

Zykronix Inc. Taiwan Branch

TEST REPORT

REPORT NUMBER
200900148TWN-001

ISSUE DATE
Nov. 02, 2020

PAGES
52

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FCC Class II Chang

TEST REPORT

| | |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant: | Zykronix Inc. Taiwan Branch 14F. -8, No. 3, Sec. 4, New Taipei Blvd., Xinzhuang Dist., New Taipei City, Taiwan |
| Product: | W-LAN + Bluetooth Module |
| Model No.: | LBEE5ZZ1PJ |
| Brand Name: | N/A |
| FCC ID: | 2AGRR-LBEE5ZZ1PJ |
| Test Method/ Standard: | 47 CFR FCC Part 15.247 & ANSI C63.10 2013 KDB 558074 D01 v05r02 |
| Test By: | Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan |



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Revision History

| Report No. | Issue Date | Revision Summary |
|------------------|---------------|-------------------------------------------------|
| 200900148TWN-001 | Nov. 02, 2020 | Original report (This case is to add hosts.) |

Table of Contents

| | |
|-----------------------------------------------------------------------------------|----|
| Summary of Test Data | 5 |
| 1. General Information | 6 |
| 1.1 Identification of the EUT | 6 |
| 1.2 Additional information about the EUT | 6 |
| 1.3 Antenna description | 7 |
| 1.4 Operation mode | 7 |
| 1.5 Peripherals equipment | 7 |
| 2. 20dB Bandwidth Test..... | 8 |
| 2.1 Test Setup & Procedure | 8 |
| 2.2 Operating Environment Condition | 8 |
| 2.3 Test Results | 8 |
| 3. Carrier Frequency Separation Test | 12 |
| 3.1 Test Setup & Procedure | 12 |
| 3.2 Operating Environment Condition | 12 |
| 3.3 Test Results | 12 |
| 4. Number of Hopping Frequencies Test | 16 |
| 4.1 Test Setup & Procedure | 16 |
| 4.2 Operating Environment Condition | 16 |
| 4.3 Test Results | 16 |
| 5. Time of Occupancy (Dwell Time) | 18 |
| 5.1 Test Setup & Procedure | 18 |
| 5.2 Operating Environment Condition | 18 |
| 5.3 Test Results | 18 |
| 5. Maximum Output Power Test..... | 22 |
| 5.1 Test Setup & Procedure | 22 |
| 5.2 Operating Environment Condition | 22 |
| 5.3 Test Results | 22 |
| 5. RF Antenna Conducted Spurious Test | 23 |
| 5.1 Test Setup & Procedure | 23 |
| 5.2 Operating Environment Condition | 23 |
| 5.3 Test Results | 24 |
| 6. Emissions in Restricted Frequency Bands (Radiated emission measurements) | 32 |
| 6.1 Instrument Setting..... | 32 |
| 6.2 Test Procedure | 32 |
| 6.3 Test Diagram | 33 |
| 6.3.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna: | 33 |
| 6.3.2 Radiated emission below 1GHz using Bilog Antenna | 33 |

TEST REPORT

- 6.3.3 Radiated emission above 1GHz using Horn Antenna 34
- 6.4 Limit..... 34
- 6.5 Operating Environment Condition 34
- 6.6 Test Result..... 35
 - 6.6.1 Measurement results: frequencies 9kHz to 30MHz 35
 - 6.6.2 Measurement results: frequencies below 1 GHz 38
 - 6.6.3 Measurement results: frequency above 1GHz to 25GHz 40
- 7. Emission on Band Edge..... 41
 - 7.1 Instrument Setting..... 41
 - 7.2 Test Procedure 41
 - 7.3 Operating Environment Condition 41
 - 7.4 Test Results 42
- 8. AC Power Line Conducted Emission 47
 - 8.1 Measuring instrument setting..... 47
 - 8.2 Test Procedure 47
 - 8.3 Test Diagram 47
 - 8.4 Limit..... 48
 - 8.5 Operating Environment Condition 48
 - 8.6 Test Results 49
- Appendix A: Test equipment list..... 51
- Appendix B: Measurement Uncertainty 52

Summary of Test Data

| Test Requirement | Applicable Rule (Section 15.247) | Result |
|---------------------------------------|---------------------------------------------|---------------|
| 20dB Bandwidth Test | 15.247(a)(1) | Pass |
| Carrier Frequency Separation Test | 15.247(a)(1) | Pass |
| Number of Hopping Frequencies Test | 15.247(a)(1) | Pass |
| Time of Occupancy (Dwell Time) Test | 15.247(a)(1)(iii) | Pass |
| Maximum Output Power Test | 15.247(b) | Pass |
| RF Antenna Conducted Spurious Test | 15.247(d) | Pass |
| Radiated Spurious Emission Test | 15.205, 15.209 | Pass |
| Emission on the Band Edge Test | 15.247(d) | Pass |
| AC Power Line Conducted Emission Test | 15.207 | Pass |
| Antenna Requirement | 15.203 | Pass |

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.

Other Testing: the specification, standard and not taking into account the measurement uncertainty.

1. General Information

1.1 Identification of the EUT

| | |
|-----------------------------------|-------------------------------|
| Product: | 15.6" Touch Screen Controller |
| Model No.: | Milano XL |
| Operating Frequency: | 2402 MHz ~ 2480 MHz |
| Channel Number: | 79 channels |
| Frequency of Each Channel: | 2402+k, k=0 ~ 78 |
| Rated Power: | DC 24 V from adapter |
| Power Cord: | N/A |
| Sample receiving date: | Sep. 14, 2020 |
| Sample condition: | Workable |
| Test Date(s): | Oct. 06, 2020 ~ Oct. 20, 2020 |

1.2 Additional information about the Hosts

| Brand Name | Model Name | Model Number | Different |
|------------|-------------------------------|--------------|--------------------------------------------------------------------|
| Zykronix | 15.6" Touch Screen Controller | Milano XL | The Model is main model |
| Zykronix | 11.6" Touch Screen Controller | Symphony XL | The difference from the main model is the screen size |
| Zykronix | 11.6" Touch Screen Controller | Symphony II | The difference from the main model is the screen size & has no LED |
| Zykronix | 8.0" Touch Screen Controller | Melody XL | The difference from the main model is the screen size |
| Zykronix | 8.0" Touch Screen Controller | Melody II | The difference from the main model is the screen size & has no LED |
| Zykronix | 6.0" Touch Screen Controller | Giulia | The difference from the main model is the screen size & has no LED |

1.3 Antenna description

Antenna Gain : 2.15 dBi
Antenna Type : FPC antenna
Connector Type : I-Pex

1.4 Operation mode

The EUT was supplied with DC 24 V from adapter (Test voltage: 120Vac, 60Hz).

EUT connected to Notebook PC & Wireless AP via Micro USB Cable & LAN, executing "Qualcomm Radio Control Tool" and select different frequency and modulation.

1.5 Peripherals equipment

| Peripherals | Brand | Model No. | Serial No. | Data cable |
|-------------|---------|----------------------|------------|-------------------------------|
| Notebook PC | HP | HP ProBook 440 G3 | 5CD8021S9H | Micro USB Cable 0.8 meter × 1 |
| Wireless AP | BUFFALO | WZR-AGL300NH | N/A | RJ-45 STP Cat.5 0.8 meter × 2 |
| Adapter | N/A | ADP-85NB A | N/A | N/A |

2. 20dB Bandwidth Test

2.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The 20dB bandwidth per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set \geq 1% of 20dB Bandwidth, the video bandwidth \geq RBW, and the SPAN may equal to approximately 2 to 3 times the 20dB bandwidth. The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

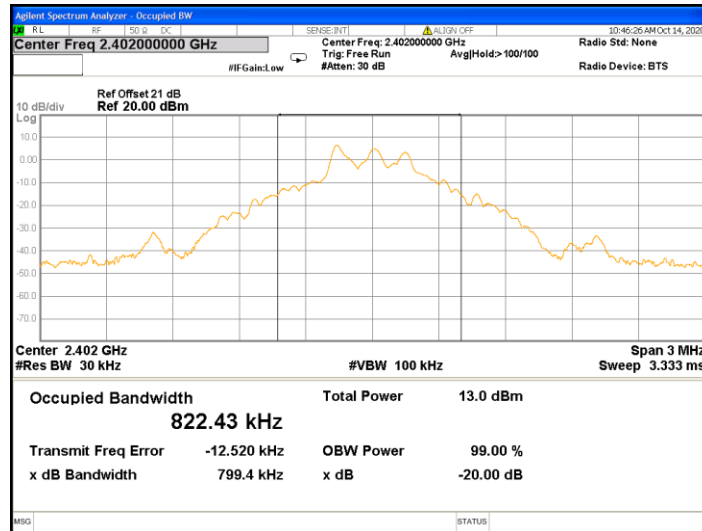
2.2 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

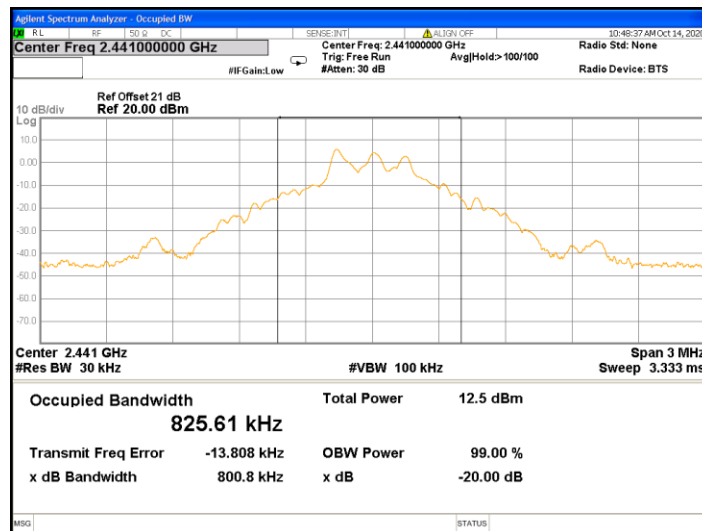
2.3 Test Results

| Mode | Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|------|---------|-----------------|----------------------|
| DH5 | 0 | 2402 | 0.799 |
| | 39 | 2441 | 0.801 |
| | 78 | 2480 | 0.801 |
| 2DH5 | 0 | 2402 | 1.117 |
| | 39 | 2441 | 1.119 |
| | 78 | 2480 | 1.120 |
| 3DH5 | 0 | 2402 | 1.160 |
| | 39 | 2441 | 1.161 |
| | 78 | 2480 | 1.163 |

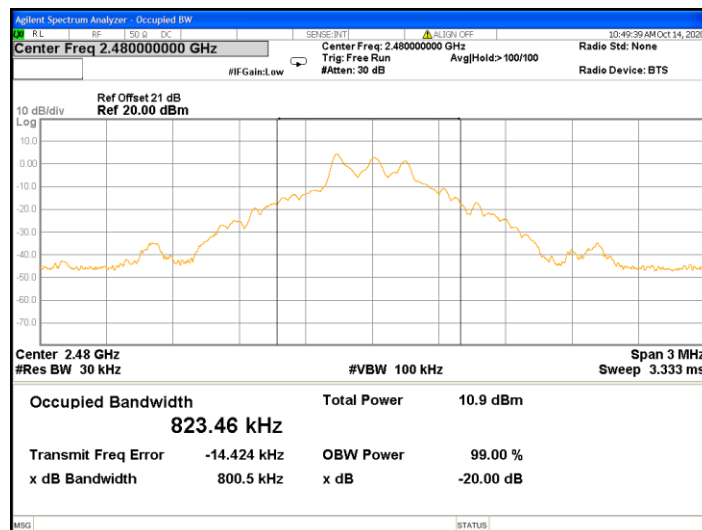
Chain 0: 20dB Occupied Bandwidth @ DH5 Ch 0



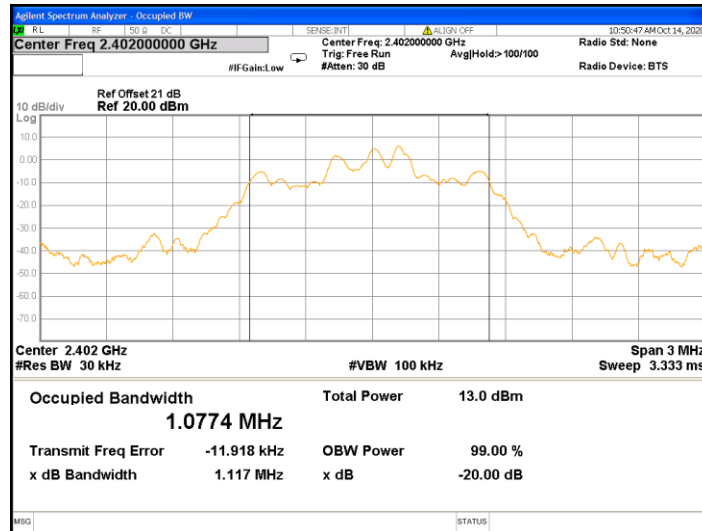
Chain 0: 20dB Occupied Bandwidth @ DH5 Ch 39



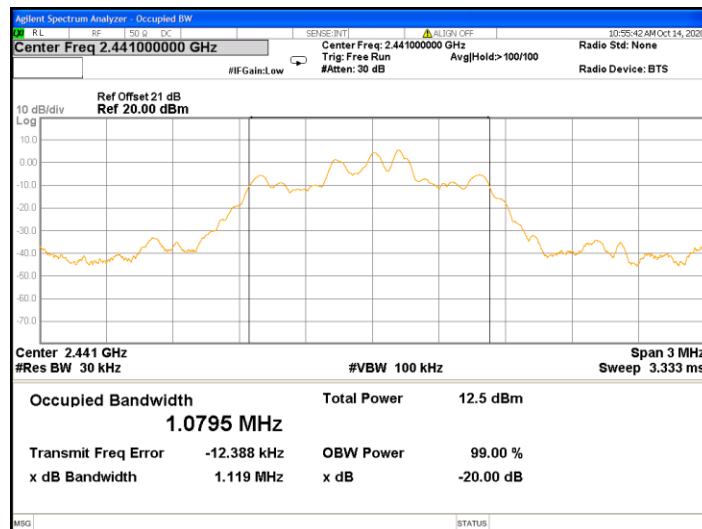
Chain 0: 20dB Occupied Bandwidth @ DH5 Ch 78



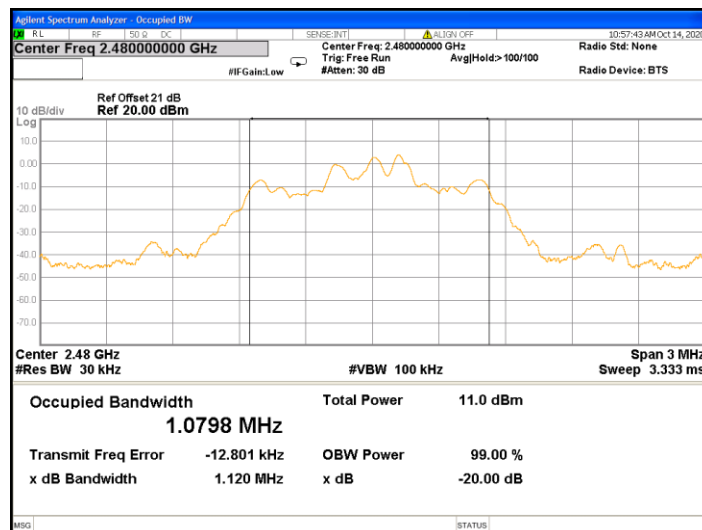
Chain 0: 20dB Occupied Bandwidth @ 2DH5 Ch 0



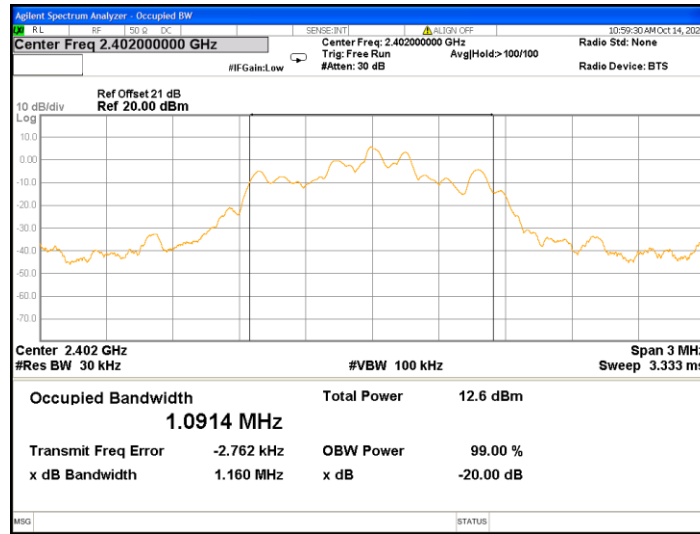
Chain 0: 20dB Occupied Bandwidth @ 2DH5 Ch 39



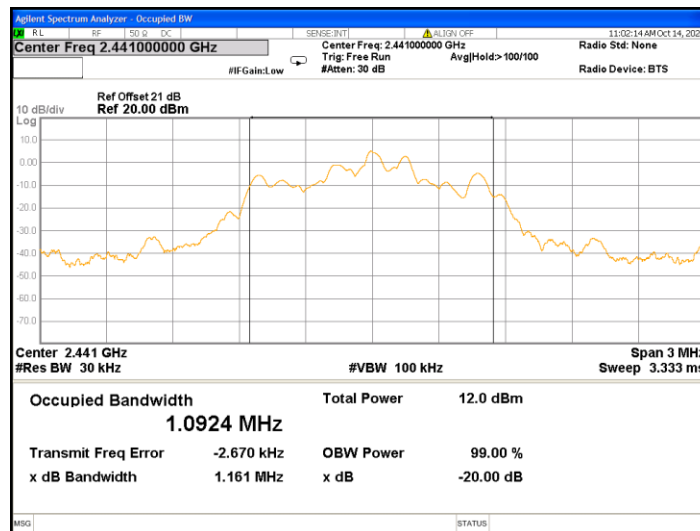
Chain 0: 20dB Occupied Bandwidth @ 2DH5 Ch 78



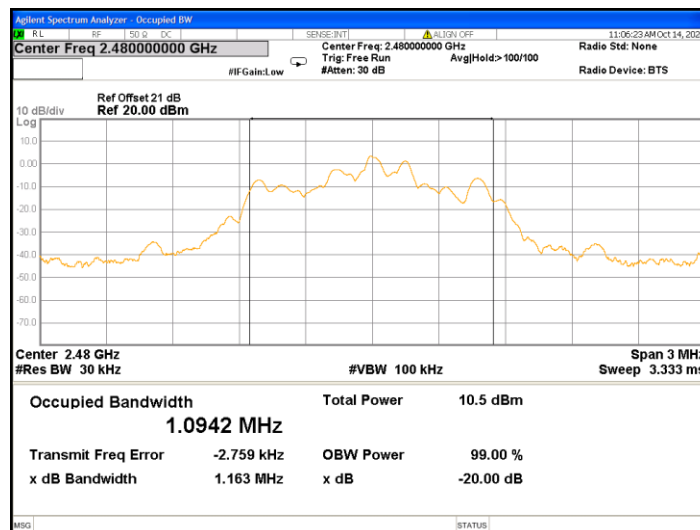
Chain 0: 20dB Occupied Bandwidth @ 3DH5 Ch 0



Chain 0: 20dB Occupied Bandwidth @ 3DH5 Ch 39



Chain 0: 20dB Occupied Bandwidth @ 3DH5 Ch 78



3. Carrier Frequency Separation Test

3.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The carrier frequency separation per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at $\geq 1\%$ of the span, the video bandwidth \geq RBW, and the SPAN was wide enough to capture the peaks of two adjacent channels. The carrier frequency separation result is in the following Table.

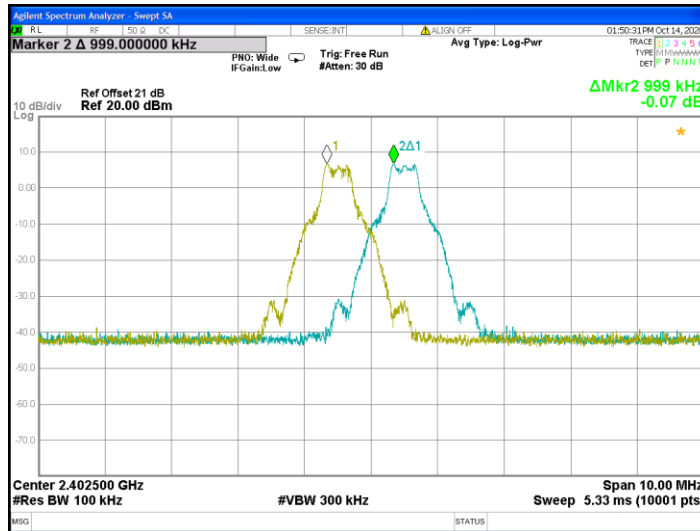
3.2 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

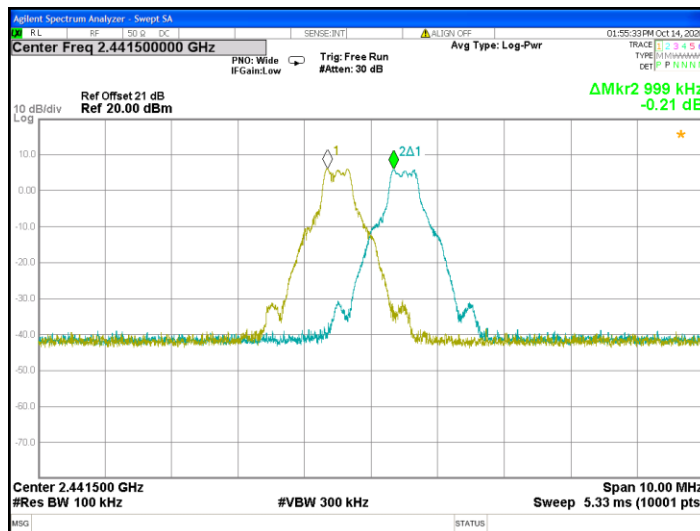
3.3 Test Results

| Mode | Channel | Frequency (MHz) | Adjacent channel separation (MHz) | > Limit (MHz) |
|------|---------|-----------------|-----------------------------------|---------------|
| DH5 | 0 | 2402 | 0.999 | 0.533 |
| | 39 | 2441 | 0.999 | 0.534 |
| | 78 | 2480 | 0.999 | 0.534 |
| 2DH5 | 0 | 2402 | 1.006 | 0.745 |
| | 39 | 2441 | 1.001 | 0.746 |
| | 78 | 2480 | 1.002 | 0.747 |
| 3DH5 | 0 | 2402 | 1.010 | 0.773 |
| | 39 | 2441 | 0.996 | 0.774 |
| | 78 | 2480 | 1.007 | 0.775 |

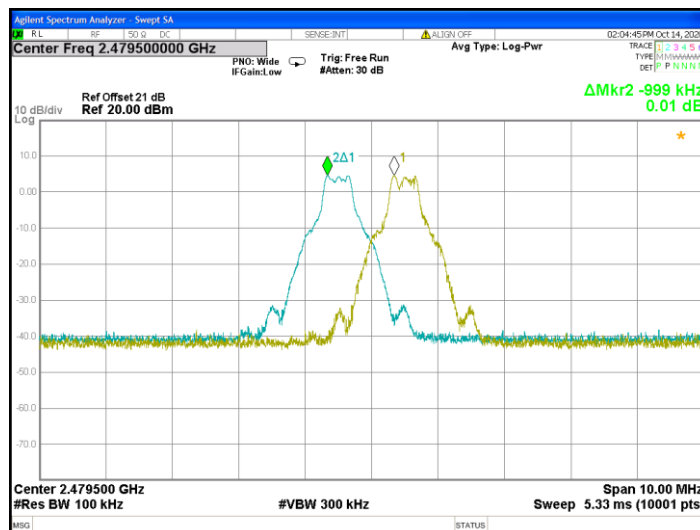
Chain 0: Carrier Frequency Separation @ DH5 Ch 0



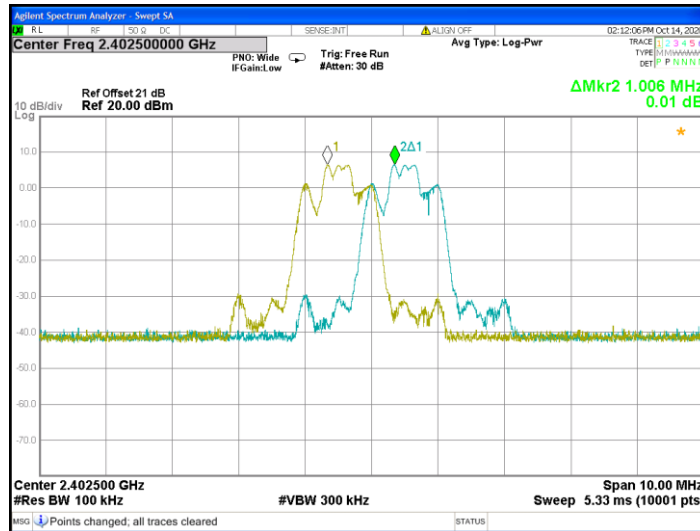
Chain 0: Carrier Frequency Separation @ DH5 Ch 39



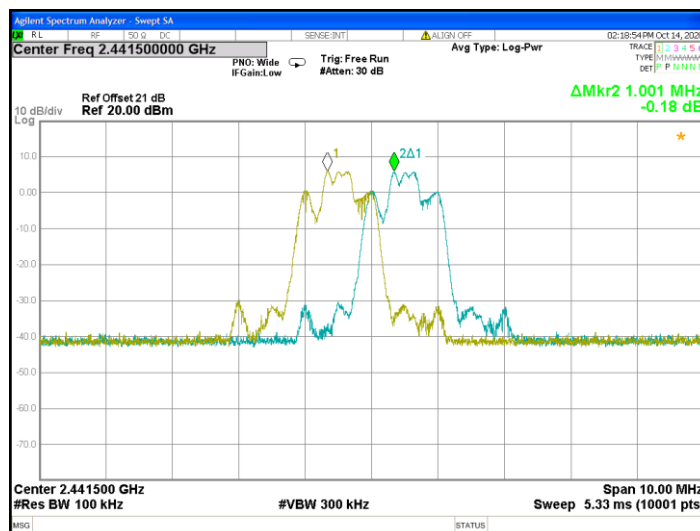
Chain 0: Carrier Frequency Separation @ DH5 Ch 78



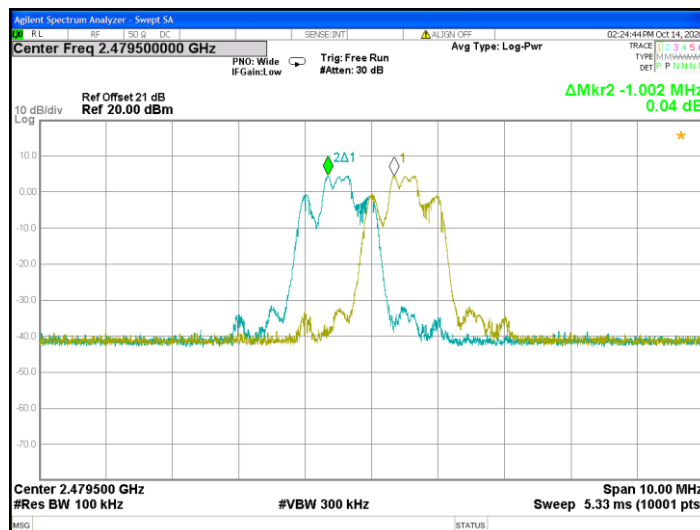
Chain 0: Carrier Frequency Separation @ 2DH5 Ch 0



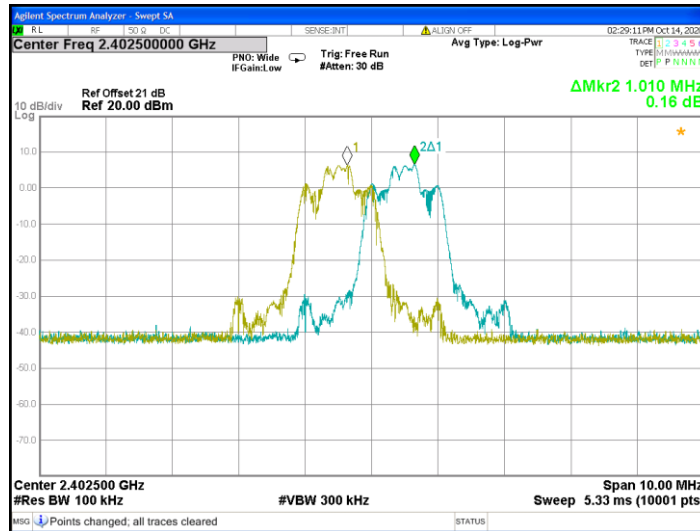
Chain 0: Carrier Frequency Separation @ 2DH5 Ch 39



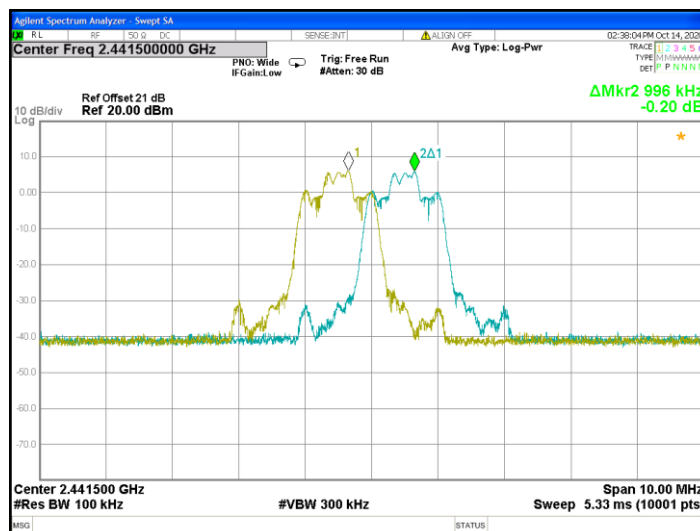
Chain 0: Carrier Frequency Separation @ 2DH5 Ch 78



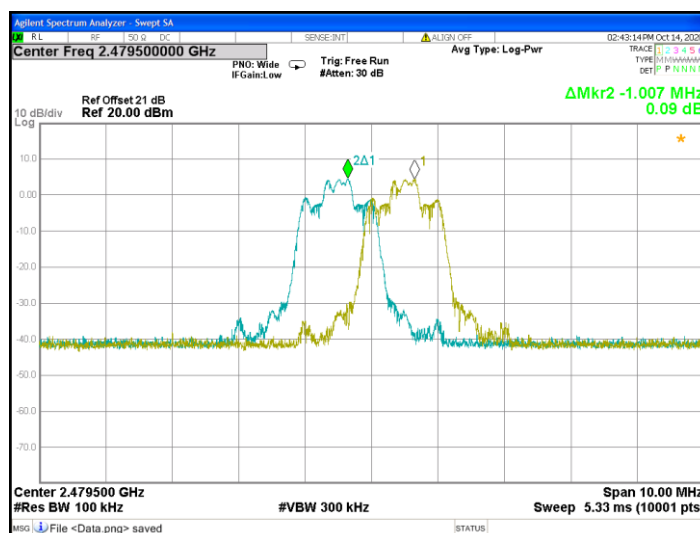
Chain 0: Carrier Frequency Separation @ 3DH5 Ch 0



Chain 0: Carrier Frequency Separation @ 3DH5 Ch 39



Chain 0: Carrier Frequency Separation @ 3DH5 Ch 78



4. Number of Hopping Frequencies Test

4.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The number of hopping frequencies per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at $\geq 1\%$ of the span, the video bandwidth \geq RBW, and the SPAN was the frequency band of operation. The carrier frequency separation result is in the following Table.

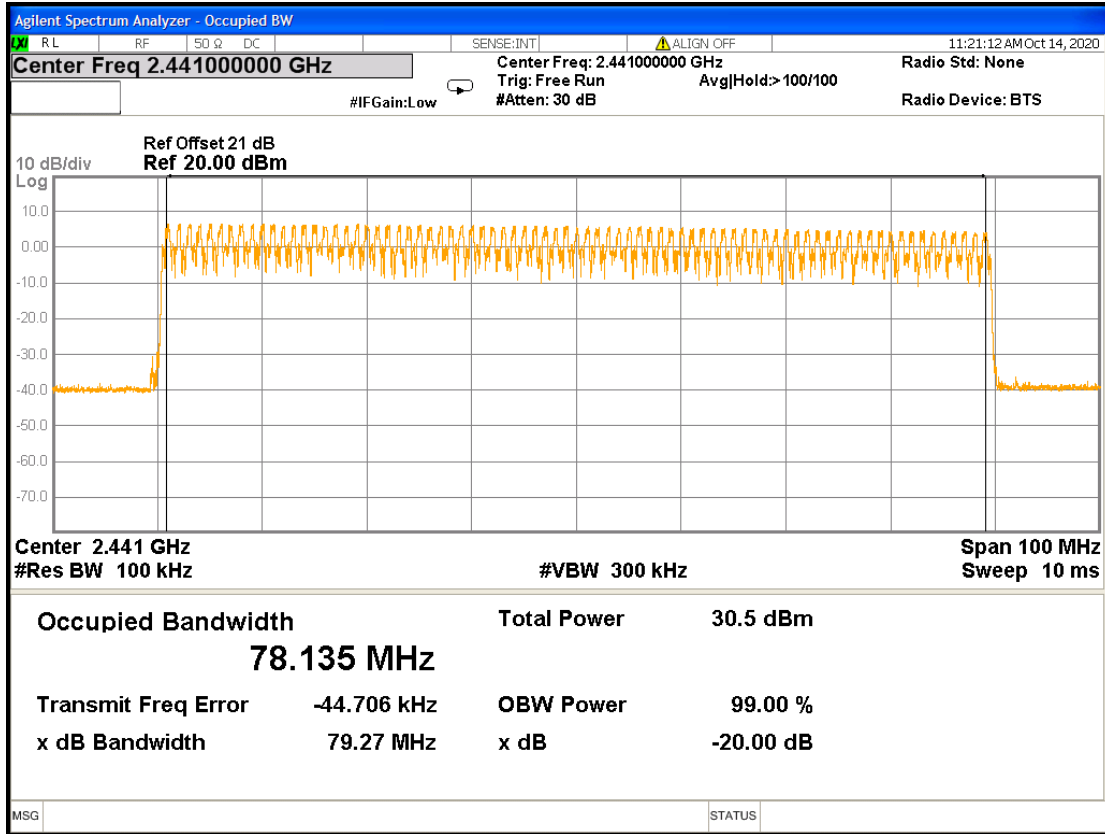
4.2 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

4.3 Test Results

| Frequency Range (MHz) | Hopping Channels |
|-----------------------|------------------|
| 2402~2480 | 79 |

Chain 0: Number of Hopping Frequencies



5. Time of Occupancy (Dwell Time)

5.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The time of occupancy (dwell time) per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth \geq RBW, and the zero span function of spectrum analyzer was enable. The EUT has its hopping function enable.

5.2 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

5.3 Test Results

The total sweep time is 0.4×79 Channels =31.6 seconds

Due to the number of hops in the 31.6s sweep, we determined to reduce the sweep time to 5s, count the number of hops and multiply by 6.32. The total number of hops will be multiplied by the measured time of one pulse.

| Mode | Packet type | Pulse duration (ms) | Measure time (s) | Dwell time (s) | Limit (s) | Test Results |
|------|-------------|---------------------|------------------|----------------|-----------|--------------|
| DH5 | DH1 | 0.377 | 31.6 | 0.121 | 0.4 | Pass |
| | DH3 | 1.634 | 31.6 | 0.261 | 0.4 | Pass |
| | DH5 | 2.876 | 31.6 | 0.307 | 0.4 | Pass |
| 2DH5 | 2DH1 | 0.384 | 31.6 | 0.123 | 0.4 | Pass |
| | 2DH3 | 2.376 | 31.6 | 0.380 | 0.4 | Pass |
| | 2DH5 | 2.884 | 31.6 | 0.308 | 0.4 | Pass |
| 3DH5 | 3DH1 | 0.385 | 31.6 | 0.123 | 0.4 | Pass |
| | 3DH3 | 1.142 | 31.6 | 0.183 | 0.4 | Pass |
| | 3DH5 | 2.883 | 31.6 | 0.308 | 0.4 | Pass |

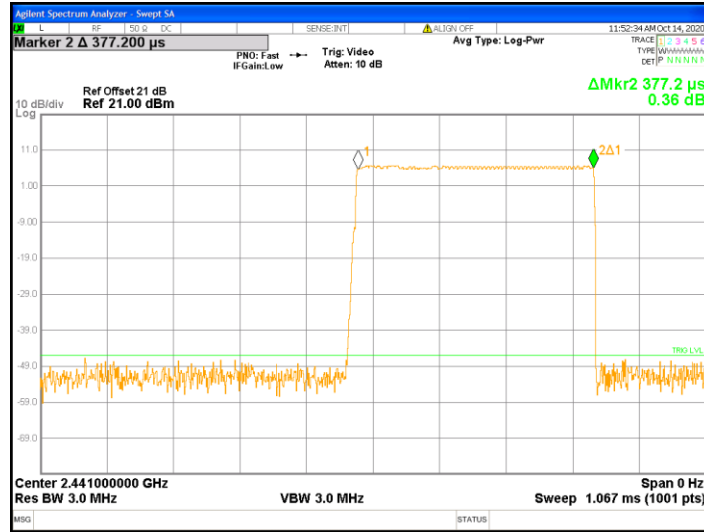
Note: (1) Dwell time = $1600 \div (79 \times N) \times$ Pulse duration \times Measure time

(2) DH1, N=2

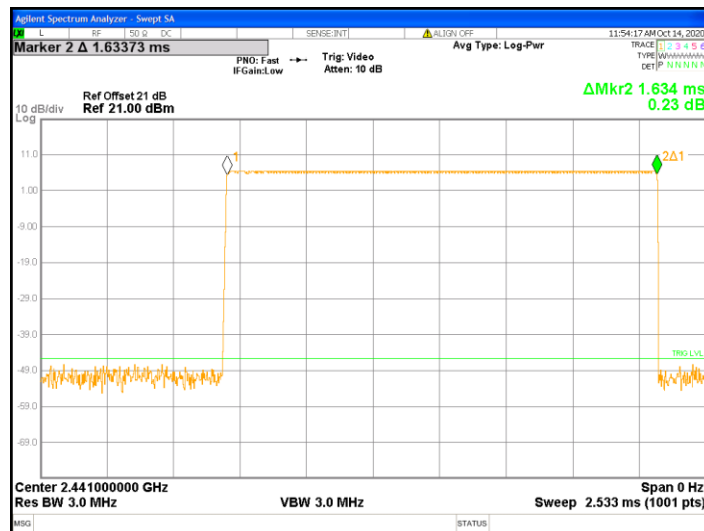
DH3, N=4

DH5, N=6

Chain 0: Dwell Time @ DH1 Ch 39



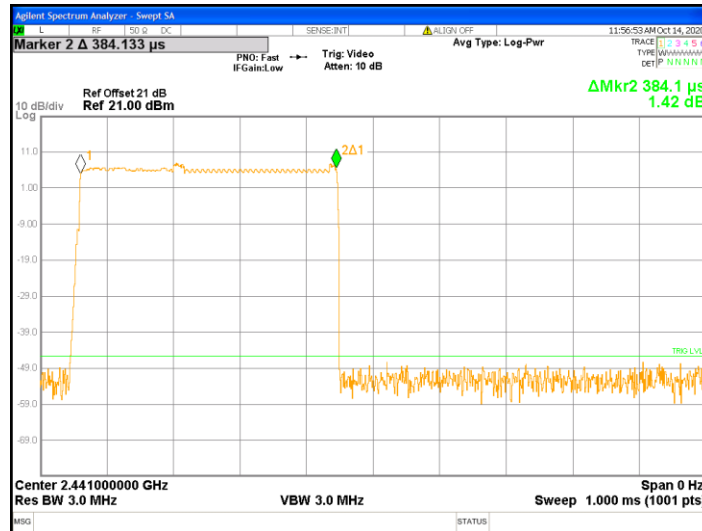
Chain 0: Dwell Time @ DH3 Ch 39



Chain 0: Dwell Time @ DH5 Ch 39



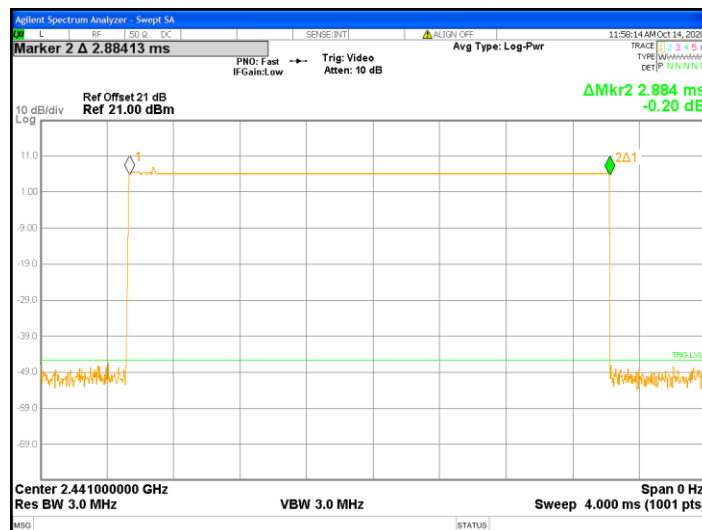
Chain 0: Dwell Time @ 2DH1 Ch 39



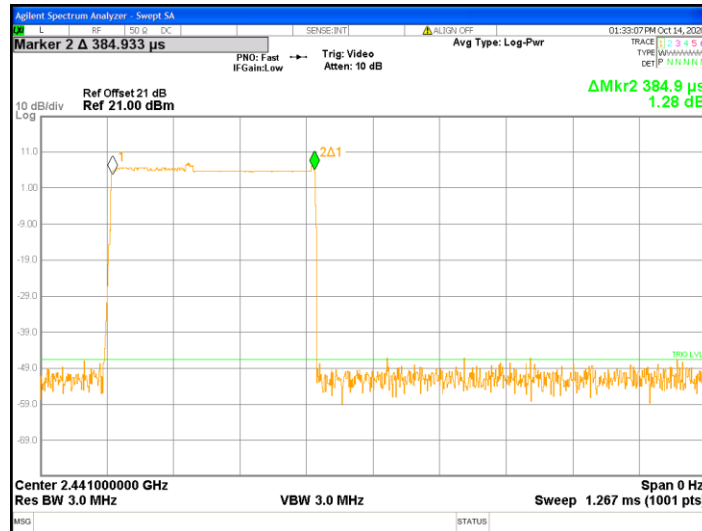
Chain 0: Dwell Time @ 2DH3 Ch 39



Chain 0: Dwell Time @ 2DH5 Ch 39



Chain 0: Dwell Time @ 3DH1 Ch 39



Chain 0: Dwell Time @ 3DH3 Ch 39



Chain 0: Dwell Time @ 3DH5 Ch 39



TEST REPORT

5. Maximum Output Power Test

5.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (2 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

5.2 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

5.3 Test Results

| Mode | Channel | Frequency (MHz) | Output Power (AV) (dBm) | Total Power (AV) (mW) | Maximum power (PK) (dBm) | Maximum power (PK) (mW) | Limit (dBm) | Margin (dB) |
|------|---------|-----------------|-------------------------|-----------------------|--------------------------|-------------------------|-------------|-------------|
| DH5 | 0 | 2402 | 2.99 | 1.99 | 3.66 | 2.32 | 30 | -26.34 |
| | 39 | 2441 | 2.14 | 1.64 | 2.92 | 1.96 | 30 | -27.08 |
| | 78 | 2480 | 0.69 | 1.17 | 1.65 | 1.46 | 30 | -28.35 |
| 2DH5 | 0 | 2402 | 6.55 | 4.52 | 7.34 | 5.42 | 30 | -22.66 |
| | 39 | 2441 | 5.64 | 3.66 | 6.51 | 4.48 | 30 | -23.49 |
| | 78 | 2480 | 4.22 | 2.64 | 5.23 | 3.33 | 30 | -24.77 |
| 3DH5 | 0 | 2402 | 6.14 | 4.11 | 6.71 | 4.69 | 30 | -23.29 |
| | 39 | 2441 | 5.22 | 3.33 | 5.89 | 3.88 | 30 | -24.11 |
| | 78 | 2480 | 3.77 | 2.38 | 4.66 | 2.92 | 30 | -25.34 |

5. RF Antenna Conducted Spurious Test

5.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.

Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

5.2 Operating Environment Condition

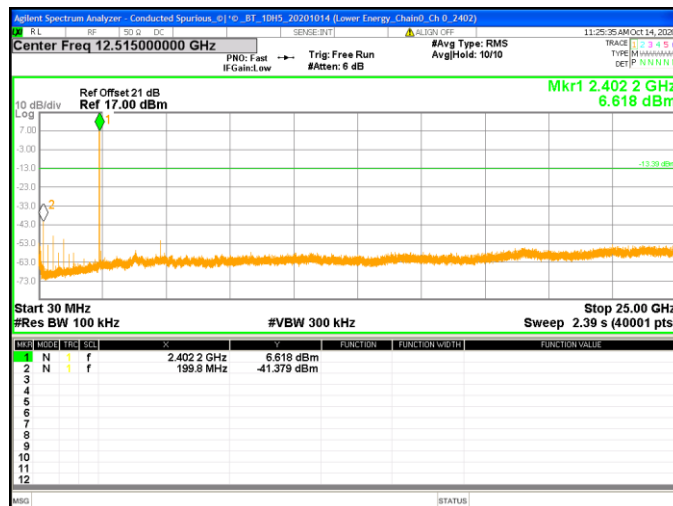
| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

5.3 Test Results

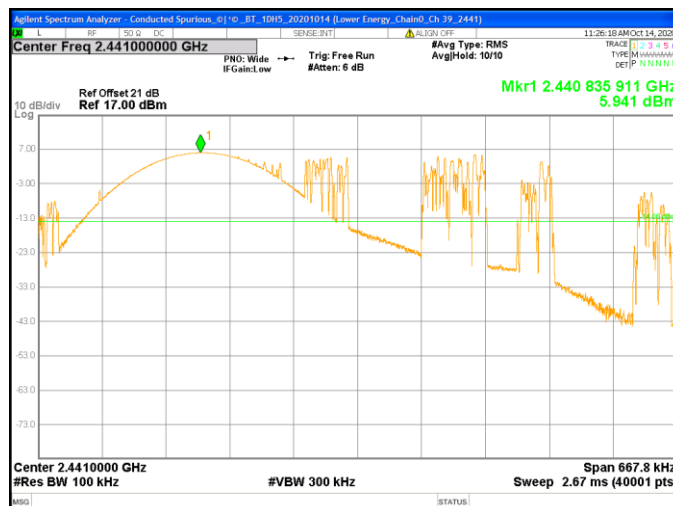
Chain 0: Conducted Spurious @ DH5 Ch 0



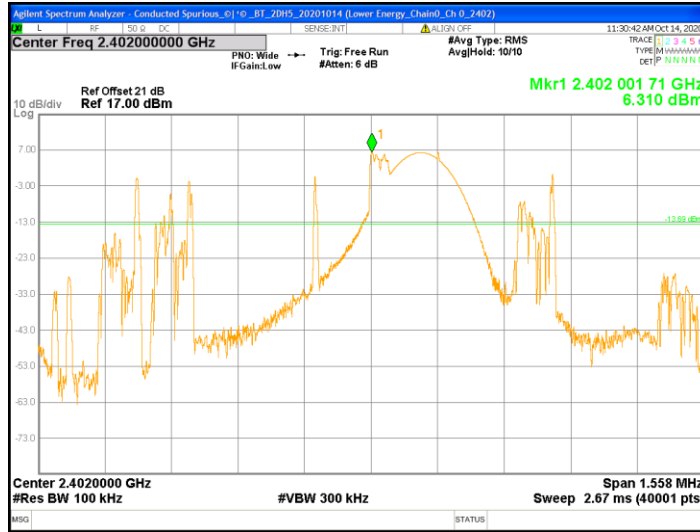
Chain 0: Conducted Spurious @ DH5 Ch 0



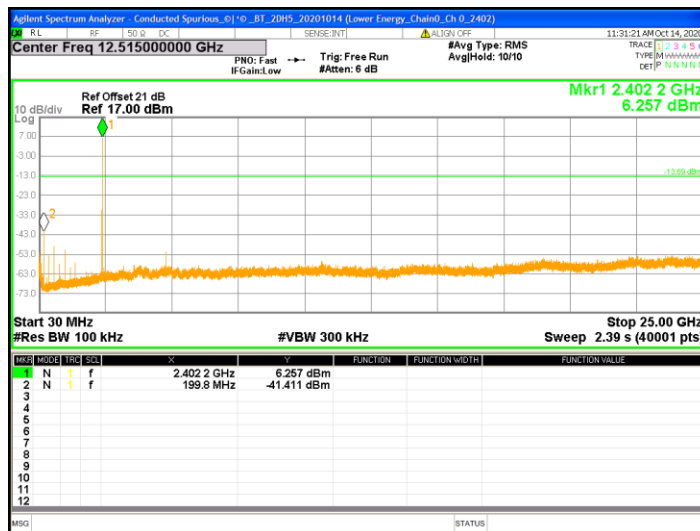
Chain 0: Conducted Spurious @ DH5 Ch 39



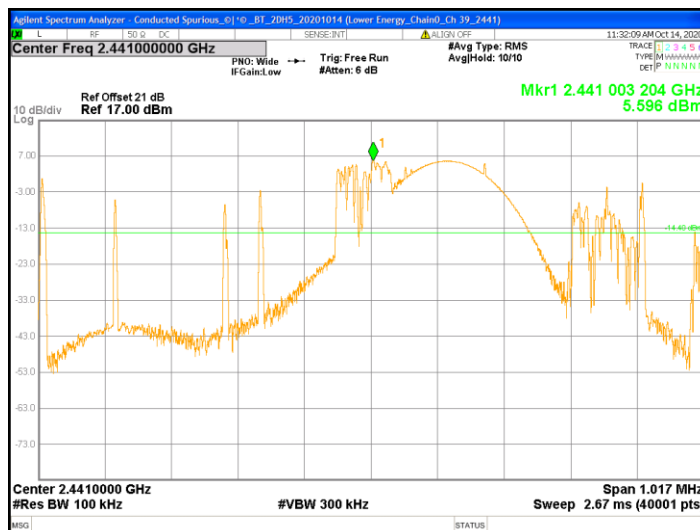
Chain 0: Conducted Spurious @ 2DH5 Ch 0



Chain 0: Conducted Spurious @ 2DH5 Ch 0



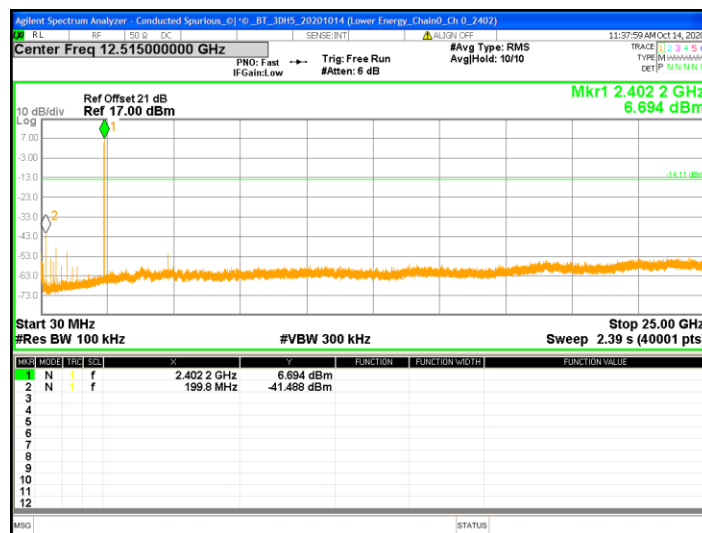
Chain 0: Conducted Spurious @ 2DH5 Ch 39



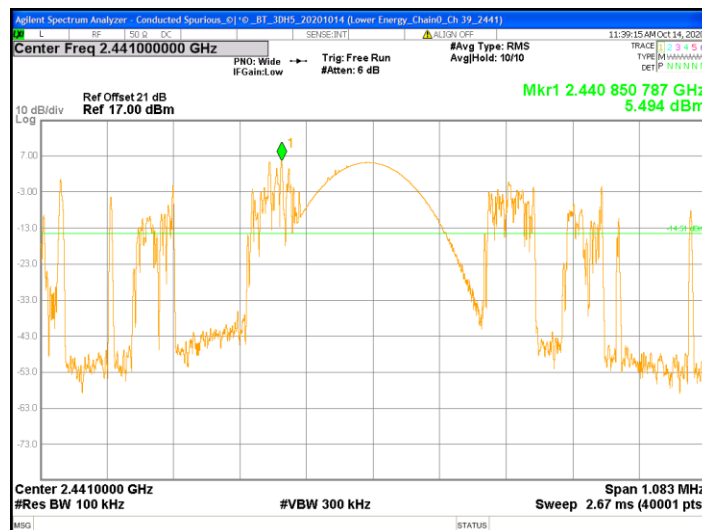
Chain 0: Conducted Spurious @ 3DH5 Ch 0



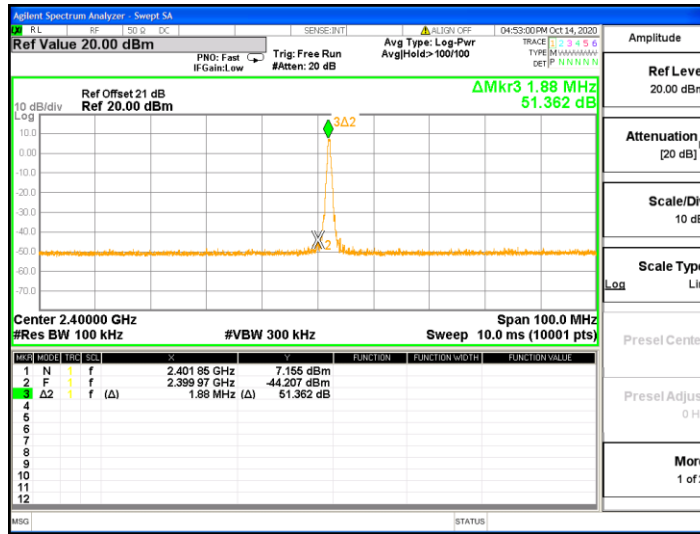
Chain 0: Conducted Spurious @ 3DH5 Ch 0



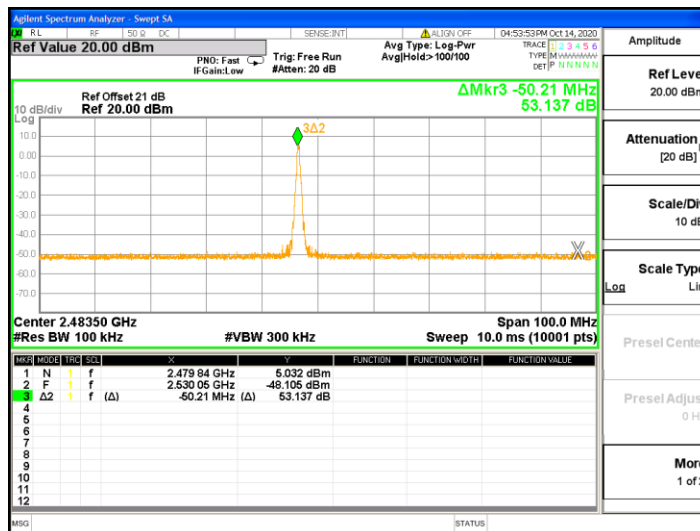
Chain 0: Conducted Spurious @ 3DH5 Ch 39



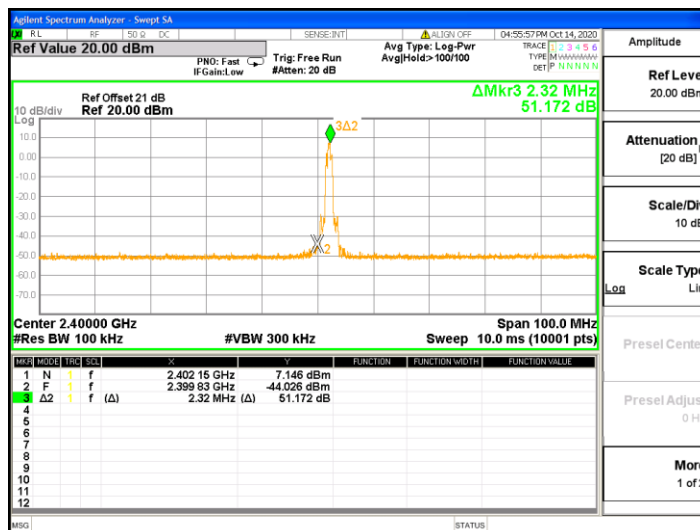
Chain 0: Authorized Band Bandedge @ DH5 Mode Ch0



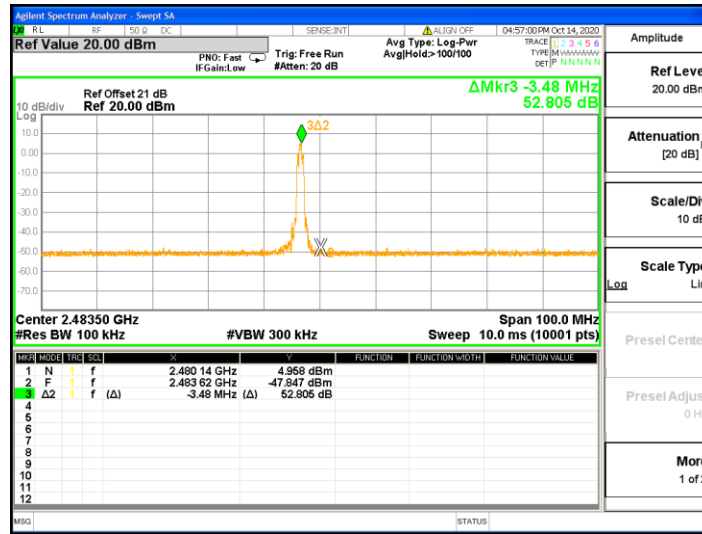
Chain 0: Authorized Band Bandedge @ DH5 Mode Ch78



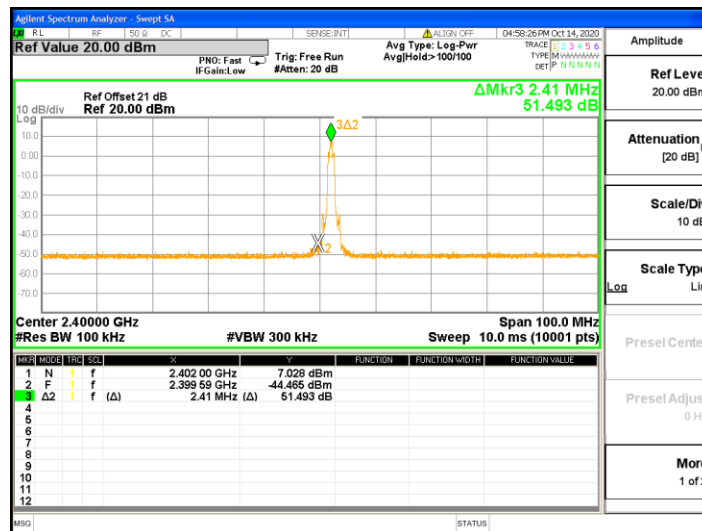
Chain 0: Authorized Band Bandedge @ 2DH5 Mode Ch0



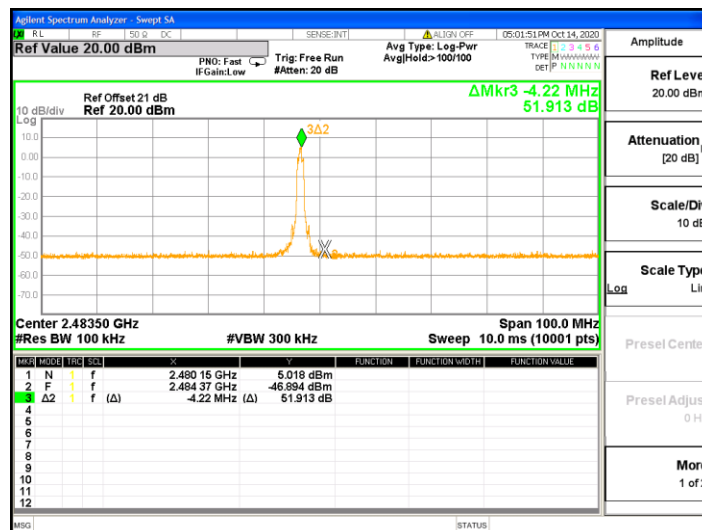
Chain 0: Authorized Band Bandedge @ 2DH5 Mode Ch78



Chain 0: Authorized Band Bandedge @ 3DH5 Mode Ch0



Chain 0: Authorized Band Bandedge @ 3DH5 Mode Ch78



6. Emissions in Restricted Frequency Bands (Radiated emission measurements)

6.1 Instrument Setting

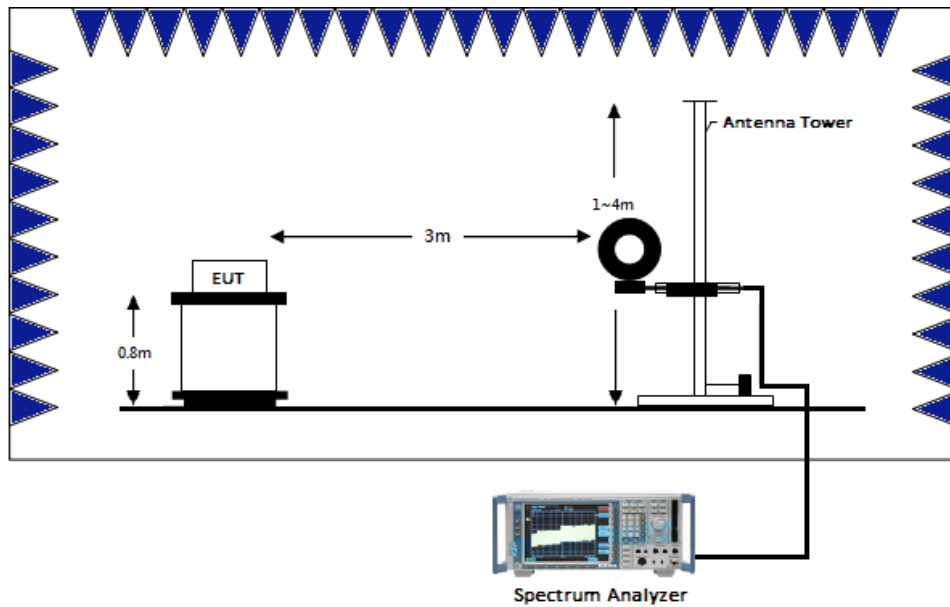
| Receiver Function | Setting (Below 1GHz) | Setting (Above 1GHz) |
|-------------------|-----------------------------------------------------------------------------|----------------------|
| Detector | QP | Peak and Average |
| RBW | 9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz | 1MHz |
| VBW | $\geq 3 \times \text{RBW}$ | 3MHz |
| Sweep | Auto couple | Auto couple |
| Start Frequency | 9 kHz | 1GHz |
| Stop Frequency | 1 GHz | Tenth harmonic |
| Attenuation | Auto | Auto |

6.2 Test Procedure

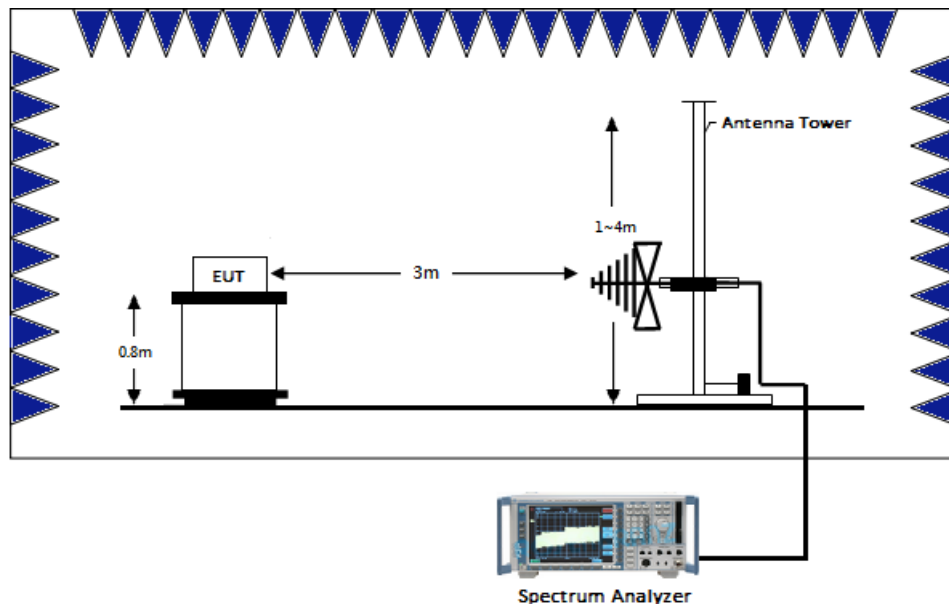
| | |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | Configure the EUT according to ANSI C63.10:2013. The EUT was placed on the top of the turntable 0.8 meter (below 1GHz) and 1.5 meter (above 1GHz) above ground. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable. |
| Step 2 | Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level. |
| Step 3 | The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization. |
| Step 4 | If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading. |
| Step 5 | Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode. |
| Step 6 | For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. |
| Step 7 | If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz. |
| Step 8 | For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported. |
| Step 9 | In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be quasi-peak measured by receiver. |

6.3 Test Diagram

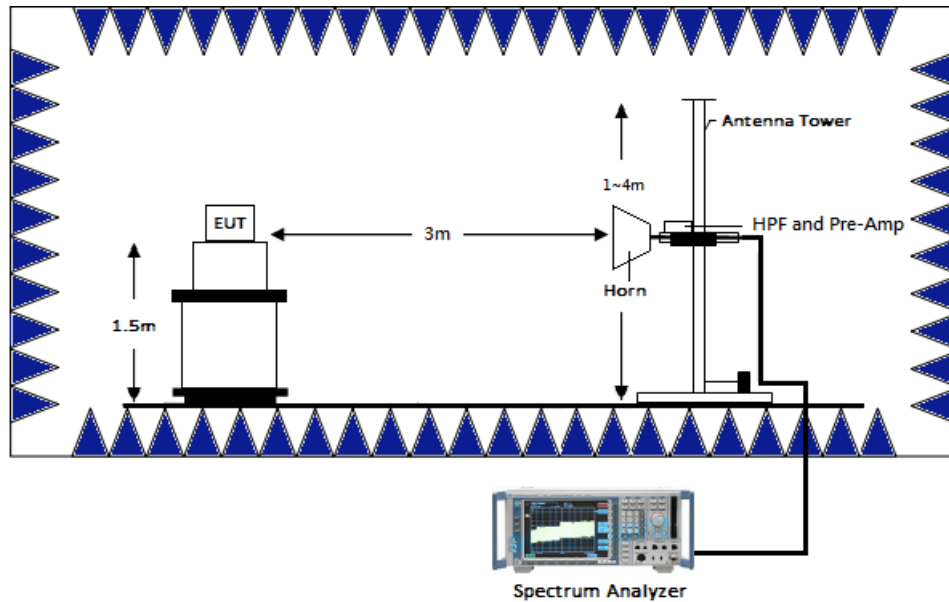
6.3.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna:



6.3.2 Radiated emission below 1GHz using Bilog Antenna



6.3.3 Radiated emission above 1GHz using Horn Antenna



6.4 Limit

| Frequency(MHz) | Field Strength(uV/m) | Measurement distance(m) |
|----------------|----------------------|-------------------------|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705~30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

6.5 Operating Environment Condition

| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

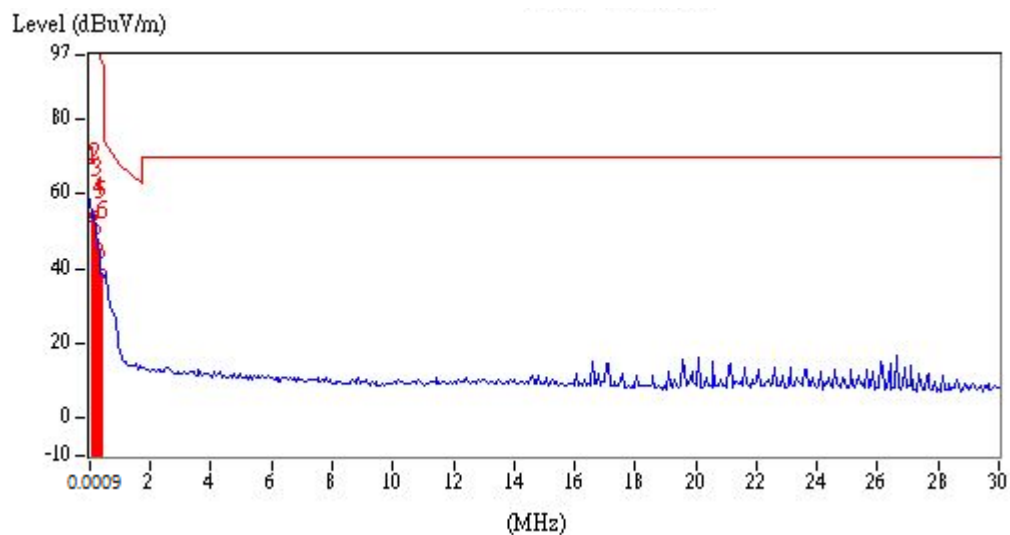
6.6 Test Result

6.6.1 Measurement results: frequencies 9kHz to 30MHz

The test was performed on EUT under continuously transmitting mode. The worst case occurred at 2DH5 Ch 39.

| Ant Polarity | Frequency (MHz) | Detector | Factor (dB/m) | Reading (dB μ V) | Corrected Reading (dB μ V/m) | Limit @ 3m (dB μ V/m) | Margin (dB) |
|---------------|-----------------|----------|---------------|----------------------|----------------------------------|---------------------------|-------------|
| Perpendicular | 0.07 | AV | 18.36 | 35.24 | 53.60 | 110.70 | -57.10 |
| Perpendicular | 0.13 | AV | 17.91 | 36.39 | 54.30 | 105.33 | -51.03 |
| Perpendicular | 0.19 | AV | 18.13 | 32.13 | 50.26 | 102.03 | -51.77 |
| Perpendicular | 0.25 | AV | 18.34 | 27.33 | 45.67 | 99.65 | -53.98 |
| Perpendicular | 0.31 | AV | 18.52 | 25.70 | 44.22 | 97.78 | -53.56 |
| Perpendicular | 0.43 | AV | 18.46 | 20.35 | 38.81 | 94.93 | -56.12 |

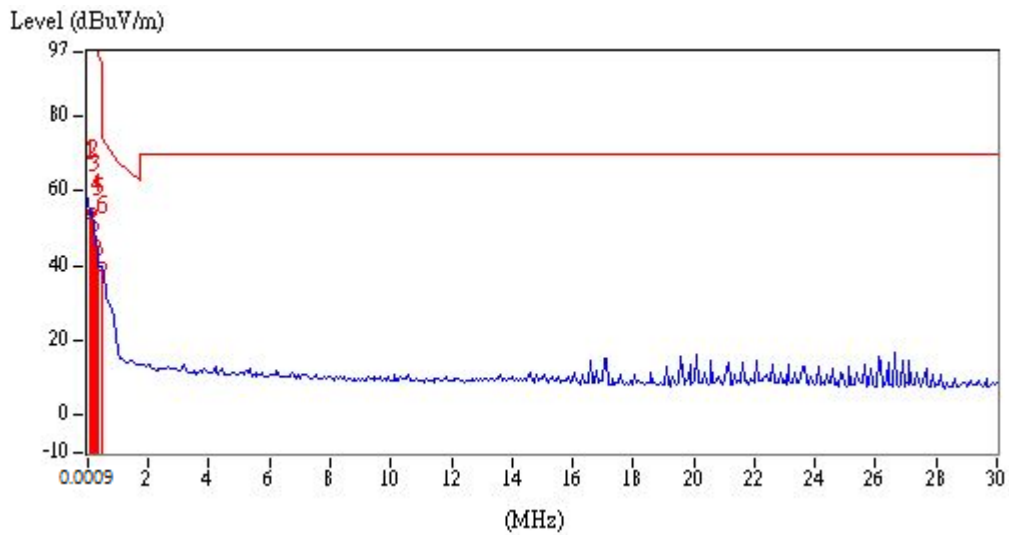
Remark: Corr. Factor = Antenna Factor + Cable Loss



TEST REPORT

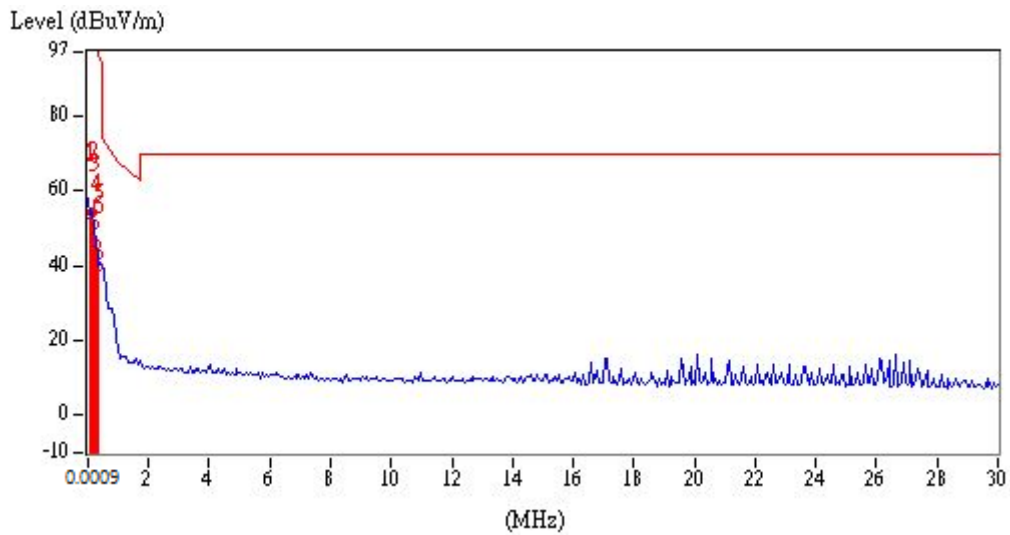
| Ant Polarity | Frequency (MHz) | Detector | Factor (dB/m) | Reading (dB μ V) | Corrected Reading (dB μ V/m) | Limit @ 3m (dB μ V/m) | Margin (dB) |
|--------------|-----------------|----------|---------------|----------------------|----------------------------------|---------------------------|-------------|
| Parallel | 0.07 | AV | 18.36 | 35.43 | 53.79 | 110.70 | -56.91 |
| Parallel | 0.13 | AV | 17.91 | 36.41 | 54.32 | 105.33 | -51.01 |
| Parallel | 0.19 | AV | 18.13 | 32.50 | 50.63 | 102.03 | -51.40 |
| Parallel | 0.25 | AV | 18.34 | 27.37 | 45.71 | 99.65 | -53.94 |
| Parallel | 0.31 | AV | 18.52 | 25.74 | 44.26 | 97.78 | -53.52 |
| Parallel | 0.49 | AV | 18.44 | 21.40 | 39.84 | 93.80 | -53.96 |

Remark: Corr. Factor = Antenna Factor + Cable Loss



| Ant Polarity | Frequency (MHz) | Detector | Factor (dB/m) | Reading (dB μ V) | Corrected Reading (dB μ V/m) | Limit @ 3m (dB μ V/m) | Margin (dB) |
|-----------------|-----------------|----------|---------------|----------------------|----------------------------------|---------------------------|-------------|
| Ground-parallel | 0.07 | AV | 18.36 | 35.27 | 53.63 | 110.70 | -57.07 |
| Ground-parallel | 0.13 | AV | 17.91 | 36.29 | 54.20 | 105.33 | -51.13 |
| Ground-parallel | 0.19 | AV | 18.13 | 32.85 | 50.98 | 102.03 | -51.05 |
| Ground-parallel | 0.25 | AV | 18.34 | 27.10 | 45.44 | 99.65 | -54.21 |
| Ground-parallel | 0.31 | AV | 18.52 | 24.45 | 42.97 | 97.78 | -54.81 |
| Ground-parallel | 0.37 | AV | 18.49 | 21.34 | 39.83 | 96.24 | -56.41 |

Remark: Corr. Factor = Antenna Factor + Cable Loss

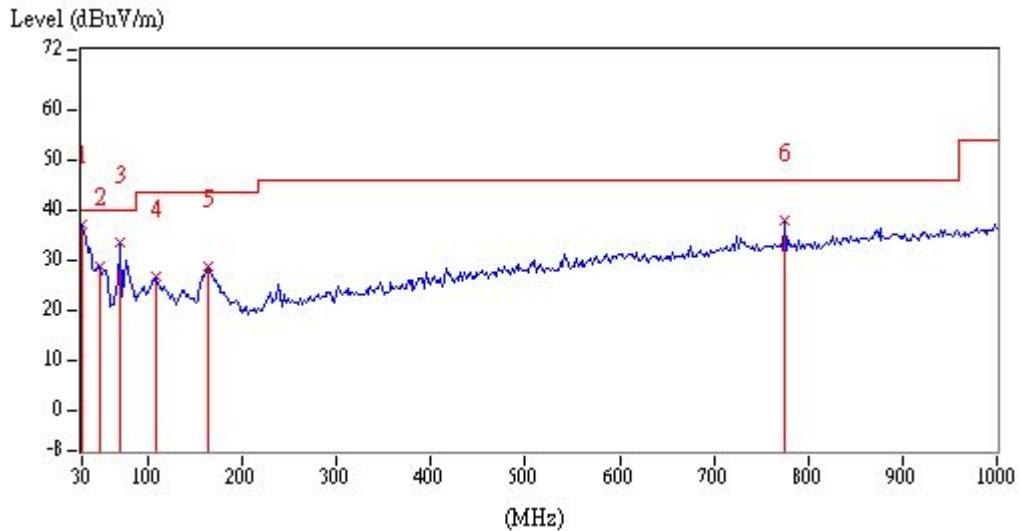


TEST REPORT

6.6.2 Measurement results: frequencies below 1 GHz

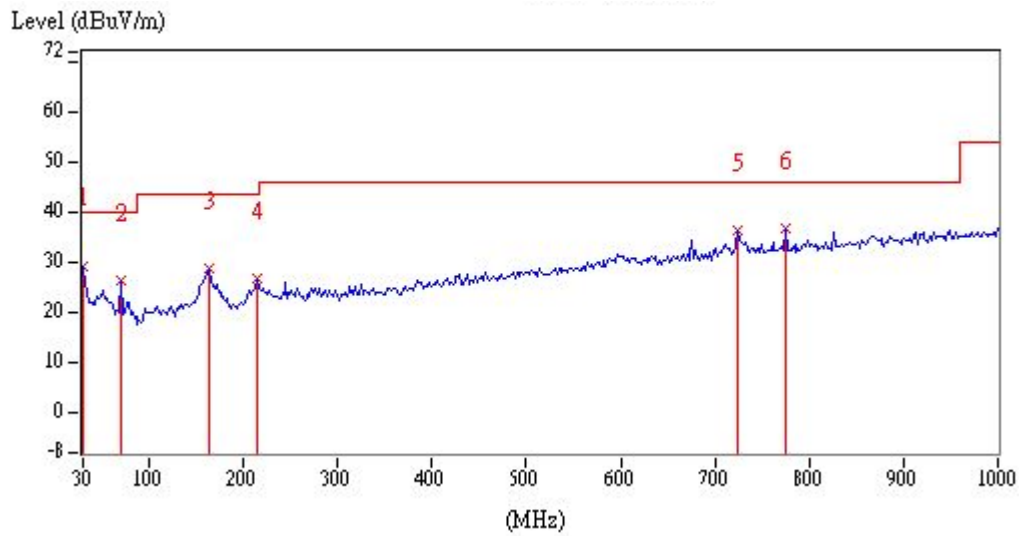
The test was performed on EUT under continuously transmitting mode. The worst case occurred at 2DH5 Ch 39.

| Ant Polarity | Frequency (MHz) | Detector | Factor (dB/m) | Reading (dB μ V) | Corrected Reading (dB μ V/m) | Limit @ 3m (dB μ V/m) | Margin (dB) |
|--------------|-----------------|----------|---------------|----------------------|----------------------------------|---------------------------|-------------|
| Vertical | 30.00 | QP | 20.75 | 16.58 | 37.33 | 40.00 | -2.67 |
| Vertical | 49.40 | QP | 22.05 | 6.94 | 28.99 | 40.00 | -11.01 |
| Vertical | 70.74 | QP | 19.46 | 14.09 | 33.55 | 40.00 | -6.45 |
| Vertical | 107.60 | QP | 17.93 | 8.85 | 26.78 | 43.50 | -16.72 |
| Vertical | 163.86 | QP | 21.79 | 6.99 | 28.78 | 43.50 | -14.72 |
| Vertical | 774.96 | QP | 32.36 | 5.62 | 37.98 | 46.00 | -8.02 |



| Ant Polarity | Frequency (MHz) | Detector | Factor (dB/m) | Reading (dB μ V) | Corrected Reading (dB μ V/m) | Limit @ 3m (dB μ V/m) | Margin (dB) |
|--------------|-----------------|----------|---------------|----------------------|----------------------------------|---------------------------|-------------|
| Horizontal | 30.00 | QP | 20.75 | 8.57 | 29.32 | 40.00 | -10.68 |
| Horizontal | 70.74 | QP | 19.46 | 6.82 | 26.28 | 40.00 | -13.72 |
| Horizontal | 163.86 | QP | 21.79 | 6.83 | 28.62 | 43.50 | -14.88 |
| Horizontal | 214.30 | QP | 19.69 | 7.08 | 26.77 | 43.50 | -16.73 |
| Horizontal | 724.52 | QP | 31.56 | 4.79 | 36.35 | 46.00 | -9.65 |
| Horizontal | 774.96 | QP | 32.36 | 4.35 | 36.71 | 46.00 | -9.29 |

Remark: Corr. Factor = Antenna Factor + Cable Loss



TEST REPORT

6.6.3 Measurement results: frequency above 1GHz to 25GHz

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|-----------|-----------------|----------------------------|-----------------|--------------------------|----------------|----------------------------|----------------------|-------------|
| DH5_Ch0 | 4804 | PK | V | 7.47 | 34.05 | 41.52 | 74.00 | -32.48 |
| | 4988 | PK | V | 7.72 | 41.21 | 48.93 | 74.00 | -25.07 |
| | 4804 | PK | H | 7.47 | 36.36 | 43.83 | 74.00 | -30.17 |
| | 4988 | PK | H | 7.72 | 37.09 | 44.81 | 74.00 | -29.19 |
| DH5_Ch39 | 4882 | PK | V | 7.58 | 36.35 | 43.93 | 74.00 | -30.07 |
| | 4988 | PK | V | 7.72 | 42.37 | 50.09 | 74.00 | -23.91 |
| | 4882 | PK | H | 7.58 | 35.33 | 42.91 | 74.00 | -31.09 |
| | 4988 | PK | H | 7.72 | 36.05 | 43.77 | 74.00 | -30.23 |
| DH5_Ch78 | 4960 | PK | V | 7.68 | 37.36 | 45.04 | 74.00 | -28.96 |
| | 4988 | PK | V | 7.72 | 42.29 | 50.01 | 74.00 | -23.99 |
| | 4960 | PK | H | 7.68 | 35.98 | 43.66 | 74.00 | -30.34 |
| | 4988 | PK | H | 7.72 | 36.14 | 43.86 | 74.00 | -30.14 |
| 2DH5_Ch0 | 4804 | PK | V | 7.47 | 35.20 | 42.67 | 74.00 | -31.33 |
| | 4988 | PK | V | 7.72 | 41.85 | 49.57 | 74.00 | -24.43 |
| | 4804 | PK | H | 7.47 | 35.32 | 42.79 | 74.00 | -31.21 |
| | 4988 | PK | H | 7.72 | 34.37 | 42.09 | 74.00 | -31.91 |
| 2DH5_Ch39 | 4882 | PK | V | 7.58 | 35.03 | 42.61 | 74.00 | -31.39 |
| | 4988 | PK | V | 7.72 | 41.65 | 49.37 | 74.00 | -24.63 |
| | 4882 | PK | H | 7.58 | 34.28 | 41.86 | 74.00 | -32.14 |
| | 4988 | PK | H | 7.72 | 34.78 | 42.50 | 74.00 | -31.50 |
| 2DH5_Ch78 | 4960 | PK | V | 7.68 | 36.93 | 44.61 | 74.00 | -29.39 |
| | 4988 | PK | V | 7.72 | 43.02 | 50.74 | 74.00 | -23.26 |
| | 4960 | PK | H | 7.68 | 34.25 | 41.93 | 74.00 | -32.07 |
| | 4988 | PK | H | 7.72 | 37.61 | 45.33 | 74.00 | -28.67 |
| 3DH5_Ch0 | 4804 | PK | V | 7.47 | 34.30 | 41.77 | 74.00 | -32.23 |
| | 4988 | PK | V | 7.72 | 41.81 | 49.53 | 74.00 | -24.47 |
| | 4804 | PK | H | 7.47 | 35.26 | 42.73 | 74.00 | -31.27 |
| | 4988 | PK | H | 7.72 | 34.37 | 42.09 | 74.00 | -31.91 |
| 3DH5_Ch39 | 4882 | PK | V | 7.58 | 35.40 | 42.98 | 74.00 | -31.02 |
| | 4988 | PK | V | 7.72 | 42.13 | 49.85 | 74.00 | -24.15 |
| | 4882 | PK | H | 7.58 | 35.22 | 42.80 | 74.00 | -31.20 |
| | 4988 | PK | H | 7.72 | 36.56 | 44.28 | 74.00 | -29.72 |
| 3DH5_Ch78 | 4960 | PK | V | 7.68 | 39.06 | 46.74 | 74.00 | -27.26 |
| | 4988 | PK | V | 7.72 | 40.95 | 48.67 | 74.00 | -25.33 |
| | 4960 | PK | H | 7.68 | 33.71 | 41.39 | 74.00 | -32.61 |
| | 4988 | PK | H | 7.72 | 34.49 | 42.21 | 74.00 | -31.79 |

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

7. Emission on Band Edge**7.1 Instrument Setting**

| Spectrum Function | Setting |
|--------------------------|----------------------------------------------|
| Detector | Peak and Average |
| RBW | 1MHz |
| VBW | 3MHz |
| Sweep | Auto couple |
| Restrict bands | 2310 MHz ~ 2390 MHz 2483.5 MHz ~ 2500 MHz |
| Attenuation | Auto |

7.2 Test Procedure

The test procedure is the same as Emissions in Restricted Frequency Bands (Radiated emission measurements).

7.3 Operating Environment Condition

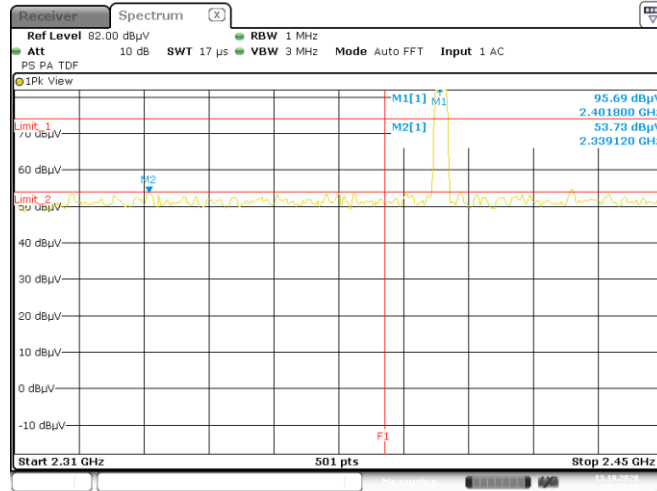
| | |
|-------------------------|----|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |

7.4 Test Results

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) | Restricted band (MHz) |
|------|-----------------|----------------------------|-----------------|--------------------------|----------------|----------------------------|----------------------|-------------|-----------------------|
| DH5 | 2339.12 | PK | V | 34.63 | 19.10 | 53.73 | 74 | -20.27 | 2310~2390 |
| | 2380.56 | AV | V | 34.82 | 8.43 | 43.25 | 54 | -10.75 | |
| | 2498.44 | PK | V | 35.37 | 18.94 | 54.31 | 74 | -19.69 | 2483.5~2500 |
| | 2499.64 | AV | V | 35.37 | 8.48 | 43.86 | 54 | -10.14 | |
| 2DH5 | 2359.00 | PK | V | 34.72 | 20.72 | 55.44 | 74 | -18.56 | 2310~2390 |
| | 2389.24 | AV | V | 34.86 | 8.19 | 43.05 | 54 | -10.95 | |
| | 2486.32 | PK | V | 35.31 | 19.32 | 54.63 | 74 | -19.37 | 2483.5~2500 |
| | 2499.52 | AV | V | 35.37 | 8.60 | 43.97 | 54 | -10.03 | |
| 3DH5 | 2375.80 | PK | V | 34.80 | 18.77 | 53.57 | 74 | -20.43 | 2310~2390 |
| | 2389.24 | AV | V | 34.86 | 8.45 | 43.31 | 54 | -10.69 | |
| | 2494.12 | PK | V | 35.35 | 18.15 | 53.50 | 74 | -20.50 | 2483.5~2500 |
| | 2498.80 | AV | V | 35.37 | 8.37 | 43.74 | 54 | -10.26 | |

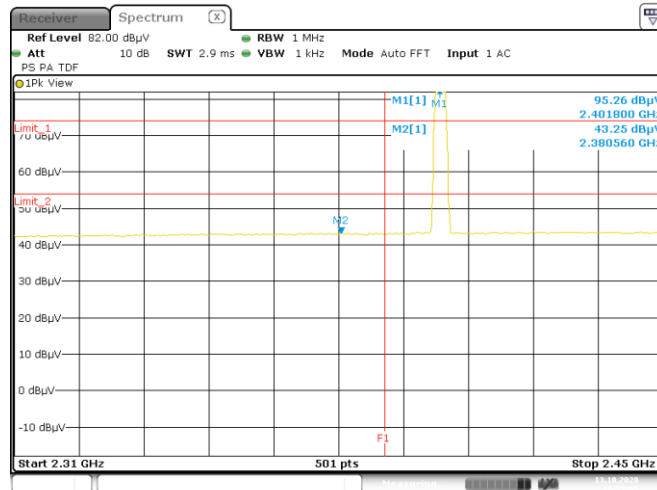
Remark: Correction Factor = Antenna Factor + Cable Loss

Chain 0: Restricted Band Bandedge @ DH5 Mode Ch0 PK



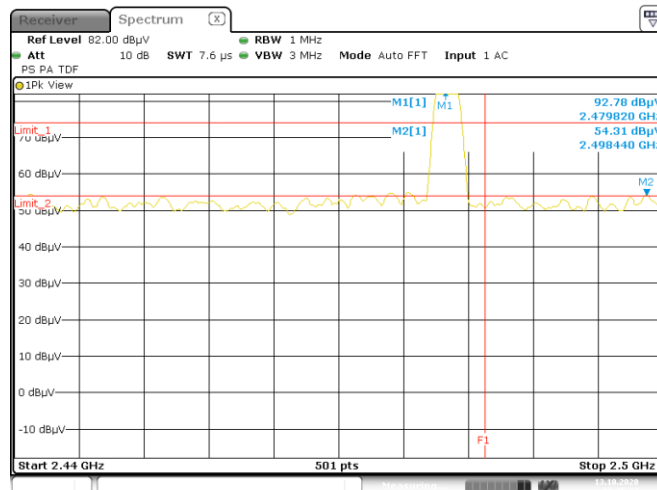
Date: 13.OCT.2020 10:23:12

Chain 0: Restricted Band Bandedge @ DH5 Mode Ch0 AV



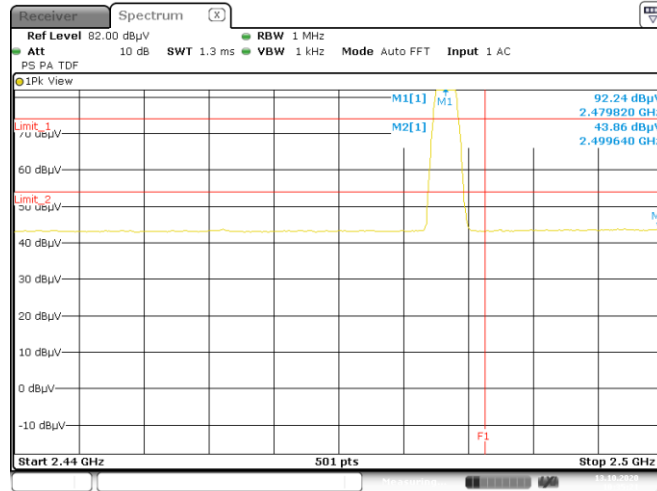
Date: 13.OCT.2020 10:23:05

Chain 0: Restricted Band Bandedge @ DH5 Mode Ch78 PK



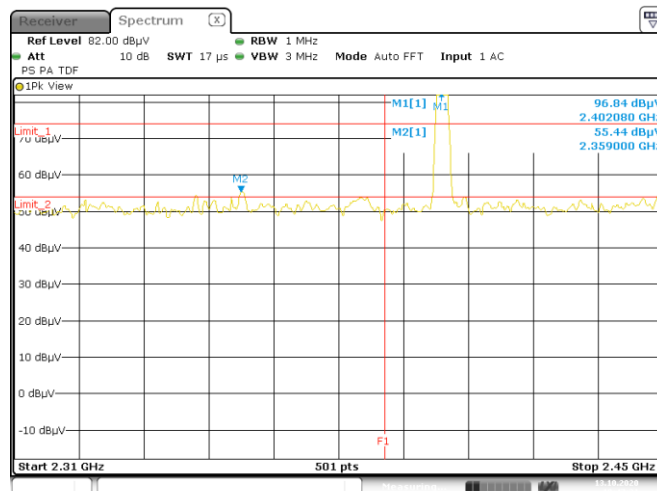
Date: 13.OCT.2020 10:35:27

Chain 0: Restricted Band Bandedge @ DH5 Mode Ch78 AV



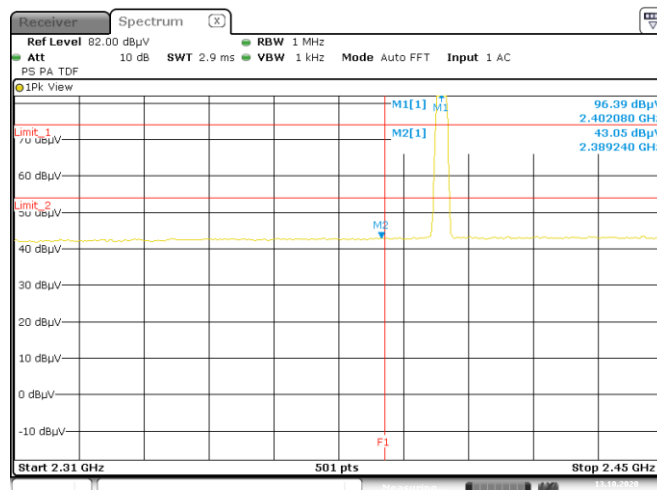
Date: 13.OCT.2020 10:35:22

Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch0 PK



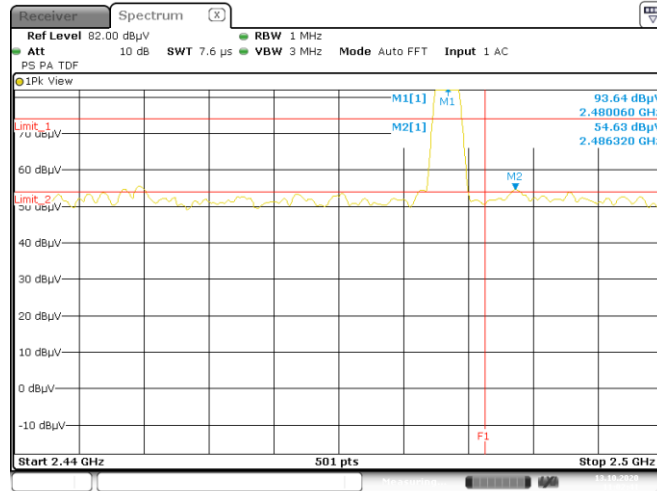
Date: 13.OCT.2020 10:47:31

Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch0 AV



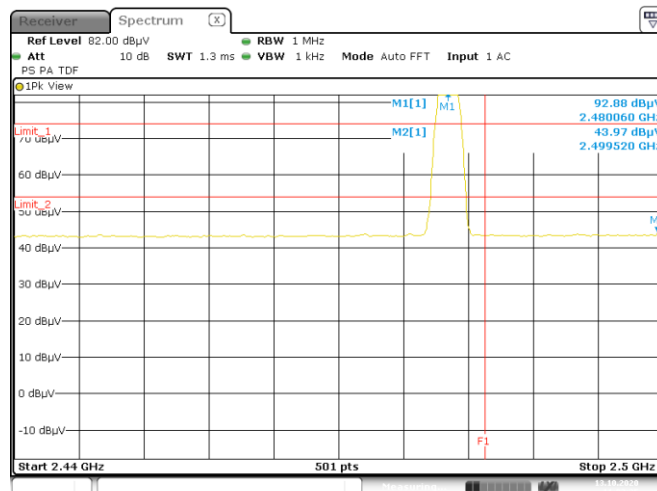
Date: 13.OCT.2020 10:47:23

Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch78 PK



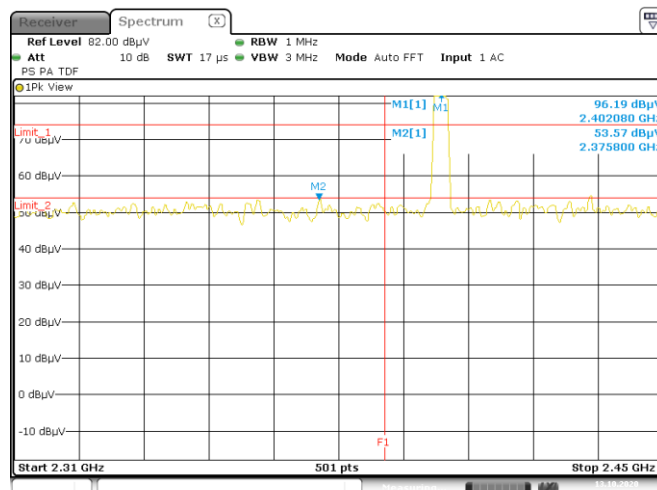
Date: 13.OCT.2020 11:02:41

Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch78 AV



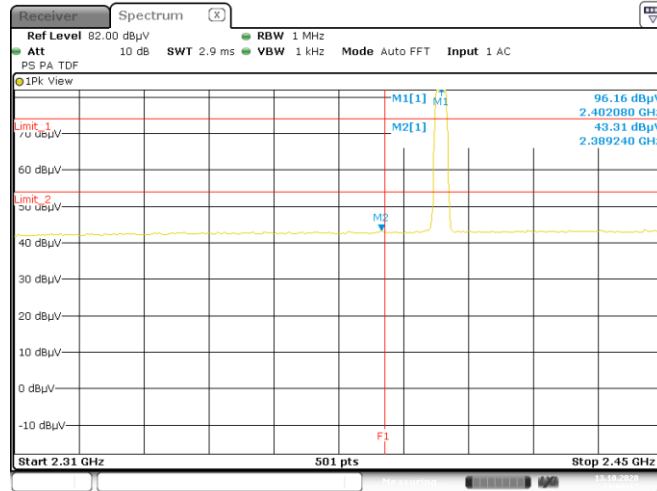
Date: 13.OCT.2020 11:02:35

Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch0 PK



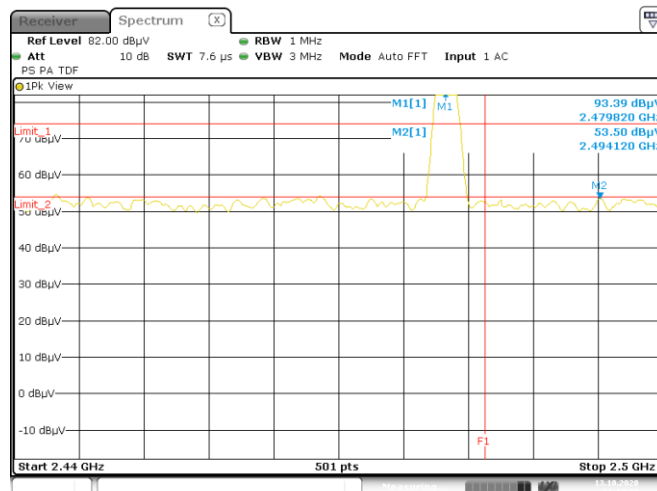
Date: 13.OCT.2020 11:08:24

Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch0 AV



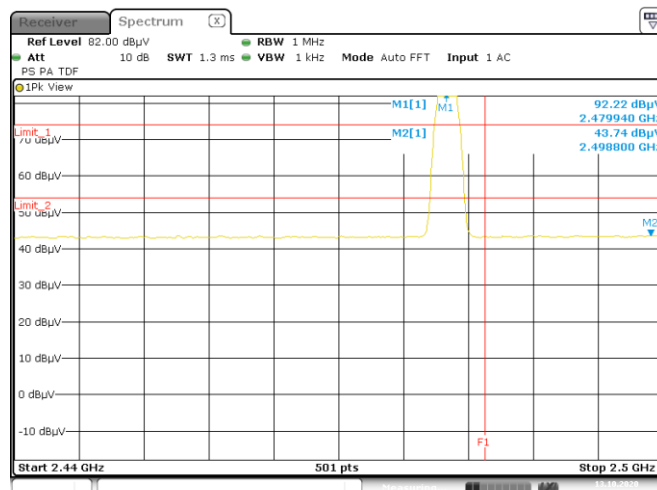
Date: 13.OCT.2020 11:08:18

Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch78 PK



Date: 13.OCT.2020 11:12:28

Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch78 AV



Date: 13.OCT.2020 11:12:23

8. AC Power Line Conducted Emission

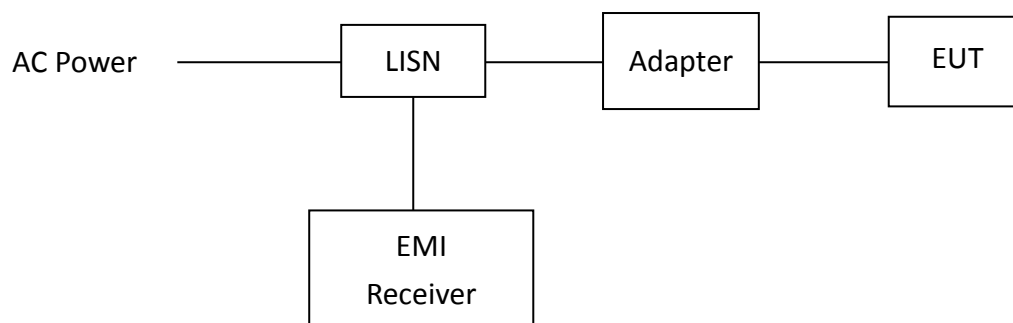
8.1 Measuring instrument setting

| Receiver Function | Setting |
|-------------------|---------|
| Detector | QP |
| Start frequency | 0.15MHz |
| Stop frequency | 30MHz |
| IF bandwidth | 9 kHz |
| Attenuation | 10dB |

8.2 Test Procedure

| | |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | Configure the EUT according to ANSI C63.10:2013. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface. |
| Step 2 | Connect EUT or host of EUT to the power mains through a line impedance stabilization network. |
| Step 3 | All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance. |
| Step 4 | The frequency range from 150 kHz to 30MHz was searched. |
| Step 5 | Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode. |
| Step 6 | The measurement has to be done between each power line and ground at the power terminal. |

8.3 Test Diagram



8.4 Limit

| Frequency (MHz) | Conducted Limit (dBuV) | |
|--------------------|------------------------|---------|
| | Q.P. | Ave. |
| 0.15~0.50 | 66 – 56 | 56 – 46 |
| 0.50~5.00 | 56 | 46 |
| 5.00~30.0 | 60 | 50 |

8.5 Operating Environment Condition

| | |
|------------------------------|------|
| Temperature (°C) : | 25 |
| Relative Humidity (%) : | 56 |
| Atmospheric Pressure (hPa) : | 1007 |

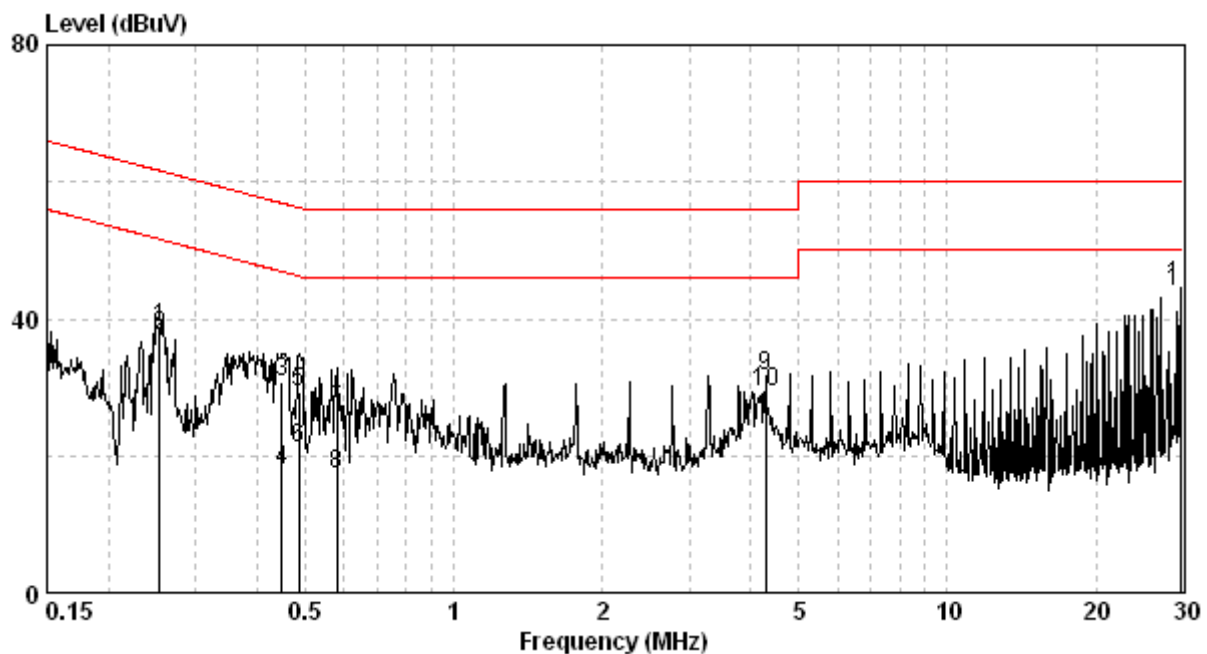
8.6 Test Results

Phase: Live Line
 Model No.: Milano XL
 Test Condition: Tx mode

| Frequency (MHz) | Corr. Factor (dB) | Reading QP (dBuV) | Level QP (dBuV) | Limit QP (dBuV) | Reading AV (dBuV) | Level AV (dBuV) | Limit AV (dBuV) | Margin (dB) | |
|-----------------|-------------------|-------------------|-----------------|-----------------|-------------------|-----------------|-----------------|-------------|--------|
| | | | | | | | | QP | AV |
| 0.253 | 9.72 | 28.83 | 38.55 | 61.64 | 27.93 | 37.65 | 51.64 | -23.09 | -13.99 |
| 0.449 | 9.78 | 21.02 | 30.80 | 56.89 | 8.11 | 17.89 | 46.89 | -26.09 | -29.00 |
| 0.486 | 9.79 | 19.40 | 29.19 | 56.23 | 11.26 | 21.05 | 46.23 | -27.04 | -25.18 |
| 0.579 | 9.80 | 16.93 | 26.72 | 56.00 | 7.59 | 17.39 | 46.00 | -29.28 | -28.61 |
| 4.292 | 9.88 | 21.79 | 31.66 | 56.00 | 19.31 | 29.19 | 46.00 | -24.34 | -16.81 |
| 29.841 | 10.85 | 33.87 | 44.72 | 60.00 | 33.25 | 44.10 | 50.00 | -15.28 | -5.90 |

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)



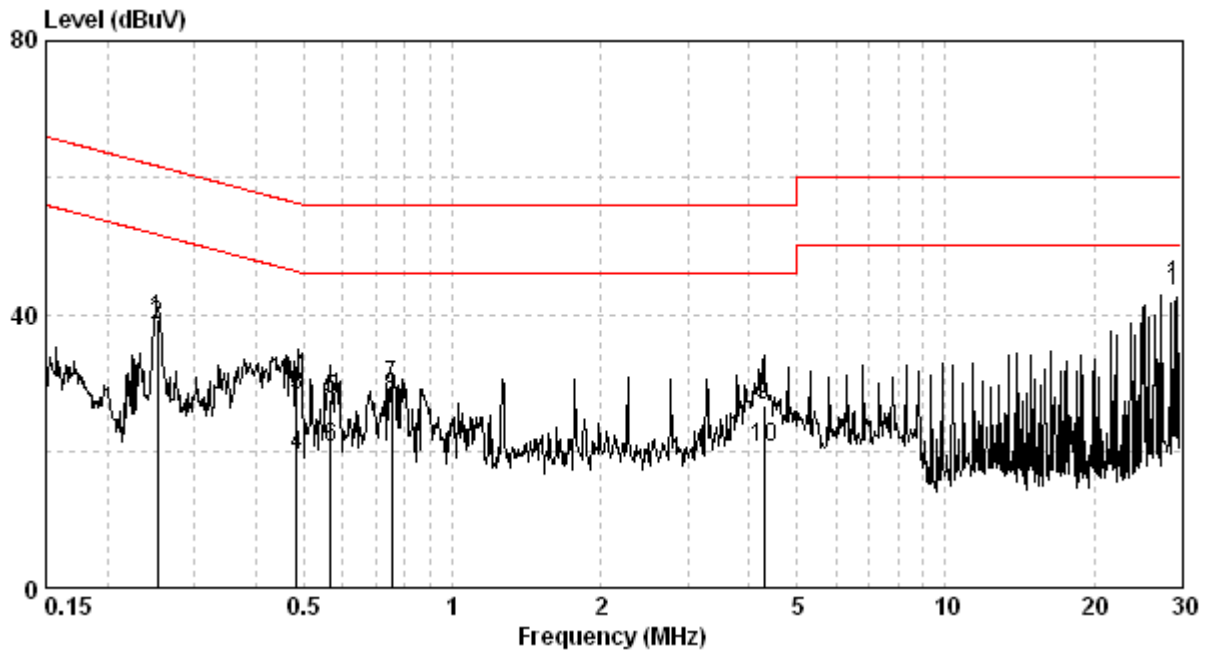
TEST REPORT

Phase: Neutral Line
 Model No.: Milano XL
 Test Condition: Tx mode

| Frequency (MHz) | Corr. Factor (dB) | Reading QP (dBuV) | Level QP (dBuV) | Limit QP (dBuV) | Reading AV (dBuV) | Level AV (dBuV) | Limit AV (dBuV) | Margin (dB) | |
|-----------------|-------------------|-------------------|-----------------|-----------------|-------------------|-----------------|-----------------|-------------|--------|
| | | | | | | | | QP | AV |
| 0.252 | 9.71 | 29.51 | 39.22 | 61.68 | 28.57 | 38.28 | 51.68 | -22.47 | -13.41 |
| 0.483 | 9.79 | 18.26 | 28.05 | 56.29 | 9.52 | 19.31 | 46.29 | -28.24 | -26.98 |
| 0.567 | 9.79 | 17.71 | 27.50 | 56.00 | 10.77 | 20.56 | 46.00 | -28.50 | -25.44 |
| 0.755 | 9.80 | 19.69 | 29.48 | 56.00 | 17.91 | 27.70 | 46.00 | -26.52 | -18.30 |
| 4.292 | 9.87 | 16.77 | 26.64 | 56.00 | 10.72 | 20.59 | 46.00 | -29.36 | -25.41 |
| 30.000 | 10.99 | 33.12 | 44.11 | 60.00 | 32.24 | 43.23 | 50.00 | -15.89 | -6.77 |

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)



Appendix A: Test equipment list

| Test Equipment/ Test site | Brand | Model No. | Serial No. | Calibration Date | Next Calibration Date |
|--------------------------------------|--------------------------------|--------------------------|--------------|---------------------|-----------------------------|
| EMI Test Receiver | Rohde & Schwarz | ESR-7 | 101232 | 2020/01/18 | 2021/01/16 |
| Spectrum Analyzer | R&S | FSP30 | 100137 | 2020/08/25 | 2021/08/24 |
| Signal Analyzer | Agilent | N9030A | MY51380492 | 2020/08/17 | 2021/08/16 |
| Active Loop Antenna | SCHWARZBECK MESS-ELEKTRONIC | FMZB1519 | 1519-067 | 2020/04/13 | 2021/04/12 |
| Broadband Antenna | SHWARZBECK | VULB 9168 | 9168-172 | 2020/06/02 | 2021/06/01 |
| Horn Antenna | SHWARZBECK | BBHA 9120 D | 9120D-456 | 2020/01/20 | 2021/01/18 |
| Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170159 | 2020/08/20 | 2023/08/19 |
| Pre-Amplifier | SCHWARZBECK | BBV9718 | 9718-004 | 2019/10/16 | 2020/10/14 |
| Pre-Amplifier | SCHWARZBECK | BBV9718 | 9718-004 | 2020/10/15 | 2021/10/14 |
| Pre-Amplifier | EMCI | EMC184045SE | 980512 | 2020/06/01 | 2021/05/31 |
| RF Cable | SUHNER | SUCOFLEX 102 | CB0006 | 2020/04/30 | 2021/04/29 |
| Hight Pass Filter | Reactel | 7HS-3G/18G-S11 | N/A | 2020/05/27 | 2021/05/26 |
| 966-2(A) Cable | SUHNER | SMA / EX 100 | N/A | 2020/08/17 | 2021/08/16 |
| 966-2(B) Cable | SUHNER | SUCOFLEX 104P | CB0005 | 2020/08/17 | 2021/08/16 |
| Power Meter | Anritsu | ML2495A | 0844001 | 2019/10/23 | 2020/10/21 |
| Power Sensor | Anritsu | MA2411B | 0738452 | 2019/10/23 | 2020/10/21 |
| 966-2_3m Semi-Anechoic Chamber | 966_2 | CEM-966_2 | N/A | 2020/02/23 | 2021/02/22 |
| EMI Test Receiver | R&S | ESCI | 100059 | 2019/11/05 | 2020/11/03 |
| LISN | R&S | ENV216 | 101160 | 2020/07/17 | 2021/07/16 |
| CON-2 Cable | SUHNER | EMCCFD300-BM -NM-6000 | 170502 | 2020/04/30 | 2021/04/29 |
| Test software | Audix | e3 | V4.20040112L | NCR | NCR |

Note: No Calibration Required (NCR).

Appendix B: Measurement Uncertainty

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

| Item | Uncertainty |
|----------------------------------------------------------------------------------------------------------------|-------------|
| Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m | 5.10 dB |
| Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m | 5.19 dB |
| Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m | 4.29 dB |
| Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m | 4.29 dB |
| Vertically polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m | 2.45 dB |
| Horizontally polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m | 2.45 dB |
| Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m | 3.32 dB |
| Emission on the Band Edge Test | 4.29 dB |
| Minimum 6 dB Bandwidth | 7.69 % |
| Maximum Peak Conducted Output Power | 0.37 dB |
| Power Spectral Density | 1.15 dB |
| Emissions In Non-Restricted Frequency Bands | 1.15 dB |
| AC Power Line Conducted Emission | 2.52 dB |