

# FCC Radio Test Report

FCC ID : 2AY4J-TK20  
Contain FCC ID : XMR2020BG95M2  
Equipment : Tack GPS Location Tracker  
Brand Name : TACK  
Model Name : TK20  
Applicant : Tack One Private Limited  
22 SIN MING LANE #06-76, MIDVIEW CITY  
SINGAPORE 573969  
Manufacturer : Tack One Private Limited  
22 SIN MING LANE #06-76, MIDVIEW CITY  
SINGAPORE 573969  
Standard : 47 CFR FCC Part 15.247

The product was received on Dec. 28, 2020, and testing was started from Apr. 26, 2021 and completed on Apr. 28, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

**SPORTON INTERNATIONAL INC. Hsinhua Laboratory**

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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TEL : 886-3-3273456  
FAX : 886-3-3270973  
Report Template No.: HE1-C10 Ver4.1  
FCC ID: 2AY4J-TK20

## Summary of Test Result

| Report Clause | Ref.Std. Clause | Test Items                                  | Result (PASS/FAIL) | Remark |
|---------------|-----------------|---------------------------------------------|--------------------|--------|
| 1.1.2         | 15.203          | Antenna Requirement                         | PASS               | -      |
| 3.1           | 15.207          | AC Power-line Conducted Emissions           | PASS               | -      |
| 3.2           | 15.247(a)       | DTS Bandwidth                               | PASS               | -      |
| 3.3           | 15.247(b)       | Maximum Conducted Output Power              | PASS               | -      |
| 3.4           | 15.247(e)       | Power Spectral Density                      | PASS               | -      |
| 3.5           | 15.247(d)       | Emissions in Non-restricted Frequency Bands | PASS               | -      |
| 3.6           | 15.247(d)       | Emissions in Restricted Frequency Bands     | PASS               | -      |

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and explanations:**

None

**Reviewed by: Ben Tseng**

**Report Producer: Jenny Yang**

# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| Frequency Range (MHz) | Bluetooth Mode | Ch. Frequency (MHz) | Channel Number |
|-----------------------|----------------|---------------------|----------------|
| 2400-2483.5           | LE             | 2402-2480           | 0-39 [40]      |

| Band          | Mode         | BWch (MHz) | Nant |
|---------------|--------------|------------|------|
| 2.4-2.4835GHz | BT-LE(1Mbps) | 1.0        | 1TX  |

Note:

- ♦ Bluetooth LE uses a GFSK (1Mbps) modulation.
- ♦ BWch is the nominal channel bandwidth.

### 1.1.2 Antenna Information

| Ant. | Brand    | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|----------|------------|--------------|-----------|------------|
| 1    | Tack GPS | TK20       | PCB          | I-PEX     | -7.02      |

**For BT function:**

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant. 1 can be used as transmitting/receiving.

### 1.1.3 EUT Information

| Operational Condition               |                                                                               |                                         |     |
|-------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------|-----|
| <b>EUT Power Type</b>               | From test fixture                                                             |                                         |     |
| <b>EUT Function</b>                 | <input checked="" type="checkbox"/> Point-to-multipoint                       | <input type="checkbox"/> Point-to-point |     |
| Type of EUT                         |                                                                               |                                         |     |
| <input checked="" type="checkbox"/> | Stand-alone                                                                   |                                         |     |
| <input type="checkbox"/>            | Combined (EUT where the radio part is fully integrated within another device) |                                         |     |
|                                     | Combined Equipment - Brand Name / Model No.:                                  |                                         | ... |
| <input type="checkbox"/>            | Plug-in radio (EUT intended for a variety of host systems)                    |                                         |     |
|                                     | Host System - Brand Name / Model No.:                                         |                                         | ... |
| <input type="checkbox"/>            | Other:                                                                        |                                         |     |

### 1.1.4 Mode Test Duty Cycle

| Mode         | DC    | DCF(dB) | T(s)   | VBW(Hz) $\geq 1/T$ |
|--------------|-------|---------|--------|--------------------|
| BT-LE(1Mbps) | 0.775 | 1.11    | 2.095m | 1k                 |

Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

## 1.2 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013

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

- KDB 558074 D01 v05r02
- KDB 414788 D01 v01r01

## 1.3 Testing Location Information

| Test Lab. : Sporton International Inc. Hsinhua Laboratory       |                                                                                         |               |                        |             |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------|------------------------|-------------|
| <input checked="" type="checkbox"/> Hsinhua<br>(TAF: 3785)      | ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)          |               |                        |             |
|                                                                 | TEL: 886-3-327-3456                                                                     |               | FAX: 886-3-327-0973    |             |
| Test site Designation No. TW3785 with FCC.                      |                                                                                         |               |                        |             |
| Test Condition                                                  | Test Site No.                                                                           | Test Engineer | Test Environment       | Test Date   |
| AC Conduction                                                   | CO04-HY                                                                                 | Edward Wang   | 21.2~22.3°C / 58~63%   | 28/Apr/2021 |
| RF Conducted                                                    | TH07-HY                                                                                 | Justin Pan    | 20.1~25.2°C / 51.2~60% | 26/Apr/2021 |
| <input checked="" type="checkbox"/> Wen 33rd.St.<br>(TAF: 3785) | ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) |               |                        |             |
|                                                                 | TEL: 886-3-318-0787                                                                     |               | FAX: 886-3-318-0287    |             |
| Test site Designation No. TW0008 with FCC.                      |                                                                                         |               |                        |             |
| Test Condition                                                  | Test Site No.                                                                           | Test Engineer | Test Environment       | Test Date   |
| Radiated                                                        | 03CH09-HY                                                                               | Lego Lin      | 23.2~24.5°C / 59~64%   | 26/Apr/2021 |

## 1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Test Items                           | Uncertainty | Remark                   |
|--------------------------------------|-------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz)  | 0.9 dB      | Confidence levels of 95% |
| Radiated Emission (9kHz ~ 30MHz)     | 2.4 dB      | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 3.7 dB      | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz)     | 3.6 dB      | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz)    | 3.5 dB      | Confidence levels of 95% |
| Conducted Emission                   | 1.0 dB      | Confidence levels of 95% |
| Temperature                          | 0.41 °C     | Confidence levels of 95% |
| Humidity                             | 3.4 %       | Confidence levels of 95% |



## **2 Test Configuration of EUT**

### **2.1 Test Channel Mode**

|                              |                       |
|------------------------------|-----------------------|
| <b>Test Software Version</b> | ESP_RF_test_tool_v2.5 |
|------------------------------|-----------------------|

| <b>Mode</b>  | <b>Power Setting</b> |
|--------------|----------------------|
| BT-LE(1Mbps) | -                    |
| 2402MHz      | 8                    |
| 2440MHz      | 8                    |
| 2480MHz      | 8                    |

## 2.2 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests |                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------|
| Tests Item                                          | AC power-line conducted emissions                                                       |
| Condition                                           | AC power-line conducted measurement for line and neutral<br>Test Voltage: 120Vac / 60Hz |
| Operating Mode                                      | CTX                                                                                     |
| 1                                                   | Test Fixture mode                                                                       |

| The Worst Case Mode for Following Conformance Tests |                                                                                                                          |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Tests Item                                          | DTS Bandwidth<br>Maximum Conducted Output Power<br>Power Spectral Density<br>Emissions in Non-restricted Frequency Bands |
| Test Condition                                      | Conducted measurement at transmit chains                                                                                 |

| The Worst Case Mode for Following Conformance Tests |                                                                                                                                                                                                                                                     |                                                                                      |                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Tests Item                                          | Emissions in Restricted Frequency Bands                                                                                                                                                                                                             |                                                                                      |                                                                                       |
| Test Condition                                      | Radiated measurement<br>If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. |                                                                                      |                                                                                       |
| Operating Mode < 1GHz                               | CTX                                                                                                                                                                                                                                                 |                                                                                      |                                                                                       |
| 1                                                   | Test Fixture mode                                                                                                                                                                                                                                   |                                                                                      |                                                                                       |
| Operating Mode > 1GHz                               | CTX                                                                                                                                                                                                                                                 |                                                                                      |                                                                                       |
| Orthogonal Planes of EUT                            | X Plane                                                                                                                                                                                                                                             | Y Plane                                                                              | Z Plane                                                                               |
|                                                     |                                                                                                                                                                  |  |  |
| Worst Planes of EUT                                 | V                                                                                                                                                                                                                                                   |                                                                                      |                                                                                       |

## 2.3 Accessories

| Accessories |              |                                                 |            |        |
|-------------|--------------|-------------------------------------------------|------------|--------|
| Data Cable  | Brand Name   | -                                               | Model Name | -      |
|             | Manufacturer | -                                               | SN         | -      |
|             | Signal Line  | 0.2 meter, non-shielded cable, w/o ferrite core |            |        |
| Battery     | Brand Name   | -                                               | Model Name | 703035 |
|             | Power Rating | 3.7 Vdc, 750 mAh                                | Type       | Li-ion |

Reminder: Regarding to more detail and other information, please refer to user manual.

## 2.4 Support Equipment

| Support Equipment – AC Conduction |                |            |            |        |        |
|-----------------------------------|----------------|------------|------------|--------|--------|
| No.                               | Equipment      | Brand Name | Model Name | FCC ID | Remark |
| 1                                 | Notebook       | DELL       | PP13S      | -      | -      |
| 2                                 | Fixture        | -          | -          | -      | Note 1 |
| 3                                 | Adapter for NB | DELL       | LA65NM130  | -      | -      |

Note 1: Provided by Customer

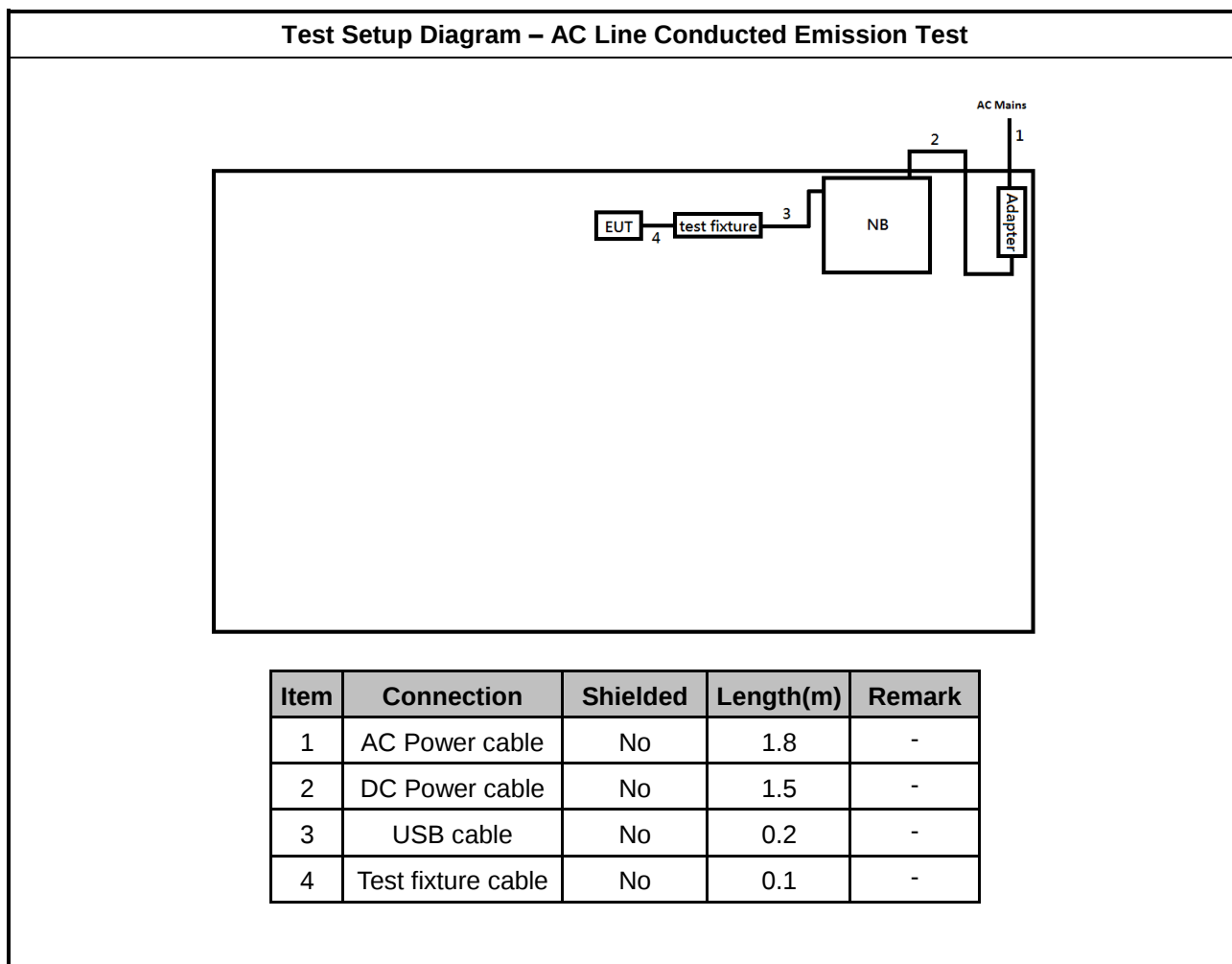
| Support Equipment – Conducted |                |            |            |        |        |
|-------------------------------|----------------|------------|------------|--------|--------|
| No.                           | Equipment      | Brand Name | Model Name | FCC ID | Remark |
| 1                             | Notebook       | HP         | 5220M      | -      | -      |
| 2                             | Adapter for NB | HP         | PPP012L-E  | -      | -      |
| 3                             | Fixture        | -          | -          | -      | Note 1 |

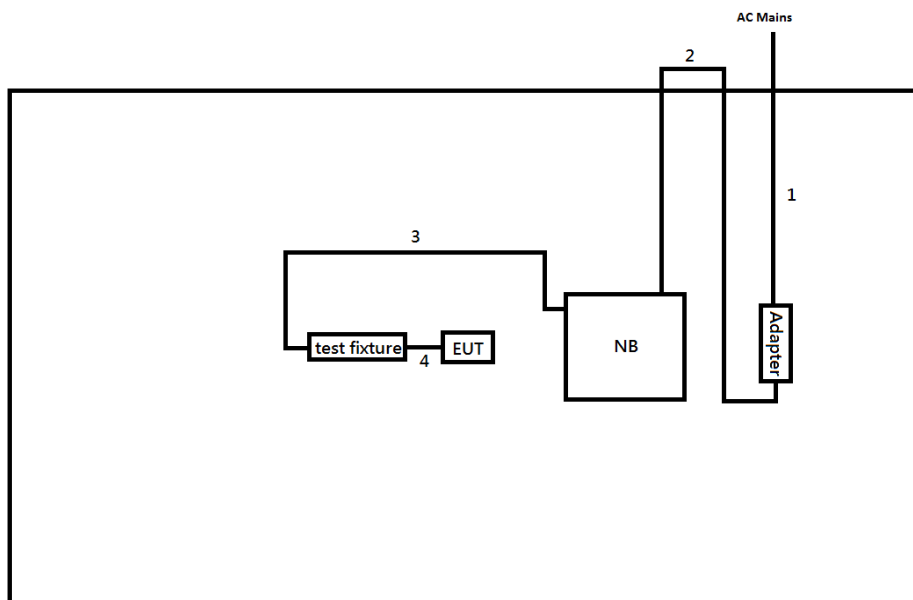
Note 1: Provided by Customer

| Support Equipment – Radiated |                |            |            |        |        |
|------------------------------|----------------|------------|------------|--------|--------|
| No.                          | Equipment      | Brand Name | Model Name | FCC ID | Remark |
| 1                            | Notebook       | DELL       | PP13S      | -      | -      |
| 2                            | Fixture        | -          | -          | -      | Note 1 |
| 3                            | Adapter for NB | DELL       | LA65NM130  | -      | -      |

Note 1: Provided by Customer

## 2.5 Test Setup Diagram



**Test Setup Diagram - Radiated Test**


| Item | Connection         | Shielded | Length(m) | Remark |
|------|--------------------|----------|-----------|--------|
| 1    | AC Power cable     | No       | 1.8       | -      |
| 2    | DC Power cable     | No       | 1.5       | -      |
| 3    | USB cable          | No       | 0.2       | -      |
| 4    | Test fixture cable | No       | 0.1       | -      |

### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line 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 1: * Decreases with the logarithm of the frequency. |            |           |

##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

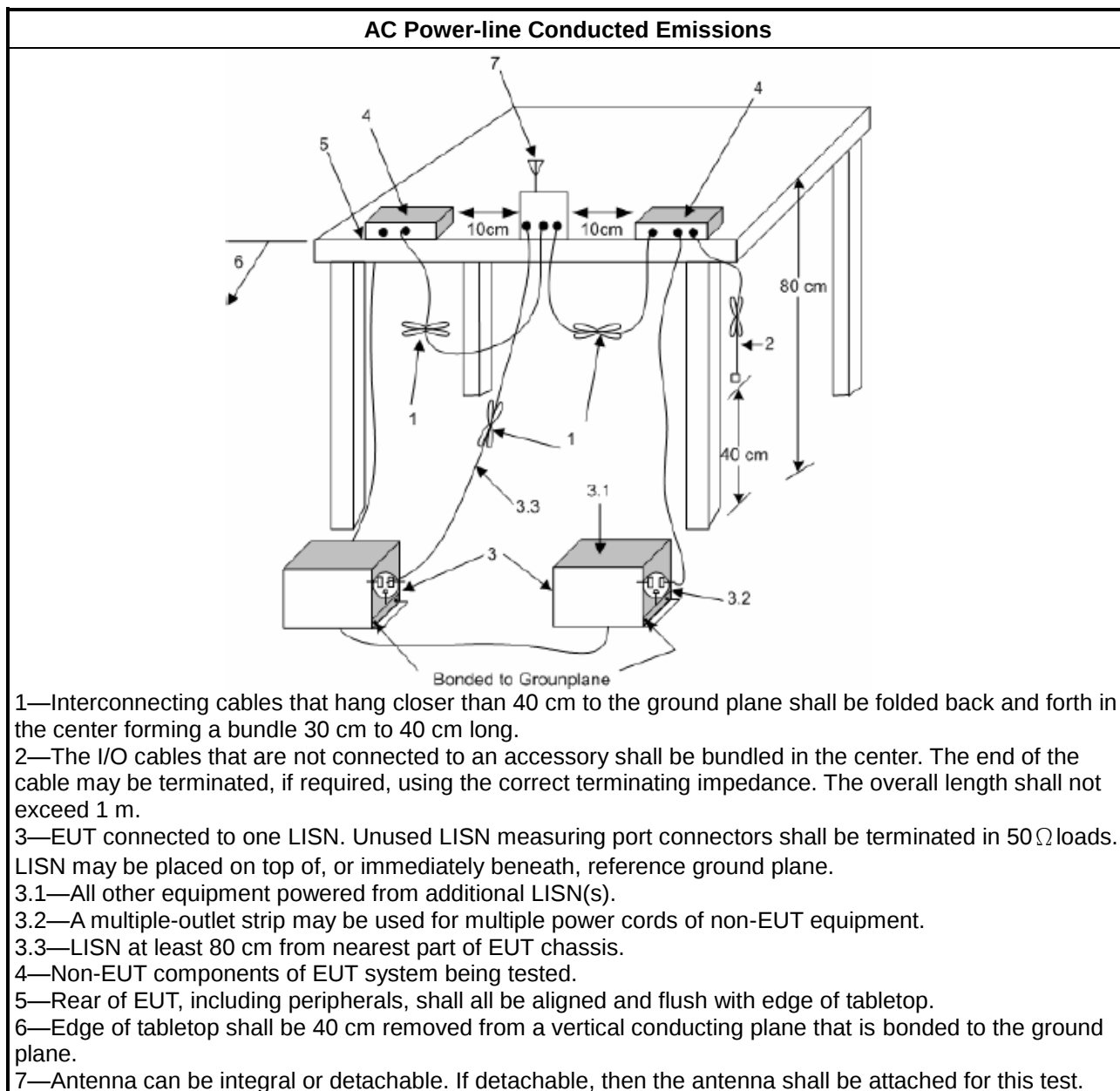
| Test Method                                                                   |
|-------------------------------------------------------------------------------|
| ▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions. |

##### 3.1.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator).

### 3.1.5 Test Setup



### 3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

## 3.2 DTS Bandwidth

### 3.2.1 6dB Bandwidth Limit

| 6dB Bandwidth Limit                          |                                |
|----------------------------------------------|--------------------------------|
| Systems using digital modulation techniques: |                                |
| ▪                                            | 6 dB bandwidth $\geq$ 500 kHz. |

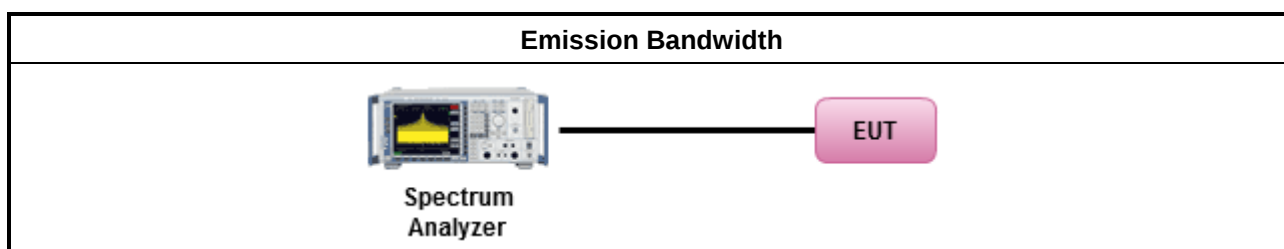
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

| Test Method                                                                    |                                                                                  |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| ▪ For the emission bandwidth shall be measured using one of the options below: |                                                                                  |
| <input checked="" type="checkbox"/>                                            | Refer as KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement. |
| <input type="checkbox"/>                                                       | Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.                     |
| <input type="checkbox"/>                                                       | Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.               |

### 3.2.4 Test Setup



### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

### 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

| Maximum Conducted Output Power Limit                                                                                                                              |                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>If <math>G_{TX} \leq 6</math> dBi, then <math>P_{Out} \leq 30</math> dBm (1 W)</li> </ul>                                                |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Point-to-multipoint systems (P2M): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)</math> dBm</li> </ul>       |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Point-to-point systems (P2P): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>          |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Smart antenna system (SAS):</li> </ul>                                                                                                   |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Single beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>                         |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Overlap beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>                        |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Aggregate power on all beams: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3 + 8</math> dB dBm</li> </ul> |
| e.i.r.p. Power Limit:                                                                                                                                             |                                                                                                                                                                                 |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>2400-2483.5 MHz Band</li> </ul>                                                                                                          |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Point-to-multipoint systems (P2M): <math>P_{eirp} \leq 36</math> dBm (4 W)</li> </ul>                                                    |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Point-to-point systems (P2P): <math>P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])</math> dBm</li> </ul>                               |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Smart antenna system (SAS)</li> </ul>                                                                                                    |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Single beam: <math>P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})</math> dBm</li> </ul>                                                |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Overlap beam: <math>P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})</math> dBm</li> </ul>                                               |
|                                                                                                                                                                   | <ul style="list-style-type: none"> <li>- Aggregate power on all beams: <math>P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])</math> dBm</li> </ul>                         |
| $P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm,<br>$G_{TX}$ = the maximum transmitting antenna directional gain in dBi. |                                                                                                                                                                                 |

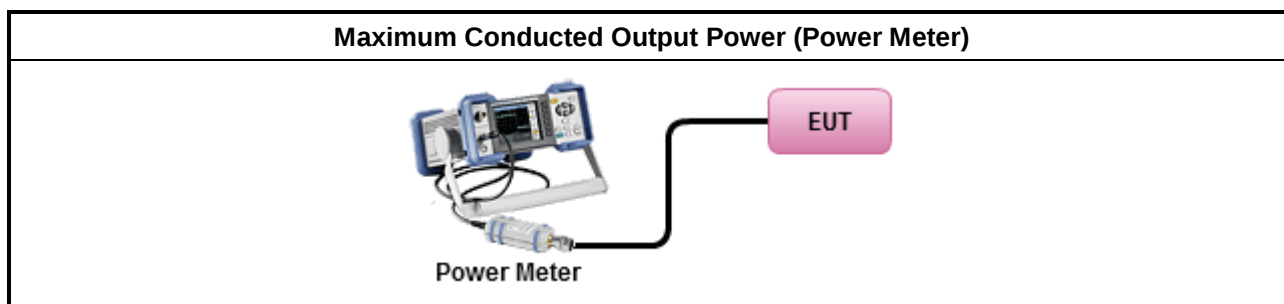
#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.3.3 Test Procedures

| Test Method                                                                                                                                                                                                                                                                                                                                                        |                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Maximum Peak Conducted Output Power</li> </ul>                                                                                                                                                                                                                                                                              |                                                                                             |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                           | Refer as KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.             |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                           | Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method. |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                           | Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.             |
| <ul style="list-style-type: none"> <li>Maximum Average Conducted Output Power</li> </ul>                                                                                                                                                                                                                                                                           |                                                                                             |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                           | Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.    |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                | Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.          |
| <ul style="list-style-type: none"> <li>For conducted measurement.</li> </ul>                                                                                                                                                                                                                                                                                       |                                                                                             |
| <ul style="list-style-type: none"> <li>If the EUT supports multiple transmit chains using options given below:<br/>Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.</li> </ul> |                                                                                             |
| <ul style="list-style-type: none"> <li>If multiple transmit chains, EIRP calculation could be following as methods:<br/> <math display="block">P_{total} = P_1 + P_2 + \dots + P_n</math> (calculated in linear unit [mW] and transfer to log unit [dBm])<br/> <math display="block">EIRP_{total} = P_{total} + DG</math> </li> </ul>                              |                                                                                             |

### 3.3.4 Test Setup



### 3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

| Power Spectral Density Limit |                                                |
|------------------------------|------------------------------------------------|
| ▪                            | Power Spectral Density (PSD) $\leq 8$ dBm/3kHz |

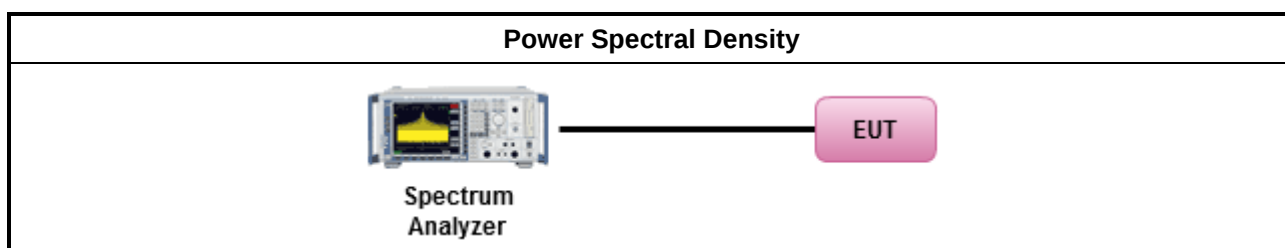
#### 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.4.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ▪                                   | Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).                                                                                                         |
| <input checked="" type="checkbox"/> | Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Max. PSD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ▪                                   | For conducted measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ▪                                   | If The EUT supports multiple transmit chains using options given below:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ▪                                   | Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. |

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

### 3.5 Emissions in Non-restricted Frequency Bands

#### 3.5.1 Emissions in Non-restricted Frequency Bands Limit

| Un-restricted Band Emissions Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| RF output power procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Limit (dB) |
| Peak output power procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20         |
| Average output power procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30         |
| <p>Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak level.</p> <p>Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average level.</p> |            |

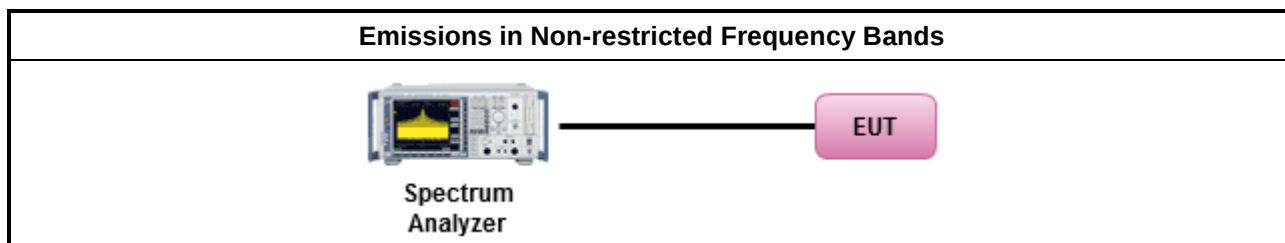
#### 3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.5.3 Test Procedures

| Test Method                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.</li> </ul> |

#### 3.5.4 Test Setup



#### 3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

### 3.6 Emissions in Restricted Frequency Bands

#### 3.6.1 Emissions in Restricted Frequency Bands Limit

| Restricted Band Emissions Limit |                       |                         |                      |
|---------------------------------|-----------------------|-------------------------|----------------------|
| Frequency Range (MHz)           | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) |
| 0.009~0.490                     | 2400/F(kHz)           | 48.5 - 13.8             | 300                  |
| 0.490~1.705                     | 24000/F(kHz)          | 33.8 - 23               | 30                   |
| 1.705~30.0                      | 30                    | 29                      | 30                   |
| 30~88                           | 100                   | 40                      | 3                    |
| 88~216                          | 150                   | 43.5                    | 3                    |
| 216~960                         | 200                   | 46                      | 3                    |
| Above 960                       | 500                   | 54                      | 3                    |

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

#### 3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.6.3 Test Procedures

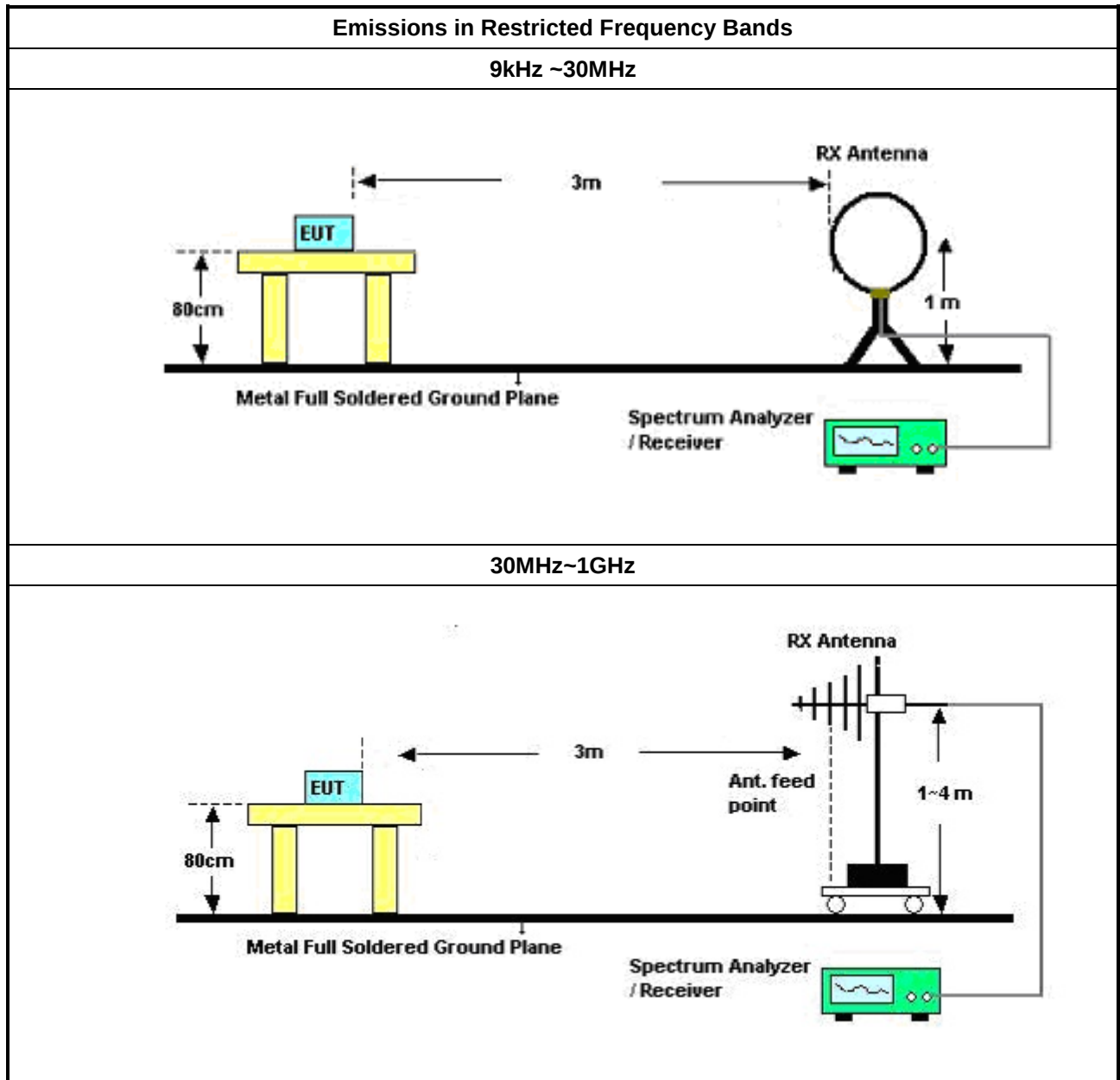
| Test Method                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>The average emission levels shall be measured in [duty cycle <math>\geq</math> 98 or duty factor].</li> </ul>                                                                        |                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.</li> </ul> |                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>For the transmitter unwanted emissions shall be measured using following options below:</li> </ul>                                                                                   |                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.</li> </ul>                                                                                                                         |
| <ul style="list-style-type: none"> <li>For the transmitter band-edge emissions shall be measured using following options below:</li> </ul>                                                                                  |                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Refer as KDB 558074 clause 8.7.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.</li> </ul> |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Refer as KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements.</li> </ul>                                                                                                  |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels.</li> </ul>                                                                             |
| <ul style="list-style-type: none"> <li>Use the following spectrum analyzer settings:</li> </ul>                                                                                                                             |                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Set RBW=100 kHz for <math>f &lt; 1</math> GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.</li> </ul>                                                                                          |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Set RBW = 1 MHz, VBW= 3MHz for <math>f \geq 1</math> GHz for peak measurement. For average measurement, refer as 1.1.4.</li> </ul>                                                                                        |
| <ul style="list-style-type: none"> <li>KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.</li> </ul>                                                                                                   |                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Based on FCC 15.31(f)(2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.</li> </ul>            |
|                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.</li> </ul>                                                                             |

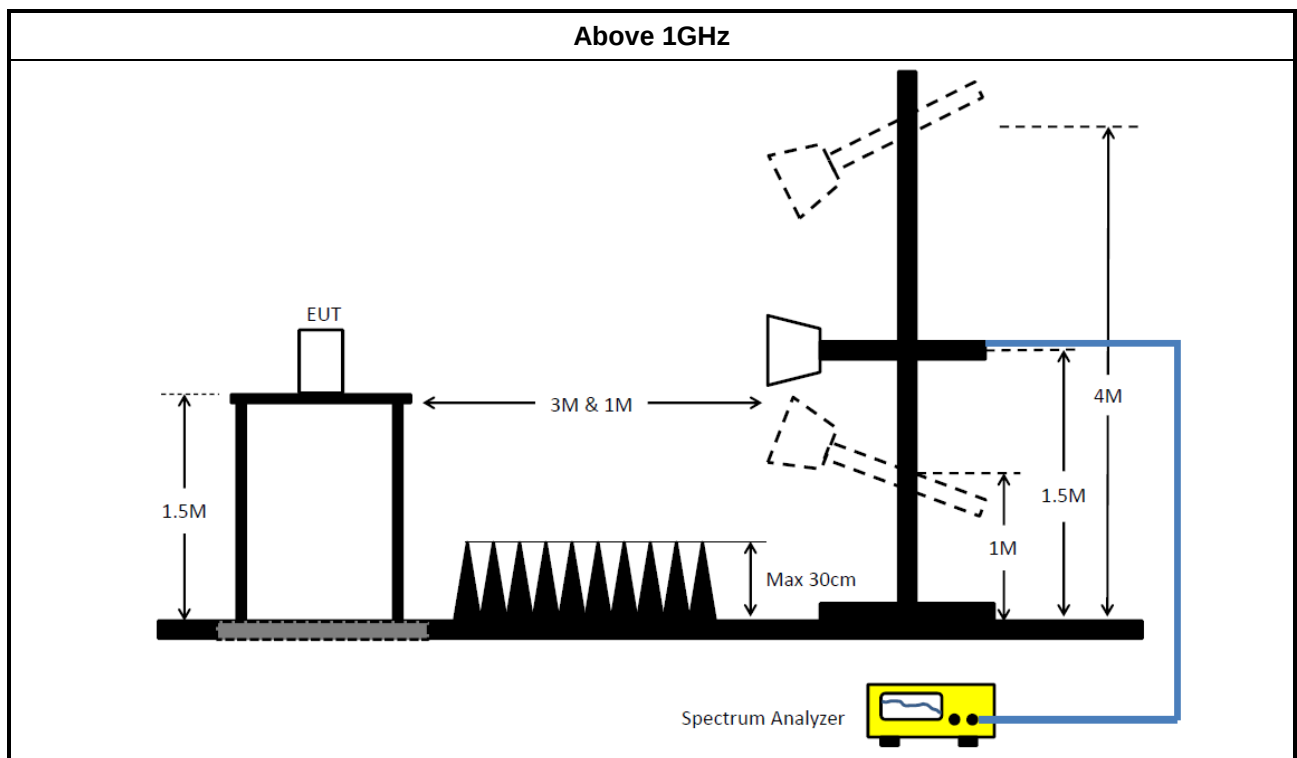
### 3.6.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

### 3.6.5 Test Setup





### 3.6.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

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

### 3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

## 4 Test Equipment and Calibration Data

### Instrument for AC Conduction

| Instrument                     | Manufacturer /Brand | Model No.   | Serial No.    | Spec.         | Calibration Date | Calibration Due Date |
|--------------------------------|---------------------|-------------|---------------|---------------|------------------|----------------------|
| EMI Test Receiver              | R&S                 | ESR3        | 102051        | 9kHz ~ 3.6GHz | 29/May/2020      | 28/May/2021          |
| LISN                           | R&S                 | ENV216      | 101295        | 9kHz ~ 30MHz  | 11/Nov/2020      | 10/Nov/2021          |
| RF Cable 5m                    | TITAN               | TITAN       | CO04-cable-01 | 0.1MHz~200MHz | 03/Mar/2021      | 02/Mar/2022          |
| Impuls Begrenzer Pulse Limiter | SCHWARZBECK         | VTSD 9561-F | 9561-F041     | 9kHz ~ 30MHz  | 21/Sep/2020      | 20/Sep/2021          |

### Instrument for Conducted Test

| Instrument               | Manufacturer /Brand | Model No. | Serial No. | Spec.        | Calibration Date | Calibration Due Date |
|--------------------------|---------------------|-----------|------------|--------------|------------------|----------------------|
| Signal Analyzer          | R&S                 | FSV 40    | 101515     | 10Hz~40GHz   | 26/Mar/2021      | 25/Mar/2022          |
| SMB100A Signal Generator | R&S                 | SMB100A03 | 181147     | 100kHz~40GHz | 20/Oct/2020      | 19/Oct/2021          |
| Pulse Sensor             | Anritsu             | MA2411B   | 1339407    | 300MHz~40GHz | 27/Nov/2020      | 26/Nov/2021          |
| Power Meter              | Anritsu             | ML2495A   | 1517010    | 300MHz~40GHz | 27/Nov/2020      | 26/Nov/2021          |

**Instrument for Radiated Test**

| Instrument                       | Manufacturer /Brand | Model No.               | Serial No.                                     | Spec.            | Calibration Date | Calibration Due Date |
|----------------------------------|---------------------|-------------------------|------------------------------------------------|------------------|------------------|----------------------|
| 3m Semi Anechoic Chamber         | TDK                 | SAC-3M                  | 03CH09-HY                                      | 30MHz~1GHz<br>3m | 26/Mar/2021      | 25/Mar/2022          |
| 3m Semi Anechoic Chamber         | TDK                 | SAC-3M                  | 03CH09-HY                                      | 1GHz~18GHz<br>3m | 18/Mar/2021      | 17/Mar/2022          |
| EXA Signal Analyzer              | KEYSIGHT            | N9010A                  | MY54200885                                     | 10Hz~44GHz       | 11/Aug/2020      | 10/Aug/2021          |
| Amplifier                        | EMC                 | EMC9135                 | 980232                                         | 9kHz~1GHz        | 12/Apr/2021      | 11/Apr/2022          |
| Microwave Preamplifier           | Agilent             | 8449B                   | 3008A02096                                     | 1GHz~26.5GHz     | 24/Jul/2020      | 23/Jul/2021          |
| Bilog Antenna & 5dB Attenuator   | TESEQ & MTJ         | CBL6111D&MT<br>J6102-05 | 35418 & 3                                      | 30MHz~1GHz       | 06/Sep/2020      | 05/Sep/2021          |
| Double Ridged Guide Horn Antenna | SCHWARZBECK         | BBHA 9120 D             | BBHA9120 D<br>1534                             | 1GHz~18GHz       | 28/May/2020      | 27/May/2021          |
| RF Cable-low                     | Jye Bao             | RG142                   | CB031+324530/4                                 | 9kHz~30MHz       | 03/Sep/2020      | 02/Sep/2021          |
| RF Cable-low                     | Jye Bao             | RG142                   | CB031+324530/4                                 | 30MHz~1GHz       | 09/Feb/2021      | 08/Feb/2022          |
| RF CABLE<br>5m+3m+1m             | HUBER+<br>SUHNER    | SUCOFLEX104             | SN MY25918/4+<br>SN MY39478/4 +<br>SN 324530/4 | 1GHz~40GHz       | 15/Aug/2020      | 14/Aug/2021          |
| Broadband Horn Antenna           | SCHWARZBECK         | BBHA 9170               | BBHA 9170221                                   | 18GHz~40GHz      | 11/Mar/2021      | 10/Mar/2022          |
| Loop Antenna                     | TESEQ               | HLA 6120                | 31244                                          | 9kHz~30MHz       | 16/Mar/2021      | 15/Mar/2022          |
| EMI Test Receiver                | R&S                 | ESR3                    | 102051                                         | 9kHz~3.6GHz      | 29/May/2020      | 28/May/2021          |



## Conducted Emissions at Powerline

## Appendix A

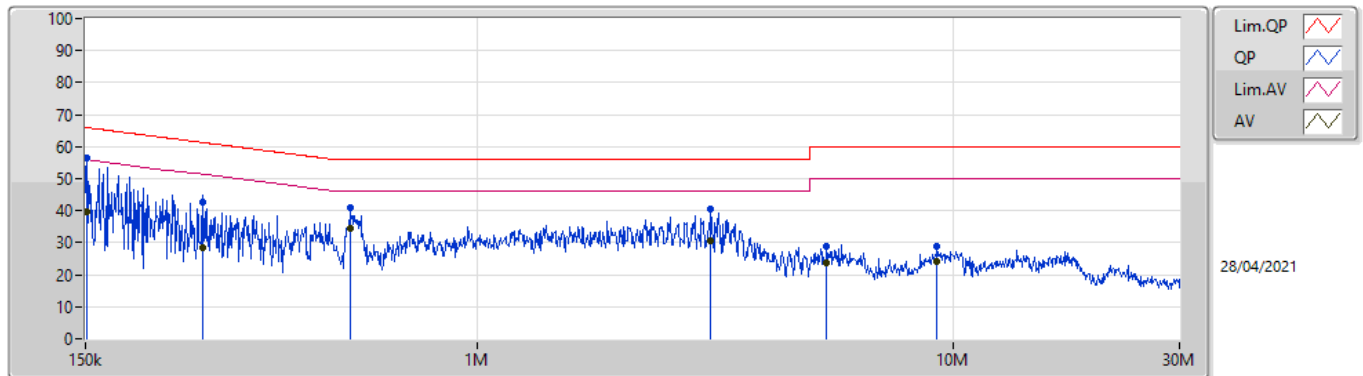
### Summary

| Mode   | Result | Type | Freq<br>(Hz) | Level<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Condition |
|--------|--------|------|--------------|-----------------|-----------------|----------------|-----------|
| Mode 1 | Pass   | QP   | 151.202k     | 56.68           | 65.92           | -9.24          | Line      |

**Result**

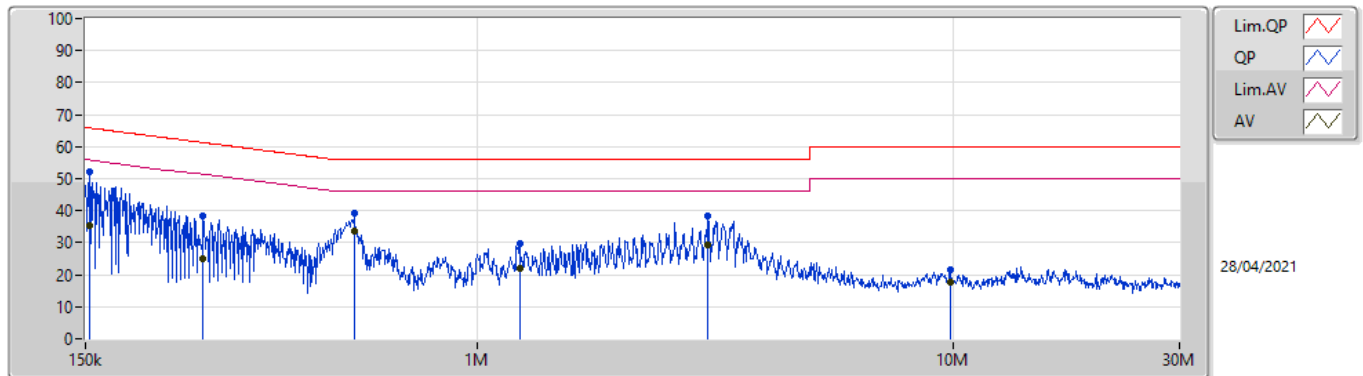
| Mode   | Result | Type | Freq (Hz) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Condition | Comments |
|--------|--------|------|-----------|--------------|--------------|-------------|-----------|----------|
| Mode 1 | Pass   | QP   | 151.202k  | 56.68        | 65.92        | -9.24       | Line      | -        |
| Mode 1 | Pass   | AV   | 151.202k  | 39.59        | 55.92        | -16.33      | Line      | -        |
| Mode 1 | Pass   | QP   | 265.468k  | 42.50        | 61.26        | -18.76      | Line      | -        |
| Mode 1 | Pass   | AV   | 265.468k  | 28.30        | 51.26        | -22.96      | Line      | -        |
| Mode 1 | Pass   | QP   | 540.273k  | 41.10        | 56.00        | -14.90      | Line      | -        |
| Mode 1 | Pass   | AV   | 540.273k  | 34.66        | 46.00        | -11.34      | Line      | -        |
| Mode 1 | Pass   | QP   | 3.104M    | 40.60        | 56.00        | -15.40      | Line      | -        |
| Mode 1 | Pass   | AV   | 3.104M    | 30.47        | 46.00        | -15.53      | Line      | -        |
| Mode 1 | Pass   | QP   | 5.429M    | 28.88        | 60.00        | -31.12      | Line      | -        |
| Mode 1 | Pass   | AV   | 5.429M    | 23.50        | 50.00        | -26.50      | Line      | -        |
| Mode 1 | Pass   | QP   | 9.269M    | 28.67        | 60.00        | -31.33      | Line      | -        |
| Mode 1 | Pass   | AV   | 9.269M    | 24.20        | 50.00        | -25.80      | Line      | -        |
| Mode 1 | Pass   | QP   | 153.024k  | 52.08        | 65.83        | -13.75      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 153.024k  | 35.51        | 55.83        | -20.32      | Neutral   | -        |
| Mode 1 | Pass   | QP   | 265.468k  | 38.52        | 61.26        | -22.74      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 265.468k  | 25.03        | 51.26        | -26.23      | Neutral   | -        |
| Mode 1 | Pass   | QP   | 551.165k  | 39.07        | 56.00        | -16.93      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 551.165k  | 33.83        | 46.00        | -12.17      | Neutral   | -        |
| Mode 1 | Pass   | QP   | 1.23M     | 29.61        | 56.00        | -26.39      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 1.23M     | 22.10        | 46.00        | -23.90      | Neutral   | -        |
| Mode 1 | Pass   | QP   | 3.055M    | 38.56        | 56.00        | -17.44      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 3.055M    | 29.15        | 46.00        | -16.85      | Neutral   | -        |
| Mode 1 | Pass   | QP   | 9.88M     | 21.50        | 60.00        | -38.50      | Neutral   | -        |
| Mode 1 | Pass   | AV   | 9.88M     | 17.83        | 50.00        | -32.17      | Neutral   | -        |

## Conducted Emissions at Powerline\_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   | 151.202k     | 56.68           | 65.92           | -9.24          | 19.63          | Line      | -       | 37.05         | 9.69         | 0.04       | 9.90       |  |  |  |
| AV   | 151.202k     | 39.59           | 55.92           | -16.33         | 19.63          | Line      | -       | 19.96         | 9.69         | 0.04       | 9.90       |  |  |  |
| QP   | 265.468k     | 42.50           | 61.26           | -18.76         | 19.63          | Line      | -       | 22.87         | 9.68         | 0.05       | 9.90       |  |  |  |
| AV   | 265.468k     | 28.30           | 51.26           | -22.96         | 19.63          | Line      | -       | 8.67          | 9.68         | 0.05       | 9.90       |  |  |  |
| QP   | 540.273k     | 41.10           | 56.00           | -14.90         | 19.61          | Line      | -       | 21.49         | 9.67         | 0.07       | 9.87       |  |  |  |
| AV   | 540.273k     | 34.66           | 46.00           | -11.34         | 19.61          | Line      | -       | 15.05         | 9.67         | 0.07       | 9.87       |  |  |  |
| QP   | 3.104M       | 40.60           | 56.00           | -15.40         | 19.68          | Line      | -       | 20.92         | 9.69         | 0.13       | 9.86       |  |  |  |
| AV   | 3.104M       | 30.47           | 46.00           | -15.53         | 19.68          | Line      | -       | 10.79         | 9.69         | 0.13       | 9.86       |  |  |  |
| QP   | 5.429M       | 28.88           | 60.00           | -31.12         | 19.76          | Line      | -       | 9.12          | 9.70         | 0.16       | 9.90       |  |  |  |
| AV   | 5.429M       | 23.50           | 50.00           | -26.50         | 19.76          | Line      | -       | 3.74          | 9.70         | 0.16       | 9.90       |  |  |  |
| QP   | 9.269M       | 28.67           | 60.00           | -31.33         | 19.82          | Line      | -       | 8.85          | 9.72         | 0.20       | 9.90       |  |  |  |
| AV   | 9.269M       | 24.20           | 50.00           | -25.80         | 19.82          | Line      | -       | 4.38          | 9.72         | 0.20       | 9.90       |  |  |  |

### Conducted Emissions at Powerline\_Mode 1



| Type | Freq<br>(Hz) | Level<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Factor | Condition | Comment | Raw<br>(dBuV) | LISN<br>(dB) | CL<br>(dB) | AT<br>(dB) |  |  |  |
|------|--------------|-----------------|-----------------|----------------|--------|-----------|---------|---------------|--------------|------------|------------|--|--|--|
| QP   | 153.024k     | 52.08           | 65.83           | -13.75         | 19.63  | Neutral   | -       | 32.45         | 9.69         | 0.04       | 9.90       |  |  |  |
| AV   | 153.024k     | 35.51           | 55.83           | -20.32         | 19.63  | Neutral   | -       | 15.88         | 9.69         | 0.04       | 9.90       |  |  |  |
| QP   | 265.468k     | 38.52           | 61.26           | -22.74         | 19.63  | Neutral   | -       | 18.89         | 9.68         | 0.05       | 9.90       |  |  |  |
| AV   | 265.468k     | 25.03           | 51.26           | -26.23         | 19.63  | Neutral   | -       | 5.40          | 9.68         | 0.05       | 9.90       |  |  |  |
| QP   | 551.165k     | 39.07           | 56.00           | -16.93         | 19.61  | Neutral   | -       | 19.46         | 9.67         | 0.07       | 9.87       |  |  |  |
| AV   | 551.165k     | 33.83           | 46.00           | -12.17         | 19.61  | Neutral   | -       | 14.22         | 9.67         | 0.07       | 9.87       |  |  |  |
| QP   | 1.23M        | 29.61           | 56.00           | -26.39         | 19.56  | Neutral   | -       | 10.05         | 9.67         | 0.09       | 9.80       |  |  |  |
| AV   | 1.23M        | 22.10           | 46.00           | -23.90         | 19.56  | Neutral   | -       | 2.54          | 9.67         | 0.09       | 9.80       |  |  |  |
| QP   | 3.055M       | 38.56           | 56.00           | -17.44         | 19.67  | Neutral   | -       | 18.89         | 9.69         | 0.12       | 9.86       |  |  |  |
| AV   | 3.055M       | 29.15           | 46.00           | -16.85         | 19.67  | Neutral   | -       | 9.48          | 9.69         | 0.12       | 9.86       |  |  |  |
| QP   | 9.88M        | 21.50           | 60.00           | -38.50         | 19.83  | Neutral   | -       | 1.67          | 9.73         | 0.20       | 9.90       |  |  |  |
| AV   | 9.88M        | 17.83           | 50.00           | -32.17         | 19.83  | Neutral   | -       | -2.00         | 9.73         | 0.20       | 9.90       |  |  |  |



**Summary**

| Mode          | Max-N dB<br>(Hz) | Max-OBW<br>(Hz) | ITU-Code | Min-N dB<br>(Hz) | Min-OBW<br>(Hz) |
|---------------|------------------|-----------------|----------|------------------|-----------------|
| 2.4-2.4835GHz | -                | -               | -        | -                | -               |
| BT-LE(1Mbps)  | 642.5k           | 1.019M          | 1M02F1D  | 635k             | 1.014M          |

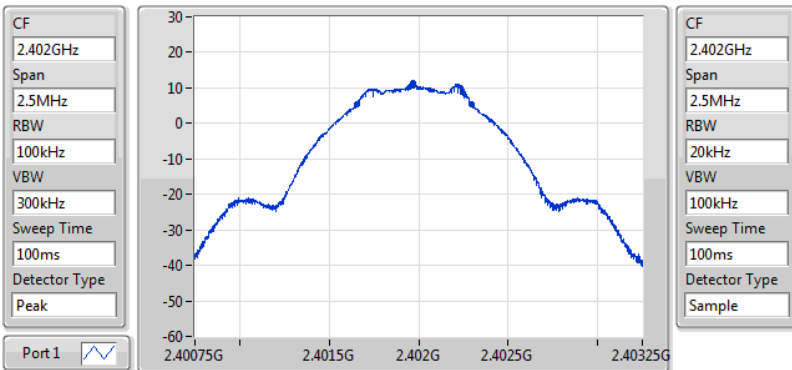
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;  
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth



Result

| Mode                 | Result | Limit<br>(Hz) | Port 1-N dB<br>(Hz) | Port 1-OBW<br>(Hz) |
|----------------------|--------|---------------|---------------------|--------------------|
| BT-LE(1Mbps)         | -      | -             | -                   | -                  |
| 2402MHz_TnomVnom-DTS | Pass   | 500k          | 642.5k              | 1.014M             |
| 2440MHz_TnomVnom-DTS | Pass   | 500k          | 635k                | 1.019M             |
| 2480MHz_TnomVnom-DTS | Pass   | 500k          | 638.75k             | 1.018M             |

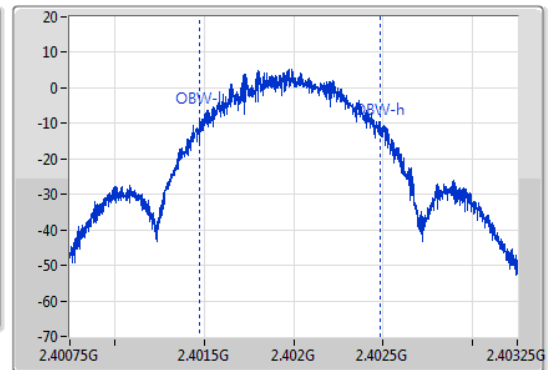
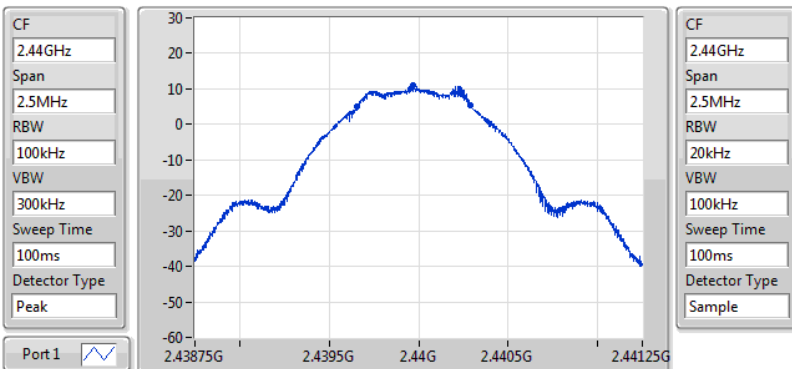
Port X-N dB = Port X 6dB down bandwidth;  
Port X-OBW = Port X 99% occupied bandwidth

**BT-LE(1Mbps)**
**2402MHz**


| 6dB(Hz) | Fl-6dB(Hz) | Fh-6dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---------|------------|------------|---------|------------|------------|-----------|------|
| 642.5k  | 2.401654G  | 2.402296G  | 1.014M  | 2.401473G  | 2.402487G  | 500k      | 1    |

**EBW-DTS**

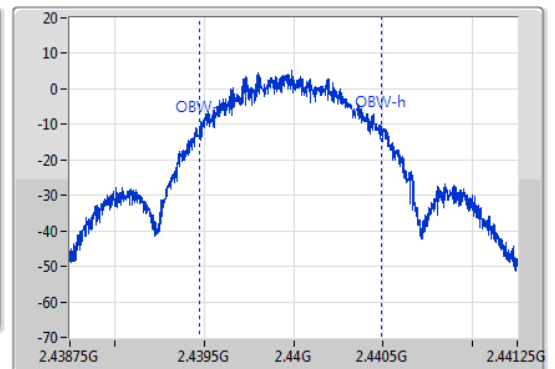
26/04/2021


**BT-LE(1Mbps)**
**2440MHz**


| 6dB(Hz) | Fl-6dB(Hz) | Fh-6dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---------|------------|------------|---------|------------|------------|-----------|------|
| 635k    | 2.439656G  | 2.440291G  | 1.019M  | 2.439474G  | 2.440494G  | 500k      | 1    |

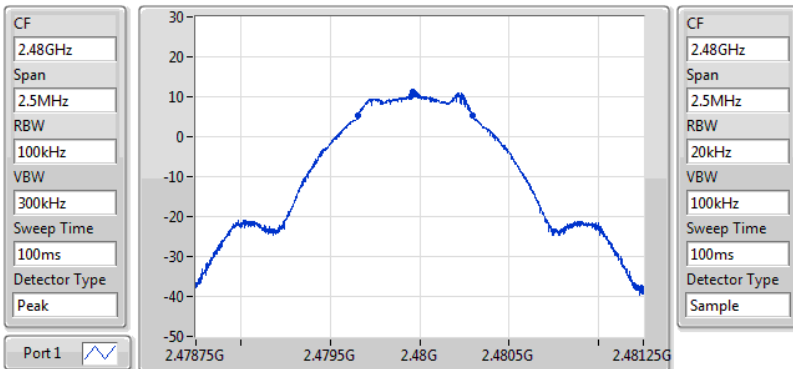
**EBW-DTS**

26/04/2021



## BT-LE(1Mbps)

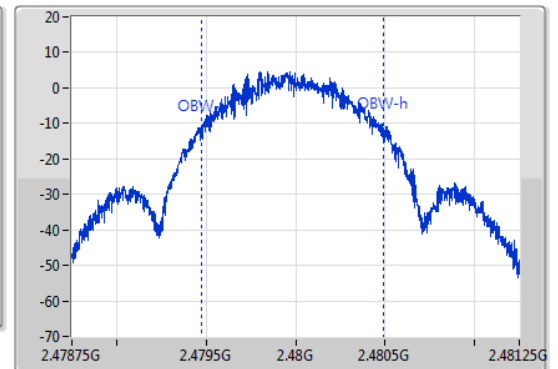
2480MHz



| 6dB(Hz) | Fl-6dB(Hz) | Fh-6dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---------|------------|------------|---------|------------|------------|-----------|------|
| 638.75k | 2.479655G  | 2.480294G  | 1.018M  | 2.479472G  | 2.48049G   | 500k      | 1    |

## EBW-DTS

26/04/2021





**Summary**

| Mode          | Power<br>(dBm) | Power<br>(W) |
|---------------|----------------|--------------|
| 2.4-2.4835GHz | -              | -            |
| BT-LE(1Mbps)  | 11.00          | 0.01259      |



## Average Power-DTS

## Appendix C

### Result

| Mode                 | Result | Gain<br>(dBi) | Power<br>(dBm) | Power Limit<br>(dBm) |
|----------------------|--------|---------------|----------------|----------------------|
| BT-LE(1Mbps)         | -      | -             | -              | -                    |
| 2402MHz_TnomVnom-DTS | Pass   | -7.02         | 11.00          | 30.00                |
| 2440MHz_TnomVnom-DTS | Pass   | -7.02         | 10.62          | 30.00                |
| 2480MHz_TnomVnom-DTS | Pass   | -7.02         | 10.93          | 30.00                |

DG = Directional Gain; Port X = Port X output power



**Summary**

| Mode          | PD<br>(dBm/RBW) |
|---------------|-----------------|
| 2.4-2.4835GHz | -               |
| BT-LE(1Mbps)  | -5.14           |

RBW = 3kHz;



Result

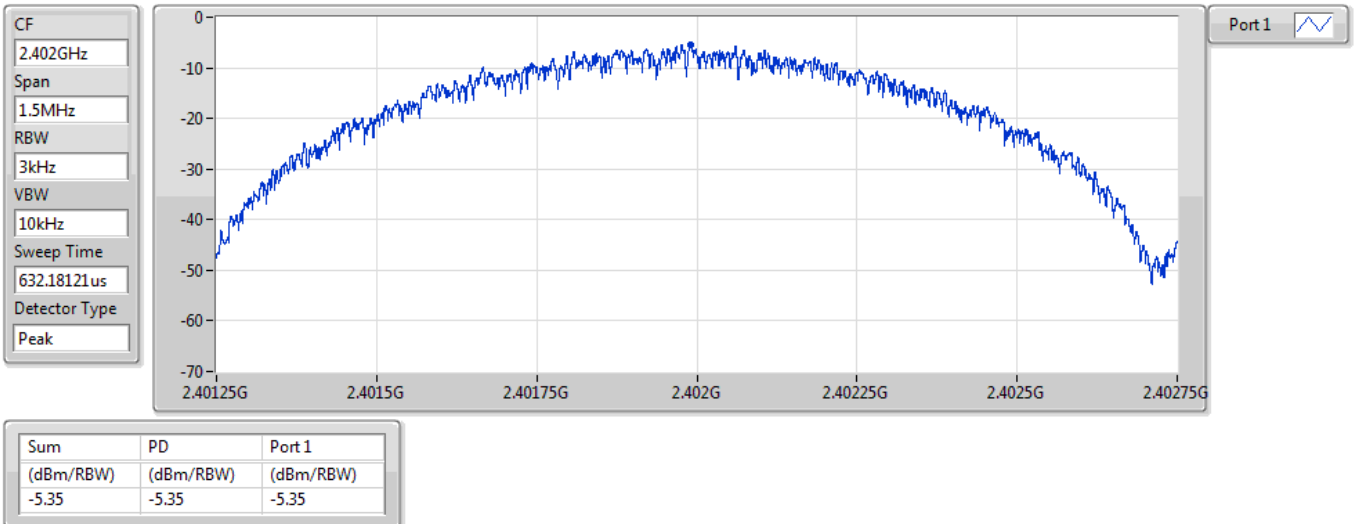
| Mode                 | Result | Gain<br>(dBi) | PD<br>(dBm/RBW) | PD Limit<br>(dBm/RBW) |
|----------------------|--------|---------------|-----------------|-----------------------|
| BT-LE(1Mbps)         | -      | -             | -               | -                     |
| 2402MHz_TnomVnom-DTS | Pass   | -7.02         | -5.35           | 8.00                  |
| 2440MHz_TnomVnom-DTS | Pass   | -7.02         | -5.98           | 8.00                  |
| 2480MHz_TnomVnom-DTS | Pass   | -7.02         | -5.14           | 8.00                  |

DG = Directional Gain; RBW = 3kHz;  
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

## BT-LE(1Mbps)

### 2402MHz

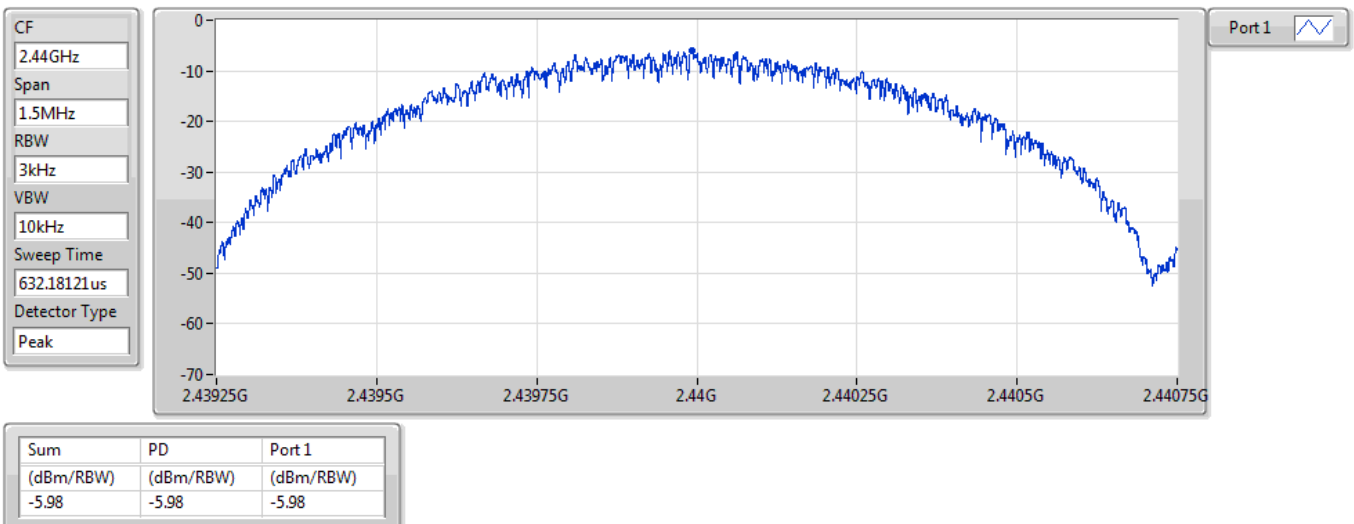
26/04/2021



## BT-LE(1Mbps)

### 2440MHz

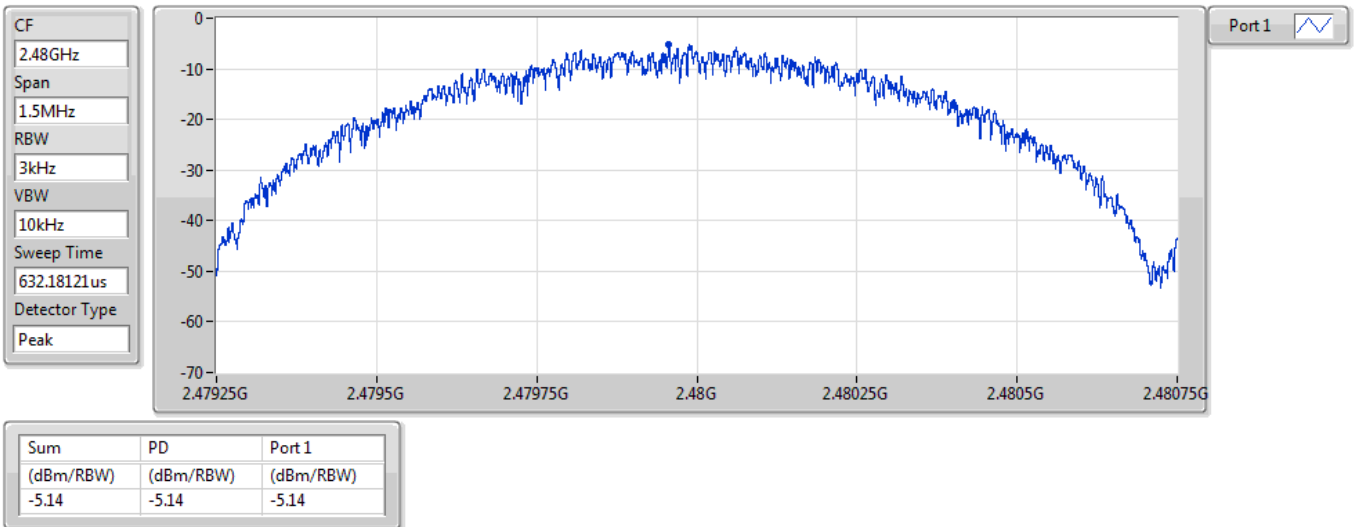
26/04/2021



## BT-LE(1Mbps)

### 2480MHz

26/04/2021





Summary

| Mode          | Result | Ref<br>(Hz) | Ref<br>(dBm) | Limit<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Port |
|---------------|--------|-------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|------|
| 2.4-2.4835GHz | -      | -           | -            | -              | -            | -              | -            | -              | -            | -              | -            | -              | -            | -              | -    |
| BT-LE(1Mbps)  | Pass   | 2.40196G    | 11.24        | -18.76         | 826.65M      | -42.35         | 2.3979G      | -51.14         | 2.4835G      | -52.65         | 2.48363G     | -50.15         | 3.30494G     | -35.72         | 1    |



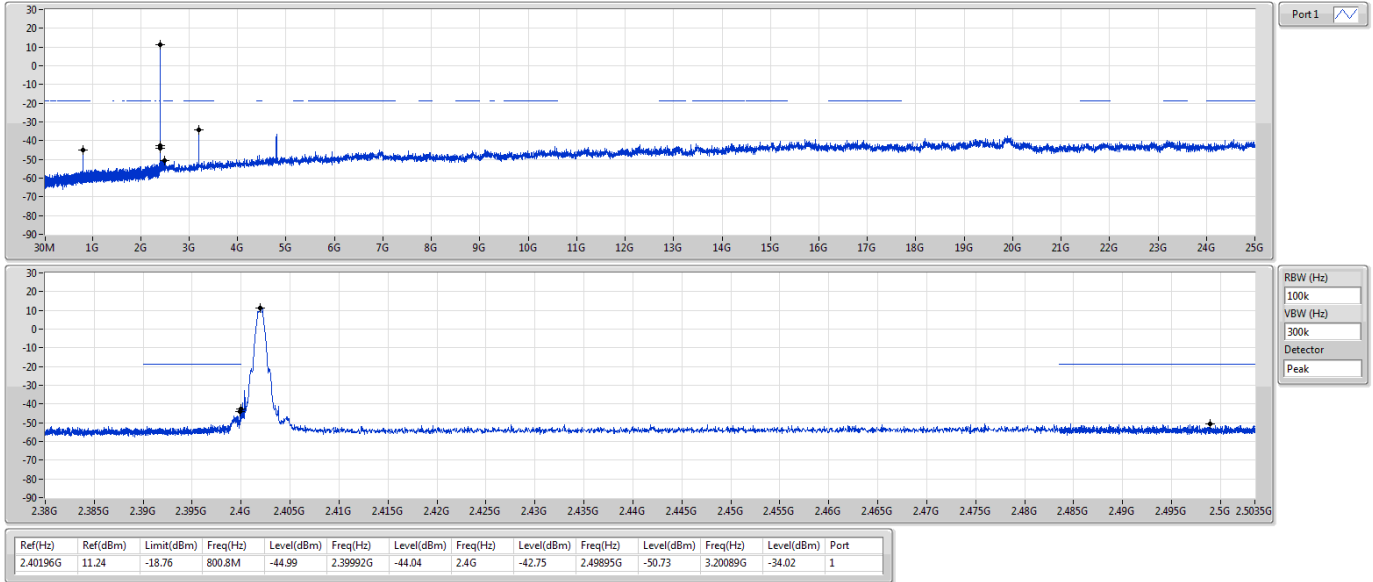
Result

| Mode                 | Result | Ref<br>(Hz) | Ref<br>(dBm) | Limit<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Freq<br>(Hz) | Level<br>(dBm) | Port |
|----------------------|--------|-------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|------|
| BT-LE(1Mbps)         | -      | -           | -            | -              | -            | -              | -            | -              | -            | -              | -            | -              | -            | -              | -    |
| 2402MHz_TnomVnom-DTS | Pass   | 2.40196G    | 11.24        | -18.76         | 800.8M       | -44.99         | 2.39992G     | -44.04         | 2.4G         | -42.75         | 2.49895G     | -50.73         | 3.20089G     | -34.02         | 1    |
| 2440MHz_TnomVnom-DTS | Pass   | 2.40196G    | 11.24        | -18.76         | 813.43M      | -43.57         | 2.39996G     | -51.70         | 2.4835G      | -52.88         | 2.49974G     | -50.55         | 3.25151G     | -34.71         | 1    |
| 2480MHz_TnomVnom-DTS | Pass   | 2.40196G    | 11.24        | -18.76         | 826.65M      | -42.35         | 2.3979G      | -51.14         | 2.4835G      | -52.65         | 2.48363G     | -50.15         | 3.30494G     | -35.72         | 1    |

BT-LE(1Mbps)

CSEndB-DTS

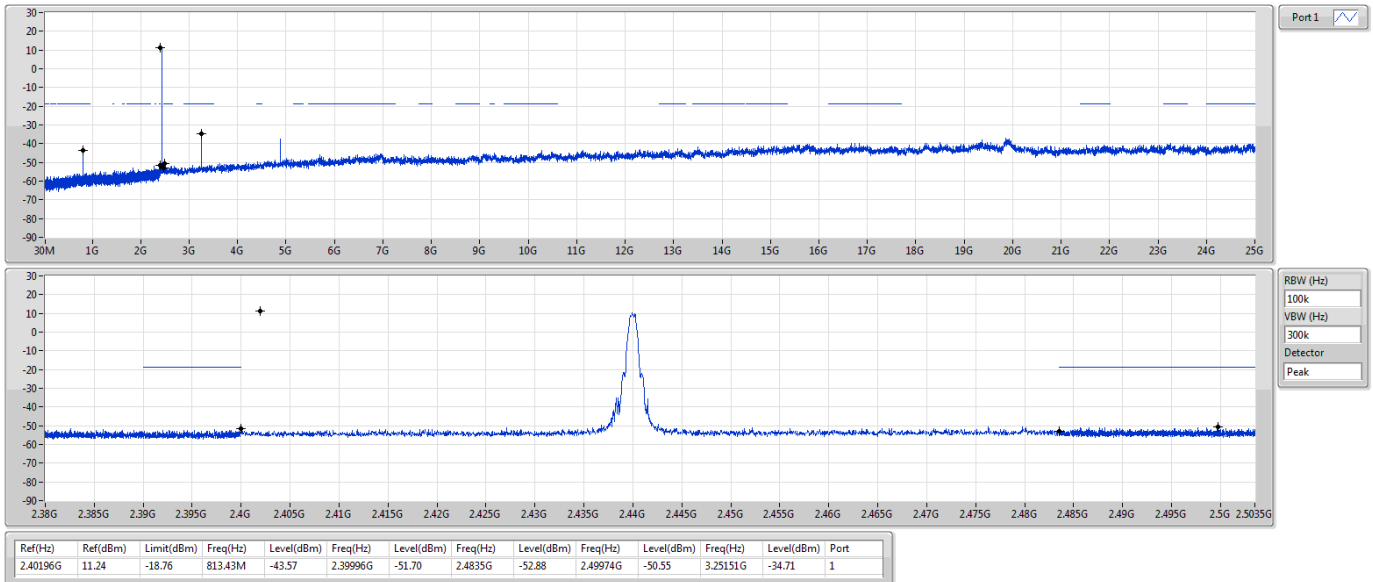
2402MHz



BT-LE(1Mbps)

CSEndB-DTS

2440MHz

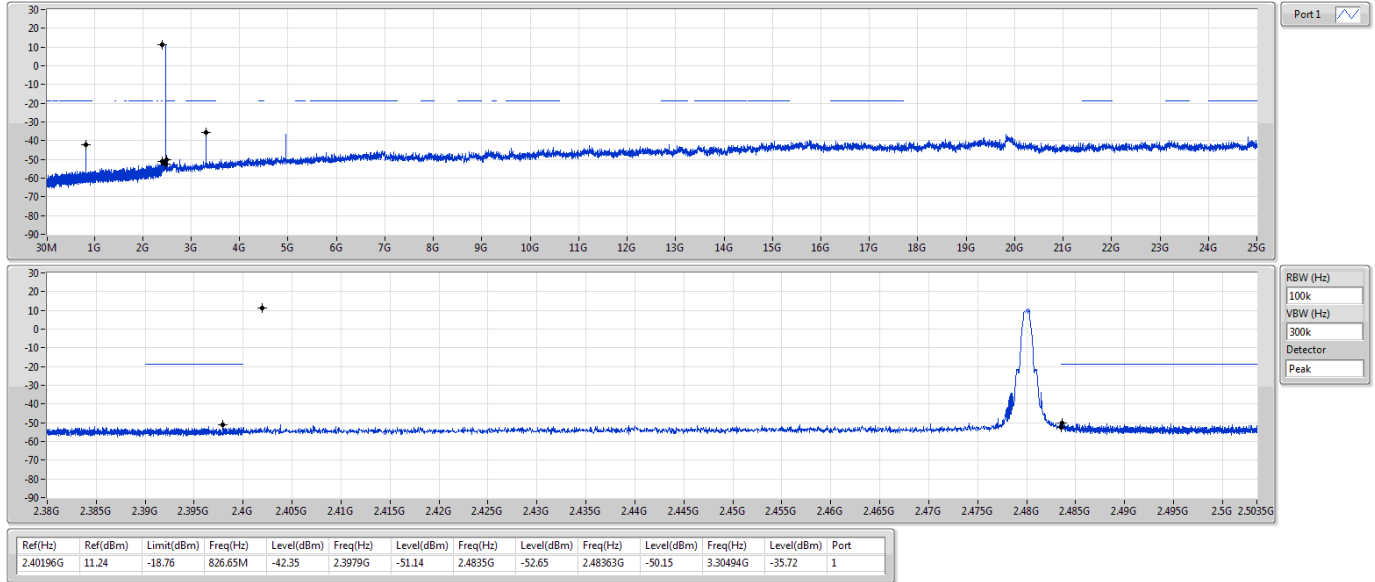


BT-LE(1Mbps)

CSEndB-DTS

2480MHz

26/04/2021





**Summary**

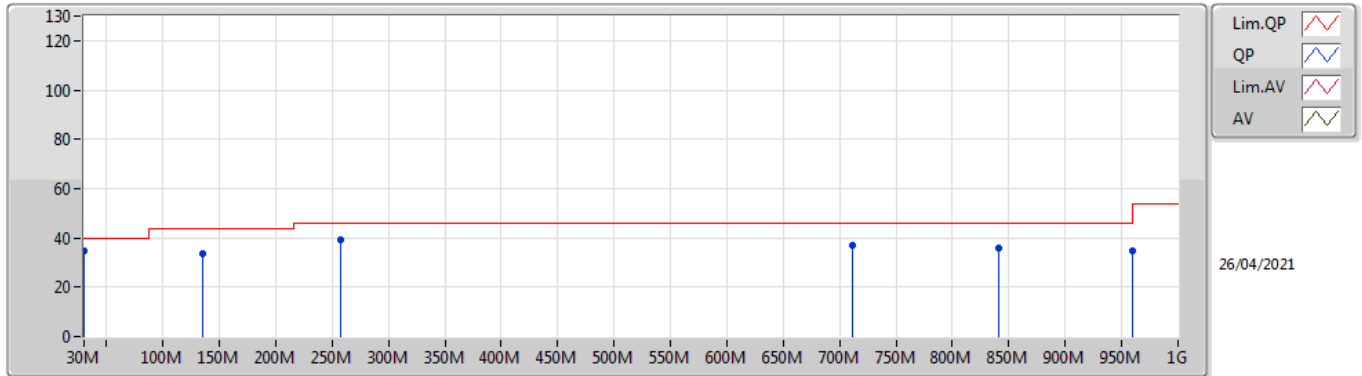
| Mode          | Result | Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Dist<br>(m) | Condition  | Azimuth<br>(°) | Height<br>(m) | Comments |
|---------------|--------|------|--------------|-------------------|-------------------|----------------|-------------|------------|----------------|---------------|----------|
| 2.4-2.4835GHz | -      | -    | -            | -                 | -                 | -              | -           | -          | -              | -             | -        |
| BT-LE(1Mbps)  | Pass   | PK   | 532.46M      | 41.66             | 46.00             | -4.34          | 3           | Horizontal | 0              | 1.00          | -        |

**Result**

| Mode         | Result | Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Dist<br>(m) | Condition  | Azimuth<br>(°) | Height<br>(m) | Comments |
|--------------|--------|------|--------------|-------------------|-------------------|----------------|-------------|------------|----------------|---------------|----------|
| BT-LE(1Mbps) | -      | -    | -            | -                 | -                 | -              | -           | -          | -              | -             | -        |
| 2440MHz      | Pass   | PK   | 30M          | 34.98             | 40.00             | -5.02          | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 134.76M      | 33.54             | 43.50             | -9.96          | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 256.98M      | 39.32             | 46.00             | -6.68          | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 710.94M      | 36.85             | 46.00             | -9.15          | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 840.92M      | 36.12             | 46.00             | -9.88          | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 960M         | 34.78             | 46.00             | -11.22         | 3           | Vertical   | 360            | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 330.7M       | 39.98             | 46.00             | -6.02          | 3           | Horizontal | 0              | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 532.46M      | 41.66             | 46.00             | -4.34          | 3           | Horizontal | 0              | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 596.48M      | 38.93             | 46.00             | -7.07          | 3           | Horizontal | 0              | 1.00          | -        |
| 2440MHz      | Pass   | PK   | 960M         | 36.14             | 46.00             | -9.86          | 3           | Horizontal | 0              | 1.00          | -        |
| 2440MHz      | Pass   | QP   | 132.82M      | 32.71             | 43.50             | -10.79         | 3           | Horizontal | 125            | 1.15          | -        |
| 2440MHz      | Pass   | QP   | 278.32M      | 30.58             | 46.00             | -15.42         | 3           | Horizontal | 278            | 1.32          | -        |

## BT-LE(1Mbps)

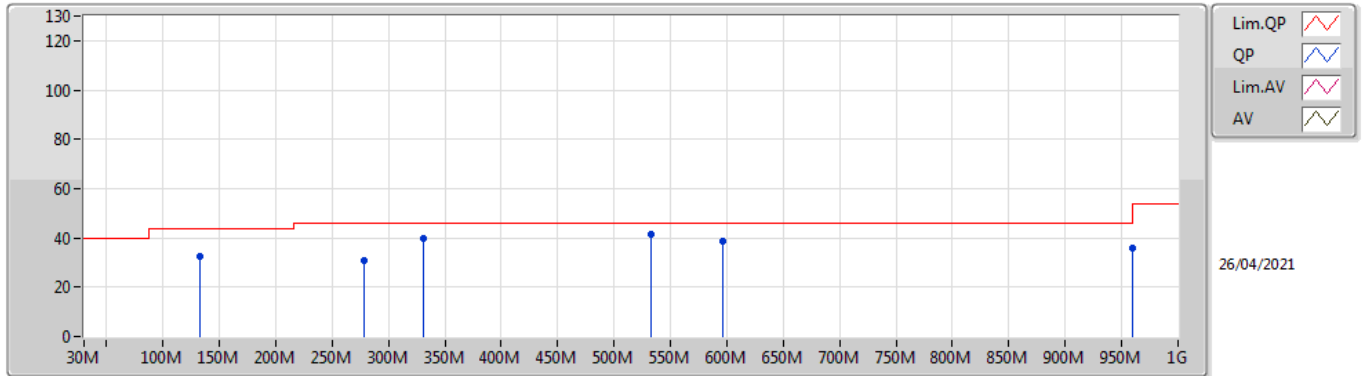
### 2440MHz\_Test Fixture



| Type | Freq    | Level    | Limit    | Margin | Factor | Dist | Condition | Azimuth | Height | Comment | Raw    | AF    | CL   | PA    |
|------|---------|----------|----------|--------|--------|------|-----------|---------|--------|---------|--------|-------|------|-------|
|      | (Hz)    | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |           | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB)  |
| PK   | 30M     | 34.98    | 40.00    | -5.02  | -13.08 | 3    | Vertical  | 360     | 1.00   | -       | 48.06  | 23.51 | 0.56 | 37.15 |
| PK   | 134.76M | 33.54    | 43.50    | -9.96  | -18.53 | 3    | Vertical  | 360     | 1.00   | -       | 52.07  | 16.80 | 1.15 | 36.48 |
| PK   | 256.98M | 39.32    | 46.00    | -6.68  | -16.19 | 3    | Vertical  | 360     | 1.00   | -       | 55.51  | 18.69 | 1.52 | 36.40 |
| PK   | 710.94M | 36.85    | 46.00    | -9.15  | -8.71  | 3    | Vertical  | 360     | 1.00   | -       | 45.56  | 25.95 | 2.70 | 37.36 |
| PK   | 840.92M | 36.12    | 46.00    | -9.88  | -6.49  | 3    | Vertical  | 360     | 1.00   | -       | 42.61  | 28.20 | 2.91 | 37.60 |
| PK   | 960M    | 34.78    | 46.00    | -11.22 | -4.11  | 3    | Vertical  | 360     | 1.00   | -       | 38.89  | 30.25 | 3.11 | 37.47 |

## BT-LE(1Mbps)

### 2440MHz\_Test Fixture



| 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   | 330.7M       | 39.98             | 46.00             | -6.02          | -15.73         | 3           | Horizontal | 0              | 1.00          | -       | 55.71         | 19.04      | 1.73       | 36.50      |
| PK   | 532.46M      | 41.66             | 46.00             | -4.34          | -11.48         | 3           | Horizontal | 0              | 1.00          | -       | 53.14         | 23.24      | 2.33       | 37.05      |
| PK   | 596.48M      | 38.93             | 46.00             | -7.07          | -9.91          | 3           | Horizontal | 0              | 1.00          | -       | 48.84         | 24.75      | 2.46       | 37.12      |
| PK   | 960M         | 36.14             | 46.00             | -9.86          | -4.11          | 3           | Horizontal | 0              | 1.00          | -       | 40.25         | 30.25      | 3.11       | 37.47      |
| QP   | 132.82M      | 32.71             | 43.50             | -10.79         | -18.54         | 3           | Horizontal | 125            | 1.15          | -       | 51.25         | 16.83      | 1.14       | 36.51      |
| QP   | 278.32M      | 30.58             | 46.00             | -15.42         | -16.97         | 3           | Horizontal | 278            | 1.32          | -       | 47.55         | 17.85      | 1.60       | 36.42      |



**Summary**

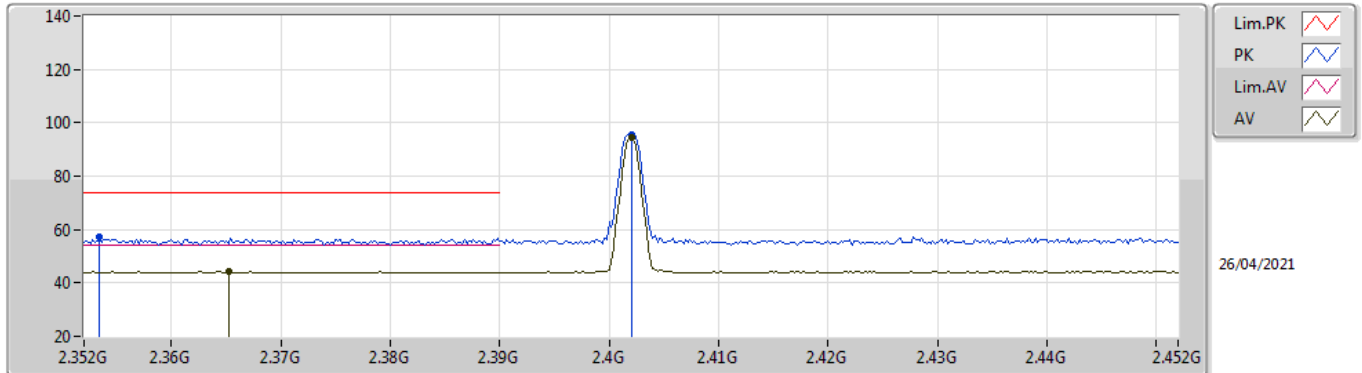
| Mode          | Result | Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Dist<br>(m) | Condition | Azimuth<br>(°) | Height<br>(m) | Comments |
|---------------|--------|------|--------------|-------------------|-------------------|----------------|-------------|-----------|----------------|---------------|----------|
| 2.4-2.4835GHz | -      | -    | -            | -                 | -                 | -              | -           | -         | -              | -             | -        |
| BT-LTE(1Mbps) | Pass   | AV   | 4.95997G     | 50.00             | 54.00             | -4.00          | 3           | Vertical  | 285            | 1.02          | -        |

**Result**

| Mode         | Result | Type | Freq<br>(Hz) | Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Dist<br>(m) | Condition  | Azimuth<br>(°) | Height<br>(m) | Comments |
|--------------|--------|------|--------------|-------------------|-------------------|----------------|-------------|------------|----------------|---------------|----------|
| BT-LE(1Mbps) | -      | -    | -            | -                 | -                 | -              | -           | -          | -              | -             | -        |
| 2402MHz      | Pass   | AV   | 2.3652G      | 44.20             | 54.00             | -9.80          | 3           | Vertical   | 67             | 2.69          | -        |
| 2402MHz      | Pass   | AV   | 2.402G       | 94.28             | Inf               | -Inf           | 3           | Vertical   | 67             | 2.69          | -        |
| 2402MHz      | Pass   | PK   | 2.3534G      | 57.08             | 74.00             | -16.92         | 3           | Vertical   | 67             | 2.69          | -        |
| 2402MHz      | Pass   | PK   | 2.402G       | 95.35             | Inf               | -Inf           | 3           | Vertical   | 67             | 2.69          | -        |
| 2402MHz      | Pass   | AV   | 2.3692G      | 44.23             | 54.00             | -9.77          | 3           | Horizontal | 202            | 1.32          | -        |
| 2402MHz      | Pass   | AV   | 2.402G       | 91.68             | Inf               | -Inf           | 3           | Horizontal | 202            | 1.32          | -        |
| 2402MHz      | Pass   | PK   | 2.381G       | 56.97             | 74.00             | -17.03         | 3           | Horizontal | 202            | 1.32          | -        |
| 2402MHz      | Pass   | PK   | 2.4018G      | 92.74             | Inf               | -Inf           | 3           | Horizontal | 202            | 1.32          | -        |
| 2402MHz      | Pass   | AV   | 4.80394G     | 47.38             | 54.00             | -6.62          | 3           | Vertical   | 175            | 1.50          | -        |
| 2402MHz      | Pass   | PK   | 4.80344G     | 53.30             | 74.00             | -20.70         | 3           | Vertical   | 175            | 1.50          | -        |
| 2402MHz      | Pass   | AV   | 4.80398G     | 42.28             | 54.00             | -11.72         | 3           | Horizontal | 46             | 2.66          | -        |
| 2402MHz      | Pass   | PK   | 4.80366G     | 50.31             | 74.00             | -23.69         | 3           | Horizontal | 46             | 2.66          | -        |
| 2440MHz      | Pass   | AV   | 2.36G        | 44.43             | 54.00             | -9.57          | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | AV   | 2.44G        | 92.58             | Inf               | -Inf           | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | AV   | 2.4852G      | 44.76             | 54.00             | -9.24          | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | PK   | 2.3736G      | 56.49             | 74.00             | -17.51         | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | PK   | 2.44G        | 93.59             | Inf               | -Inf           | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | PK   | 2.4928G      | 56.68             | 74.00             | -17.32         | 3           | Vertical   | 79             | 3.00          | -        |
| 2440MHz      | Pass   | AV   | 2.3612G      | 44.19             | 54.00             | -9.81          | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | AV   | 2.44G        | 90.37             | Inf               | -Inf           | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | AV   | 2.4835G      | 44.48             | 54.00             | -9.52          | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | PK   | 2.368G       | 56.80             | 74.00             | -17.20         | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | PK   | 2.44G        | 91.38             | Inf               | -Inf           | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | PK   | 2.4872G      | 57.47             | 74.00             | -16.53         | 3           | Horizontal | 202            | 1.50          | -        |
| 2440MHz      | Pass   | AV   | 4.87998G     | 48.79             | 54.00             | -5.21          | 3           | Vertical   | 279            | 1.02          | -        |
| 2440MHz      | Pass   | PK   | 4.87947G     | 54.22             | 74.00             | -19.78         | 3           | Vertical   | 279            | 1.02          | -        |
| 2440MHz      | Pass   | AV   | 4.87996G     | 48.87             | 54.00             | -5.13          | 3           | Horizontal | 201            | 2.61          | -        |
| 2440MHz      | Pass   | PK   | 4.87956G     | 54.24             | 74.00             | -19.76         | 3           | Horizontal | 201            | 2.61          | -        |
| 2480MHz      | Pass   | AV   | 2.48G        | 91.46             | Inf               | -Inf           | 3           | Vertical   | 134            | 1.53          | -        |
| 2480MHz      | Pass   | AV   | 2.496G       | 44.63             | 54.00             | -9.37          | 3           | Vertical   | 134            | 1.53          | -        |
| 2480MHz      | Pass   | PK   | 2.48G        | 92.60             | Inf               | -Inf           | 3           | Vertical   | 134            | 1.53          | -        |
| 2480MHz      | Pass   | PK   | 2.4978G      | 57.50             | 74.00             | -16.50         | 3           | Vertical   | 134            | 1.53          | -        |
| 2480MHz      | Pass   | AV   | 2.48G        | 89.80             | Inf               | -Inf           | 3           | Horizontal | 201            | 1.50          | -        |
| 2480MHz      | Pass   | AV   | 2.4952G      | 44.71             | 54.00             | -9.29          | 3           | Horizontal | 201            | 1.50          | -        |
| 2480MHz      | Pass   | PK   | 2.48G        | 90.88             | Inf               | -Inf           | 3           | Horizontal | 201            | 1.50          | -        |
| 2480MHz      | Pass   | PK   | 2.4868G      | 57.86             | 74.00             | -16.14         | 3           | Horizontal | 201            | 1.50          | -        |
| 2480MHz      | Pass   | AV   | 4.95997G     | 50.00             | 54.00             | -4.00          | 3           | Vertical   | 285            | 1.02          | -        |
| 2480MHz      | Pass   | PK   | 4.95948G     | 55.28             | 74.00             | -18.72         | 3           | Vertical   | 285            | 1.02          | -        |
| 2480MHz      | Pass   | AV   | 4.95998G     | 49.72             | 54.00             | -4.28          | 3           | Horizontal | 199            | 2.96          | -        |
| 2480MHz      | Pass   | PK   | 4.95995G     | 55.25             | 74.00             | -18.75         | 3           | Horizontal | 199            | 2.96          | -        |

## BT-LE(1Mbps)

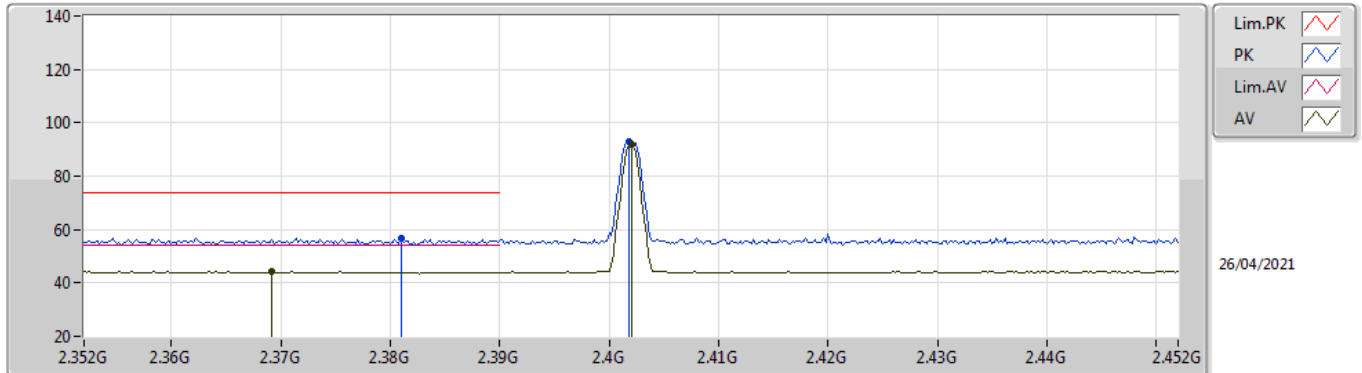
### 2402MHz\_TX



| 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) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|-----------|----------------|---------------|---------|---------------|------------|------------|------------|
| AV   | 2.3652G      | 44.20             | 54.00             | -9.80          | 31.59          | 3           | Vertical  | 67             | 2.69          | -       | 12.61         | 27.74      | 3.85       | -          |
| AV   | 2.402G       | 94.28             | Inf               | -Inf           | 31.50          | 3           | Vertical  | 67             | 2.69          | -       | 62.78         | 27.60      | 3.90       | -          |
| PK   | 2.3534G      | 57.08             | 74.00             | -16.92         | 31.62          | 3           | Vertical  | 67             | 2.69          | -       | 25.46         | 27.79      | 3.83       | -          |
| PK   | 2.402G       | 95.35             | Inf               | -Inf           | 31.50          | 3           | Vertical  | 67             | 2.69          | -       | 63.85         | 27.60      | 3.90       | -          |

## BT-LE(1Mbps)

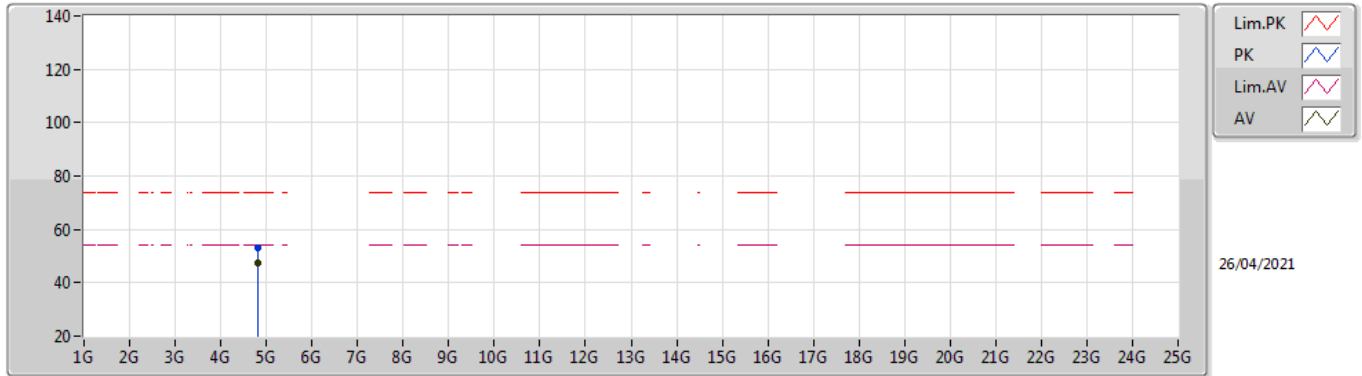
### 2402MHz\_TX



| Type | Freq    | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw    | AF    | CL   | PA   |
|------|---------|----------|----------|--------|--------|------|------------|---------|--------|---------|--------|-------|------|------|
|      | (Hz)    | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |            | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB) |
| AV   | 2.3692G | 44.23    | 54.00    | -9.77  | 31.57  | 3    | Horizontal | 202     | 1.32   | -       | 12.66  | 27.72 | 3.85 | -    |
| AV   | 2.402G  | 91.68    | Inf      | -Inf   | 31.50  | 3    | Horizontal | 202     | 1.32   | -       | 60.18  | 27.60 | 3.90 | -    |
| PK   | 2.381G  | 56.97    | 74.00    | -17.03 | 31.55  | 3    | Horizontal | 202     | 1.32   | -       | 25.42  | 27.68 | 3.87 | -    |
| PK   | 2.4018G | 92.74    | Inf      | -Inf   | 31.50  | 3    | Horizontal | 202     | 1.32   | -       | 61.24  | 27.60 | 3.90 | -    |

# BT-LE(1Mbps)

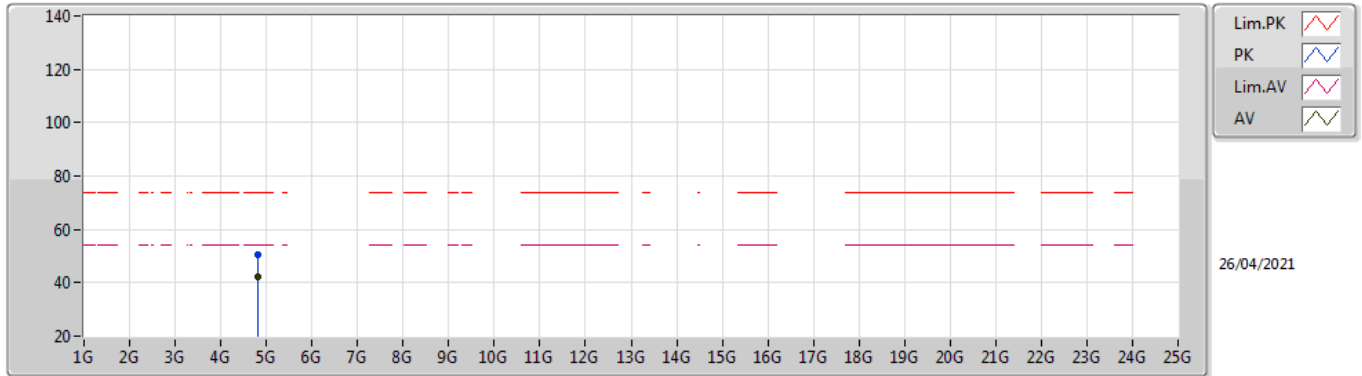
## 2402MHz\_TX



| 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) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|-----------|----------------|---------------|---------|---------------|------------|------------|------------|
| AV   | 4.80394G     | 47.38             | 54.00             | -6.62          | 1.49           | 3           | Vertical  | 175            | 1.50          | -       | 45.89         | 31.12      | 5.30       | 34.93      |
| PK   | 4.80344G     | 53.30             | 74.00             | -20.70         | 1.48           | 3           | Vertical  | 175            | 1.50          | -       | 51.82         | 31.11      | 5.30       | 34.93      |

# BT-LE(1Mbps)

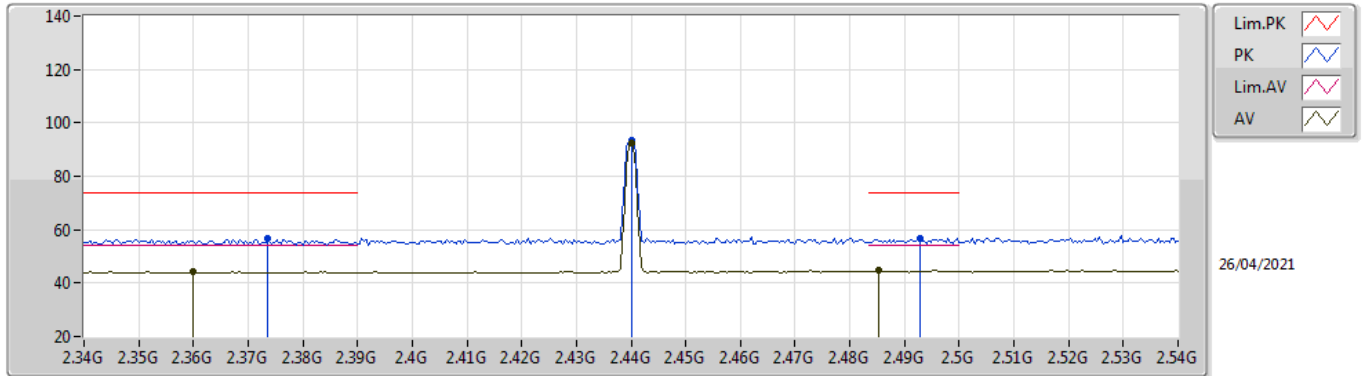
## 2402MHz\_TX



| Type | Freq     | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw    | AF    | CL   | PA    |
|------|----------|----------|----------|--------|--------|------|------------|---------|--------|---------|--------|-------|------|-------|
|      | (Hz)     | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |            | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB)  |
| AV   | 4.80398G | 42.28    | 54.00    | -11.72 | 1.49   | 3    | Horizontal | 46      | 2.66   | -       | 40.79  | 31.12 | 5.30 | 34.93 |
| PK   | 4.80366G | 50.31    | 74.00    | -23.69 | 1.48   | 3    | Horizontal | 46      | 2.66   | -       | 48.83  | 31.11 | 5.30 | 34.93 |

# BT-LE(1Mbps)

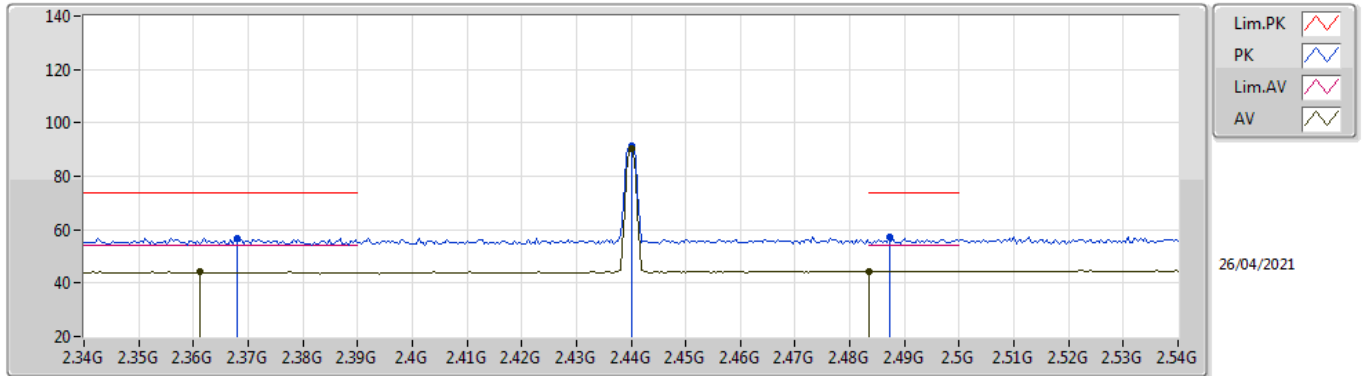
## 2440MHz\_TX



| Type | Freq    | Level    | Limit    | Margin | Factor | Dist | Condition | Azimuth | Height | Comment | Raw    | AF    | CL   | PA   |
|------|---------|----------|----------|--------|--------|------|-----------|---------|--------|---------|--------|-------|------|------|
|      | (Hz)    | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |           | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB) |
| AV   | 2.36G   | 44.43    | 54.00    | -9.57  | 31.60  | 3    | Vertical  | 79      | 3.00   | -       | 12.83  | 27.76 | 3.84 | -    |
| AV   | 2.44G   | 92.58    | Inf      | -Inf   | 31.56  | 3    | Vertical  | 79      | 3.00   | -       | 61.02  | 27.60 | 3.96 | -    |
| AV   | 2.4852G | 44.76    | 54.00    | -9.24  | 31.63  | 3    | Vertical  | 79      | 3.00   | -       | 13.13  | 27.60 | 4.03 | -    |
| PK   | 2.3736G | 56.49    | 74.00    | -17.51 | 31.57  | 3    | Vertical  | 79      | 3.00   | -       | 24.92  | 27.71 | 3.86 | -    |
| PK   | 2.44G   | 93.59    | Inf      | -Inf   | 31.56  | 3    | Vertical  | 79      | 3.00   | -       | 62.03  | 27.60 | 3.96 | -    |
| PK   | 2.4928G | 56.68    | 74.00    | -17.32 | 31.64  | 3    | Vertical  | 79      | 3.00   | -       | 25.04  | 27.60 | 4.04 | -    |

## BT-LE(1Mbps)

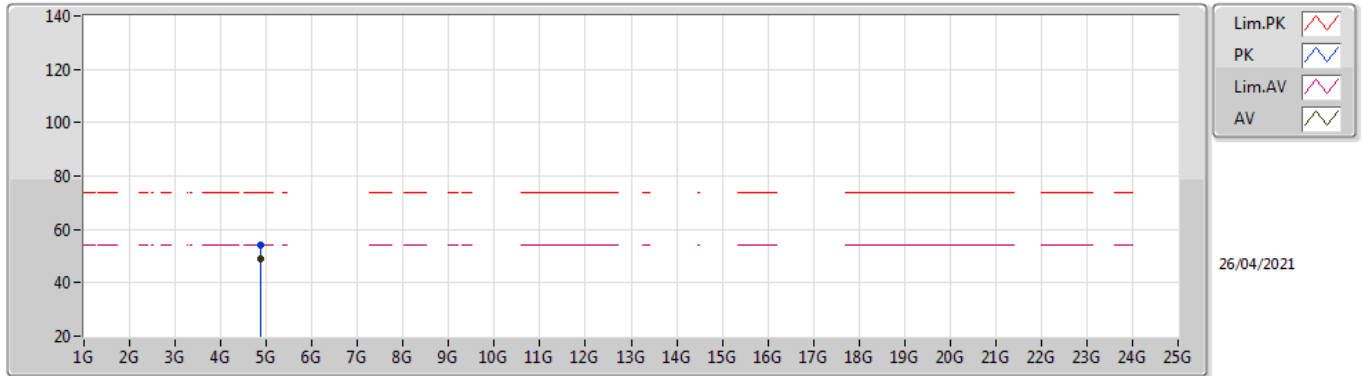
### 2440MHz\_TX



| 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) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|------------|----------------|---------------|---------|---------------|------------|------------|------------|
| AV   | 2.3612G      | 44.19             | 54.00             | -9.81          | 31.60          | 3           | Horizontal | 202            | 1.50          | -       | 12.59         | 27.76      | 3.84       | -          |
| AV   | 2.44G        | 90.37             | Inf               | -Inf           | 31.56          | 3           | Horizontal | 202            | 1.50          | -       | 58.81         | 27.60      | 3.96       | -          |
| AV   | 2.4835G      | 44.48             | 54.00             | -9.52          | 31.63          | 3           | Horizontal | 202            | 1.50          | -       | 12.85         | 27.60      | 4.03       | -          |
| PK   | 2.368G       | 56.80             | 74.00             | -17.20         | 31.58          | 3           | Horizontal | 202            | 1.50          | -       | 25.22         | 27.73      | 3.85       | -          |
| PK   | 2.44G        | 91.38             | Inf               | -Inf           | 31.56          | 3           | Horizontal | 202            | 1.50          | -       | 59.82         | 27.60      | 3.96       | -          |
| PK   | 2.4872G      | 57.47             | 74.00             | -16.53         | 31.63          | 3           | Horizontal | 202            | 1.50          | -       | 25.84         | 27.60      | 4.03       | -          |

# BT-LE(1Mbps)

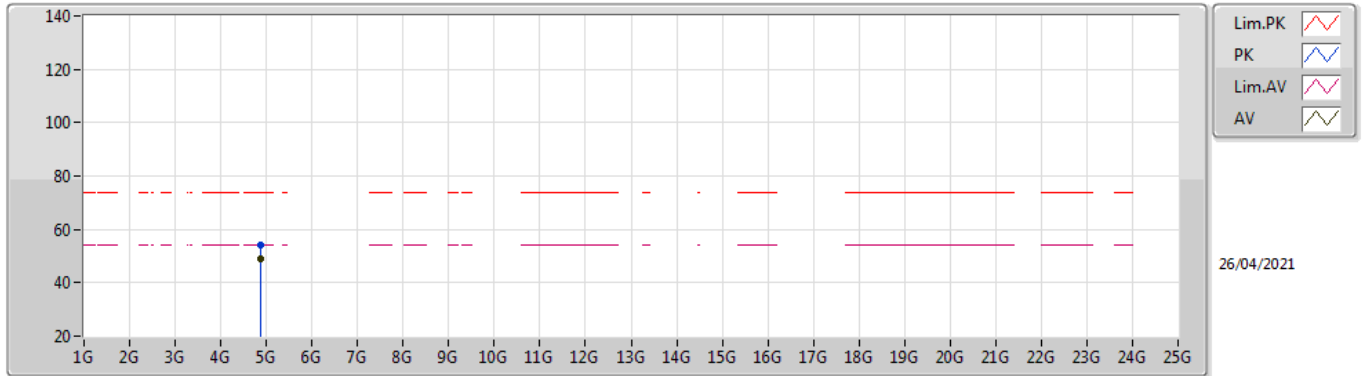
## 2440MHz\_TX



| Type | Freq     | Level    | Limit    | Margin | Factor | Dist | Condition | Azimuth | Height | Comment | Raw    | AF    | CL   | PA    |
|------|----------|----------|----------|--------|--------|------|-----------|---------|--------|---------|--------|-------|------|-------|
|      | (Hz)     | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |           | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB)  |
| AV   | 4.87998G | 48.79    | 54.00    | -5.21  | 1.65   | 3    | Vertical  | 279     | 1.02   | -       | 47.14  | 31.24 | 5.34 | 34.93 |
| PK   | 4.87947G | 54.22    | 74.00    | -19.78 | 1.65   | 3    | Vertical  | 279     | 1.02   | -       | 52.57  | 31.24 | 5.34 | 34.93 |

# BT-LE(1Mbps)

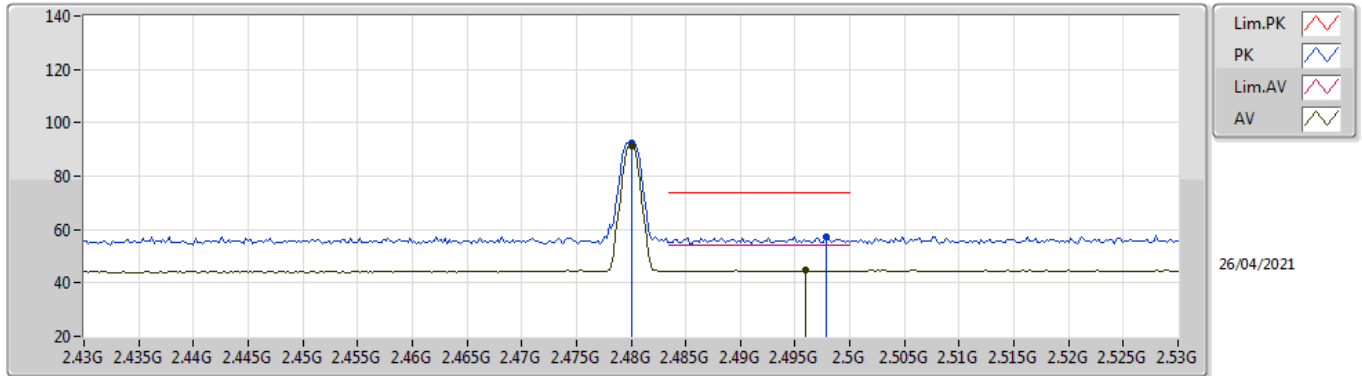
## 2440MHz\_TX



| 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) |
|------|--------------|-------------------|-------------------|----------------|----------------|-------------|------------|----------------|---------------|---------|---------------|------------|------------|------------|
| AV   | 4.87996G     | 48.87             | 54.00             | -5.13          | 1.65           | 3           | Horizontal | 201            | 2.61          | -       | 47.22         | 31.24      | 5.34       | 34.93      |
| PK   | 4.87956G     | 54.24             | 74.00             | -19.76         | 1.65           | 3           | Horizontal | 201            | 2.61          | -       | 52.59         | 31.24      | 5.34       | 34.93      |

# BT-LE(1Mbps)

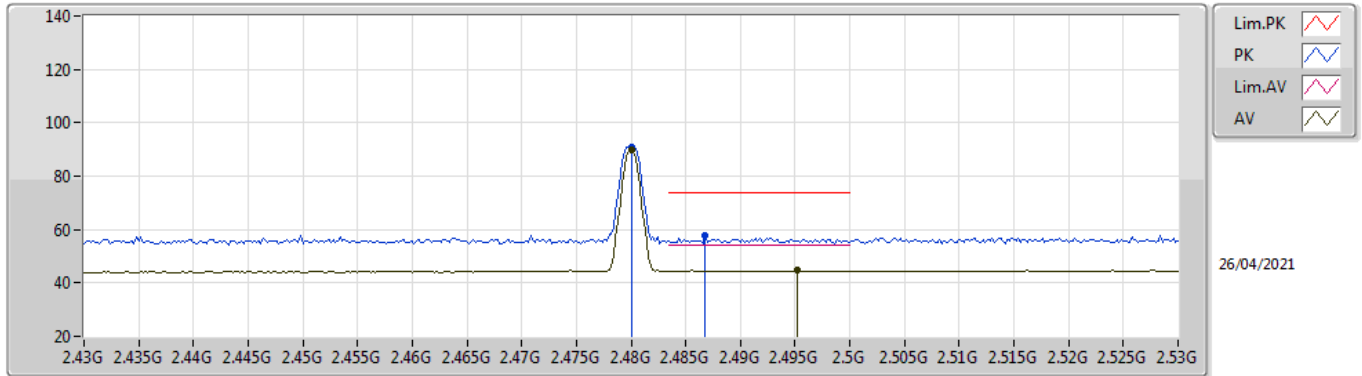
## 2480MHz\_TX



| Type | Freq    | Level    | Limit    | Margin | Factor | Dist | Condition | Azimuth | Height | Comment | Raw    | AF    | CL   | PA   |
|------|---------|----------|----------|--------|--------|------|-----------|---------|--------|---------|--------|-------|------|------|
|      | (Hz)    | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |           | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB) |
| AV   | 2.48G   | 91.46    | Inf      | -Inf   | 31.62  | 3    | Vertical  | 134     | 1.53   | -       | 59.84  | 27.60 | 4.02 | -    |
| AV   | 2.496G  | 44.63    | 54.00    | -9.37  | 31.64  | 3    | Vertical  | 134     | 1.53   | -       | 12.99  | 27.60 | 4.04 | -    |
| PK   | 2.48G   | 92.60    | Inf      | -Inf   | 31.62  | 3    | Vertical  | 134     | 1.53   | -       | 60.98  | 27.60 | 4.02 | -    |
| PK   | 2.4978G | 57.50    | 74.00    | -16.50 | 31.65  | 3    | Vertical  | 134     | 1.53   | -       | 25.85  | 27.60 | 4.05 | -    |

## BT-LE(1Mbps)

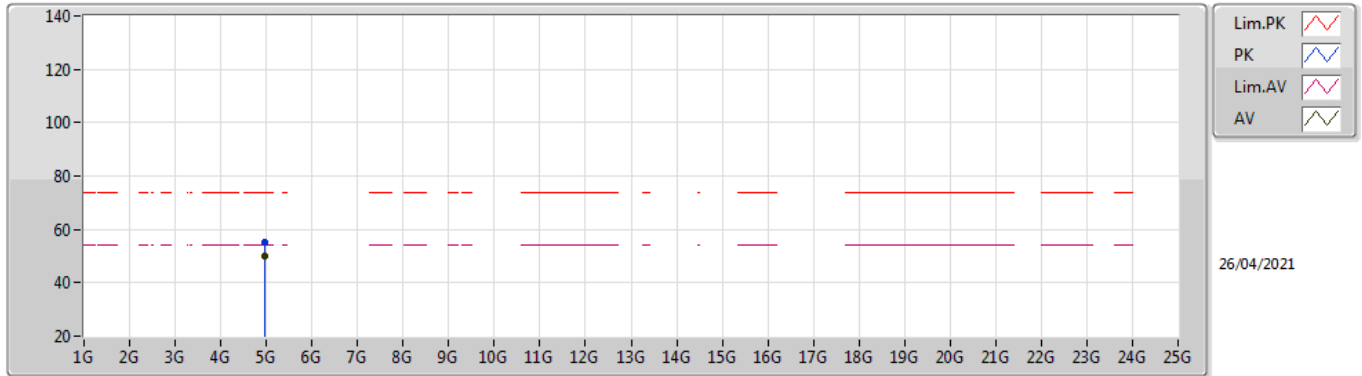
### 2480MHz\_TX



| Type | Freq    | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw    | AF    | CL   | PA   |
|------|---------|----------|----------|--------|--------|------|------------|---------|--------|---------|--------|-------|------|------|
|      | (Hz)    | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |            | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB) |
| AV   | 2.48G   | 89.80    | Inf      | -Inf   | 31.62  | 3    | Horizontal | 201     | 1.50   | -       | 58.18  | 27.60 | 4.02 | -    |
| AV   | 2.4952G | 44.71    | 54.00    | -9.29  | 31.64  | 3    | Horizontal | 201     | 1.50   | -       | 13.07  | 27.60 | 4.04 | -    |
| PK   | 2.48G   | 90.88    | Inf      | -Inf   | 31.62  | 3    | Horizontal | 201     | 1.50   | -       | 59.26  | 27.60 | 4.02 | -    |
| PK   | 2.4868G | 57.86    | 74.00    | -16.14 | 31.63  | 3    | Horizontal | 201     | 1.50   | -       | 26.23  | 27.60 | 4.03 | -    |

## BT-LE(1Mbps)

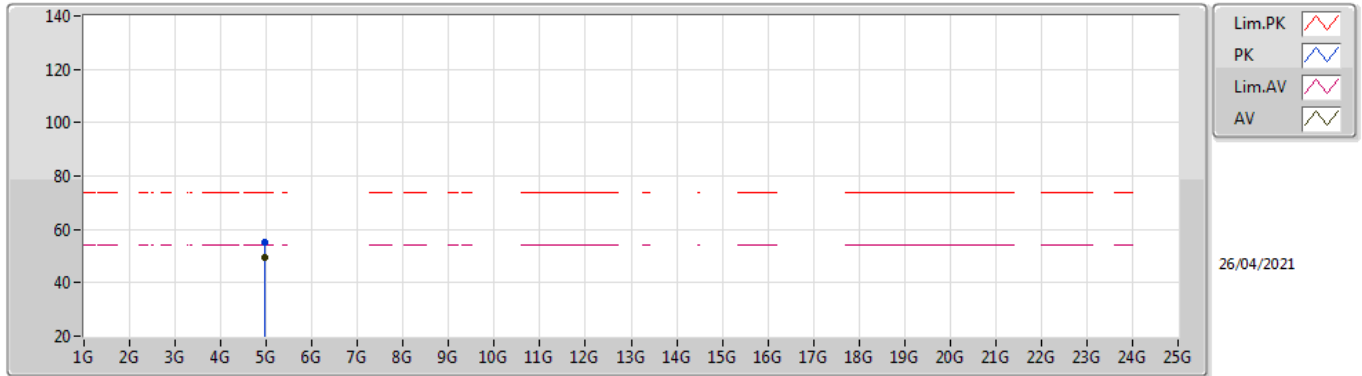
### 2480MHz\_TX



| Type | Freq     | Level    | Limit    | Margin | Factor | Dist | Condition | Azimuth | Height | Comment | Raw    | AF    | CL   | PA    |
|------|----------|----------|----------|--------|--------|------|-----------|---------|--------|---------|--------|-------|------|-------|
|      | (Hz)     | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |           | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB)  |
| AV   | 4.95997G | 50.00    | 54.00    | -4.00  | 1.86   | 3    | Vertical  | 285     | 1.02   | -       | 48.14  | 31.42 | 5.38 | 34.94 |
| PK   | 4.95948G | 55.28    | 74.00    | -18.72 | 1.86   | 3    | Vertical  | 285     | 1.02   | -       | 53.42  | 31.42 | 5.38 | 34.94 |

## BT-LE(1Mbps)

### 2480MHz\_TX



| Type | Freq     | Level    | Limit    | Margin | Factor | Dist | Condition  | Azimuth | Height | Comment | Raw    | AF    | CL   | PA    |
|------|----------|----------|----------|--------|--------|------|------------|---------|--------|---------|--------|-------|------|-------|
|      | (Hz)     | (dBuV/m) | (dBuV/m) | (dB)   | (dB)   | (m)  |            | (°)     | (m)    |         | (dBuV) | (dB)  | (dB) | (dB)  |
| AV   | 4.95998G | 49.72    | 54.00    | -4.28  | 1.86   | 3    | Horizontal | 199     | 2.96   | -       | 47.86  | 31.42 | 5.38 | 34.94 |
| PK   | 4.95995G | 55.25    | 74.00    | -18.75 | 1.86   | 3    | Horizontal | 199     | 2.96   | -       | 53.39  | 31.42 | 5.38 | 34.94 |