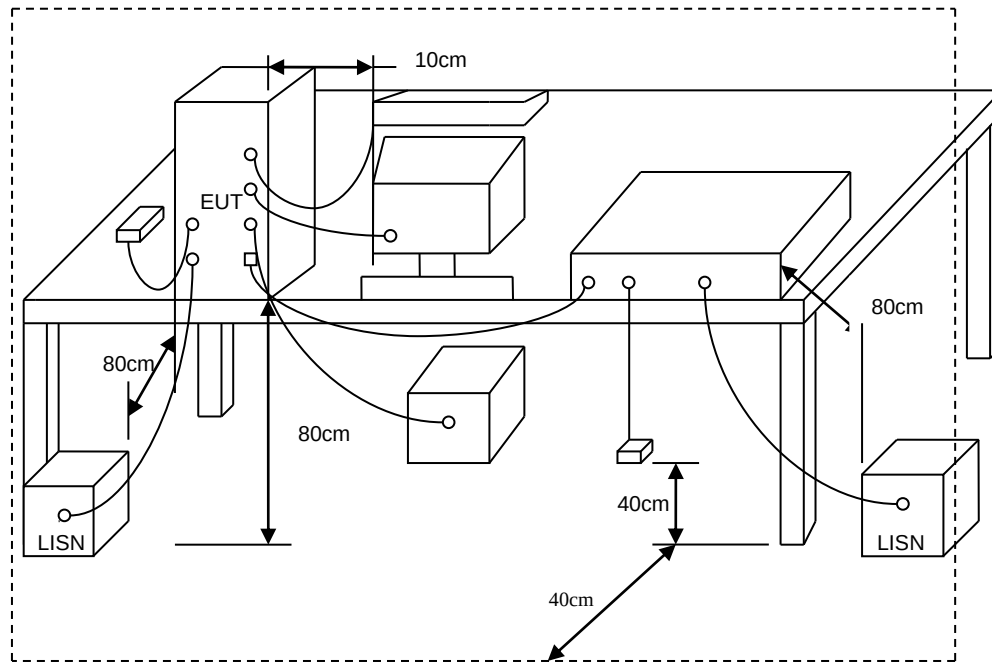
\*Decreases with the logarithm of the frequency.

### 5.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



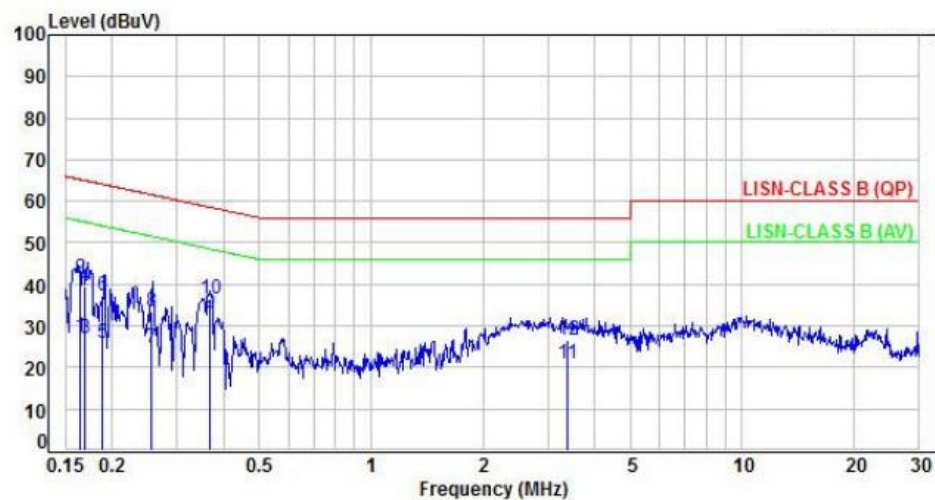
### 5.3. Typical Test Setup





#### 5.4. Test Result and Data

|           |                  |             |         |
|-----------|------------------|-------------|---------|
| Power     | : AC 120V        | Pol/Phase   | : LINE  |
| Test Mode | : Mode 1, Band 1 | Temperature | : 22 °C |
| Test Date | : Dec. 20, 2018  | Humidity    | : 49 %  |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.16            | 9.94        | 17.26          | 27.20        | 55.27        | -28.07      | Average  | P   |
| 2   | 0.16            | 9.94        | 31.46          | 41.40        | 65.27        | -23.87      | QP       | P   |
| 3   | 0.17            | 9.94        | 17.02          | 26.96        | 55.00        | -28.04      | Average  | P   |
| 4   | 0.17            | 9.94        | 29.53          | 39.47        | 65.00        | -25.53      | QP       | P   |
| 5   | 0.19            | 9.94        | 16.04          | 25.98        | 54.07        | -28.09      | Average  | P   |
| 6   | 0.19            | 9.94        | 27.42          | 37.36        | 64.07        | -26.71      | QP       | P   |
| 7   | 0.26            | 9.94        | 14.77          | 24.71        | 51.58        | -26.87      | Average  | P   |
| 8   | 0.26            | 9.94        | 23.64          | 33.58        | 61.58        | -28.00      | QP       | P   |
| 9   | 0.37            | 9.95        | 23.05          | 33.00        | 48.55        | -15.55      | Average  | P   |
| 10  | 0.37            | 9.95        | 26.54          | 36.49        | 58.55        | -22.06      | QP       | P   |
| 11  | 3.38            | 10.10       | 10.69          | 20.79        | 46.00        | -25.21      | Average  | P   |
| 12  | 3.38            | 10.10       | 16.44          | 26.54        | 56.00        | -29.46      | QP       | P   |

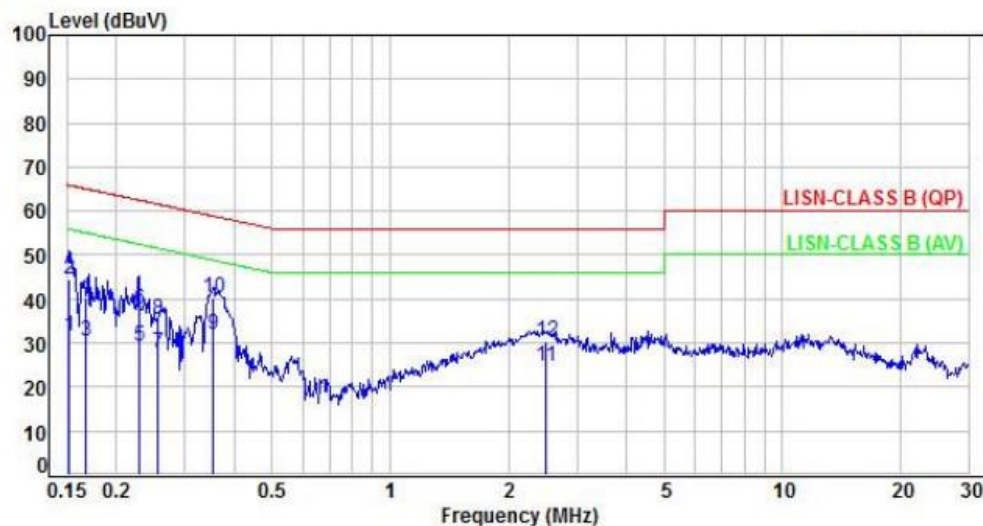
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



|           |                  |             |           |
|-----------|------------------|-------------|-----------|
| Power     | : AC 120V        | Pol/Phase   | : NEUTRAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 22 °C   |
| Test Date | : Dec. 20, 2018  | Humidity    | : 49 %    |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.15            | 9.94        | 21.64          | 31.58        | 55.88        | -24.30      | Average  | P   |
| 2   | 0.15            | 9.94        | 34.66          | 44.60        | 65.88        | -21.28      | QP       | P   |
| 3   | 0.17            | 9.94        | 20.42          | 30.36        | 55.11        | -24.75      | Average  | P   |
| 4   | 0.17            | 9.94        | 30.55          | 40.49        | 65.11        | -24.62      | QP       | P   |
| 5   | 0.23            | 9.94        | 19.46          | 29.40        | 52.48        | -23.08      | Average  | P   |
| 6   | 0.23            | 9.94        | 27.87          | 37.81        | 62.48        | -24.67      | QP       | P   |
| 7   | 0.25            | 9.94        | 17.83          | 27.77        | 51.61        | -23.84      | Average  | P   |
| 8   | 0.25            | 9.94        | 25.46          | 35.40        | 61.61        | -26.21      | QP       | P   |
| 9   | 0.35            | 9.95        | 21.84          | 31.79        | 48.88        | -17.09      | Average  | P   |
| 10  | 0.35            | 9.95        | 30.23          | 40.18        | 58.88        | -18.70      | QP       | P   |
| 11  | 2.49            | 10.06       | 14.79          | 24.85        | 46.00        | -21.15      | Average  | P   |
| 12  | 2.49            | 10.06       | 20.29          | 30.35        | 56.00        | -25.65      | QP       | P   |

Note: Level=Reading+Factor

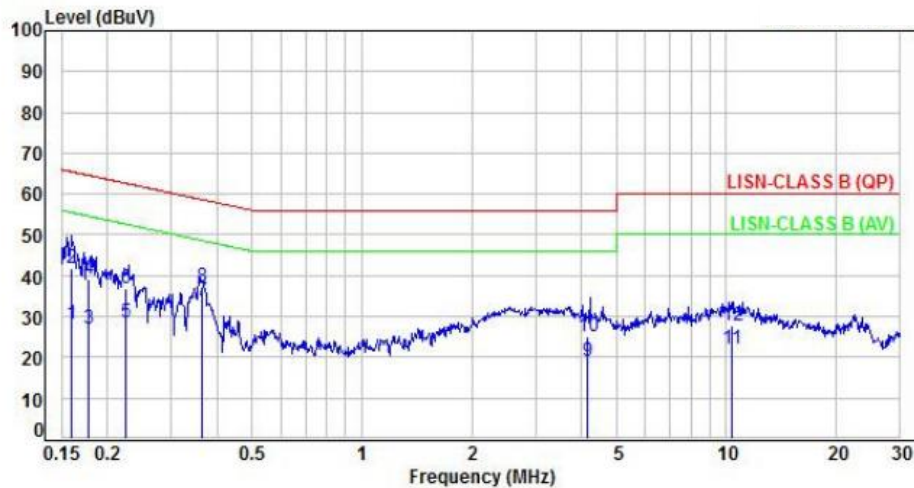
Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss





|           |                  |             |         |
|-----------|------------------|-------------|---------|
| Power     | : AC 120V        | Pol/Phase   | : LINE  |
| Test Mode | : Mode 1, Band 4 | Temperature | : 22 °C |
| Test Date | : Dec. 20, 2018  | Humidity    | : 49 %  |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.16            | 9.94        | 18.13          | 28.07        | 55.47        | -27.40      | Average  | P   |
| 2   | 0.16            | 9.94        | 31.98          | 41.92        | 65.47        | -23.55      | QP       | P   |
| 3   | 0.18            | 9.94        | 16.88          | 26.82        | 54.59        | -27.77      | Average  | P   |
| 4   | 0.18            | 9.94        | 29.10          | 39.04        | 64.59        | -25.55      | QP       | P   |
| 5   | 0.23            | 9.94        | 18.60          | 28.54        | 52.60        | -24.06      | Average  | P   |
| 6   | 0.23            | 9.94        | 27.11          | 37.05        | 62.60        | -25.55      | QP       | P   |
| 7   | 0.36            | 9.95        | 23.87          | 33.82        | 48.68        | -14.86      | Average  | P   |
| 8   | 0.36            | 9.95        | 27.22          | 37.17        | 58.68        | -21.51      | QP       | P   |
| 9   | 4.16            | 10.13       | 8.87           | 19.00        | 46.00        | -27.00      | Average  | P   |
| 10  | 4.16            | 10.13       | 14.85          | 24.98        | 56.00        | -31.02      | QP       | P   |
| 11  | 10.38           | 10.29       | 11.87          | 22.16        | 50.00        | -27.84      | Average  | P   |
| 12  | 10.38           | 10.29       | 17.36          | 27.65        | 60.00        | -32.35      | QP       | P   |

Note: Level=Reading+Factor

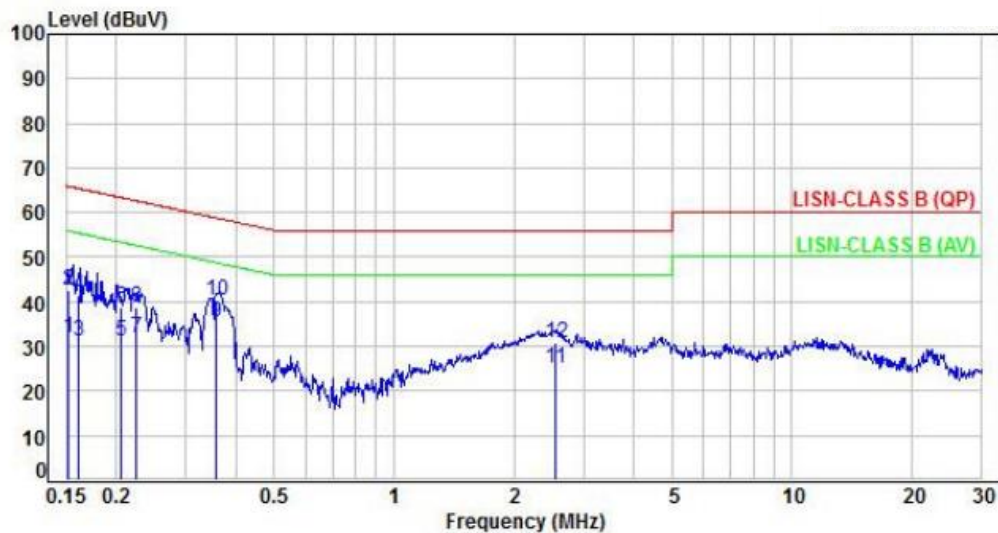
Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss





|           |                  |             |           |
|-----------|------------------|-------------|-----------|
| Power     | : AC 120V        | Pol/Phase   | : NEUTRAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 22 °C   |
| Test Date | : Dec. 20, 2018  | Humidity    | : 49 %    |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.15            | 9.94        | 21.85          | 31.79        | 55.93        | -24.14      | Average  | P   |
| 2   | 0.15            | 9.94        | 32.73          | 42.67        | 65.93        | -23.26      | QP       | P   |
| 3   | 0.16            | 9.94        | 21.22          | 31.16        | 55.45        | -24.29      | Average  | P   |
| 4   | 0.16            | 9.94        | 31.65          | 41.59        | 65.45        | -23.86      | QP       | P   |
| 5   | 0.21            | 9.94        | 21.06          | 31.00        | 53.37        | -22.37      | Average  | P   |
| 6   | 0.21            | 9.94        | 28.77          | 38.71        | 63.37        | -24.66      | QP       | P   |
| 7   | 0.23            | 9.94        | 22.18          | 32.12        | 52.61        | -20.49      | Average  | P   |
| 8   | 0.23            | 9.94        | 29.02          | 38.96        | 62.61        | -23.65      | QP       | P   |
| 9   | 0.36            | 9.95        | 25.30          | 35.25        | 48.82        | -13.57      | Average  | P   |
| 10  | 0.36            | 9.95        | 30.44          | 40.39        | 58.82        | -18.43      | QP       | P   |
| 11  | 2.54            | 10.06       | 14.94          | 25.00        | 46.00        | -21.00      | Average  | P   |
| 12  | 2.54            | 10.06       | 20.77          | 30.83        | 56.00        | -25.17      | QP       | P   |

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



## 6. Test of Spurious Emission (Radiated)

### 6.1. Test Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:  
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

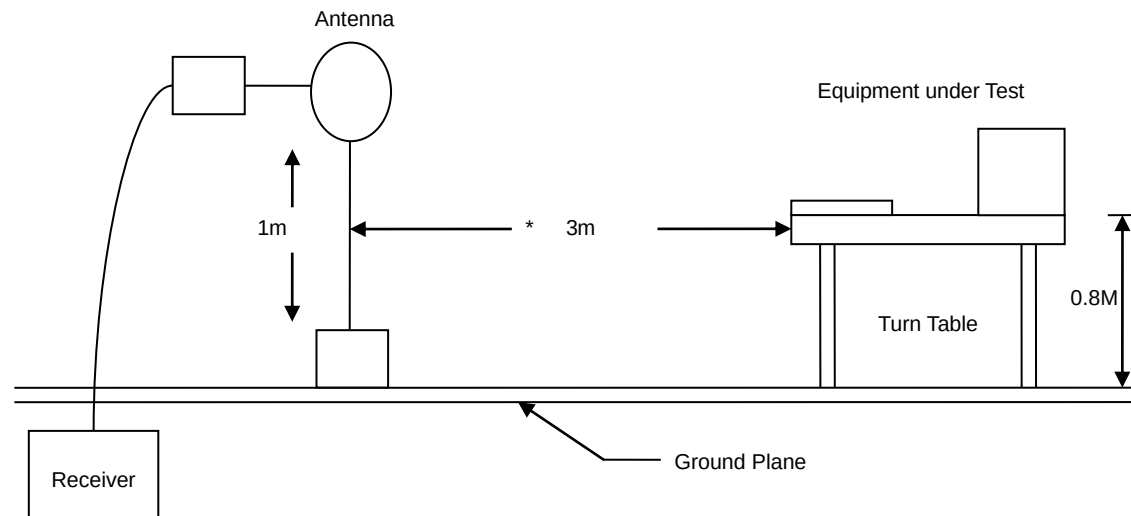
### 6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

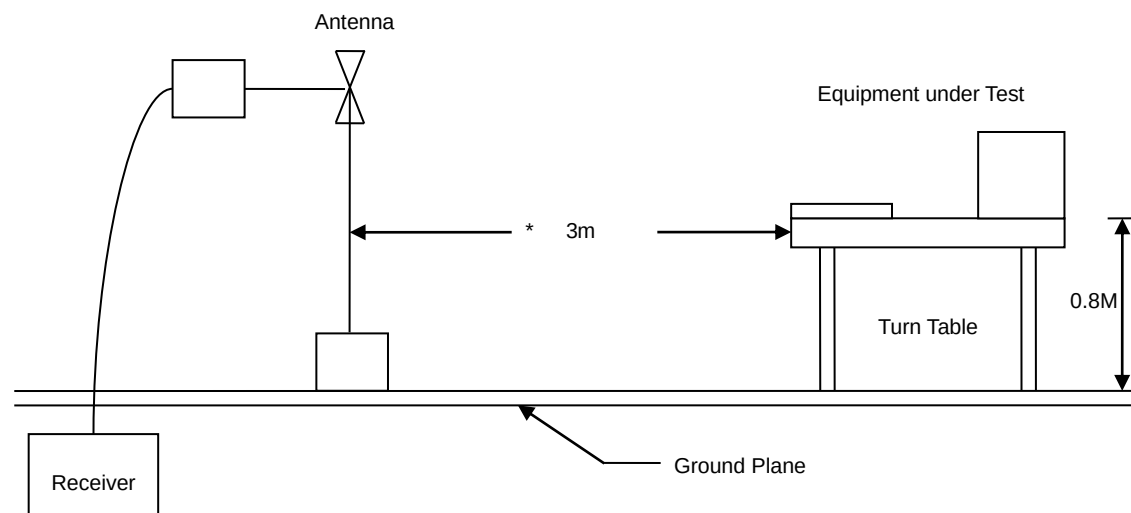


### 6.3. Typical Test Setup

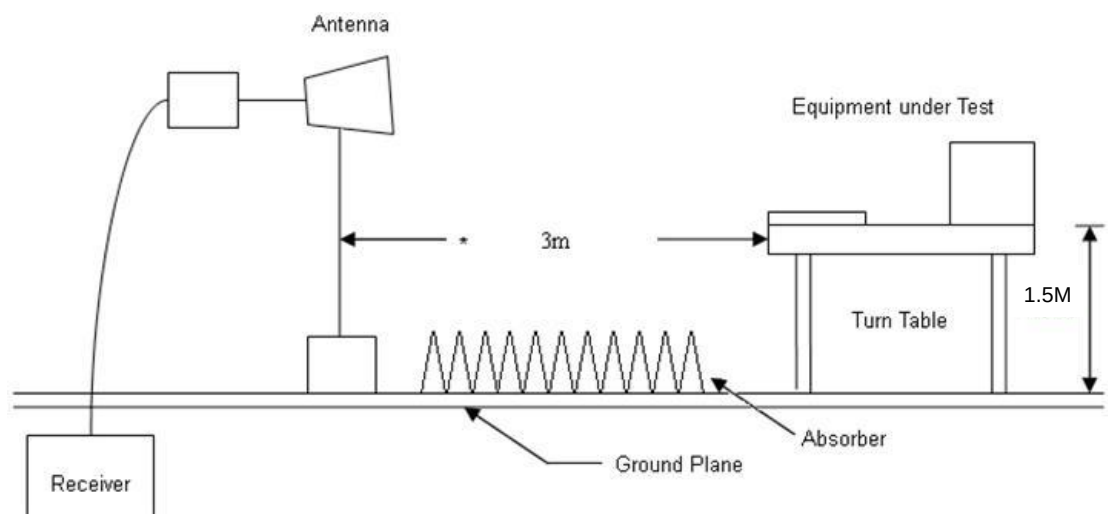
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



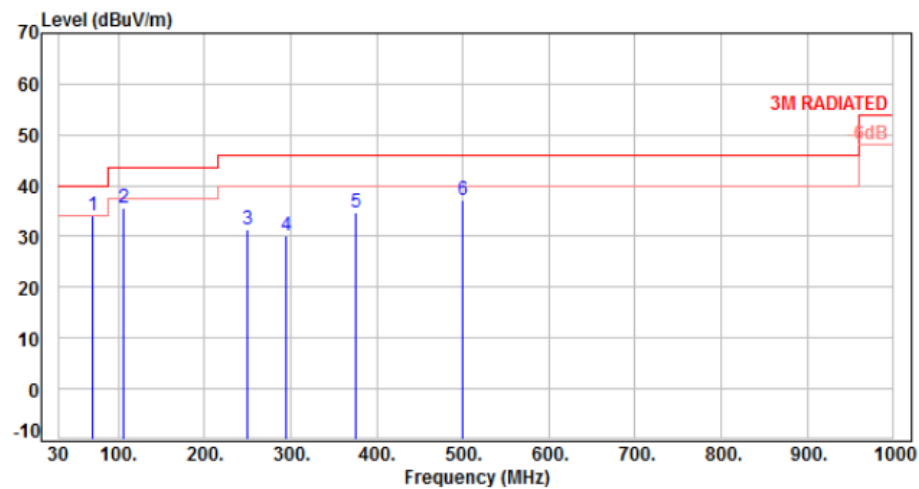


#### 6.4. Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

#### 6.5. Test Result and Data (30MHz ~ 1GHz)

|           |                  |             |            |
|-----------|------------------|-------------|------------|
| Power     | : AC 120V        | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 22 °C    |
| Test Date | : Dec. 17, 2018  | Humidity    | : 59 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 69.77           | -11.42      | 45.44          | 34.02          | 40.00          | -5.98       | Peak     | 400         | 0             | P   |
| 2   | 106.63          | -13.26      | 48.86          | 35.60          | 43.50          | -7.90       | Peak     | 400         | 0             | P   |
| 3   | 250.19          | -10.23      | 41.56          | 31.33          | 46.00          | -14.67      | Peak     | 400         | 0             | P   |
| 4   | 294.81          | -8.74       | 38.83          | 30.09          | 46.00          | -15.91      | Peak     | 400         | 0             | P   |
| 5   | 375.32          | -6.35       | 41.12          | 34.77          | 46.00          | -11.23      | Peak     | 400         | 0             | P   |
| 6   | 500.45          | -3.64       | 40.68          | 37.04          | 46.00          | -8.96       | Peak     | 400         | 0             | P   |

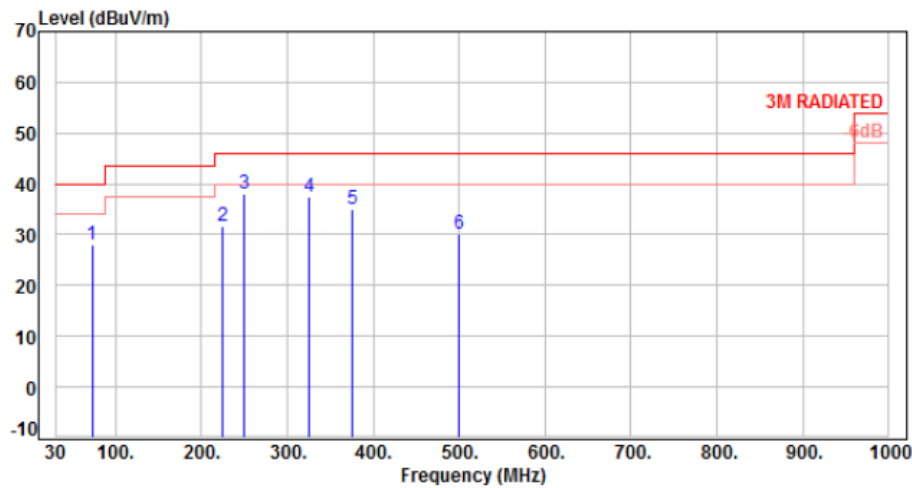
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                  |             |              |
|-----------|------------------|-------------|--------------|
| Power     | : AC 120V        | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 22 °C      |
| Test Date | : Dec. 17, 2018  | Humidity    | : 59 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 72.68           | -11.90      | 40.01          | 28.11          | 40.00          | -11.89      | Peak     | 100         | 0             | P   |
| 2   | 224.00          | -11.49      | 43.24          | 31.75          | 46.00          | -14.25      | Peak     | 100         | 0             | P   |
| 3   | 250.19          | -10.23      | 48.43          | 38.20          | 46.00          | -7.80       | Peak     | 100         | 0             | P   |
| 4   | 324.88          | -7.89       | 45.24          | 37.35          | 46.00          | -8.65       | Peak     | 100         | 0             | P   |
| 5   | 375.32          | -6.35       | 41.40          | 35.05          | 46.00          | -10.95      | Peak     | 100         | 0             | P   |
| 6   | 500.45          | -3.64       | 33.85          | 30.21          | 46.00          | -15.79      | Peak     | 100         | 0             | P   |

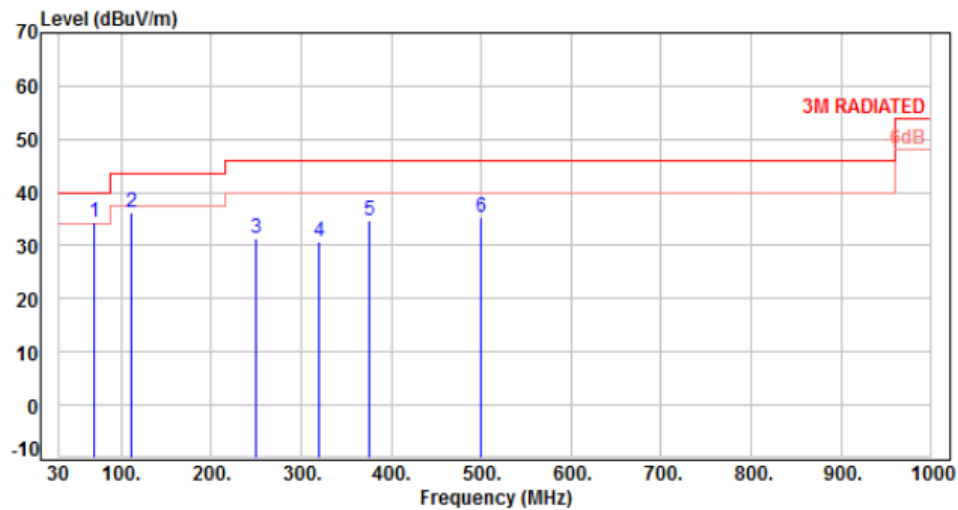
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                  |             |            |
|-----------|------------------|-------------|------------|
| Power     | : AC 120V        | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 22 °C    |
| Test Date | : Dec. 17, 2018  | Humidity    | : 59 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 70.74           | -11.62      | 46.04          | 34.42          | 40.00          | -5.58       | Peak     | 400         | 0             | P   |
| 2   | 110.51          | -12.74      | 49.08          | 36.34          | 43.50          | -7.16       | Peak     | 400         | 0             | P   |
| 3   | 250.19          | -10.23      | 41.66          | 31.43          | 46.00          | -14.57      | Peak     | 400         | 0             | P   |
| 4   | 320.03          | -8.12       | 38.96          | 30.84          | 46.00          | -15.16      | Peak     | 400         | 0             | P   |
| 5   | 375.32          | -6.35       | 41.03          | 34.68          | 46.00          | -11.32      | Peak     | 400         | 0             | P   |
| 6   | 500.45          | -3.64       | 39.08          | 35.44          | 46.00          | -10.56      | Peak     | 400         | 0             | P   |

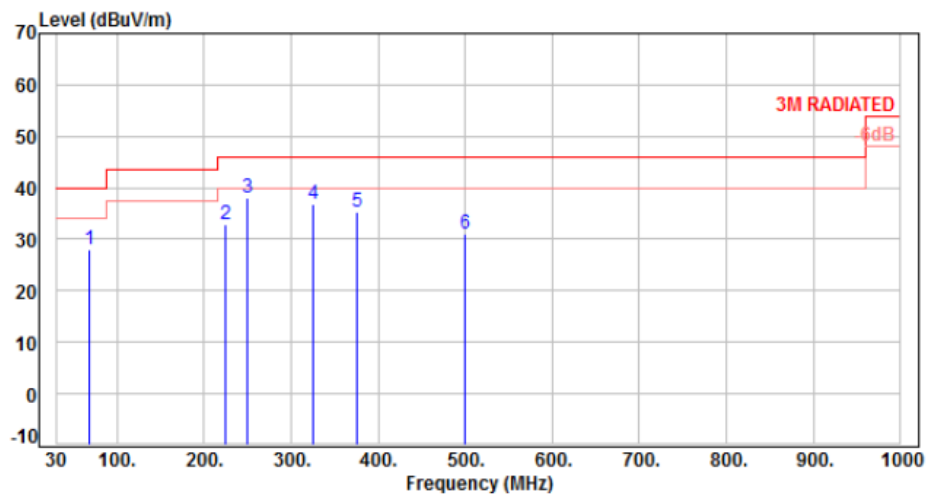
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                  |             |              |
|-----------|------------------|-------------|--------------|
| Power     | : AC 120V        | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 22 °C      |
| Test Date | : Dec. 17, 2018  | Humidity    | : 59 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 67.83           | -11.05      | 38.97          | 27.92          | 40.00          | -12.08      | Peak     | 100         | 0             | P   |
| 2   | 224.97          | -11.49      | 44.27          | 32.78          | 46.00          | -13.22      | Peak     | 100         | 0             | P   |
| 3   | 250.19          | -10.23      | 48.21          | 37.98          | 46.00          | -8.02       | Peak     | 100         | 0             | P   |
| 4   | 324.88          | -7.89       | 44.61          | 36.72          | 46.00          | -9.28       | Peak     | 100         | 0             | P   |
| 5   | 375.32          | -6.35       | 41.62          | 35.27          | 46.00          | -10.73      | Peak     | 100         | 0             | P   |
| 6   | 500.45          | -3.64       | 34.72          | 31.08          | 46.00          | -14.92      | Peak     | 100         | 0             | P   |

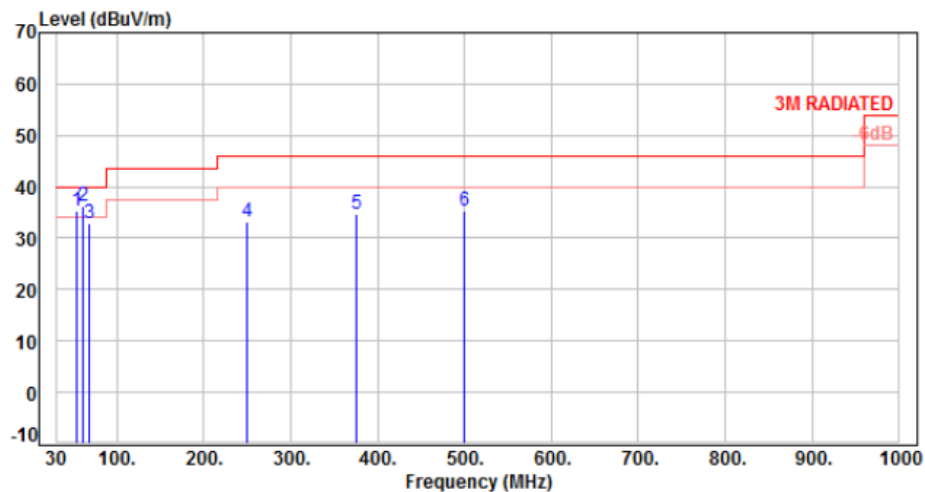
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |   |                |             |   |          |
|-----------|---|----------------|-------------|---|----------|
| Power     | : | From PoE       | Pol/Phase   | : | VERTICAL |
| Test Mode | : | Mode 4, Band 1 | Temperature | : | 22 °C    |
| Test Date | : | Dec. 17, 2018  | Humidity    | : | 59 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 53.28           | -9.57       | 44.93          | 35.36          | 40.00          | -4.64       | Peak     | 400         | 0             | P   |
| 2   | 61.04           | -10.17      | 46.50          | 36.33          | 40.00          | -3.67       | Peak     | 400         | 0             | P   |
| 3   | 68.80           | -11.23      | 44.27          | 33.04          | 40.00          | -6.96       | QP       | 102         | 317           | P   |
| 4   | 250.19          | -10.23      | 43.38          | 33.15          | 46.00          | -12.85      | Peak     | 400         | 0             | P   |
| 5   | 375.32          | -6.35       | 40.92          | 34.57          | 46.00          | -11.43      | Peak     | 400         | 0             | P   |
| 6   | 500.45          | -3.64       | 39.07          | 35.43          | 46.00          | -10.57      | Peak     | 400         | 0             | P   |

Note: Level=Reading+Factor

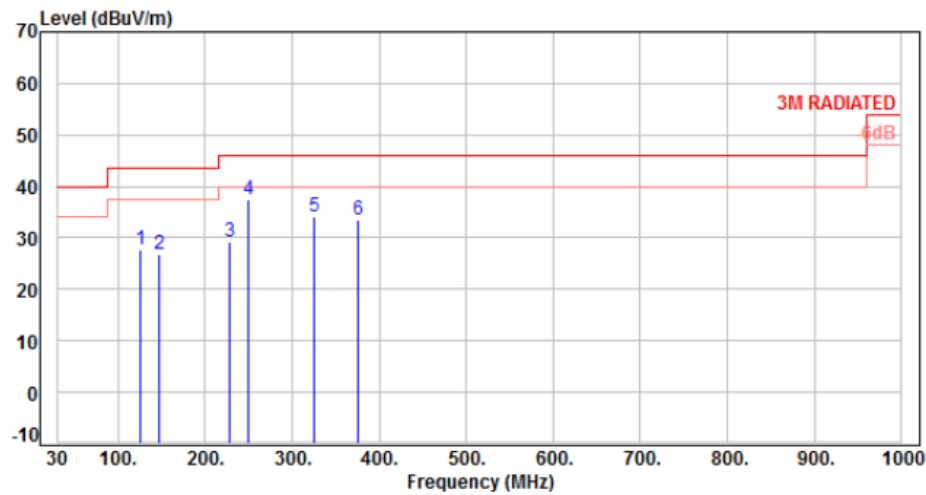
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor





|           |   |                |             |   |            |
|-----------|---|----------------|-------------|---|------------|
| Power     | : | From PoE       | Pol/Phase   | : | HORIZONTAL |
| Test Mode | : | Mode 4, Band 1 | Temperature | : | 22 °C      |
| Test Date | : | Dec. 17, 2018  | Humidity    | : | 59 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 125.06          | -11.24      | 38.98          | 27.74          | 43.50          | -15.76      | Peak     | 100         | 0             | P   |
| 2   | 147.37          | -9.58       | 36.31          | 26.73          | 43.50          | -16.77      | Peak     | 100         | 0             | P   |
| 3   | 227.88          | -11.49      | 40.58          | 29.09          | 46.00          | -16.91      | Peak     | 100         | 0             | P   |
| 4   | 250.19          | -10.23      | 47.74          | 37.51          | 46.00          | -8.49       | Peak     | 100         | 0             | P   |
| 5   | 324.88          | -7.89       | 42.00          | 34.11          | 46.00          | -11.89      | Peak     | 100         | 0             | P   |
| 6   | 375.32          | -6.35       | 39.82          | 33.47          | 46.00          | -12.53      | Peak     | 100         | 0             | P   |

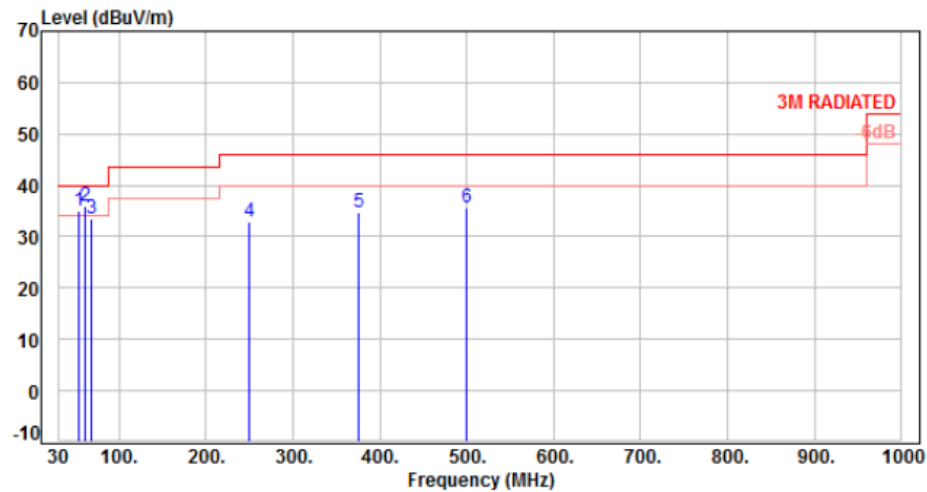
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                  |             |            |
|-----------|------------------|-------------|------------|
| Power     | : From PoE       | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 4, Band 4 | Temperature | : 22 °C    |
| Test Date | : Dec. 17, 2018  | Humidity    | : 59 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 53.28           | -9.57       | 44.71          | 35.14          | 40.00          | -4.86       | Peak     | 400         | 0             | P   |
| 2   | 61.04           | -10.17      | 46.07          | 35.90          | 40.00          | -4.10       | Peak     | 400         | 0             | P   |
| 3   | 68.80           | -11.23      | 44.70          | 33.47          | 40.00          | -6.53       | QP       | 100         | 324           | P   |
| 4   | 250.19          | -10.23      | 43.14          | 32.91          | 46.00          | -13.09      | Peak     | 400         | 0             | P   |
| 5   | 375.32          | -6.35       | 40.99          | 34.64          | 46.00          | -11.36      | Peak     | 400         | 0             | P   |
| 6   | 500.45          | -3.64       | 39.14          | 35.50          | 46.00          | -10.50      | Peak     | 400         | 0             | P   |

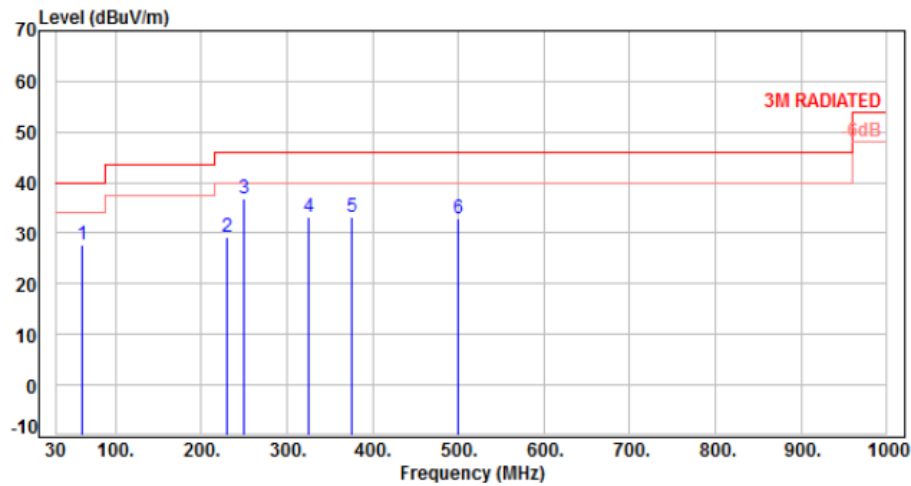
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |   |                |             |   |            |
|-----------|---|----------------|-------------|---|------------|
| Power     | : | From PoE       | Pol/Phase   | : | HORIZONTAL |
| Test Mode | : | Mode 4, Band 4 | Temperature | : | 22 °C      |
| Test Date | : | Dec. 17, 2018  | Humidity    | : | 59 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 61.04           | -10.17      | 37.94          | 27.77          | 40.00          | -12.23      | Peak     | 100         | 0             | P   |
| 2   | 229.82          | -11.49      | 40.85          | 29.36          | 46.00          | -16.64      | Peak     | 100         | 0             | P   |
| 3   | 250.19          | -10.23      | 47.07          | 36.84          | 46.00          | -9.16       | Peak     | 100         | 0             | P   |
| 4   | 324.88          | -7.89       | 41.19          | 33.30          | 46.00          | -12.70      | Peak     | 100         | 0             | P   |
| 5   | 375.32          | -6.35       | 39.60          | 33.25          | 46.00          | -12.75      | Peak     | 100         | 0             | P   |
| 6   | 500.45          | -3.64       | 36.49          | 32.85          | 46.00          | -13.15      | Peak     | 100         | 0             | P   |

Note: Level=Reading+Factor

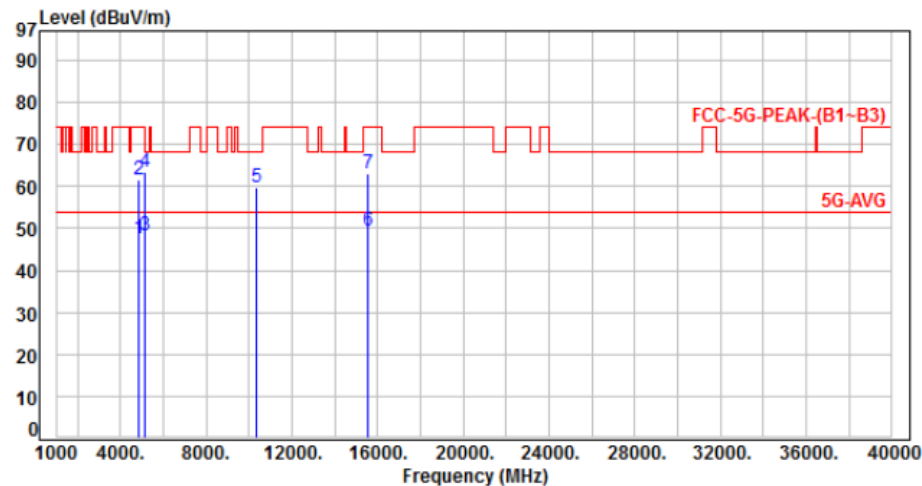
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



## 6.6. Test Result and Data (1GHz ~ 40GHz)

|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : AC 120V              | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH36, Band 1 | Temperature | : 23 °C    |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4860.00         | -8.36       | 56.09          | 47.73          | 54.00          | -6.27       | Average  | 400         | 15            | P   |
| 2   | 4860.00         | -8.36       | 69.79          | 61.43          | 74.00          | -12.57      | Peak     | 400         | 15            | P   |
| 3   | 5150.00         | -7.68       | 56.00          | 48.32          | 54.00          | -5.68       | Average  | 377         | 15            | P   |
| 4   | 5150.00         | -7.68       | 71.20          | 63.52          | 74.00          | -10.48      | Peak     | 377         | 15            | P   |
| 5   | 10360.00        | -0.12       | 59.80          | 59.68          | 68.20          | -8.52       | Peak     | 188         | 10            | P   |
| 6   | 15540.00        | 5.24        | 44.00          | 49.24          | 54.00          | -4.76       | Average  | 100         | 338           | P   |
| 7   | 15540.00        | 5.24        | 57.90          | 63.14          | 74.00          | -10.86      | Peak     | 100         | 338           | P   |

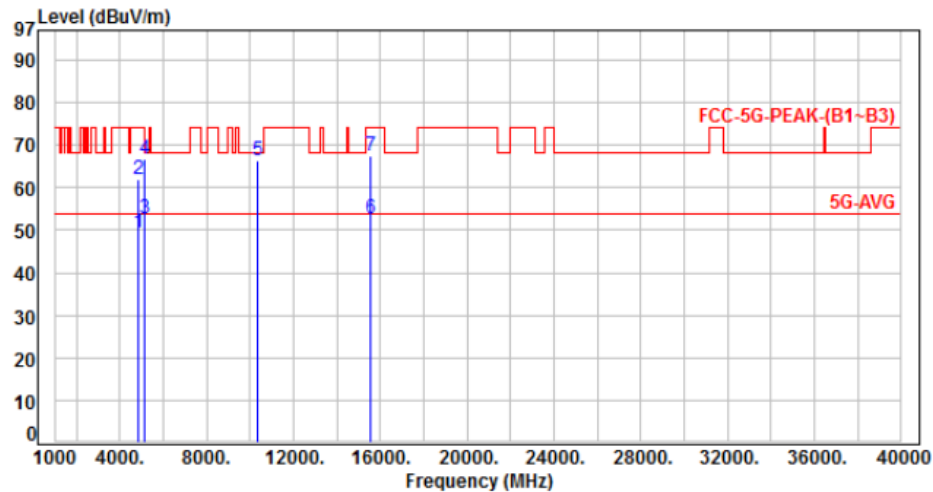
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : AC 120V              | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH36, Band 1 | Temperature | : 23 °C      |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4860.00         | -8.36       | 57.69          | 49.33          | 54.00          | -4.67       | Average  | 110         | 110           | P   |
| 2   | 4860.00         | -8.36       | 70.49          | 62.13          | 74.00          | -11.87      | Peak     | 110         | 110           | P   |
| 3   | 5150.00         | -7.68       | 60.40          | 52.72          | 54.00          | -1.28       | Average  | 244         | 75            | P   |
| 4   | 5150.00         | -7.68       | 74.30          | 66.62          | 74.00          | -7.38       | Peak     | 244         | 75            | P   |
| 5   | 10360.00        | -0.12       | 66.50          | 66.38          | 68.20          | -1.82       | Peak     | 180         | 350           | P   |
| 6   | 15540.00        | 5.24        | 47.40          | 52.64          | 54.00          | -1.36       | Average  | 286         | 40            | P   |
| 7   | 15540.00        | 5.24        | 62.20          | 67.44          | 74.00          | -6.56       | Peak     | 286         | 40            | P   |

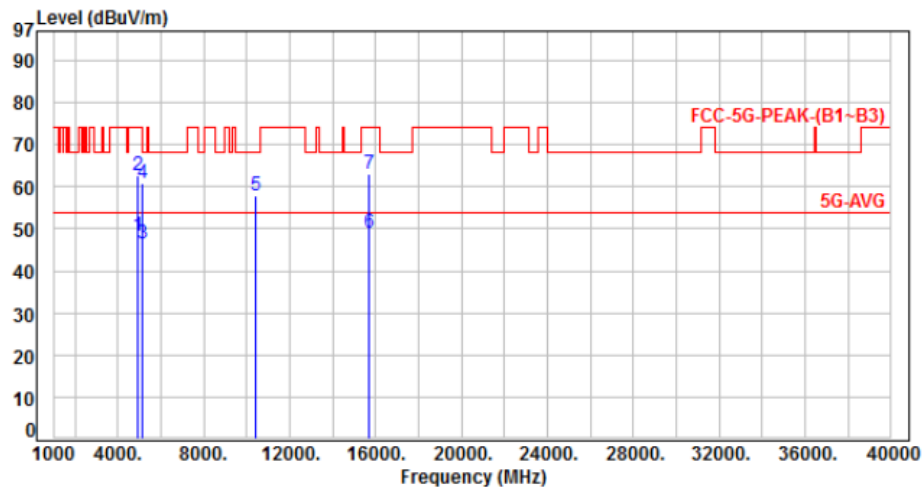
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : AC 120V              | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH44, Band 1 | Temperature | : 23 °C    |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4900.00         | -8.25       | 56.52          | 48.27          | 54.00          | -5.73       | Average  | 355         | 28            | P   |
| 2   | 4900.00         | -8.25       | 71.10          | 62.85          | 74.00          | -11.15      | Peak     | 355         | 28            | P   |
| 3   | 5150.00         | -7.68       | 54.30          | 46.62          | 54.00          | -7.38       | Average  | 381         | 140           | P   |
| 4   | 5150.00         | -7.68       | 68.50          | 60.82          | 74.00          | -13.18      | Peak     | 381         | 140           | P   |
| 5   | 10440.00        | -0.03       | 57.80          | 57.77          | 68.20          | -10.43      | Peak     | 100         | 100           | P   |
| 6   | 15660.00        | 5.32        | 43.90          | 49.22          | 54.00          | -4.78       | Average  | 100         | 340           | P   |
| 7   | 15660.00        | 5.32        | 57.80          | 63.12          | 74.00          | -10.88      | Peak     | 100         | 340           | P   |

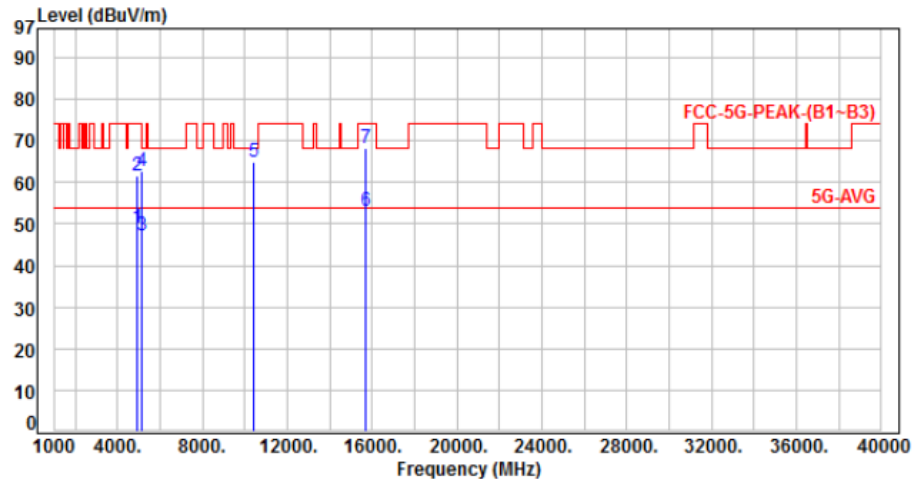
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : AC 120V              | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH44, Band 1 | Temperature | : 23 °C      |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4900.00         | -8.25       | 57.43          | 49.18          | 54.00          | -4.82       | Average  | 120         | 166           | P   |
| 2   | 4900.00         | -8.25       | 69.92          | 61.67          | 74.00          | -12.33      | Peak     | 120         | 166           | P   |
| 3   | 5150.00         | -7.68       | 54.80          | 47.12          | 54.00          | -6.88       | Average  | 220         | 70            | P   |
| 4   | 5150.00         | -7.68       | 70.20          | 62.52          | 74.00          | -11.48      | Peak     | 220         | 70            | P   |
| 5   | 10440.00        | -0.03       | 64.80          | 64.77          | 68.20          | -3.43       | Peak     | 188         | 346           | P   |
| 6   | 15660.00        | 5.32        | 47.65          | 52.97          | 54.00          | -1.03       | Average  | 289         | 44            | P   |
| 7   | 15660.00        | 5.32        | 62.90          | 68.22          | 74.00          | -5.78       | Peak     | 289         | 44            | P   |

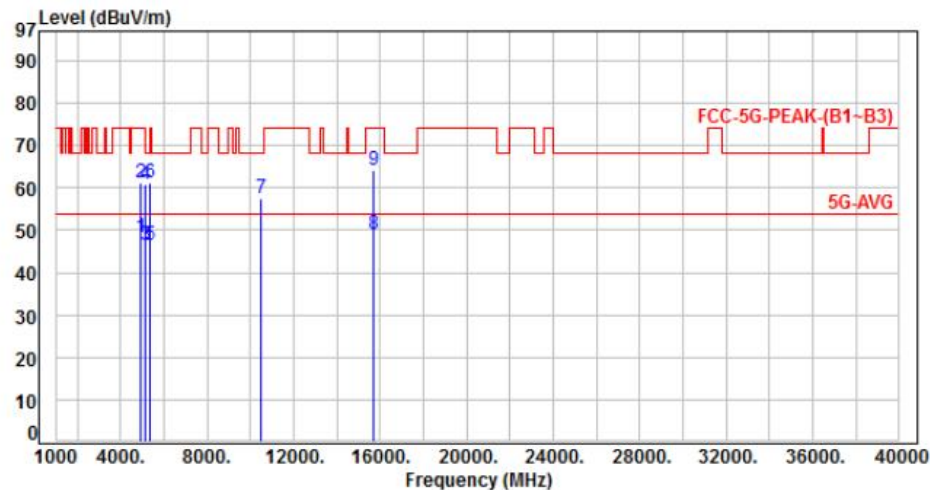
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : AC 120V              | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH48, Band 1 | Temperature | : 23 °C    |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4920.00         | -8.20       | 56.44          | 48.24          | 54.00          | -5.76       | Average  | 366         | 100           | P   |
| 2   | 4920.00         | -8.20       | 69.42          | 61.22          | 74.00          | -12.78      | Peak     | 366         | 100           | P   |
| 3   | 5150.00         | -7.68       | 54.20          | 46.52          | 54.00          | -7.48       | Average  | 384         | 140           | P   |
| 4   | 5150.00         | -7.68       | 68.70          | 61.02          | 74.00          | -12.98      | Peak     | 384         | 140           | P   |
| 5   | 5350.00         | -7.30       | 53.80          | 46.50          | 54.00          | -7.50       | Average  | 384         | 140           | P   |
| 6   | 5350.00         | -7.30       | 68.50          | 61.20          | 74.00          | -12.80      | Peak     | 384         | 140           | P   |
| 7   | 10480.00        | 0.01        | 57.60          | 57.61          | 68.20          | -10.59      | Peak     | 200         | 357           | P   |
| 8   | 15720.00        | 5.36        | 43.80          | 49.16          | 54.00          | -4.84       | Average  | 100         | 339           | P   |
| 9   | 15720.00        | 5.36        | 58.70          | 64.06          | 74.00          | -9.94       | Peak     | 100         | 339           | P   |

Note: Level=Reading+Factor

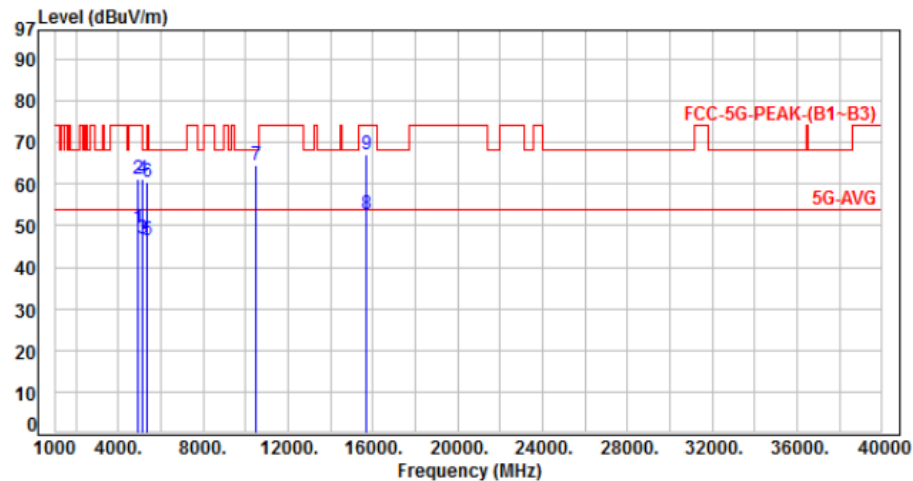
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor





|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : AC 120V              | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH48, Band 1 | Temperature | : 23 °C      |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4920.00         | -8.20       | 57.47          | 49.27          | 54.00          | -4.73       | Average  | 100         | 201           | P   |
| 2   | 4920.00         | -8.20       | 69.49          | 61.29          | 74.00          | -12.71      | Peak     | 100         | 201           | P   |
| 3   | 5150.00         | -7.68       | 54.50          | 46.82          | 54.00          | -7.18       | Average  | 266         | 249           | P   |
| 4   | 5150.00         | -7.68       | 68.90          | 61.22          | 74.00          | -12.78      | Peak     | 266         | 249           | P   |
| 5   | 5350.00         | -7.30       | 53.90          | 46.60          | 54.00          | -7.40       | Average  | 266         | 249           | P   |
| 6   | 5350.00         | -7.30       | 67.80          | 60.50          | 74.00          | -13.50      | Peak     | 266         | 249           | P   |
| 7   | 10480.00        | 0.01        | 64.70          | 64.71          | 68.20          | -3.49       | Peak     | 190         | 339           | P   |
| 8   | 15720.00        | 5.36        | 47.30          | 52.66          | 54.00          | -1.34       | Average  | 250         | 27            | P   |
| 9   | 15720.00        | 5.36        | 61.60          | 66.96          | 74.00          | -7.04       | Peak     | 250         | 27            | P   |

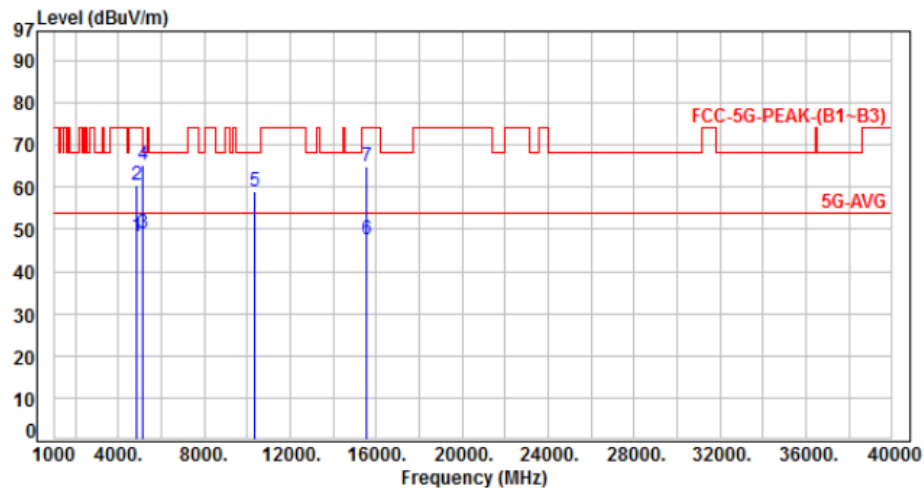
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : AC 120V              | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH36, Band 1 | Temperature | : 23 °C    |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4860.00         | -8.36       | 56.57          | 48.21          | 54.00          | -5.79       | Average  | 392         | 101           | P   |
| 2   | 4860.00         | -8.36       | 68.98          | 60.62          | 74.00          | -13.38      | Peak     | 392         | 101           | P   |
| 3   | 5150.00         | -7.68       | 56.80          | 49.12          | 54.00          | -4.88       | Average  | 100         | 133           | P   |
| 4   | 5150.00         | -7.68       | 72.80          | 65.12          | 74.00          | -8.88       | Peak     | 100         | 133           | P   |
| 5   | 10360.00        | -0.12       | 59.10          | 58.98          | 68.20          | -9.22       | Peak     | 106         | 160           | P   |
| 6   | 15540.00        | 5.24        | 42.20          | 47.44          | 54.00          | -6.56       | Average  | 100         | 338           | P   |
| 7   | 15540.00        | 5.24        | 59.50          | 64.74          | 74.00          | -9.26       | Peak     | 100         | 338           | P   |

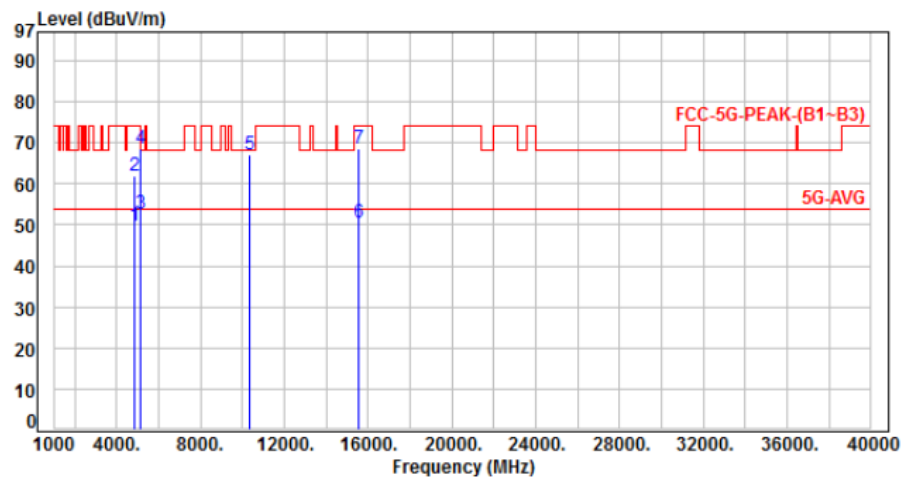
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : AC 120V              | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH36, Band 1 | Temperature | : 23 °C      |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %       |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4860.00         | -8.36       | 58.10          | 49.74          | 54.00          | -4.26       | Average  | 100         | 133           | P   |
| 2   | 4860.00         | -8.36       | 70.31          | 61.95          | 74.00          | -12.05      | Peak     | 100         | 133           | P   |
| 3   | 5150.00         | -7.68       | 60.60          | 52.92          | 54.00          | -1.08       | Average  | 240         | 60            | P   |
| 4   | 5150.00         | -7.68       | 76.40          | 68.72          | 74.00          | -5.28       | Peak     | 240         | 60            | P   |
| 5   | 10360.00        | -0.12       | 67.20          | 67.08          | 68.20          | -1.12       | Peak     | 166         | 345           | P   |
| 6   | 15540.00        | 5.24        | 45.30          | 50.54          | 54.00          | -3.46       | Average  | 330         | 44            | P   |
| 7   | 15540.00        | 5.24        | 63.50          | 68.74          | 74.00          | -5.26       | Peak     | 330         | 44            | P   |

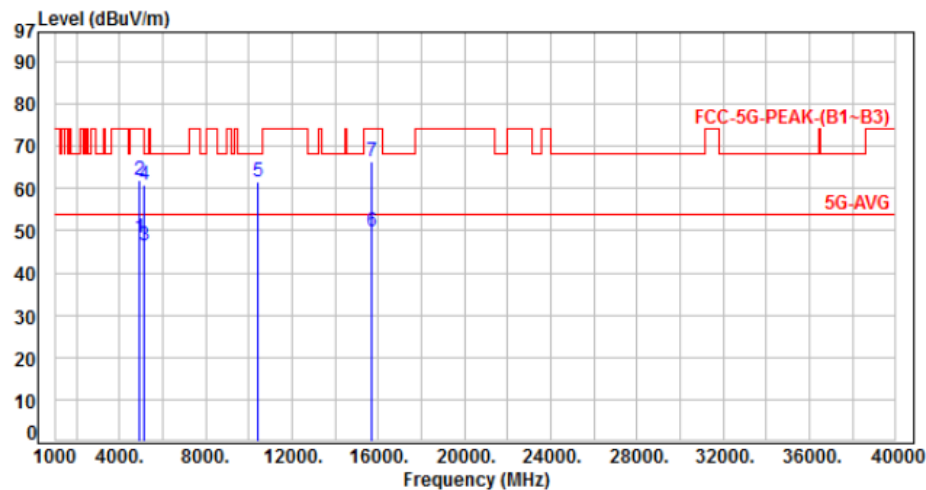
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : AC 120V              | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH44, Band 1 | Temperature | : 23 °C    |
| Test Date | : Sep. 28, 2018        | Humidity    | : 62 %     |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 4900.00         | -8.25       | 56.66          | 48.41          | 54.00          | -5.59       | Average  | 296         | 45            | P   |
| 2   | 4900.00         | -8.25       | 70.33          | 62.08          | 74.00          | -11.92      | Peak     | 296         | 45            | P   |
| 3   | 5150.00         | -7.68       | 54.20          | 46.52          | 54.00          | -7.48       | Average  | 155         | 137           | P   |
| 4   | 5150.00         | -7.68       | 68.40          | 60.72          | 74.00          | -13.28      | Peak     | 155         | 137           | P   |
| 5   | 10440.00        | -0.03       | 61.60          | 61.57          | 68.20          | -6.63       | Peak     | 300         | 350           | P   |
| 6   | 15660.00        | 5.32        | 44.50          | 49.82          | 54.00          | -4.18       | Average  | 100         | 339           | P   |
| 7   | 15660.00        | 5.32        | 60.90          | 66.22          | 74.00          | -7.78       | Peak     | 100         | 339           | P   |

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor