



# RADIO TEST REPORT

**FCC ID** : HEDMLTG360N  
**Equipment** : 60GHz backhaul transmitter  
**Brand Name** : Edge-core 、Kwikbit Networks  
**Model Name** : MLTG-360 、K60DNxy  
(Refer to section 1.1.9 for detail information)  
**Applicant** : Accton Technology Corp  
No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077,  
Taiwan R.O.C.  
**Manufacturer** : Accton Technology Corp  
No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077,  
Taiwan R.O.C.  
**Standard** : 47 CFR FCC Part 15.255

The product was received on Jun. 16, 2022, and testing was started from Jul. 02, 2022 and completed on Sep. 01, 2022. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 47 CFR FCC Part 15.255 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

**Sporton International Inc. Hsinchu Laboratory**

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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## History of this test report

| Report No.  | Version | Description                                               | Issued Date  |
|-------------|---------|-----------------------------------------------------------|--------------|
| FR0D1524-04 | 01      | Initial issue of report                                   | May 11, 2023 |
| FR0D1524-04 | 02      | Revising Brand name to "Kwikbit Networks" from "Kwikbit". | May 24, 2023 |
|             |         |                                                           |              |
|             |         |                                                           |              |
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|             |         |                                                           |              |
|             |         |                                                           |              |



## Summary of Test Result

| Report Clause                                     | Ref Std. Clause | Test Items                                   | Result (PASS/FAIL) | Remark |
|---------------------------------------------------|-----------------|----------------------------------------------|--------------------|--------|
| 3.1                                               | 15.207          | AC Power Conducted Emissions                 | PASS               | -      |
| 3.2                                               | 15.255(e)       | Occupied Bandwidth                           | PASS               | -      |
| 3.3                                               | 15.255(c)       | EIRP Power                                   | PASS               | -      |
| 3.4                                               | 15.255(c)       | Peak Conducted Power                         | PASS               | -      |
| 3.5                                               | 15.255(d)       | Transmitter Spurious Emissions               | PASS               | -      |
| 3.6                                               | 15.255(f)       | Frequency Stability                          | PASS               | -      |
| 3.7                                               | 15.255(a),(h)   | Operation Restriction and Group Installation | PASS               | -      |
| Note: Reference to Sporton Project No.: 0D1524-02 |                 |                                              |                    |        |

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Sam Chen**

**Report Producer: Cathy Chiu**



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| RF General Information |                                 |            |
|------------------------|---------------------------------|------------|
| Frequency Range (GHz)  | Operating Frequency Range (GHz) | Modulation |
| 57-71 GHz              | 58.32, 60.48, 62.64, 64.80 GHz  | OFDM       |

Note: The EUT contains a certified module (Brand Name: WROOM, Model No.:ESP32-WROOM-32U, FCC: 2AC7Z-ESP32WROOM32U), and the EUT only use its WIFI 2.4GHz function at this time.

### 1.1.2 Antenna Information

| Ant. | Brand  | Model Name      | Antenna Type | Connector | Gain (dBi) |
|------|--------|-----------------|--------------|-----------|------------|
| 1    | Murata | LBKA0ZZ1SV-TEMP | Array        | N/A       | 28         |

Note: The above information was declared by manufacturer.

### 1.1.3 Power Levels

| Worst Power Levels for Channel 1 |                                                                             |                |                  |
|----------------------------------|-----------------------------------------------------------------------------|----------------|------------------|
| Applicable power levels          | <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP |                |                  |
| Frequency (GHz)                  | Highest ( $P_{high}$ ):                                                     |                |                  |
|                                  | Mode                                                                        | AV Power (dBm) | Peak Power (dBm) |
| 58.32                            | OFDM                                                                        | 35.89          | 36.48            |

| Worst Power Levels for Channel 3 |                                                                             |                |                  |
|----------------------------------|-----------------------------------------------------------------------------|----------------|------------------|
| Applicable power levels          | <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP |                |                  |
| Frequency (GHz)                  | Highest ( $P_{high}$ ): (dBm)                                               |                |                  |
|                                  | Mode                                                                        | AV Power (dBm) | Peak Power (dBm) |
| 62.64                            | OFDM                                                                        | 35.66          | 36.38            |

| Worst Power Levels for Channel 4 |                                                                             |                |                  |
|----------------------------------|-----------------------------------------------------------------------------|----------------|------------------|
| Applicable power levels          | <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP |                |                  |
| Frequency (GHz)                  | Highest ( $P_{high}$ ): (dBm)                                               |                |                  |
|                                  | Mode                                                                        | AV Power (dBm) | Peak Power (dBm) |
| 64.80                            | OFDM                                                                        | 29.20          | 29.73            |

**1.1.4 Operating Conditions**

| Operating Conditions                                 |                                                                                                            |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> -20 °C to +50 °C |                                                                                                            |
| <input type="checkbox"/> 0 °C to +40 °C              |                                                                                                            |
| <input type="checkbox"/> Other:                      |                                                                                                            |
| EUT Power Type                                       | From PoE or DC power (48V)                                                                                 |
| Test Software Version                                | TeraTerm 4.75                                                                                              |
| Supply Voltage                                       | <input type="checkbox"/> AC                      State AC voltage   -                      V               |
| Supply Voltage                                       | <input checked="" type="checkbox"/> DC                        State DC voltage   48                      V |

**1.1.5 Equipment Use Condition**

| Equipment Use Condition                                                       |
|-------------------------------------------------------------------------------|
| <input type="checkbox"/> Fixed field disturbance sensors at 61-61.5GHz        |
| <input type="checkbox"/> Except fixed field disturbance sensors at 61-61.5GHz |
| <input checked="" type="checkbox"/> Except fixed field disturbance sensors    |

**1.1.6 User Condition**

| Intended Operation                                                                |
|-----------------------------------------------------------------------------------|
| <input type="checkbox"/> Indoor                                                   |
| <input checked="" type="checkbox"/> Outdoor (except outdoor fixed Point to Point) |
| <input type="checkbox"/> Outdoor fixed Point to Point                             |

Note: The above information was declared by manufacturer.

**1.1.7 Duty Cycle**

| Duty Cycle | Duty Cycle Factor (dB) |
|------------|------------------------|
| 51 %       | 2.92                   |

**1.1.8 Table For Radio List**

| Radio 1 | Radio 2 | Radio 3 | Radio 4 |
|---------|---------|---------|---------|
| V       | V       | V       | V       |

Note: According to above, Radio 2 has been evaluated to be the worst case among Radio 1~Radio 4, thus it was selected to test and record in the report as a result.



### 1.1.9 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

| Brand Name       | Model Name                                                                                    | Description                                                                                   |
|------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Edge-core        | MLTG-360                                                                                      | There is nothing different for brand names and model names, just for marketing purposes only. |
| Kwikbit Networks | K60DNxy<br>(where "x" is [1..4] , "y" is [P R] if x = 2,<br>otherwise y = blank, not a space) |                                                                                               |

Note 1: From the above models, model: MLTG-360 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.



## 1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.255
- ♦ ANSI C63.10-2013 Section 9. "Procedures for testing millimeter-wave systems"

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 414788 D01 v01r01

## 1.3 Testing Location

| Testing Location Information                                    |                                                                                    |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------|
| Test Lab. : Sporton International Inc. Hsinchu Laboratory       |                                                                                    |
| Hsinchu                                                         | ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) |
| (TAF: 3787)                                                     | TEL: 886-3-656-9065 FAX: 886-3-656-9085                                            |
| Test site Designation No. TW3787 with FCC.                      |                                                                                    |
| Conformity Assessment Body Identifier (CABID) TW3787 with ISED. |                                                                                    |

| Test Condition                                                                                                                 | Test Site No. | Test Engineer | Test Environment (°C / %) | Test Date                       |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------------------|---------------------------------|
| Radiated<br>(For Frequency Stability)                                                                                          | TH03-CB       | Eddie Weng    | 26.1~26.5 / 66~71         | Jul. 06, 2022                   |
| Radiated below 1GHz                                                                                                            | 10CH01-CB     | Bob Chang     | 22~23 / 63~64             | Aug. 25, 2022                   |
| Radiated 1GHz~40GHz<br>(For Occupied Bandwidth, EIRP<br>Power, Peak Conducted Power,<br>Transmitter Spurious<br>Emissions-CTX) | 03CH03-CB     | KJ Chang      | 24.1~25.7 / 64~66         | Jul. 02, 2022~<br>Aug. 26, 2022 |
|                                                                                                                                | 03CH04-CB     | KJ Chang      | 25.5~26.3 / 67~68         | Jul. 02, 2022~<br>Aug. 26, 2022 |
| AC Conduction                                                                                                                  | CO01-CB       | Dean Chang    | 22~23 / 52~53             | Sep. 01, 2022                   |



## 2 Test Configuration of Equipment under Test

### 2.1 Parameters of Test Software Setting

| Channel Plan (GHz) |       | Software Setting |
|--------------------|-------|------------------|
| Channel 1          | 58.32 | 29               |
| Channel 3          | 62.64 | 29               |
| Channel 4          | 64.80 | 29               |

### 2.2 Conformance Tests and Related Test Frequencies

| Test Item                                                | Test Frequencies (GHz) |
|----------------------------------------------------------|------------------------|
| AC Power Conducted Emissions Test Voltage: 120Vac / 60Hz | Random Frequency       |
| Occupied Bandwidth                                       | 58.32, 62.64, 64.80    |
| EIRP Power                                               | 58.32, 62.64, 64.80    |
| Peak Conducted Power                                     | 58.32, 62.64, 64.80    |
| Transmitter Spurious Emissions (below 1 GHz)             | Random Frequency       |
| Transmitter Spurious Emissions (1 GHz-40 GHz)            | 58.32, 62.64, 64.80    |
| Transmitter Spurious Emissions (above 40 GHz)            | 58.32, 62.64, 64.80    |
| Frequency Stability                                      | 62.64                  |



| <b>The Worst Case Mode for Following Conformance Tests</b> |                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tests Item</b>                                          | AC power-line conducted emissions                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Condition</b>                                           | AC power-line conducted measurement for line and neutral<br>Test Voltage: 120Vac / 60Hz                                                                                                                                                                                                                                                                                                           |
| <b>Operating Mode</b>                                      | Normal Link                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                            | The EUT was performed with PoE in and DC power in, "DC power in" has been evaluated to be the worst case. So the measurement will follow this same test configuration.                                                                                                                                                                                                                            |
| 1                                                          | EUT with DC power in                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Tests Item</b>                                          | Occupied Bandwidth<br>EIRP Power<br>Peak Conducted Power<br>Frequency Stability                                                                                                                                                                                                                                                                                                                   |
|                                                            | The EUT was performed at X axis, Y axis and Z axis position for Transmitter Spurious Emissions Intentional above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.                                                                                                                                                                  |
| <b>Test Condition</b>                                      | Radiated measurement                                                                                                                                                                                                                                                                                                                                                                              |
| 1                                                          | EUT in Y axis                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Tests Item</b>                                          | Transmitter Spurious Emissions                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Operating Mode<br/>&lt;1GHz</b>                         | CTX                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                            | 1. The EUT was performed at X axis, Y axis and Z axis, and the worst case was found at Y axis for Transmitter Spurious Emissions Intentional above 1GHz test. So the measurement will follow this same test configuration.<br>2. The EUT was performed with PoE in and DC power in, "PoE in" has been evaluated to be the worst case. So the measurement will follow this same test configuration |
| 1                                                          | EUT in Y axis with PoE in                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Operating Mode<br/>&gt;1GHz</b>                         | CTX                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                            | The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration                                                                                                                                                                                                                                  |
| 1                                                          | EUT in Y axis_58.32 GHz                                                                                                                                                                                                                                                                                                                                                                           |
| 2                                                          | EUT in Y axis_62.64 GHz                                                                                                                                                                                                                                                                                                                                                                           |
| 3                                                          | EUT in Y axis_64.80 GHz                                                                                                                                                                                                                                                                                                                                                                           |

| <b>The Worst Case Mode for Following Conformance Tests</b>                            |                                                                         |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Tests Item</b>                                                                     | Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation |
| <b>Operating Mode</b>                                                                 |                                                                         |
| 1                                                                                     | 60 GHz + WLAN 2.4GHz                                                    |
| Refer to Sporton Test Report No.: FA0D1524-04 for Co-location RF Exposure Evaluation. |                                                                         |



## 2.3 EUT Operation during Test

For CTX:

During the test, executed the test program to control the EUT continuously transmit RF signal.

For Normal Link Mode:

During the test, the EUT operation to normal function.

## 2.4 Accessories

| Others                |
|-----------------------|
| Splash-proof cover *1 |
| Wall-mounted rack *1  |
| Metal band*1          |

## 2.5 Support Equipment

For AC Conduction

| Support Equipment |                     |            |             |        |
|-------------------|---------------------|------------|-------------|--------|
| No.               | Equipment           | Brand Name | Model Name  | FCC ID |
| A                 | LAN1 NB             | DELL       | E6430       | N/A    |
| B                 | LAN2 NB             | DELL       | E6430       | N/A    |
| C                 | POE Load            | IgniteNet  | SP-AC750    | N/A    |
| D                 | MGMT NB             | DELL       | E6430       | N/A    |
| E                 | 2.4G NB             | DELL       | E6430       | N/A    |
| F                 | 60G Radio Client    | Edgecore   | MLTG-CN     | N/A    |
| G                 | LAN3 NB             | DELL       | E6430       | N/A    |
| H                 | LAN4 NB             | DELL       | E6430       | N/A    |
| I                 | 10G SFP+ PC         | DELL       | T3400       | N/A    |
| J                 | 60G Radio Client NB | DELL       | E6430       | N/A    |
| K                 | POE Load            | IgniteNet  | SP-AC750    | N/A    |
| L                 | POE Load            | IgniteNet  | SP-AC750    | N/A    |
| M                 | POE Load            | IgniteNet  | SP-AC750    | N/A    |
| N                 | Fiber Converter     | Eopto      | EOLT-V96-02 | N/A    |
| O                 | Adapter             | DELTA      | ADP-280BR B | N/A    |

**For Radiated (below 1GHz):**

| Support Equipment |           |            |                    |        |
|-------------------|-----------|------------|--------------------|--------|
| No.               | Equipment | Brand Name | Model Name         | FCC ID |
| A                 | PoE       | Carrier    | GME40B-480135FDA-2 | N/A    |
| B                 | Notebook  | DELL       | E4300              | N/A    |

**For Radiated (above 1GHz), Occupied Bandwidth, EIRP Power, Peak Conducted Power test:**

| Support Equipment |           |            |                    |        |
|-------------------|-----------|------------|--------------------|--------|
| No.               | Equipment | Brand Name | Model Name         | FCC ID |
| A                 | PoE       | Carrier    | GME40B-480135FDA-2 | N/A    |
| B                 | Notebook  | DELL       | E4300              | N/A    |

**For Frequency Stability test:**

| Support Equipment |           |            |                    |        |
|-------------------|-----------|------------|--------------------|--------|
| No.               | Equipment | Brand Name | Model Name         | FCC ID |
| A                 | PoE       | Carrier    | GME40B-480135FDA-2 | N/A    |
| B                 | Notebook  | DELL       | E4300              | N/A    |

## 2.6 Far Field Boundary Calculations

The far-field boundary is given as:

$$\text{far field} = (2 * L^2) / \lambda$$

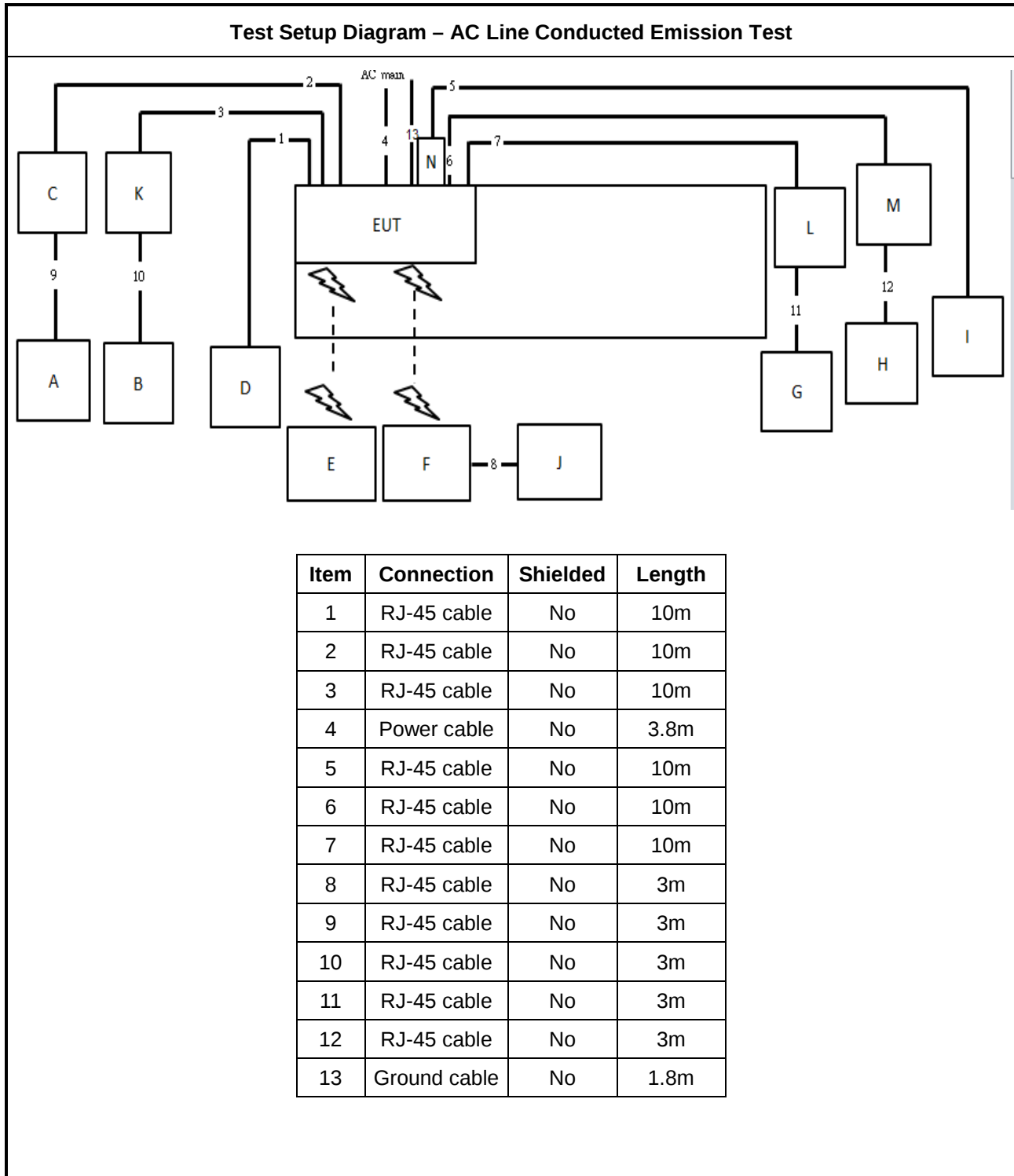
where:

L = Largest Antenna Dimension, including the reflector, in meters

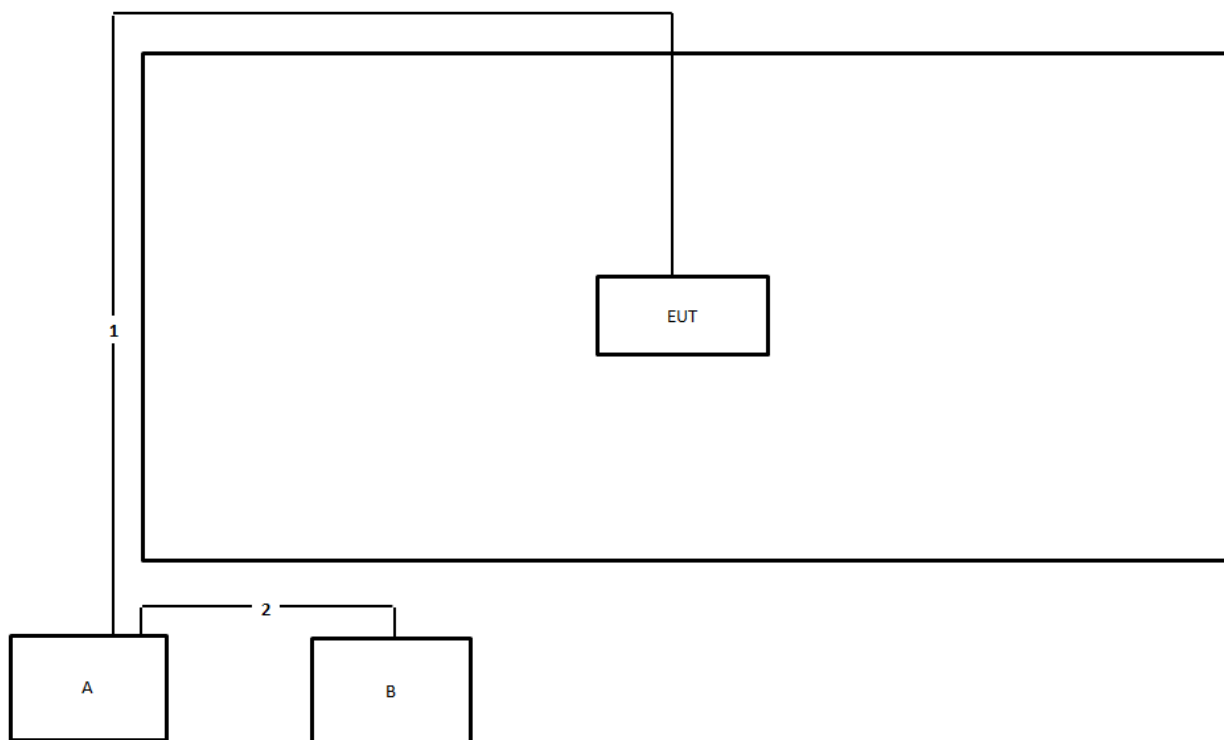
$\lambda$  = wavelength in meters

| Far Field (m)   |       |            |                  |                   |
|-----------------|-------|------------|------------------|-------------------|
| Frequency (GHz) | L (m) | Lambda (m) | d(Far Field) (m) | d(Far Field) (cm) |
| 58.32           | 0.13  | 0.0051440  | 6.571            | 657.07            |
| 62.64           | 0.13  | 0.0047893  | 7.057            | 705.74            |
| 64.80           | 0.13  | 0.0046296  | 7.301            | 730.08            |

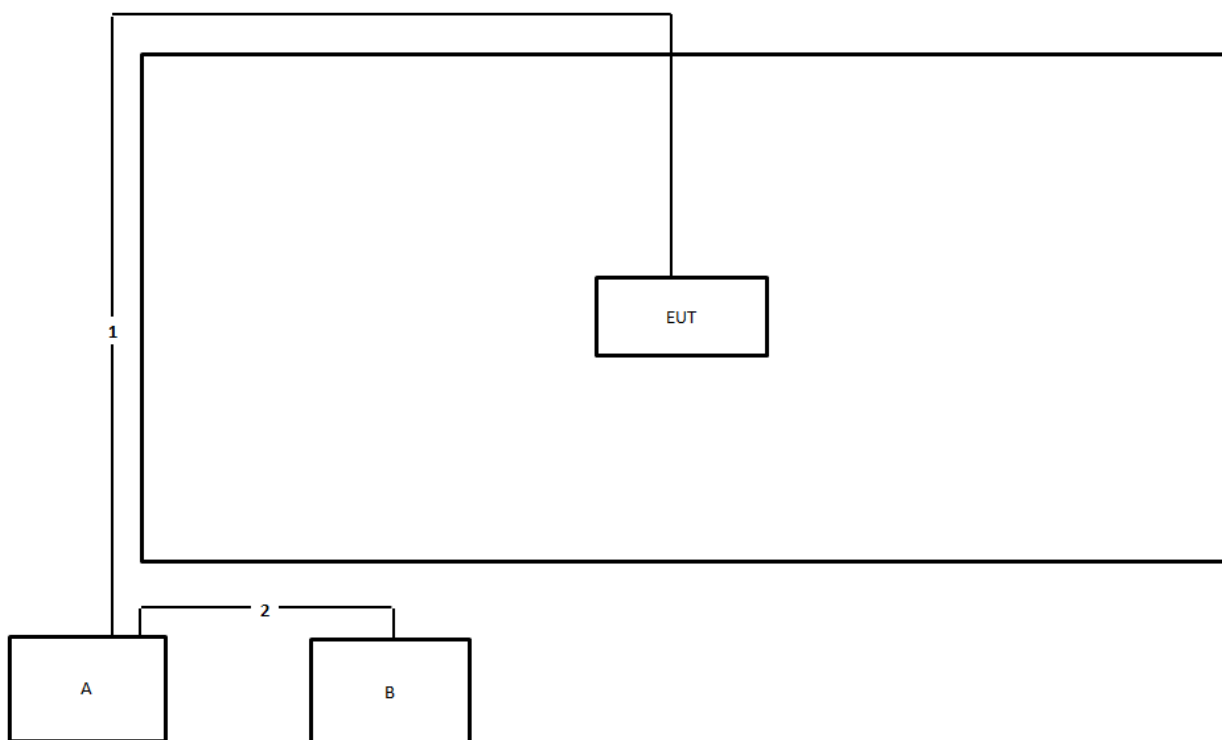
## 2.7 Test Setup Diagram



**Test Setup Diagram - Transmitter Spurious Emissions below 1 GHz**



| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | RJ-45 cable | No       | 10m    |
| 2    | RJ-45 cable | No       | 1.5m   |

**Test Setup Diagram - Transmitter Spurious Emissions above 1 GHz**


| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | RJ-45 cable | No       | 10m    |
| 2    | RJ-45 cable | No       | 1.5m   |

### 3 Transmitter Test Result

#### 3.1 AC Power Conducted Emissions

##### 3.1.1 Limit of AC Power Conducted Emissions

| AC Power Conducted Emissions Limit                     |            |           |
|--------------------------------------------------------|------------|-----------|
| Frequency Emission (MHz)                               | Quasi-Peak | Average   |
| 0.15-0.5                                               | 66 - 56 *  | 56 - 46 * |
| 0.5-5                                                  | 56         | 46        |
| 5-30                                                   | 60         | 50        |
| Note: * Decreases with the logarithm of the frequency. |            |           |

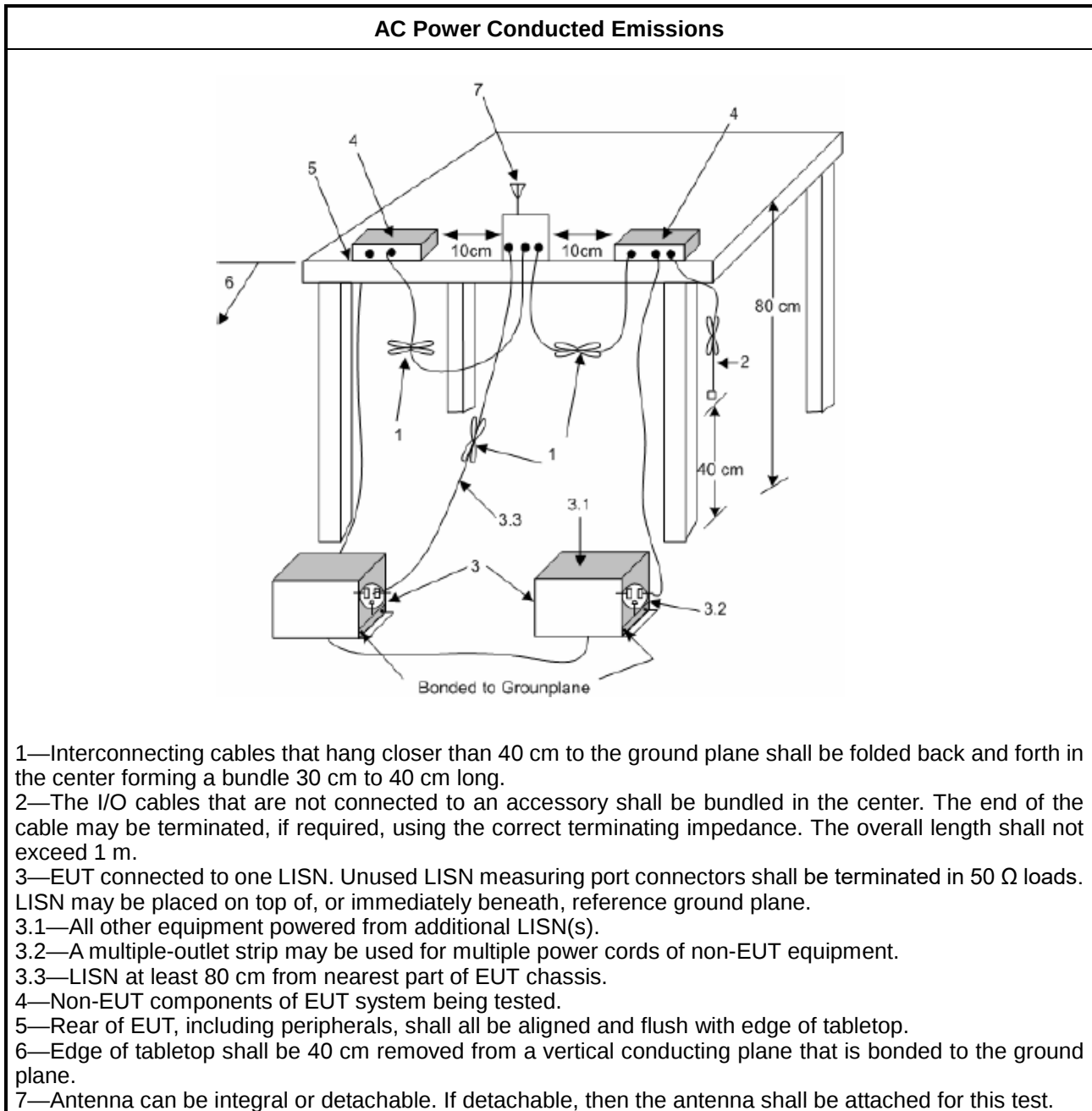
##### 3.1.2 Measuring Instruments

Refer a measuring instruments list in this test report.

##### 3.1.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 6.2.

### 3.1.4 Test Setup



### 3.1.5 Measurement Results Calculation

The measured Level is calculated using:

- Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- Margin = -Limit + Level

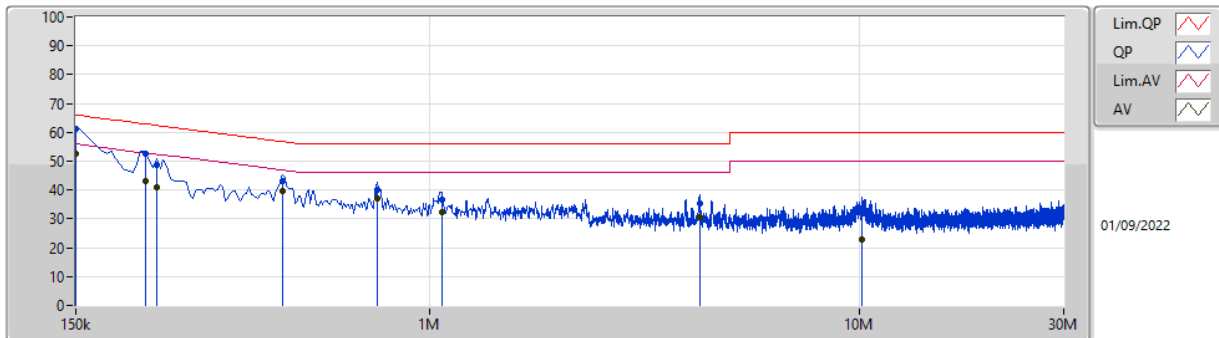


### 3.1.6 Test Result of AC Power Conducted Emissions

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | see ANSI C63.10, clause 5.11  |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | see ANSI C63.10, clause 6.2.3 |
| <p>NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.</p> <p>NOTE 2: "&gt;20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.</p> |                               |



|       |      |               |             |
|-------|------|---------------|-------------|
| Phase | Line | Configuration | Normal Link |
|-------|------|---------------|-------------|

**Mode 1**

| Type | Freq<br>(Hz) | Level<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Factor<br>(dB) | Condition | Comment | Raw<br>(dBuV) | LISN<br>(dB) | CL<br>(dB) | AT<br>(dB) |  |  |  |
|------|--------------|-----------------|-----------------|----------------|----------------|-----------|---------|---------------|--------------|------------|------------|--|--|--|
| QP   | 150k         | 61.00           | 66.00           | -5.00          | 9.99           | Line      | -       | 51.01         | 0.06         | 0.04       | 9.89       |  |  |  |
| AV   | 150k         | 52.80           | 56.00           | -3.20          | 9.99           | Line      | "Worst" | 42.81         | 0.06         | 0.04       | 9.89       |  |  |  |
| QP   | 217.5k       | 52.59           | 62.92           | -10.33         | 9.99           | Line      | -       | 42.60         | 0.06         | 0.04       | 9.89       |  |  |  |
| AV   | 217.5k       | 43.22           | 52.92           | -9.70          | 9.99           | Line      | -       | 33.23         | 0.06         | 0.04       | 9.89       |  |  |  |
| QP   | 231k         | 48.84           | 62.41           | -13.57         | 9.99           | Line      | -       | 38.85         | 0.06         | 0.04       | 9.89       |  |  |  |
| AV   | 231k         | 40.82           | 52.41           | -11.59         | 9.99           | Line      | -       | 30.83         | 0.06         | 0.04       | 9.89       |  |  |  |
| QP   | 456k         | 42.92           | 56.76           | -13.84         | 10.01          | Line      | -       | 32.91         | 0.06         | 0.06       | 9.89       |  |  |  |
| AV   | 456k         | 39.55           | 46.76           | -7.21          | 10.01          | Line      | -       | 29.54         | 0.06         | 0.06       | 9.89       |  |  |  |
| QP   | 757.5k       | 40.28           | 56.00           | -15.72         | 10.01          | Line      | -       | 30.27         | 0.07         | 0.05       | 9.89       |  |  |  |
| AV   | 757.5k       | 36.93           | 46.00           | -9.07          | 10.01          | Line      | -       | 26.92         | 0.07         | 0.05       | 9.89       |  |  |  |
| QP   | 1.068M       | 36.45           | 56.00           | -19.55         | 10.00          | Line      | -       | 26.45         | 0.07         | 0.04       | 9.89       |  |  |  |
| AV   | 1.068M       | 32.49           | 46.00           | -13.51         | 10.00          | Line      | -       | 22.49         | 0.07         | 0.04       | 9.89       |  |  |  |
| QP   | 4.254M       | 35.51           | 56.00           | -20.49         | 10.12          | Line      | -       | 25.39         | 0.13         | 0.10       | 9.89       |  |  |  |
| AV   | 4.254M       | 30.44           | 46.00           | -15.56         | 10.12          | Line      | -       | 20.32         | 0.13         | 0.10       | 9.89       |  |  |  |
| QP   | 10.172M      | 31.87           | 60.00           | -28.13         | 10.29          | Line      | -       | 21.58         | 0.22         | 0.16       | 9.91       |  |  |  |
| AV   | 10.172M      | 23.03           | 50.00           | -26.97         | 10.29          | Line      | -       | 12.74         | 0.22         | 0.16       | 9.91       |  |  |  |



01/09/2022

| Type | Freq<br>(Hz) | Level<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Factor<br>(dB) | Condition | Comment | Raw<br>(dBuV) | LISN<br>(dB) | CL<br>(dB) | AT<br>(dB) |  |  |  |
|------|--------------|-----------------|-----------------|----------------|----------------|-----------|---------|---------------|--------------|------------|------------|--|--|--|
| QP   | 154.5k       | 60.58           | 65.75           | -5.17          | 10.00          | Neutral   | -       | 50.58         | 0.07         | 0.04       | 9.89       |  |  |  |
| AV   | 154.5k       | 52.48           | 55.75           | -3.27          | 10.00          | Neutral   | "Worst" | 42.48         | 0.07         | 0.04       | 9.89       |  |  |  |
| QP   | 217.5k       | 54.86           | 62.92           | -8.06          | 10.00          | Neutral   | -       | 44.86         | 0.07         | 0.04       | 9.89       |  |  |  |
| AV   | 217.5k       | 46.56           | 52.92           | -6.36          | 10.00          | Neutral   | -       | 36.56         | 0.07         | 0.04       | 9.89       |  |  |  |
| QP   | 303k         | 50.38           | 60.17           | -9.79          | 10.01          | Neutral   | -       | 40.37         | 0.07         | 0.05       | 9.89       |  |  |  |
| AV   | 303k         | 36.41           | 50.17           | -13.76         | 10.01          | Neutral   | -       | 26.40         | 0.07         | 0.05       | 9.89       |  |  |  |
| QP   | 388.5k       | 45.08           | 58.10           | -13.02         | 10.02          | Neutral   | -       | 35.06         | 0.07         | 0.06       | 9.89       |  |  |  |
| AV   | 388.5k       | 33.42           | 48.10           | -14.68         | 10.02          | Neutral   | -       | 23.40         | 0.07         | 0.06       | 9.89       |  |  |  |
| QP   | 757.5k       | 40.52           | 56.00           | -15.48         | 10.02          | Neutral   | -       | 30.50         | 0.08         | 0.05       | 9.89       |  |  |  |
| AV   | 757.5k       | 36.92           | 46.00           | -9.08          | 10.02          | Neutral   | -       | 26.90         | 0.08         | 0.05       | 9.89       |  |  |  |
| QP   | 1.365M       | 34.39           | 56.00           | -21.61         | 10.04          | Neutral   | -       | 24.35         | 0.09         | 0.06       | 9.89       |  |  |  |
| AV   | 1.365M       | 29.43           | 46.00           | -16.57         | 10.04          | Neutral   | -       | 19.39         | 0.09         | 0.06       | 9.89       |  |  |  |
| QP   | 4.866M       | 34.15           | 56.00           | -21.85         | 10.15          | Neutral   | -       | 24.00         | 0.15         | 0.11       | 9.89       |  |  |  |
| AV   | 4.866M       | 27.83           | 46.00           | -18.17         | 10.15          | Neutral   | -       | 17.68         | 0.15         | 0.11       | 9.89       |  |  |  |
| QP   | 9.758M       | 29.30           | 60.00           | -30.70         | 10.31          | Neutral   | -       | 18.99         | 0.24         | 0.16       | 9.91       |  |  |  |
| AV   | 9.758M       | 22.12           | 50.00           | -27.88         | 10.31          | Neutral   | -       | 11.81         | 0.24         | 0.16       | 9.91       |  |  |  |



## 3.2 Occupied Bandwidth

### 3.2.1 Limit of Occupied Bandwidth

|                                                                                                                                                                                                                                                                                                      |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>6dBc Bandwidth</b> (see Note 1)                                                                                                                                                                                                                                                                   | None |
| <b>99% Occupied Bandwidth</b> (see Note 2)                                                                                                                                                                                                                                                           | None |
| NOTE 1: The 6dBc bandwidth is the frequency bandwidth of the signal power at the -6 dBc points when measured with a 100 kHz resolution bandwidth. These measurements shall also be performed at normal test conditions.                                                                              |      |
| NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions. |      |

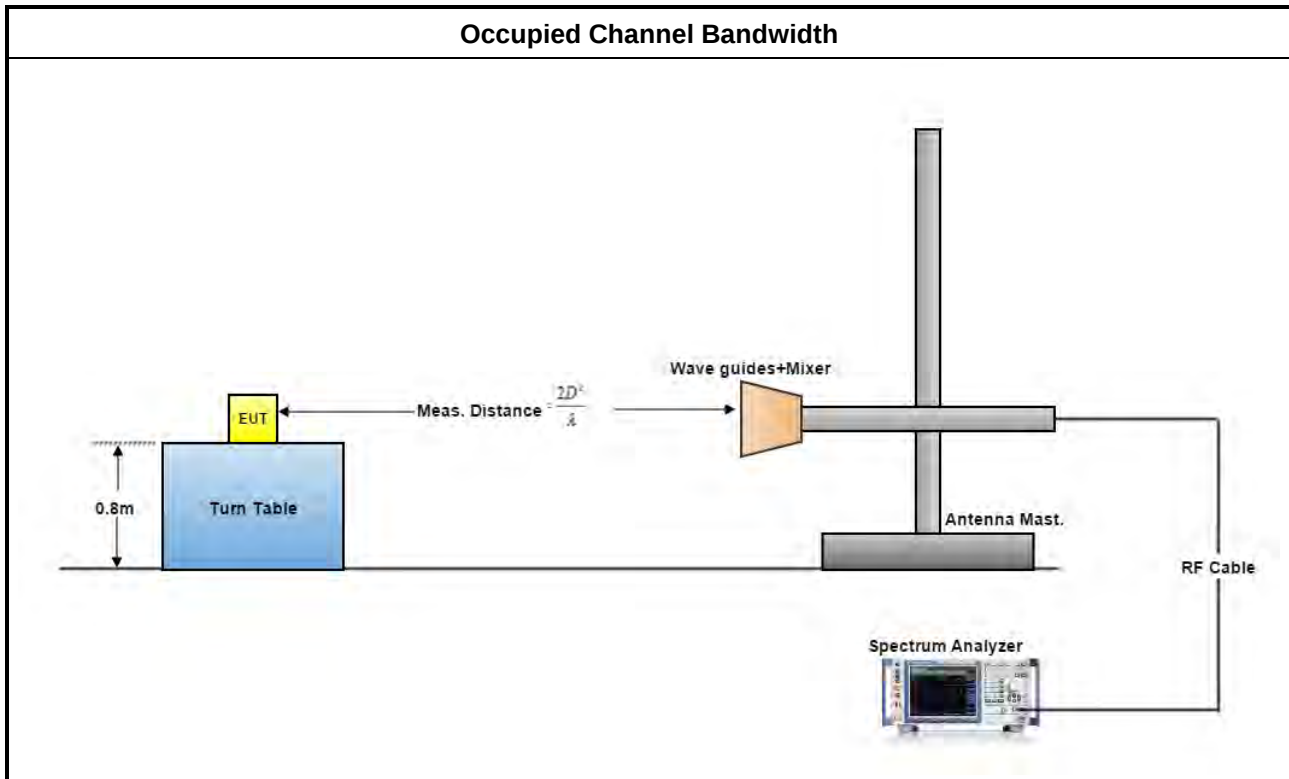
### 3.2.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 6.9.2.

### 3.2.4 Test Setup





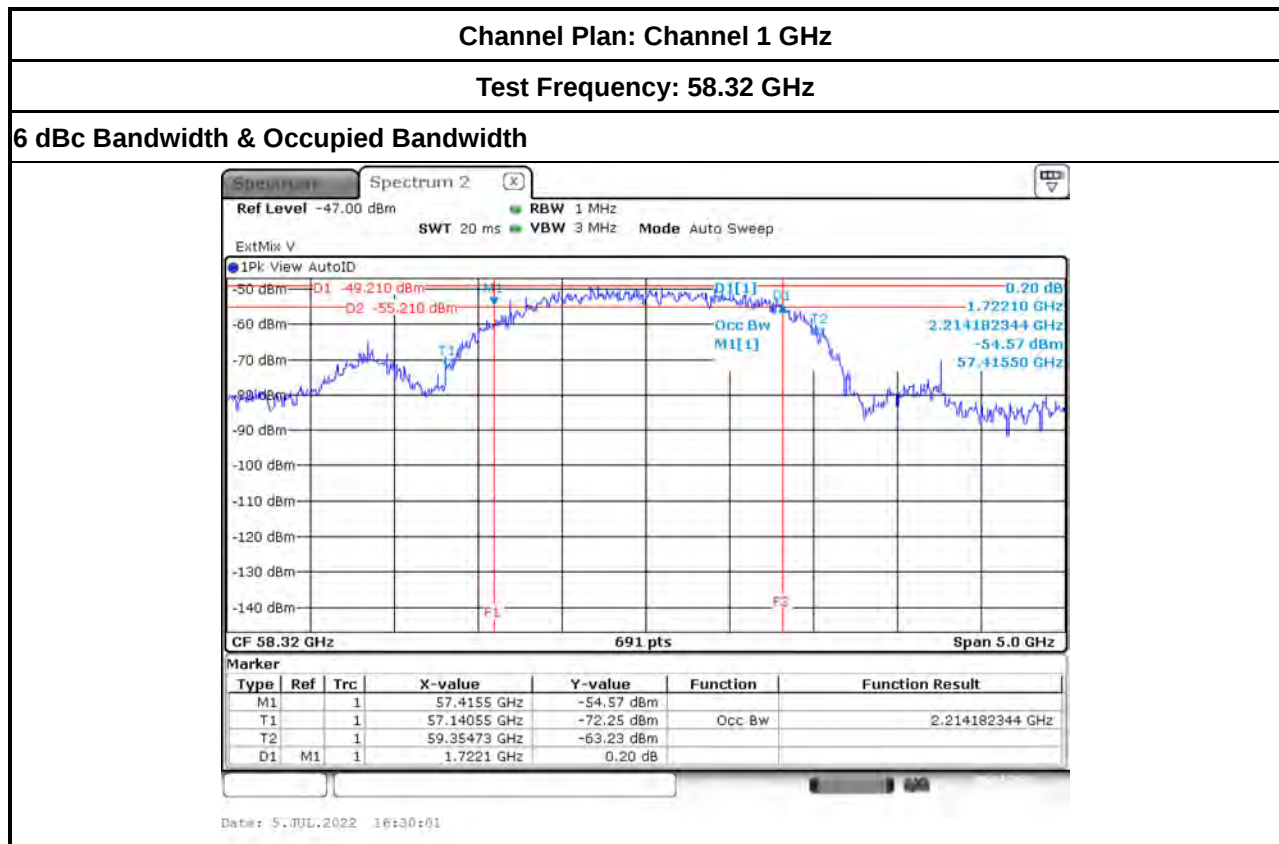
### 3.2.5 Test Result of Occupied Bandwidth

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | see ANSI C63.10, clause 5.11  |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | see ANSI C63.10, clause 6.9.2 |
| NOTE: If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Refer as ANSI C63.10, clause 15, observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources. |                               |

| Test Results          |                  |                             |                                 |                |
|-----------------------|------------------|-----------------------------|---------------------------------|----------------|
| Channel Plan<br>(GHz) | Test Freq. (GHz) | 6 dBc<br>Bandwidth<br>(MHz) | 99% Occupied<br>Bandwidth (MHz) | Limit<br>(MHz) |
| Channel 1             | 58.32            | 2214.18                     | 1722.10                         | N/A            |
| Channel 3             | 62.64            | 2054.92                     | 1657.00                         | N/A            |
| Channel 4             | 64.80            | 2004.34                     | 1512.30                         | N/A            |



### 3.2.5.1 Bandwidth Plots

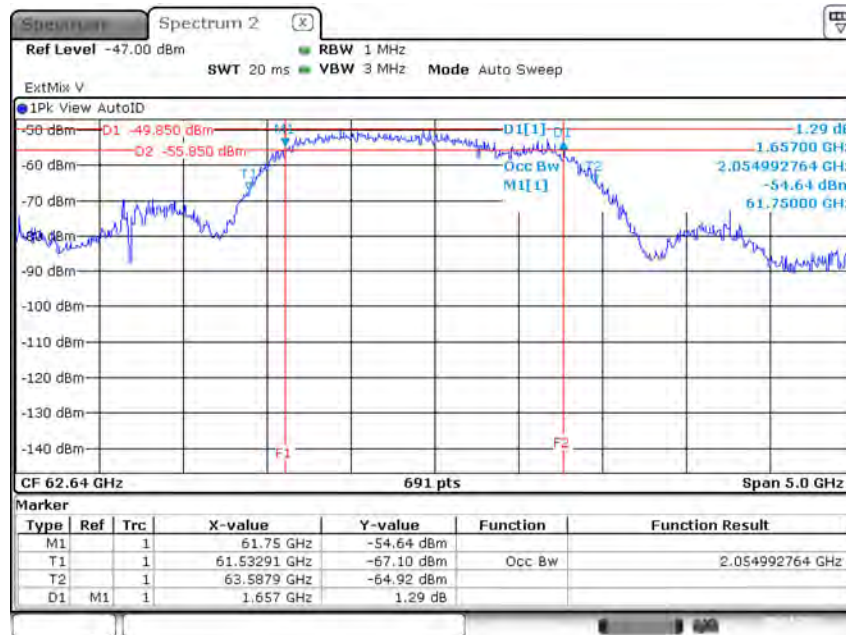




Channel Plan: Channel 3 GHz

Test Frequency: 62.64 GHz

6 dBc Bandwidth & Occupied Bandwidth



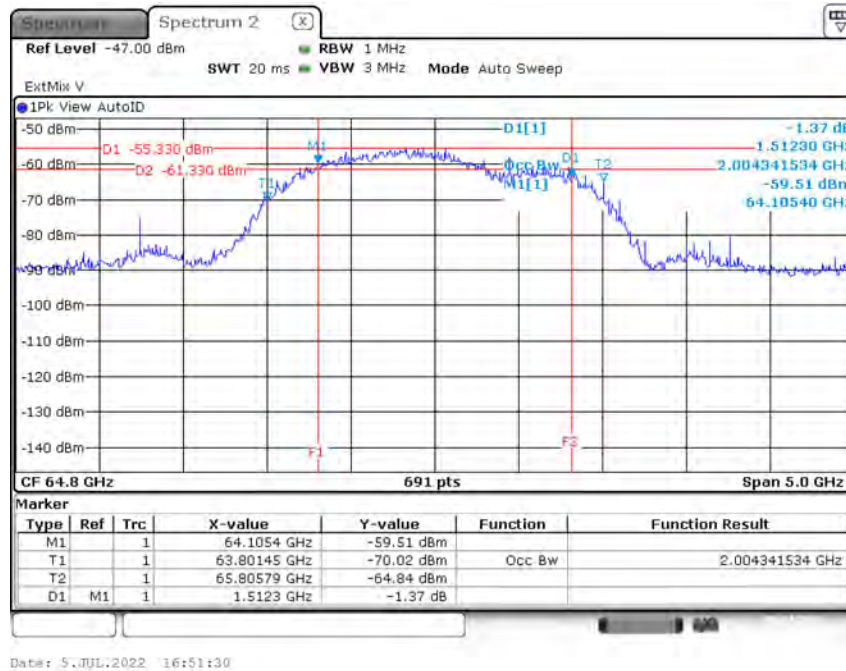
Date: 5.JUL.2022 16:32:16



Channel Plan: Channel 4 GHz

Test Frequency: 64.80 GHz

6 dBc Bandwidth & Occupied Bandwidth





### 3.3 EIRP Power

#### 3.3.1 Limit of EIRP Power

| EIRP Power Limit                                                                                                                                                                                                                                                                                                                                              |                    |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| Use Condition                                                                                                                                                                                                                                                                                                                                                 | EIRP Average Power | EIRP Peak Power |
| Fixed field disturbance sensors at within the frequency band 61-61.5GHz                                                                                                                                                                                                                                                                                       | 40 dBm             | 43 dBm          |
| Fixed field disturbance sensors at outside of the band 61-61.5GHz                                                                                                                                                                                                                                                                                             | 10 dBm             | 13 dBm          |
| Except fixed field disturbance sensors at 61-61.5GHz                                                                                                                                                                                                                                                                                                          | N/A                | 10 dBm          |
| Except outdoor fixed Point to Point                                                                                                                                                                                                                                                                                                                           | 40 dBm             | 43 dBm          |
| Outdoor fixed Point to Point                                                                                                                                                                                                                                                                                                                                  | 82 dBm             | 85 dBm          |
| Note: For fixed point-to-point transmitters located outdoors, the average power of any emission shall not exceed 82 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi.<br>The peak power of any emission shall not exceed 85 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi. |                    |                 |

NOTE: For the applicable limit, see 15.255(c)

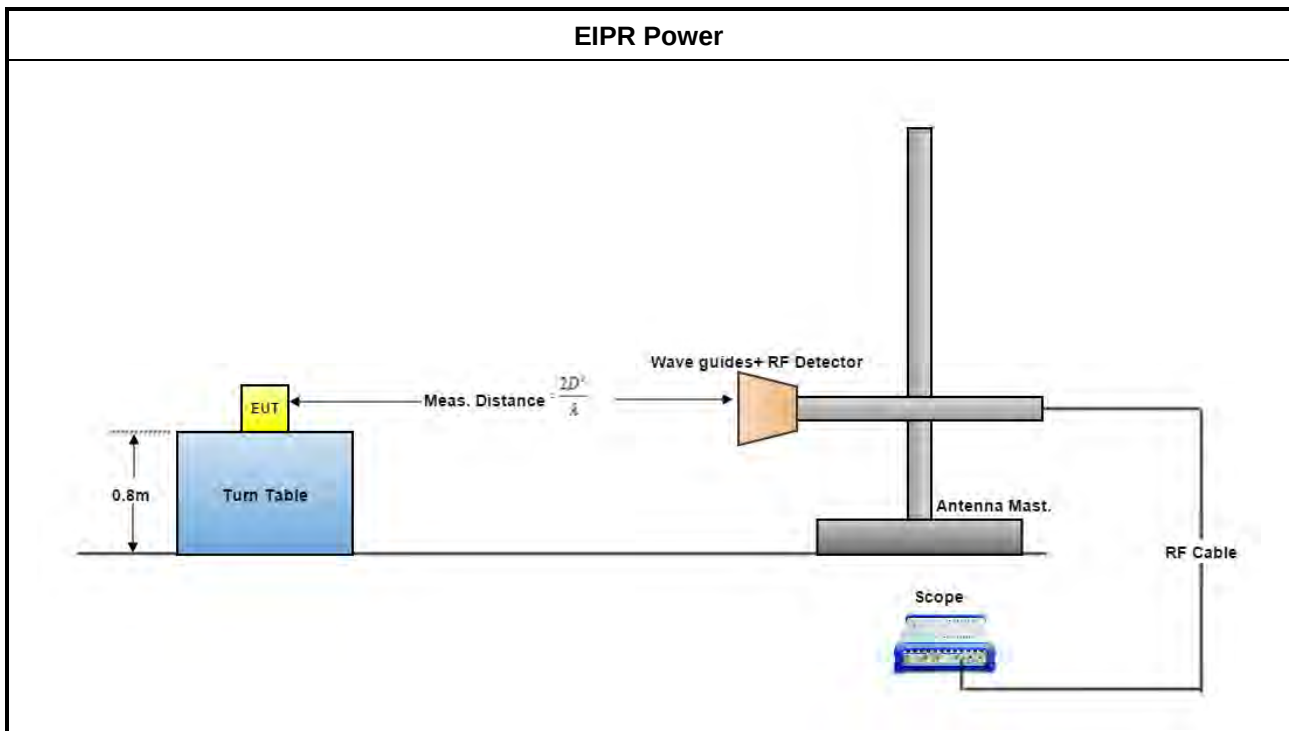
#### 3.3.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.3.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013 clause 9.3 & 9.5.

### 3.3.4 Test Setup



### 3.3.5 Test Result of EIRP Power

**Test Conditions** see ANSI C63.10, clause 5.11 & clause 9

**Test Setup** see ANSI C63.10, clause 9.11

NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing.

**3.3.5.1 Test Result of EIRP Power**

| Test Distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        | 8 m                 |             |       |                            |        |                               |        |               |       |                                 |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|-------------|-------|----------------------------|--------|-------------------------------|--------|---------------|-------|---------------------------------|----|
| Test Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |                     |             |       |                            |        |                               |        |               |       |                                 |    |
| Channel Plan<br>(GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Test<br>Freq.<br>(GHz) | Rx<br>Gain<br>(dBi) | DSO<br>(mV) |       | Power<br>Measured<br>(dBm) |        | E <sub>Meas</sub><br>(dBuV/m) |        | EIRP<br>(dBm) |       | EIRP Limit<br>(dBm)<br>(note 1) |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |                     | Peak        | AV    | Peak                       | AV     | Peak                          | AV     | Peak          | AV    | Peak                            | AV |
| Channel 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 58.32                  | 23.6                | 23.78       | 21.04 | -25.76                     | -26.35 | 123.21                        | 122.62 | 36.48         | 35.89 | 43                              | 40 |
| Channel 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 62.64                  | 23.6                | 20.38       | 17.09 | -26.48                     | -27.20 | 123.11                        | 122.39 | 36.38         | 35.66 | 43                              | 40 |
| Channel 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 64.80                  | 23.6                | 4.39        | 3.98  | -33.42                     | -33.95 | 116.47                        | 115.94 | 29.73         | 29.20 | 43                              | 40 |
| <p>The measured power level is converted to EIRP using the Friis equation:</p> <p>For radiated emissions, calculate the field strength (E) in dBμV/meter.</p> <p>E = 126.8 – 20log(λ) + P – G</p> <p>where:</p> <p>E : is the field strength of the emission at the measurement distance, in dBμV/m</p> <p>P : is the power measured at the output of the test antenna, in dBm</p> <p>λ: is the wavelength of the emission under investigation [300/fMHz], in m</p> <p>G : is the gain of the test antenna, in dBi For radiated emissions, calculate the EIRP (dBm). If the measurement was performed in the far field, calculate the EIRP.</p> <p>EIRP = E-meas +20log(d-meas)-104.7</p> <p>where:</p> <p>EIRP : is the equivalent isotopically radiated power, in dBm</p> <p>E-meas. : is the field strength of the emission at the measurement distance, in dBμV/m</p> <p>d-meas. : is the measurement distance, in m</p> <p>NOTE 1: For the applicable limit, see 15.255(c)</p> <p>NOTE 2: The comparison method which replaces EUT with a signal generator is used to find the correct conversion factor between “DSO(mV)” &amp; “Power Measured(dBm)”.</p> |                        |                     |             |       |                            |        |                               |        |               |       |                                 |    |

### 3.4 Peak Conducted Power

#### 3.4.1 Limit of Peak Conducted Power

| Peak Conducted Power Limit                                                              |                |                    |                                  |
|-----------------------------------------------------------------------------------------|----------------|--------------------|----------------------------------|
| Use Condition                                                                           | 6dBc Bandwidth | Occupied Bandwidth | Peak Conducted Power (note 1)    |
| Fixed field disturbance sensors at within the frequency band 61-61.5GHz                 | > 100MHz       | ≤500MHz            | 500mW                            |
|                                                                                         | ≤ 100MHz       |                    | 500mW x (BW/100)<br>(see note 2) |
| Fixed field disturbance sensors at outside of the band 61-61.5GHz and within 57 -71 GHz | > 100MHz       | N/A                | 500mW                            |
|                                                                                         | ≤ 100MHz       |                    | 500mW x (BW/100)<br>(see note 2) |
| Except fixed field disturbance sensors at 61-61.5GHz                                    | N/A            | > 500MHz           | -10 dBm                          |
| Except outdoor fixed Point to Point,                                                    | > 100MHz       | N/A                | 500mW                            |
| Outdoor fixed Point to Point                                                            | ≤ 100MHz       | N/A                | 500mW x (BW/100)<br>(see note 2) |
| NOTE 1: For the applicable limit, see                                                   |                |                    |                                  |
| NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)                                      |                |                    |                                  |

#### 3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.4.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.5

#### 3.4.4 Test Result of Peak Conducted Power

|                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                   | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                        | see ANSI C63.10, clause 9.11            |
| NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing. |                                         |

### 3.4.4.1 Peak Conducted Power

| Test Results          |                        |               |                            |                                   |                       |                             |                                     |
|-----------------------|------------------------|---------------|----------------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------------|
| Channel Plan<br>(GHz) | Test<br>Freq.<br>(GHz) | EIRP<br>(dBm) | Max.<br>Ant. Gain<br>(dBi) | Peak<br>Power<br>(dBm)<br>(note1) | Peak<br>Power<br>(mW) | 6dBc BW<br>(MHz)<br>(note2) | Peak Power<br>Limit (mW)<br>(note3) |
| Channel 1             | 58.32                  | 36.48         | 28                         | 8.48                              | 7.040                 | 2214.18                     | 500.00                              |
| Channel 3             | 62.64                  | 36.38         | 28                         | 8.38                              | 6.881                 | 2054.92                     | 500.00                              |
| Channel 4             | 64.80                  | 29.73         | 28                         | 1.73                              | 1.490                 | 2004.34                     | 500.00                              |

NOTE 1: Because EUT used for the integral antenna without temporary RF connector provided. Therefore peak conducted power is equal to EIRP power subtract the antenna gain.

NOTE 2: For the 6dBc bandwidth, see test report clause 3.2.5.

NOTE 3: For the applicable limit, see

NOTE 4: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm)

$$P(\text{cond}) = \text{EIRP} - G(\text{dBi})$$

where:

G(dBi) is gain of EUT antenna.



### **3.5 Transmitter Spurious Emissions**

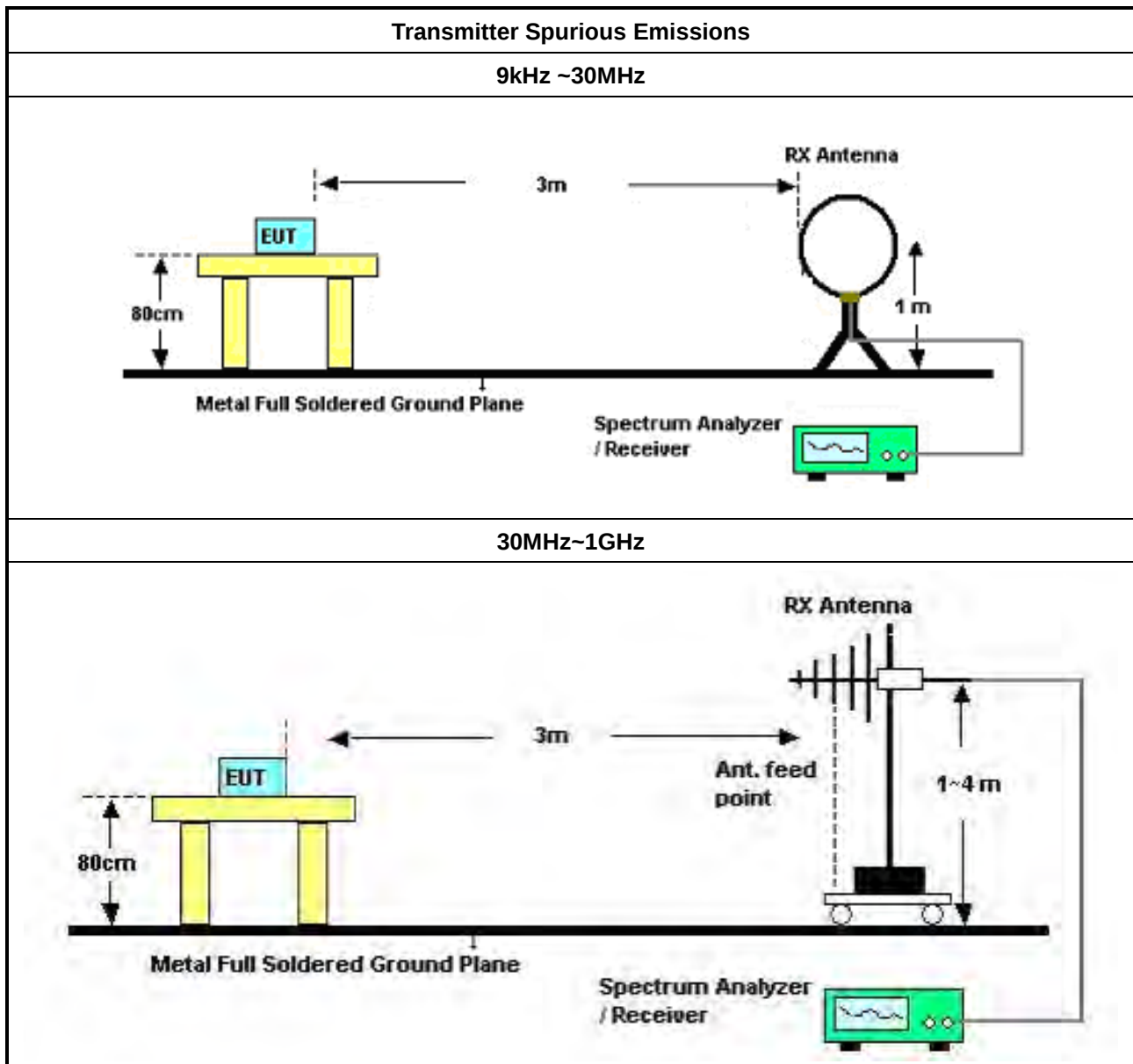
#### **3.5.1 Limit of Transmitter Spurious Emissions**

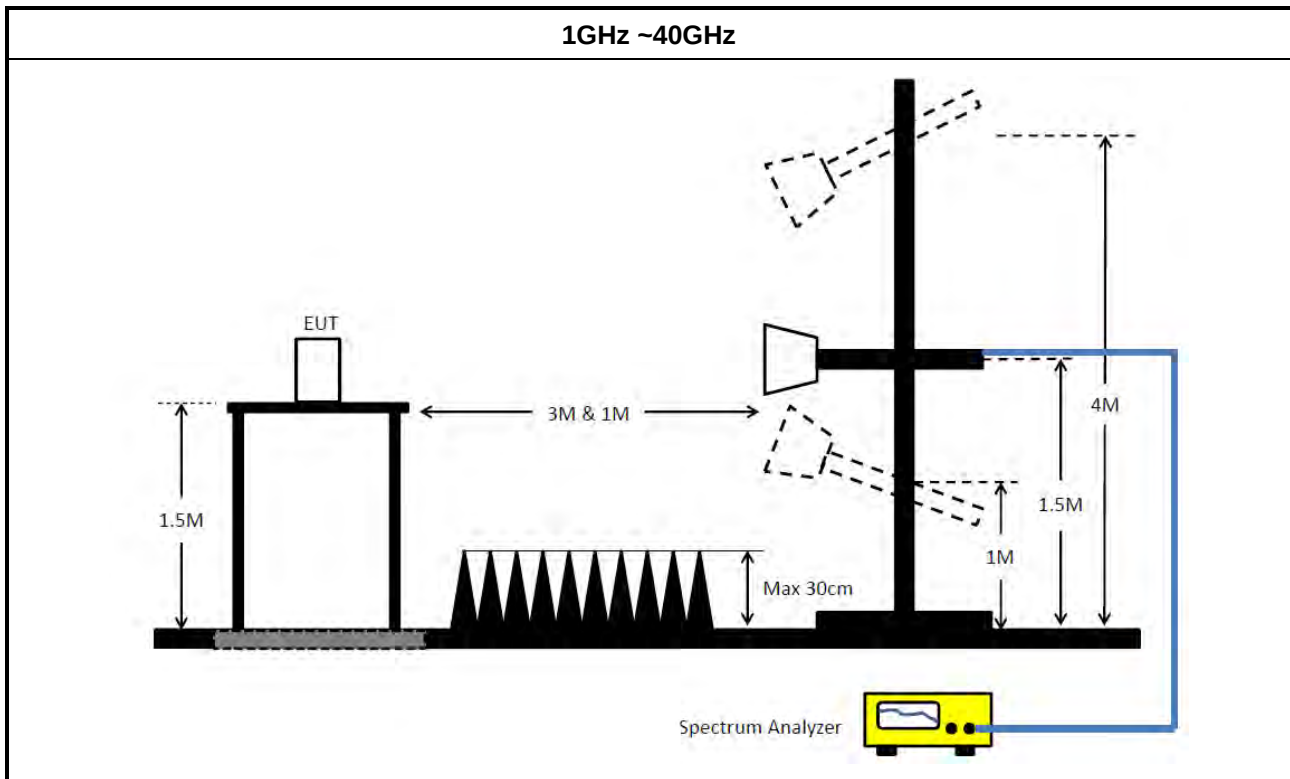
| Frequency Range                                                                    | Limit                                                          |
|------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Radiated emissions below 40 GHz                                                    | Reference to section 15.209                                    |
| Radiated emissions above 40 GHz – 200GHz                                           | 90 pW/cm <sup>2</sup> @ 3 m (Equivalent EIRP 102 µW, -9.91dBm) |
| NOTE 1: For the applicable limit, see 15.255(d)                                    |                                                                |
| NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission. |                                                                |

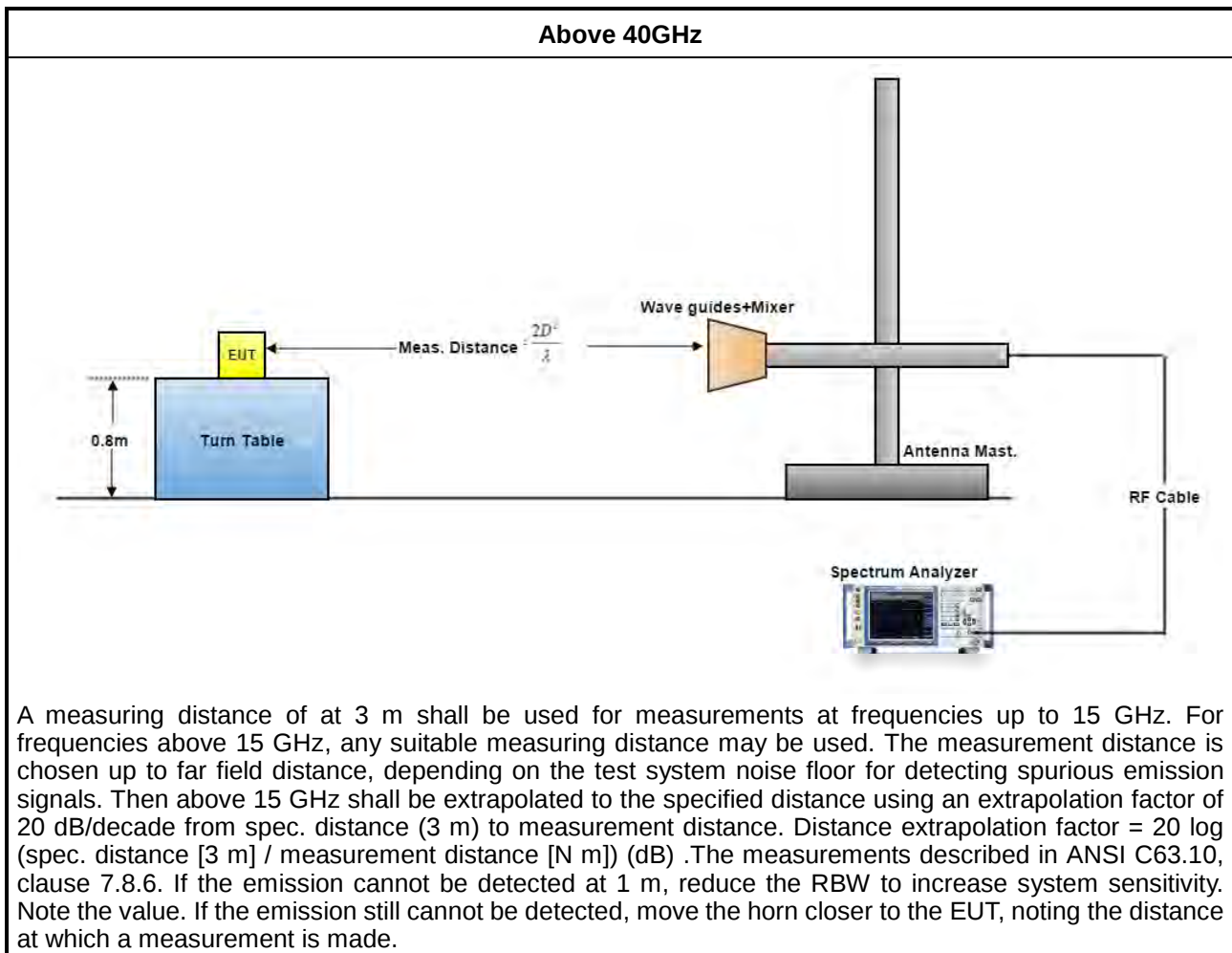
#### **3.5.2 Test Procedures**

Method of measurement: Refer as ANSI C63.10-2013, clause 9.12

### 3.5.3 Test Setup







### 3.5.4 Measurement Results Calculation

The measured Level is calculated using:

For below 40GHz

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

For above 40GHz

$$\text{EIRP} = \text{Meas. Level} - \text{RX Antenna Gain} + 20 \cdot \log(4 \cdot \pi \cdot (3.14159) \cdot D / (300 / (\text{Frequency} \cdot 1000)))$$



### 3.5.5 Test Result of Transmitter Spurious Emissions

|                                                                                                                                                                                                                                                                  |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                           | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                | see ANSI C63.10, clause 9.12 ~ 9.13     |
| NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. |                                         |

#### 3.5.5.1 Test Result of Transmitter Spurious Emissions (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

**3.5.5.2 Test Result of Transmitter Spurious Emissions**

|                    |                   |               |        |
|--------------------|-------------------|---------------|--------|
| Test Range         | 30 MHz – 1000 MHz | Test Distance | 3 m    |
| Test Configuration | CTX               | Test Mode     | Mode 1 |

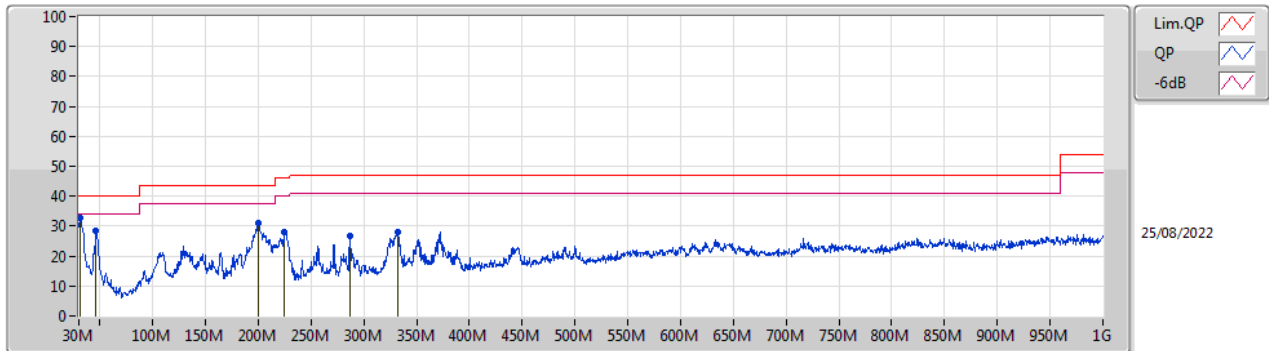
Vertical

**Mode 1**

| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV) | AF<br>(dB) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|-----------|----------------|---------------|---------|---------------|------------|------------|------------|
| PK   | 34.85M       | 36.27             | 40.00             | -3.73          | -31.00         | 3           | Vertical  | 233            | 2.00          | "Worst" | 67.27         | 22.29      | 0.80       | 54.09      |
| QP   | 44.07M       | 29.98             | 40.00             | -10.02         | -35.62         | 3           | Vertical  | 42             | 3.00          | -       | 65.60         | 17.66      | 0.80       | 54.08      |
| PK   | 55.71M       | 34.49             | 40.00             | -5.51          | -40.19         | 3           | Vertical  | 313            | 1.00          | -       | 74.68         | 12.89      | 1.01       | 54.09      |
| PK   | 60.56M       | 32.88             | 40.00             | -7.12          | -40.76         | 3           | Vertical  | 67             | 2.00          | -       | 73.64         | 12.23      | 1.10       | 54.09      |
| PK   | 110.03M      | 32.92             | 43.50             | -10.58         | -35.68         | 3           | Vertical  | 60             | 1.00          | -       | 68.60         | 16.95      | 1.35       | 53.98      |
| PK   | 731.31M      | 37.77             | 47.00             | -9.23          | -21.19         | 3           | Vertical  | 355            | 1.00          | -       | 58.96         | 28.23      | 3.43       | 52.85      |
| PK   | 746.35M      | 37.67             | 47.00             | -9.33          | -20.96         | 3           | Vertical  | 213            | 2.00          | -       | 58.63         | 28.34      | 3.49       | 52.79      |



Horizontal

**Mode 1**

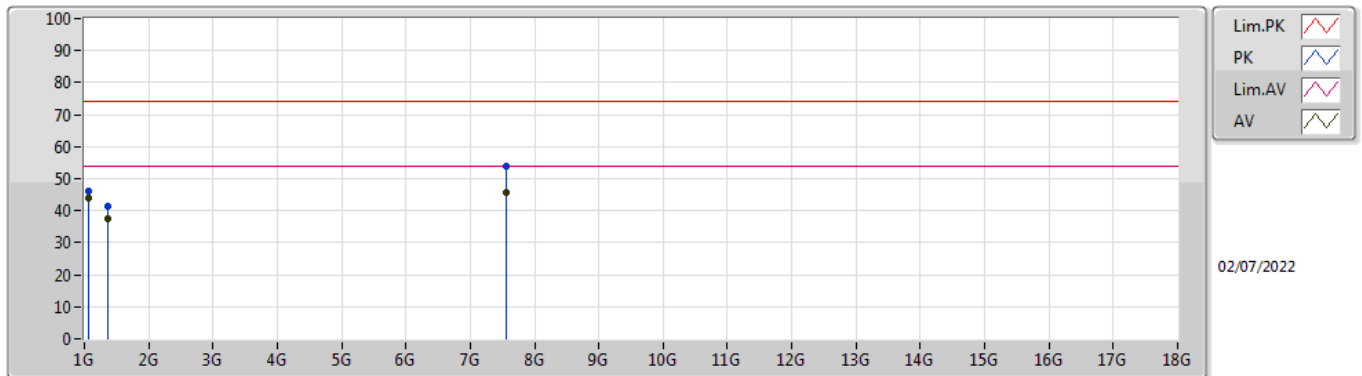
| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB) | Dist<br>(m) | Condition  | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV) | AF<br>(dB) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|------------|----------------|---------------|---------|---------------|------------|------------|------------|
| PK   | 30.97M       | 32.71             | 40.00             | -7.29          | -29.35         | 3           | Horizontal | 233            | 2.00          | "Worst" | 62.06         | 24.04      | 0.72       | 54.11      |
| PK   | 46.49M       | 28.46             | 40.00             | -11.54         | -36.75         | 3           | Horizontal | 311            | 3.00          | -       | 65.21         | 16.50      | 0.83       | 54.08      |
| PK   | 199.75M      | 30.87             | 43.50             | -12.63         | -37.22         | 3           | Horizontal | 27             | 4.00          | -       | 68.09         | 14.96      | 1.80       | 53.98      |
| PK   | 224.97M      | 28.21             | 46.00             | -17.79         | -36.57         | 3           | Horizontal | 45             | 1.00          | -       | 64.78         | 15.57      | 1.90       | 54.04      |
| PK   | 286.57M      | 26.52             | 47.00             | -20.48         | -32.92         | 3           | Horizontal | 95             | 1.00          | -       | 59.44         | 19.01      | 2.15       | 54.08      |
| PK   | 332.16M      | 28.06             | 47.00             | -18.94         | -31.82         | 3           | Horizontal | 255            | 2.00          | -       | 59.88         | 19.86      | 2.26       | 53.94      |



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 1 GHz – 18 GHz | Test Distance | 3 m    |
| Test Configuration | CTX            | Test Mode     | Mode 1 |

Vertical

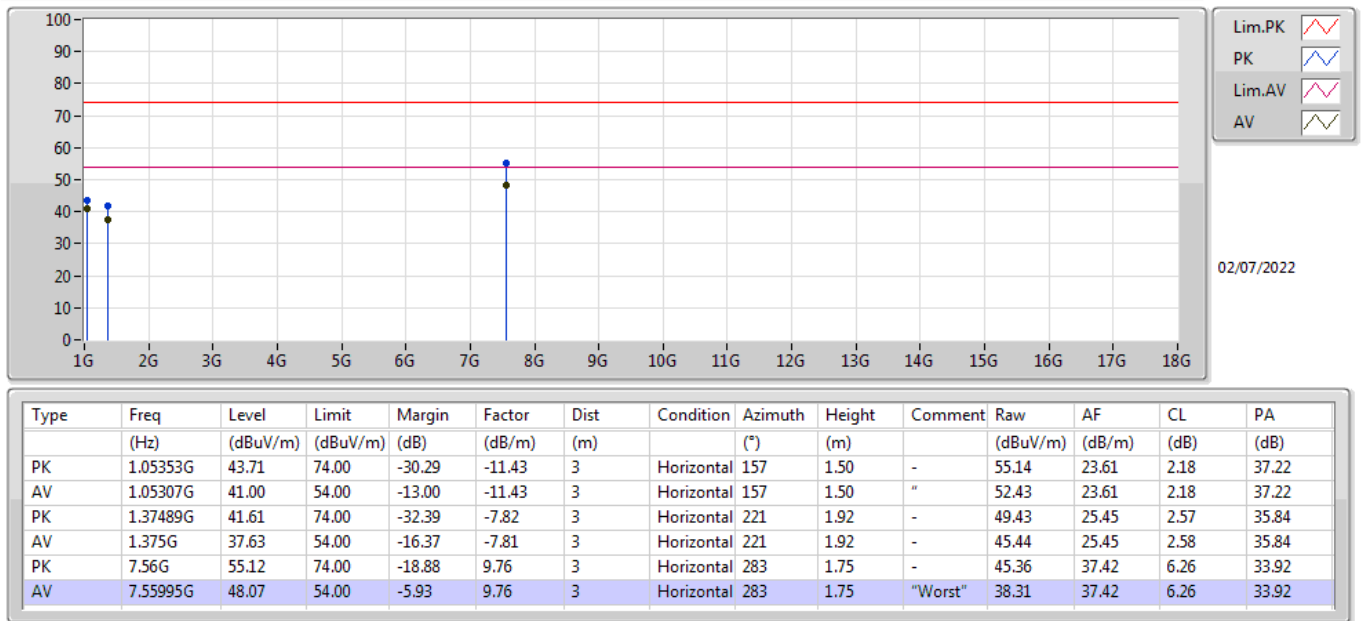
## Mode 1



| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 1.05365G     | 45.99             | 74.00             | -28.01         | -11.43           | 3           | Vertical  | 267            | 1.05          | -       | 57.42           | 23.61        | 2.18       | 37.22      |
| AV   | 1.05369G     | 43.92             | 54.00             | -10.08         | -11.43           | 3           | Vertical  | 267            | 1.05          | "       | 55.35           | 23.61        | 2.18       | 37.22      |
| PK   | 1.37496G     | 41.52             | 74.00             | -32.48         | -7.82            | 3           | Vertical  | 317            | 1.20          | -       | 49.34           | 25.45        | 2.57       | 35.84      |
| AV   | 1.37501G     | 37.44             | 54.00             | -16.56         | -7.81            | 3           | Vertical  | 317            | 1.20          | -       | 45.25           | 25.45        | 2.58       | 35.84      |
| PK   | 7.5601G      | 53.72             | 74.00             | -20.28         | 9.76             | 3           | Vertical  | 197            | 1.53          | -       | 43.96           | 37.42        | 6.26       | 33.92      |
| AV   | 7.56001G     | 45.59             | 54.00             | -8.41          | 9.76             | 3           | Vertical  | 197            | 1.53          | "Worst" | 35.83           | 37.42        | 6.26       | 33.92      |



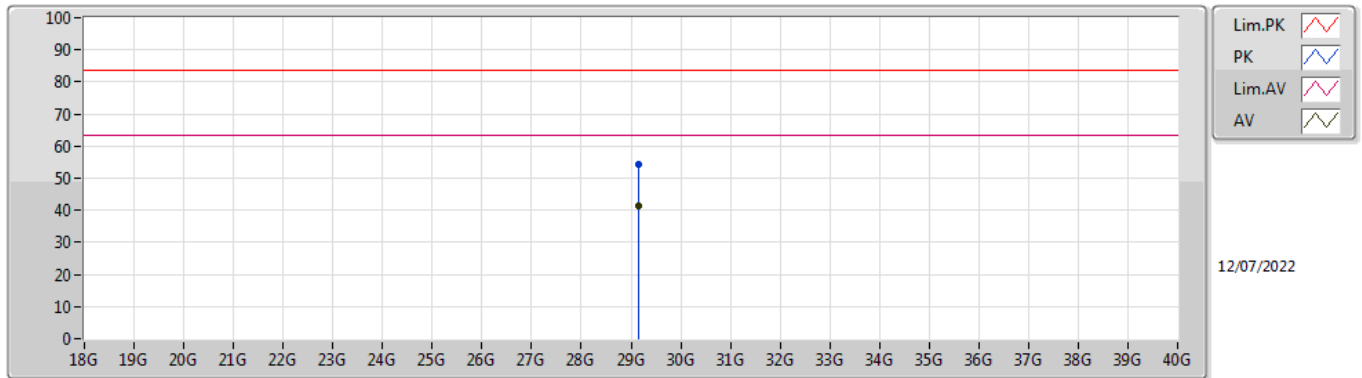
Horizontal

**Mode 1**



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 18GHz – 40 GHz | Test Distance | 1 m    |
| Test Configuration | CTX            | Test Mode     | Mode 1 |

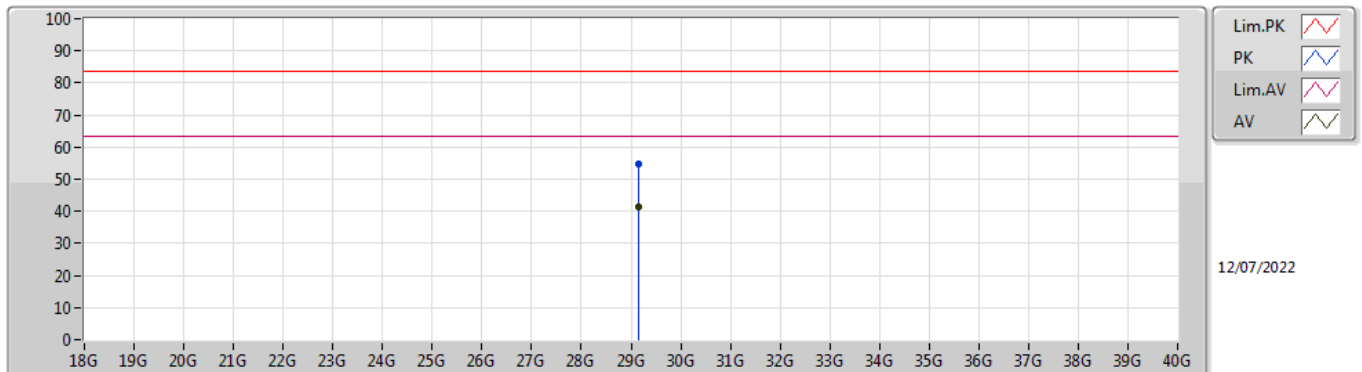
Vertical

**Mode 1**

| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 29.16504G    | 54.37             | 83.54             | -29.17         | 12.49            | 1           | Vertical  | 122            | 1.70          | -       | 41.88           | 39.97        | 18.25      | 45.73      |
| AV   | 29.15154G    | 41.51             | 63.54             | -22.03         | 12.47            | 1           | Vertical  | 122            | 1.70          | "Worst" | 29.04           | 39.96        | 18.25      | 45.74      |



Horizontal

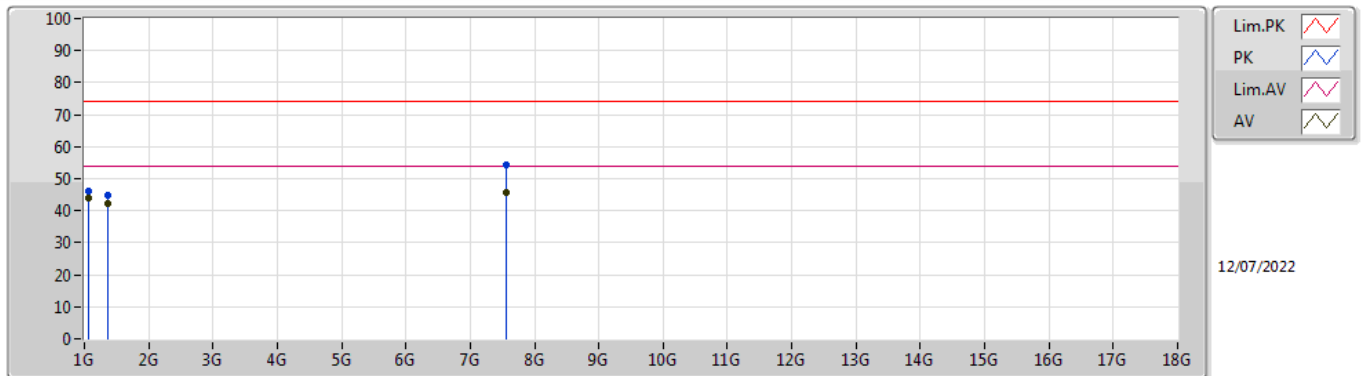
**Mode 1**

| Type | Freq      | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw      | AF     | CL    | PA    |
|------|-----------|----------|----------|--------|--------|------|------------|---------|--------|---------|----------|--------|-------|-------|
|      | (Hz)      | (dBuV/m) | (dBuV/m) | (dB)   | (dB/m) | (m)  |            | (°)     | (m)    |         | (dBuV/m) | (dB/m) | (dB)  | (dB)  |
| PK   | 29.16336G | 54.63    | 83.54    | -28.91 | 12.49  | 1    | Horizontal | 251     | 1.70   | -       | 42.14    | 39.97  | 18.25 | 45.73 |
| AV   | 29.15294G | 41.54    | 63.54    | -22.00 | 12.47  | 1    | Horizontal | 251     | 1.70   | "Worst" | 29.07    | 39.96  | 18.25 | 45.74 |



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 1 GHz – 18 GHz | Test Distance | 3 m    |
| Test Configuration | CTX            | Test Mode     | Mode 2 |

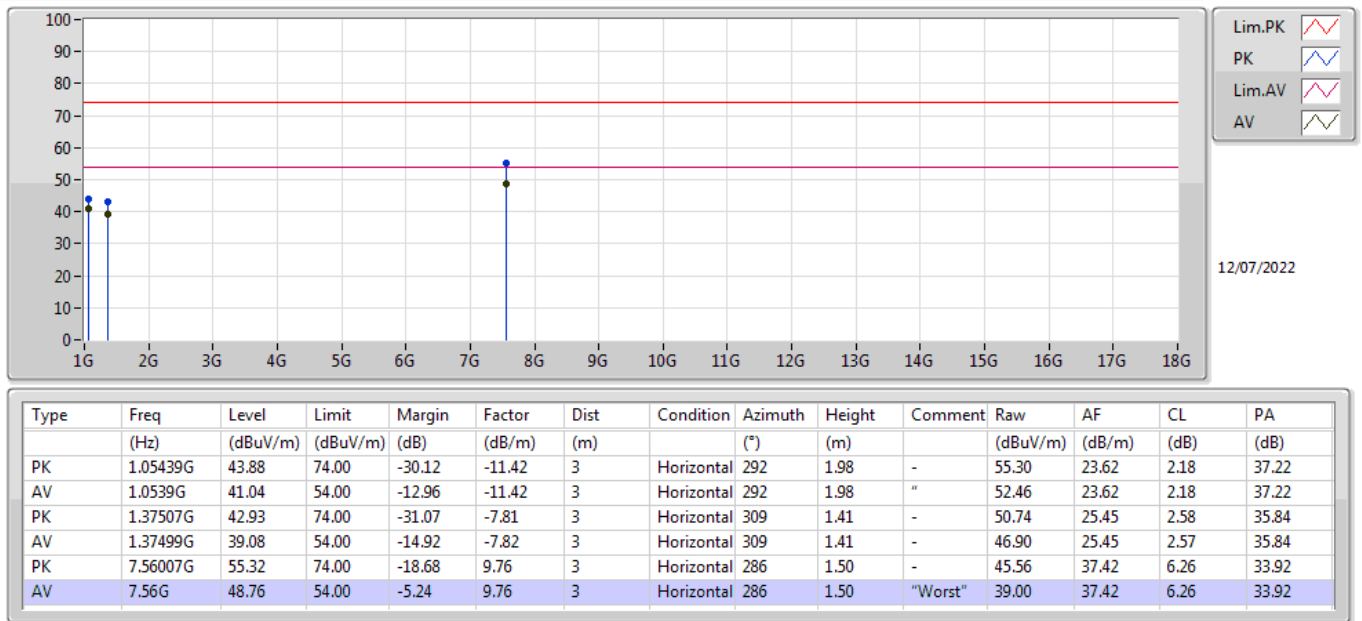
Vertical

**Mode 2**

| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 1.05402G     | 46.20             | 74.00             | -27.80         | -11.42           | 3           | Vertical  | 269            | 1.57          | -       | 57.62           | 23.62        | 2.18       | 37.22      |
| AV   | 1.054G       | 44.13             | 54.00             | -9.87          | -11.42           | 3           | Vertical  | 269            | 1.57          | "       | 55.55           | 23.62        | 2.18       | 37.22      |
| PK   | 1.37498G     | 44.81             | 74.00             | -29.19         | -7.82            | 3           | Vertical  | 119            | 1.31          | -       | 52.63           | 25.45        | 2.57       | 35.84      |
| AV   | 1.37499G     | 42.11             | 54.00             | -11.89         | -7.82            | 3           | Vertical  | 119            | 1.31          | -       | 49.93           | 25.45        | 2.57       | 35.84      |
| PK   | 7.56006G     | 54.12             | 74.00             | -19.88         | 9.76             | 3           | Vertical  | 191            | 1.66          | -       | 44.36           | 37.42        | 6.26       | 33.92      |
| AV   | 7.56001G     | 45.81             | 54.00             | -8.19          | 9.76             | 3           | Vertical  | 191            | 1.66          | "Worst" | 36.05           | 37.42        | 6.26       | 33.92      |



Horizontal

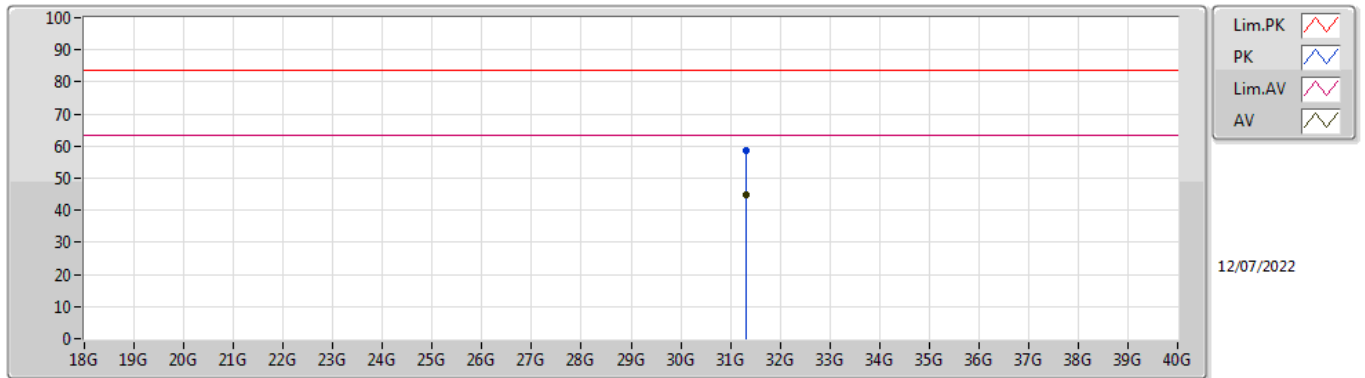
**Mode 2**



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 18GHz – 40 GHz | Test Distance | 1 m    |
| Test Configuration | CTX            | Test Mode     | Mode 2 |

Vertical

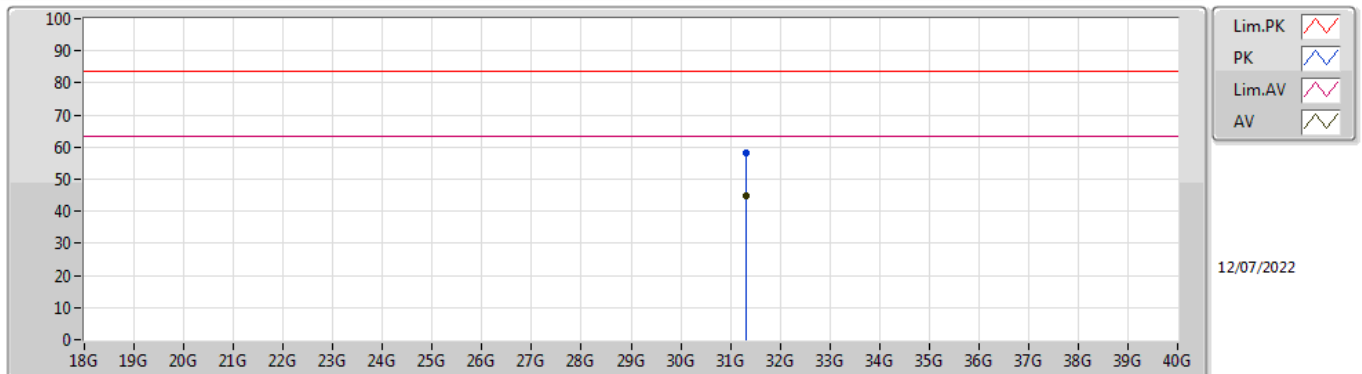
## Mode 2



| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 31.32052G    | 58.62             | 83.54             | -24.92         | 13.75            | 1           | Vertical  | 57             | 1.50          | -       | 44.87           | 40.72        | 18.96      | 45.93      |
| AV   | 31.31446G    | 44.78             | 63.54             | -18.76         | 13.75            | 1           | Vertical  | 57             | 1.50          | "Worst" | 31.03           | 40.72        | 18.96      | 45.93      |



Horizontal

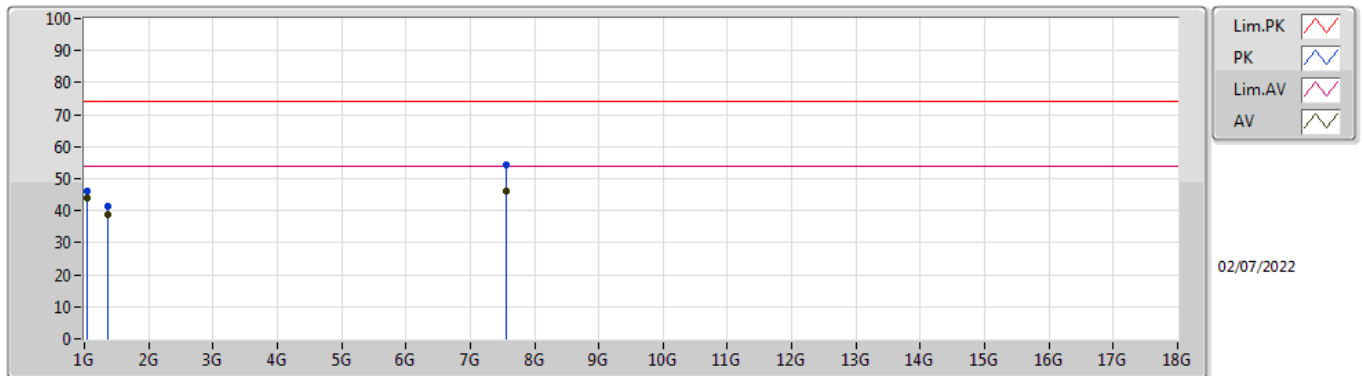
**Mode 2**

| Type | Freq      | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw      | AF     | CL    | PA    |
|------|-----------|----------|----------|--------|--------|------|------------|---------|--------|---------|----------|--------|-------|-------|
|      | (Hz)      | (dBuV/m) | (dBuV/m) | (dB)   | (dB/m) | (m)  |            | (°)     | (m)    |         | (dBuV/m) | (dB/m) | (dB)  | (dB)  |
| PK   | 31.31784G | 58.23    | 83.54    | -25.31 | 13.75  | 1    | Horizontal | 320     | 1.56   | -       | 44.48    | 40.72  | 18.96 | 45.93 |
| AV   | 31.3293G  | 44.83    | 63.54    | -18.71 | 13.74  | 1    | Horizontal | 320     | 1.56   | "Worst" | 31.09    | 40.70  | 18.97 | 45.93 |



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 1 GHz – 18 GHz | Test Distance | 3 m    |
| Test Configuration | CTX            | Test Mode     | Mode 3 |

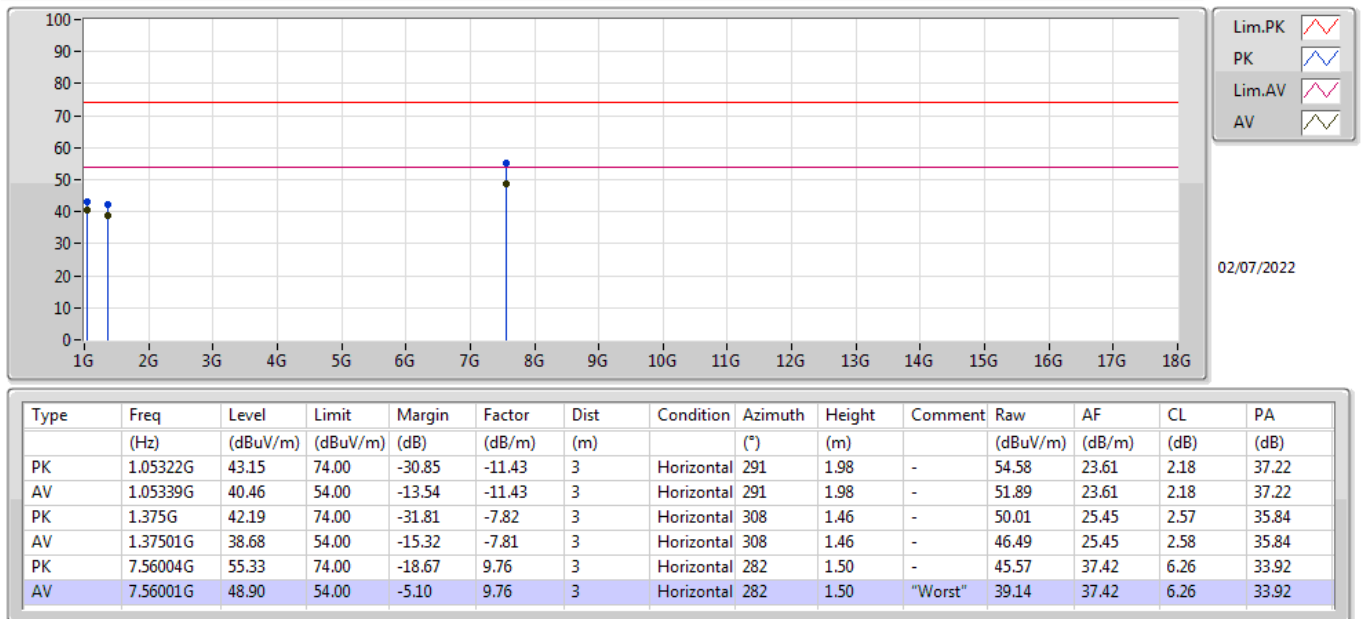
Vertical

**Mode 3**

| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 1.05352G     | 46.06             | 74.00             | -27.94         | -11.43           | 3           | Vertical  | 269            | 1.59          | -       | 57.49           | 23.61        | 2.18       | 37.22      |
| AV   | 1.05348G     | 44.12             | 54.00             | -9.88          | -11.43           | 3           | Vertical  | 269            | 1.59          | -       | 55.55           | 23.61        | 2.18       | 37.22      |
| PK   | 1.375G       | 41.48             | 74.00             | -32.52         | -7.81            | 3           | Vertical  | 119            | 1.37          | -       | 49.29           | 25.45        | 2.58       | 35.84      |
| AV   | 1.375G       | 38.78             | 54.00             | -15.22         | -7.81            | 3           | Vertical  | 119            | 1.37          | -       | 46.59           | 25.45        | 2.58       | 35.84      |
| PK   | 7.56009G     | 54.23             | 74.00             | -19.77         | 9.76             | 3           | Vertical  | 193            | 1.66          | -       | 44.47           | 37.42        | 6.26       | 33.92      |
| AV   | 7.56007G     | 46.26             | 54.00             | -7.74          | 9.76             | 3           | Vertical  | 193            | 1.66          | "Worst" | 36.50           | 37.42        | 6.26       | 33.92      |



Horizontal

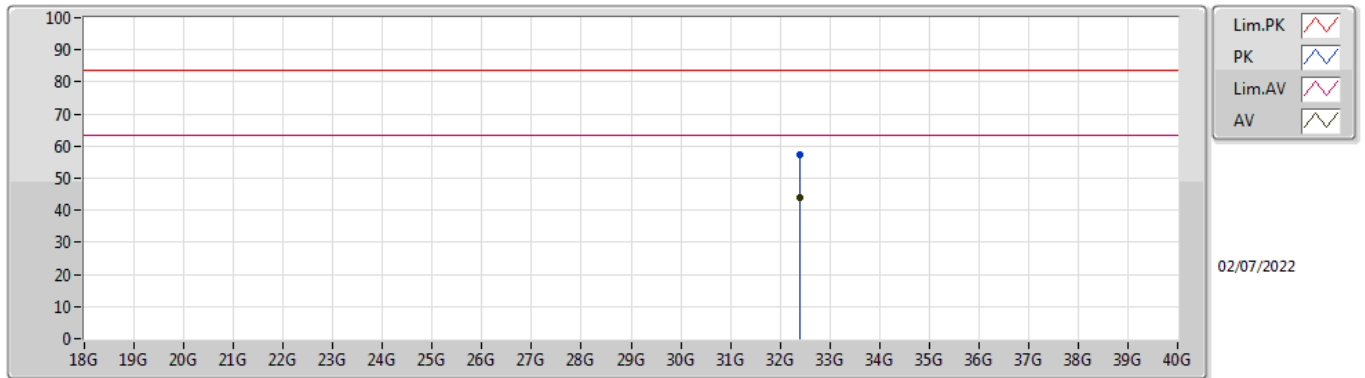
**Mode 3**



|                    |                |               |        |
|--------------------|----------------|---------------|--------|
| Test Range         | 18GHz – 40 GHz | Test Distance | 1 m    |
| Test Configuration | CTX            | Test Mode     | Mode 3 |

Vertical

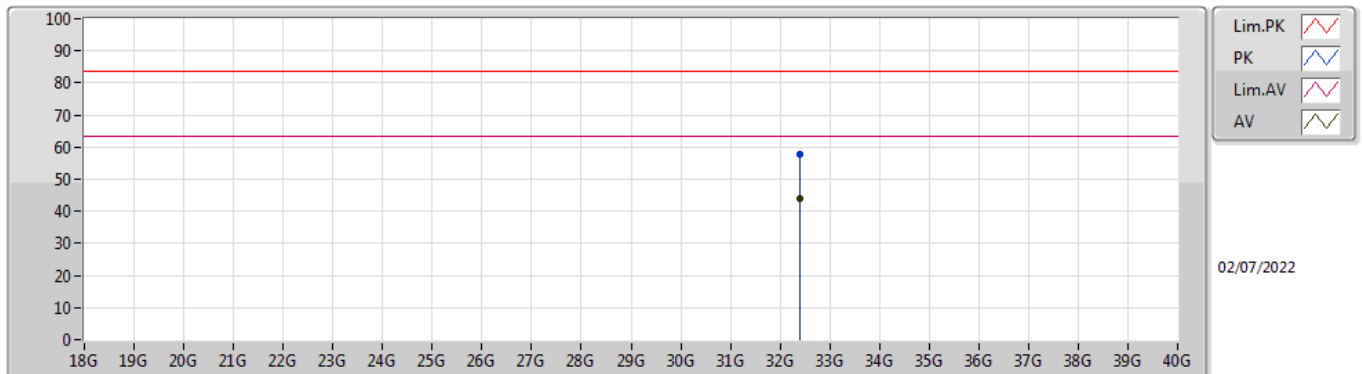
## Mode 3



| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|-----------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 32.39728G    | 57.47             | 83.54             | -26.07         | 14.00            | 1           | Vertical  | 72             | 1.57          | -       | 43.47           | 40.60        | 19.96      | 46.56      |
| AV   | 32.39402G    | 44.13             | 63.54             | -19.41         | 14.00            | 1           | Vertical  | 72             | 1.57          | "Worst" | 30.13           | 40.60        | 19.96      | 46.56      |



Horizontal

**Mode 3**

| Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Factor<br>(dB/m) | Dist<br>(m) | Condition  | Azimuth<br>(°) | Height<br>(m) | Comment | Raw<br>(dBuV/m) | AF<br>(dB/m) | CL<br>(dB) | PA<br>(dB) |
|------|--------------|-------------------|-------------------|----------------|------------------|-------------|------------|----------------|---------------|---------|-----------------|--------------|------------|------------|
| PK   | 32.4068G     | 57.57             | 83.54             | -25.97         | 14.00            | 1           | Horizontal | 360            | 1.70          | -       | 43.57           | 40.60        | 19.96      | 46.56      |
| AV   | 32.4047G     | 44.04             | 63.54             | -19.50         | 14.00            | 1           | Horizontal | 360            | 1.70          | "Worst" | 30.04           | 40.60        | 19.96      | 46.56      |



|            |                |
|------------|----------------|
| Test Range | 40GHz – 200GHz |
|------------|----------------|

**Test Plan: Channel 1**

| Test Frequency<br>(GHz) | Rx Antenna Gain<br>(dBi)         | Measurement<br>Distance<br>(m)         | Read Worse<br>Frequency<br>(GHz) | Read Level<br>(dBm) |
|-------------------------|----------------------------------|----------------------------------------|----------------------------------|---------------------|
| 58.32                   | 23.6                             | 8.00                                   | 52.70                            | -98.7               |
| EIRP<br>(dBm)           | Specification<br>Distance<br>(m) | Power Density<br>(pW/cm <sup>2</sup> ) | Limit<br>(pW/cm <sup>2</sup> )   | Test Result         |
| -37.36                  | 3                                | 0.1624                                 | 90                               | PASS                |

**Test Plan: Channel 3**

| Test Frequency<br>(GHz) | Rx Antenna Gain<br>(dBi)         | Measurement<br>Distance<br>(m)         | Read Worse<br>Frequency<br>(GHz) | Read Level<br>(dBm) |
|-------------------------|----------------------------------|----------------------------------------|----------------------------------|---------------------|
| 62.64                   | 23.6                             | 8.00                                   | 51.45                            | -96.05              |
| EIRP<br>(dBm)           | Specification<br>Distance<br>(m) | Power Density<br>(pW/cm <sup>2</sup> ) | Limit<br>(pW/cm <sup>2</sup> )   | Test Result         |
| -34.92                  | 3                                | 0.2849                                 | 90                               | PASS                |

**Test Plan: Channel 4**

| Test Frequency<br>(GHz) | Rx Antenna Gain<br>(dBi)         | Measurement<br>Distance<br>(m)         | Read Worse<br>Frequency<br>(GHz) | Read Level<br>(dBm) |
|-------------------------|----------------------------------|----------------------------------------|----------------------------------|---------------------|
| 64.80                   | 23.6                             | 8.00                                   | 54.31                            | -97.71              |
| EIRP<br>(dBm)           | Specification<br>Distance<br>(m) | Power Density<br>(pW/cm <sup>2</sup> ) | Limit<br>(pW/cm <sup>2</sup> )   | Test Result         |
| -36.11                  | 3                                | 0.2166                                 | 90                               | PASS                |

Note:

$$\text{EIRP} = \text{Prx} - \text{Grx} + \text{Free Space Path Loss} = \text{Prx} - \text{Grx} + 20\log(4\pi d / \lambda)^2$$

Which

Prx = Read Level.

Grx = Rx Antenna Gain.

A distance factor is offset and the formula is  $20\log(D1/D2)$ 

Which

D1 = Specification Distance

D2 = Measurement Distance

## 3.6 Frequency Stability

### 3.6.1 Limit of Frequency Stability

| Frequency Stability                                                                     | Limit                      |
|-----------------------------------------------------------------------------------------|----------------------------|
| Refer as 15.255(f) and<br>ANSI C63.10-2013, clause 9.14                                 | within the frequency bands |
| Note: These measurements shall also be performed at normal and extreme test conditions. |                            |

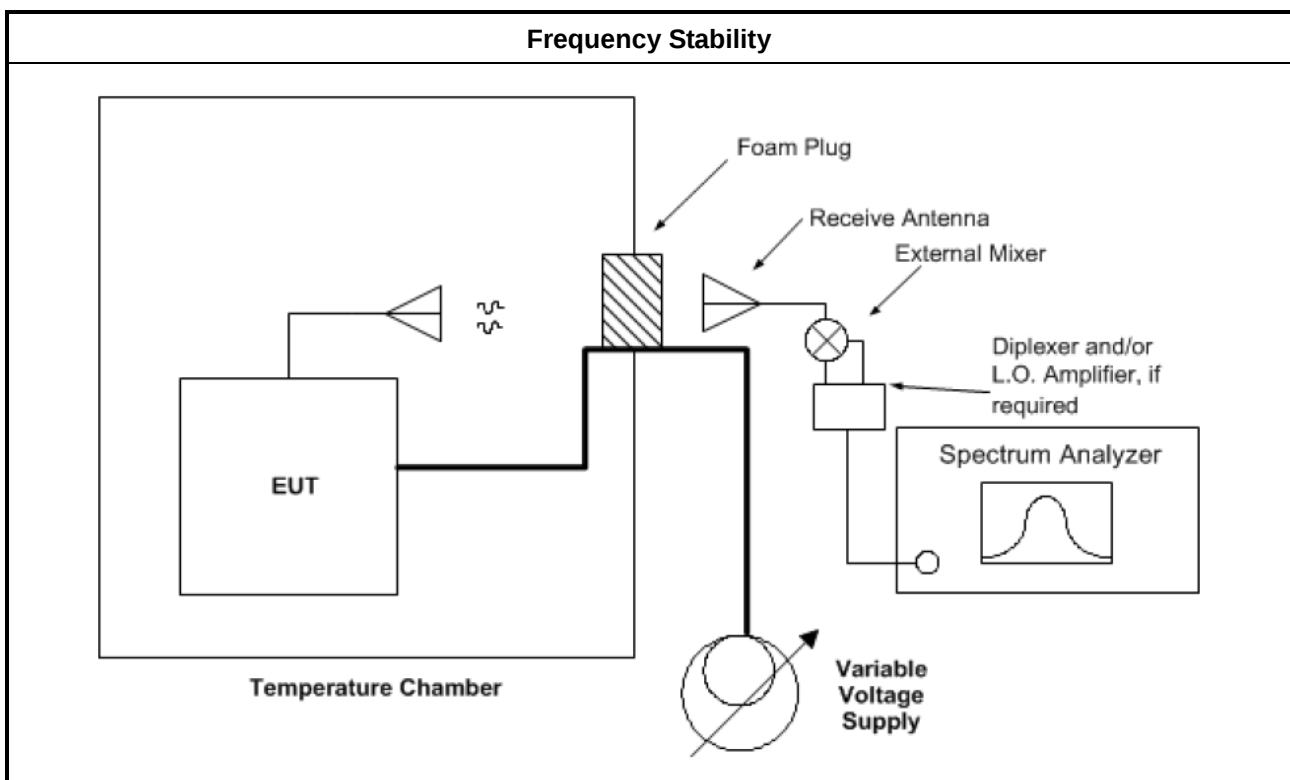
### 3.6.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.6.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 9.14.

### 3.6.4 Test Setup





### 3.6.5 Test Result of Frequency Stability

|                                                                                                                                                                                                                                                                  |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                           | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                | see ANSI C63.10, clause 9.14            |
| NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. |                                         |

#### 3.6.5.1 Frequency Stability with Respect to Ambient Temperature

| Frequency Stability with Respect to Ambient Temperature |                          |                       |              |
|---------------------------------------------------------|--------------------------|-----------------------|--------------|
| Test Results                                            |                          |                       |              |
| Test Temperature (°C)                                   | Measured Frequency (MHz) | Delta Frequency (kHz) | Limit (±kHz) |
| -20                                                     | 62621.91                 | 61505                 | within band  |
| -10                                                     | 62618.80                 | 58390                 | within band  |
| 0                                                       | 62618.80                 | 58390                 | within band  |
| 10                                                      | 62560.41                 | 0                     | within band  |
| 20                                                      | 62560.41                 | Reference             | within band  |
| 30                                                      | 62582.12                 | 21710                 | within band  |
| 40                                                      | 62582.12                 | 21710                 | within band  |
| 50                                                      | 62574.88                 | 14470                 | within band  |

**3.6.5.2 Frequency Stability When Varying Supply Voltage**

| Frequency Stability When Varying Supply Voltage |                          |                       |              |
|-------------------------------------------------|--------------------------|-----------------------|--------------|
| Test Results                                    |                          |                       |              |
| Test Voltage: (Vac)                             | Measured Frequency (MHz) | Delta Frequency (kHz) | Limit (±kHz) |
| 93.5                                            | 62560.405                | 0                     | within band  |
| 110                                             | 62560.405                | Reference             | within band  |
| 126.5                                           | 62582.115                | 21710                 | within band  |



### 3.7 Operation Restriction and Group Installation

#### 3.7.1 Limit of Operation Restriction and Group Installation

| Item                  | Limit                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Restriction | Operation is not permitted for the following products: <ul style="list-style-type: none"><li>♦ Equipment used on aircraft or satellites. (Refer as 15.255(a))</li><li>♦ Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as 15.255(a))</li></ul> |
| Group Installation    | Operation is not permitted for the following products: <ul style="list-style-type: none"><li>♦ External phase-locking (Refer as 15.255(h))</li></ul>                                                                                                                                                                                      |

#### 3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not be used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for use on aircraft or satellites.

#### 3.7.3 Result of Group Installation

The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array.



## 4 Test Equipment and Calibration Data

| Instrument                        | Brand          | Model No.        | Serial No.     | Characteristics      | Calibration Date | Calibration Due Date | Remark                |
|-----------------------------------|----------------|------------------|----------------|----------------------|------------------|----------------------|-----------------------|
| EMI Receiver                      | Agilent        | N9038A           | My52260123     | 9kHz ~ 8.4GHz        | Feb. 22, 2022    | Feb. 21, 2023        | Conduction (CO01-CB)  |
| LISN                              | F.C.C.         | FCC-LISN-50-16-2 | 04083          | 150kHz ~ 100MHz      | Feb. 09, 2022    | Feb. 08, 2023        | Conduction (CO01-CB)  |
| LISN                              | Schwarzbeck    | NSLK 8127        | 8127647        | 9kHz ~ 30MHz         | Apr. 12, 2022    | Apr. 11, 2023        | Conduction (CO01-CB)  |
| Pulse Limiter                     | Rohde&Schwarz  | ESH3-Z2          | 100430         | 9kHz ~ 30MHz         | Feb. 10, 2022    | Feb. 09, 2023        | Conduction (CO01-CB)  |
| COND Cable                        | Woken          | Cable            | Low cable-CO01 | 9kHz ~ 30MHz         | May 18, 2022     | May 17, 2023         | Conduction (CO01-CB)  |
| Software                          | SPORTON        | SENSE            | V5.10          | -                    | N.C.R.           | N.C.R.               | Conduction (CO01-CB)  |
| Loop Antenna                      | Teseq          | HLA 6120         | 24155          | 9kHz - 30 MHz        | May 14, 2022     | May 13, 2023         | Radiation (10CH01-CB) |
| 10m Semi Anechoic Chamber NSA     | TDK            | SAC-10M          | 10CH01-CB      | 30MHz~1GHz<br>10m,3m | Jan. 27, 2022    | Jan. 26, 2023        | Radiation (10CH01-CB) |
| Amplifier                         | Agilent        | 8447D            | 2944A10783     | 9kHz ~ 1.3GHz        | Mar. 11, 2022    | Mar. 10, 2023        | Radiation (10CH01-CB) |
| Amplifier                         | Agilent        | 8447D            | 2944A10784     | 9kHz ~ 1.3GHz        | Mar. 11, 2022    | Mar. 10, 2023        | Radiation (10CH01-CB) |
| Low Cable                         | Woken          | SUCOFLEX 104     | low cable-01   | 25MHz ~ 1GHz         | Oct. 19, 2021    | Oct. 18, 2022        | Radiation (10CH01-CB) |
| Low Cable                         | Woken          | SUCOFLEX 104     | low cable-02   | 25MHz ~ 1GHz         | Oct. 19, 2021    | Oct. 18, 2022        | Radiation (10CH01-CB) |
| Bilog Antenna with 6dB Attenuator | Chase & EMCI   | CBL6111A &N-6-06 | 1543 &AT-N0609 | 30MHz ~ 1GHz         | Jun. 25, 2022    | Jun. 24, 2023        | Radiation (10CH01-CB) |
| Amplifier                         | EM             | EM101            | 060703         | 10MHz ~ 1GHz         | Oct. 20, 2021    | Oct. 19, 2022        | Radiation (10CH01-CB) |
| Low Cable                         | TITAN          | T318E            | low cable-03   | 30MHz ~ 1GHz         | Jun. 17, 2022    | Jun. 16, 2023        | Radiation (10CH01-CB) |
| EMI Receiver                      | Agilent        | N9038A           | MY52260140     | 9kHz ~ 8.4GHz        | May 06, 2022     | May 05, 2023         | Radiation (10CH01-CB) |
| Signal Analyzer                   | R&S            | FSV40            | 101904         | 9kHz ~ 40GHz         | Apr. 26, 2022    | Apr. 25, 2023        | Radiation (10CH01-CB) |
| Software                          | SPORTON        | SENSE            | V5.10          | -                    | N.C.R.           | N.C.R.               | Radiation (10CH01-CB) |
| 3m Semi Anechoic Chamber VSWR     | TDK            | SAC-3M           | 03CH03-CB      | 1GHz ~18GHz<br>3m    | May 05, 2022     | May 04, 2023         | Radiation (03CH03-CB) |
| Horn Antenna                      | ETS · Lindgren | 3115             | 6821           | 750MHz~18GHz         | Jan. 21, 2022    | Jan. 20, 2023        | Radiation (03CH03-CB) |



| Instrument            | Brand            | Model No.     | Serial No.       | Characteristics | Calibration Date | Calibration Due Date | Remark                |
|-----------------------|------------------|---------------|------------------|-----------------|------------------|----------------------|-----------------------|
| Horn Antenna          | Schwarzbeck      | BBHA 9170     | BBHA9170252      | 15GHz ~ 40GHz   | Aug. 05, 2021    | Aug. 04, 2022        | Radiation (03CH03-CB) |
| Horn Antenna          | SCHWARZBECK      | BBHA 9170     | BBHA9170507      | 15GHz ~ 40GHz   | Jul. 05, 2022    | Jul. 04, 2023        | Radiation (03CH03-CB) |
| Pre-Amplifier         | Agilent          | 8449B         | 3008A02097       | 1GHz ~ 26.5GHz  | Jul. 01, 2022    | Jun. 30, 2023        | Radiation (03CH03-CB) |
| Pre-Amplifier         | -                | -             | TF-130N-R1       | 18GHz ~ 40GHz   | Jun. 21, 2022    | Jun. 20, 2023        | Radiation (03CH03-CB) |
| Spectrum Analyzer     | R&S              | FSP40         | 100019           | 9kHz ~ 40GHz    | Jun. 10, 2022    | Jun. 09, 2023        | Radiation (03CH03-CB) |
| RF Cable-high         | Woken            | RG402         | High Cable-20+29 | 1GHz ~ 18GHz    | Oct. 04, 2021    | Oct. 03, 2022        | Radiation (03CH03-CB) |
| RF Cable-high         | Woken            | RG402         | High Cable-29    | 1GHz ~ 18GHz    | Oct. 04, 2021    | Oct. 03, 2022        | Radiation (03CH03-CB) |
| High Cable            | Woken            | WCA0929M      | 40G#5+7          | 1GHz ~ 40 GHz   | Dec. 14, 2021    | Dec. 13, 2022        | Radiation (03CH03-CB) |
| High Cable            | Woken            | WCA0929M      | 40G#5            | 1GHz ~ 40 GHz   | Dec. 08, 2021    | Dec. 07, 2022        | Radiation (03CH03-CB) |
| High Cable            | Woken            | WCA0929M      | 40G#7            | 1GHz ~ 40 GHz   | Dec. 14, 2021    | Dec. 13, 2022        | Radiation (03CH03-CB) |
| Test Software         | SPORTON          | SENSE         | V5.10            | -               | N.C.R.           | N.C.R.               | Radiation (03CH03-CB) |
| Mixer                 | OML              | M19HWA        | U91113-1         | 40 ~ 60 GHz     | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH03-CB) |
| *Mixer                | OML              | M15HWA        | V91113-1         | 50 ~ 75 GHz     | Nov. 13, 2020    | Nov. 12, 2022        | Radiation (03CH03-CB) |
| *Mixer                | OML              | M12HWA        | E91113-1         | 60 ~ 90 GHz     | Nov. 14, 2020    | Nov. 13, 2022        | Radiation (03CH03-CB) |
| Mixer                 | OML              | M08HWA        | F91113-1         | 90 ~ 140 GHz    | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH03-CB) |
| Mixer                 | OML              | M05HW/A       | G91113-1         | 140 ~ 220 GHz   | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH03-CB) |
| Detector              | Millitech        | DET-15-RPF W0 | #A18185(074)     | 50 ~ 75 GHz     | Apr. 23, 2022    | Apr. 22, 2023        | Radiation (03CH03-CB) |
| PC Oscilloscope       | PICO TECH        | 6402C         | CX372/002        | N/A             | Jul. 08, 2021    | Jul. 07, 2022        | Radiation (03CH03-CB) |
| PC Oscilloscope       | PICO TECH        | 6402C         | CX372/002        | N/A             | Jul. 07, 2022    | Jul. 06, 2023        | Radiation (03CH03-CB) |
| Standard Horn Antenna | Custom Microwave | M19RH         | U91113-A         | 40 ~ 60 GHz     | N.C.R            | N.C.R                | Radiation (03CH03-CB) |
| Standard Horn Antenna | Custom Microwave | M15RH         | V91113-A         | 50 ~ 75 GHz     | N.C.R            | N.C.R                | Radiation (03CH03-CB) |
| Standard Horn Antenna | Custom Microwave | M12RH         | E91113-A         | 60 ~ 90 GHz     | N.C.R            | N.C.R                | Radiation (03CH03-CB) |
| Standard Horn Antenna | Custom Microwave | M08RH         | F91113-A         | 90 ~ 140 GHz    | N.C.R            | N.C.R                | Radiation (03CH03-CB) |



| Instrument                    | Brand            | Model No.     | Serial No.       | Characteristics | Calibration Date | Calibration Due Date | Remark                |
|-------------------------------|------------------|---------------|------------------|-----------------|------------------|----------------------|-----------------------|
| Standard Horn Antenna         | Custom Microwave | M05RH         | G91113-A         | 140 ~ 220 GHz   | N.C.R            | N.C.R                | Radiation (03CH03-CB) |
| 3m Semi Anechoic Chamber VSWR | TDK              | SAC-3M        | 03CH04-CB        | 1GHz ~18GHz 3m  | Feb. 24, 2022    | Feb. 23, 2023        | Radiation (03CH04-CB) |
| Horn Antenna                  | ETS • Lindgren   | 3115          | 00143147         | 750MHz~18GHz    | Oct. 25, 2021    | Oct. 24, 2022        | Radiation (03CH04-CB) |
| Horn Antenna                  | Schwarzbeck      | BBHA 9170     | BBHA9170252      | 15GHz ~ 40GHz   | Aug. 05, 2021    | Aug. 04, 2022        | Radiation (03CH04-CB) |
| Horn Antenna                  | SCHWARZBECK      | BBHA 9170     | BBHA9170507      | 15GHz ~ 40GHz   | Jul. 05, 2022    | Jul. 04, 2023        | Radiation (03CH04-CB) |
| Pre-Amplifier                 | Agilent          | 83017A        | MY53270063       | 0.5GHz~26.5GHz  | Jul. 01, 2022    | Jun. 30, 2023        | Radiation (03CH04-CB) |
| Pre-Amplifier                 | -                | -             | TF-130N-R1       | 18GHz ~ 40GHz   | Jun. 21, 2022    | Jun. 20, 2023        | Radiation (03CH04-CB) |
| Spectrum Analyzer             | R&S              | FSP40         | 100142           | 9kHz~40GHz      | Mar. 28, 2022    | Mar. 27, 2023        | Radiation (03CH04-CB) |
| RF Cable-high                 | Woken            | RG402         | High Cable-21    | 1GHz - 18GHz    | Oct. 04, 2021    | Oct. 03, 2022        | Radiation (03CH04-CB) |
| RF Cable-high                 | Woken            | RG402         | High Cable-21+67 | 1GHz - 18GHz    | Oct. 04, 2021    | Oct. 03, 2022        | Radiation (03CH04-CB) |
| High Cable                    | Woken            | WCA0929M      | 40G#5+7          | 1GHz ~ 40 GHz   | Dec. 14, 2021    | Dec. 13, 2022        | Radiation (03CH04-CB) |
| High Cable                    | Woken            | WCA0929M      | 40G#5            | 1GHz ~ 40 GHz   | Dec. 08, 2021    | Dec. 07, 2022        | Radiation (03CH04-CB) |
| High Cable                    | Woken            | WCA0929M      | 40G#7            | 1GHz ~ 40 GHz   | Dec. 14, 2021    | Dec. 13, 2022        | Radiation (03CH04-CB) |
| Test Software                 | SPORTON          | SENSE         | V5.10            | -               | N.C.R.           | N.C.R.               | Radiation (03CH04-CB) |
| Mixer                         | OML              | M19HWA        | U91113-1         | 40 ~ 60 GHz     | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH04-CB) |
| *Mixer                        | OML              | M15HWA        | V91113-1         | 50 ~ 75 GHz     | Nov. 13, 2020    | Nov. 12, 2022        | Radiation (03CH04-CB) |
| *Mixer                        | OML              | M12HWA        | E91113-1         | 60 ~ 90 GHz     | Nov. 14, 2020    | Nov. 13, 2022        | Radiation (03CH04-CB) |
| Mixer                         | OML              | M08HWA        | F91113-1         | 90 ~ 140 GHz    | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH04-CB) |
| Mixer                         | OML              | M05HW/A       | G91113-1         | 140 ~ 220 GHz   | Mar. 10, 2022    | Mar. 09, 2023        | Radiation (03CH04-CB) |
| Detector                      | Millitech        | DET-15-RPF W0 | #A18185(074)     | 50 ~ 75 GHz     | Apr. 23, 2022    | Apr. 22, 2023        | Radiation (03CH04-CB) |
| PC Oscilloscope               | PICO TECH        | 6402C         | CX372/002        | N/A             | Jul. 08, 2021    | Jul. 07, 2022        | Radiation (03CH04-CB) |
| PC Oscilloscope               | PICO TECH        | 6402C         | CX372/002        | N/A             | Jul. 07, 2022    | Jul. 06, 2023        | Radiation (03CH04-CB) |



| Instrument                 | Brand            | Model No.        | Serial No.  | Characteristics | Calibration Date | Calibration Due Date | Remark                |
|----------------------------|------------------|------------------|-------------|-----------------|------------------|----------------------|-----------------------|
| Standard Horn Antenna      | Custom Microwave | M19RH            | U91113-A    | 40 ~ 60 GHz     | N.C.R            | N.C.R                | Radiation (03CH04-CB) |
| Standard Horn Antenna      | Custom Microwave | M15RH            | V91113-A    | 50 ~ 75 GHz     | N.C.R            | N.C.R                | Radiation (03CH04-CB) |
| Standard Horn Antenna      | Custom Microwave | M12RH            | E91113-A    | 60 ~ 90 GHz     | N.C.R            | N.C.R                | Radiation (03CH04-CB) |
| Standard Horn Antenna      | Custom Microwave | M08RH            | F91113-A    | 90 ~ 140 GHz    | N.C.R            | N.C.R                | Radiation (03CH04-CB) |
| Standard Horn Antenna      | Custom Microwave | M05RH            | G91113-A    | 140 ~ 220 GHz   | N.C.R            | N.C.R                | Radiation (03CH04-CB) |
| Spectrum analyzer          | R&S              | FSV40            | 101028      | 9kHz~40GHz      | Jan. 07, 2022    | Jan. 06, 2023        | Radiation (TH03-CB)   |
| Temp. and Humidity Chamber | Gaint Force      | GTH-408-40-CP-AR | MAA1410-011 | -40~100 degree  | Sep. 09, 2021    | Sep. 08, 2022        | Radiation (TH03-CB)   |

Note: Calibration Interval of instruments listed above is one year.

“\*” Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.



## 5 Measurement Uncertainty

| Test Items                           | Uncertainty | Remark                   |
|--------------------------------------|-------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz)  | 3.4 dB      | Confidence levels of 95% |
| Radiated Emission (9kHz ~ 30MHz)     | 3.4 dB      | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 5.6 dB      | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz)     | 5.2 dB      | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz)    | 4.7 dB      | Confidence levels of 95% |
| Radiated Emission (40GHz ~ 60GHz)    | 3.0 dB      | Confidence levels of 95% |
| Radiated Emission (60GHz ~ 90GHz)    | 3.2 dB      | Confidence levels of 95% |
| Radiated Emission (90GHz ~ 200GHz)   | 4.3 dB      | Confidence levels of 95% |
| Temperature                          | 1.2°C       | Confidence levels of 95% |