

# SPURIOUS CONDUCTED EMISSIONS



XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description                  | Manufacturer       | Model                 | ID  | Last Cal.  | Cal. Due   |
|------------------------------|--------------------|-----------------------|-----|------------|------------|
| Generator - Signal           | Agilent            | N5182A                | TIF | 2020-08-29 | 2023-08-29 |
| Analyzer - Spectrum Analyzer | Keysight           | N9010A                | AFM | 2021-04-16 | 2022-04-16 |
| Block - DC                   | Fairview Microwave | SD3379                | AMI | 2021-08-13 | 2022-08-13 |
| Attenuator                   | Fairview Microwave | SA18S5W-20            | RFX | 2021-06-02 | 2022-06-02 |
| Cable                        | Micro-Coax         | UFD150A-1-0720-200200 | MNL | 2021-09-12 | 2022-09-12 |

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

# SPURIOUS CONDUCTED EMISSIONS



TSTx 2021.12.14.1 XMR 2022.02.07.0

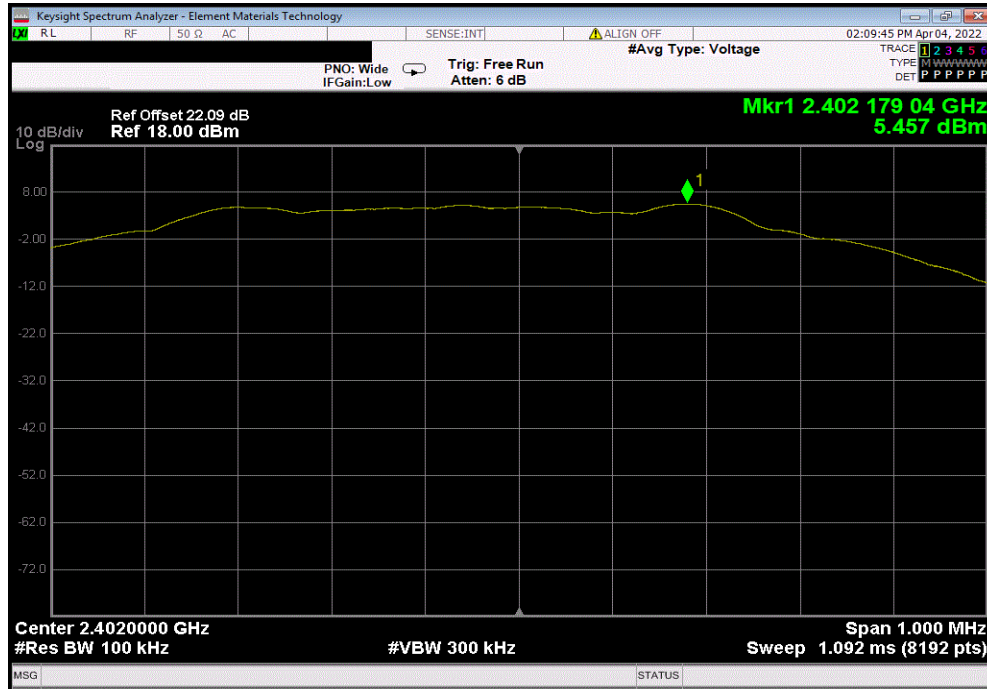
| EUT: XB3C2                                                                                                          |                   | Work Order: DGII0455            |                 |               |        |
|---------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------|-----------------|---------------|--------|
| Serial Number: 350588280003609                                                                                      |                   | Date: 5-Apr-22                  |                 |               |        |
| Customer: Digi International Inc                                                                                    |                   | Temperature: 22.8 °C            |                 |               |        |
| Attendees: None                                                                                                     |                   | Humidity: 28% RH                |                 |               |        |
| Project: None                                                                                                       |                   | Barometric Pres.: 1004 mbar     |                 |               |        |
| Tested by: Andrew Rogstad                                                                                           |                   | Power: 5VDC                     |                 |               |        |
| Job Site: MN08                                                                                                      |                   |                                 |                 |               |        |
| TEST SPECIFICATIONS                                                                                                 |                   | Test Method                     |                 |               |        |
| FCC 15.247:2022                                                                                                     |                   | ANSI C63.10:2013                |                 |               |        |
| COMMENTS                                                                                                            |                   |                                 |                 |               |        |
| IMEI 350588280003609. Reference level offset accounts for measurement cable, attenuator, DC block, and patch cable. |                   |                                 |                 |               |        |
| DEVIATIONS FROM TEST STANDARD                                                                                       |                   |                                 |                 |               |        |
| None                                                                                                                |                   |                                 |                 |               |        |
| Configuration #                                                                                                     | 9                 | Signature <i>Andrew Rogstad</i> |                 |               |        |
|                                                                                                                     | Frequency Range   | Measured Freq (MHz)             | Max Value (dBc) | Limit ≤ (dBc) | Result |
| BLE/GFSK 1 Mbps                                                                                                     |                   |                                 |                 |               |        |
| Low Channel, 2402 MHz                                                                                               | Fundamental       | 2402.18                         | N/A             | N/A           | N/A    |
| Low Channel, 2402 MHz                                                                                               | 30 MHz - 12.5 GHz | 2397.34                         | -56.98          | -20           | Pass   |
| Low Channel, 2402 MHz                                                                                               | 12.5 GHz - 25 GHz | 24650.53                        | -45.92          | -20           | Pass   |
| Mid Channel, 2440 MHz                                                                                               | Fundamental       | 2440.18                         | N/A             | N/A           | N/A    |
| Mid Channel, 2440 MHz                                                                                               | 30 MHz - 12.5 GHz | 6299.25                         | -58.41          | -20           | Pass   |
| Mid Channel, 2440 MHz                                                                                               | 12.5 GHz - 25 GHz | 24830.61                        | -46.23          | -20           | Pass   |
| High Channel, 2480 MHz                                                                                              | Fundamental       | 2480.18                         | N/A             | N/A           | N/A    |
| High Channel, 2480 MHz                                                                                              | 30 MHz - 12.5 GHz | 12079.82                        | -57.87          | -20           | Pass   |
| High Channel, 2480 MHz                                                                                              | 12.5 GHz - 25 GHz | 24873.34                        | -45.44          | -20           | Pass   |
| BLE/GFSK 2 Mbps                                                                                                     |                   |                                 |                 |               |        |
| Low Channel, 2404 MHz                                                                                               | Fundamental       | 2404.11                         | N/A             | N/A           | N/A    |
| Low Channel, 2404 MHz                                                                                               | 30 MHz - 12.5 GHz | 2395.81                         | -54.94          | -20           | Pass   |
| Low Channel, 2404 MHz                                                                                               | 12.5 GHz - 25 GHz | 24847.39                        | -43.6           | -20           | Pass   |
| Mid Channel, 2440 MHz                                                                                               | Fundamental       | 2440.1                          | N/A             | N/A           | N/A    |
| Mid Channel, 2440 MHz                                                                                               | 30 MHz - 12.5 GHz | 6224.66                         | -55.96          | -20           | Pass   |
| Mid Channel, 2440 MHz                                                                                               | 12.5 GHz - 25 GHz | 24694.79                        | -43.6           | -20           | Pass   |
| High Channel, 2478 MHz                                                                                              | Fundamental       | 2478.1                          | N/A             | N/A           | N/A    |
| High Channel, 2478 MHz                                                                                              | 30 MHz - 12.5 GHz | 11954.98                        | -56.52          | -20           | Pass   |
| High Channel, 2478 MHz                                                                                              | 12.5 GHz - 25 GHz | 24624.59                        | -43.35          | -20           | Pass   |

# SPURIOUS CONDUCTED EMISSIONS

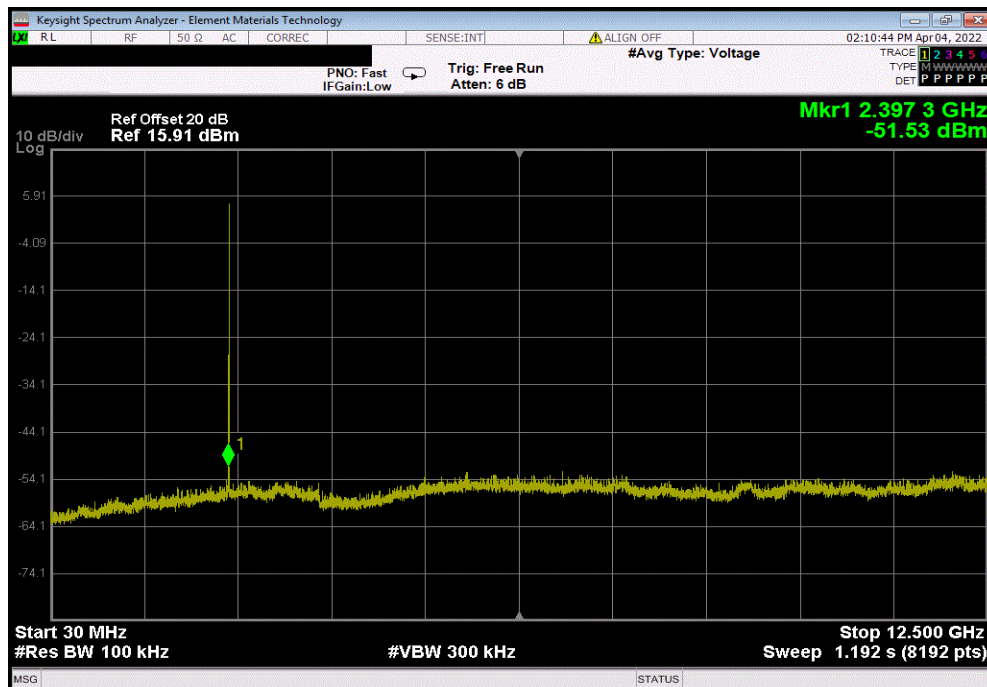


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps, Low Channel, 2402 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                            | 2402.18             | N/A             | N/A           | N/A    |  |  |



| BLE/GFSK 1 Mbps, Low Channel, 2402 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                      | 2397.34             | -56.98          | -20           | Pass   |  |  |

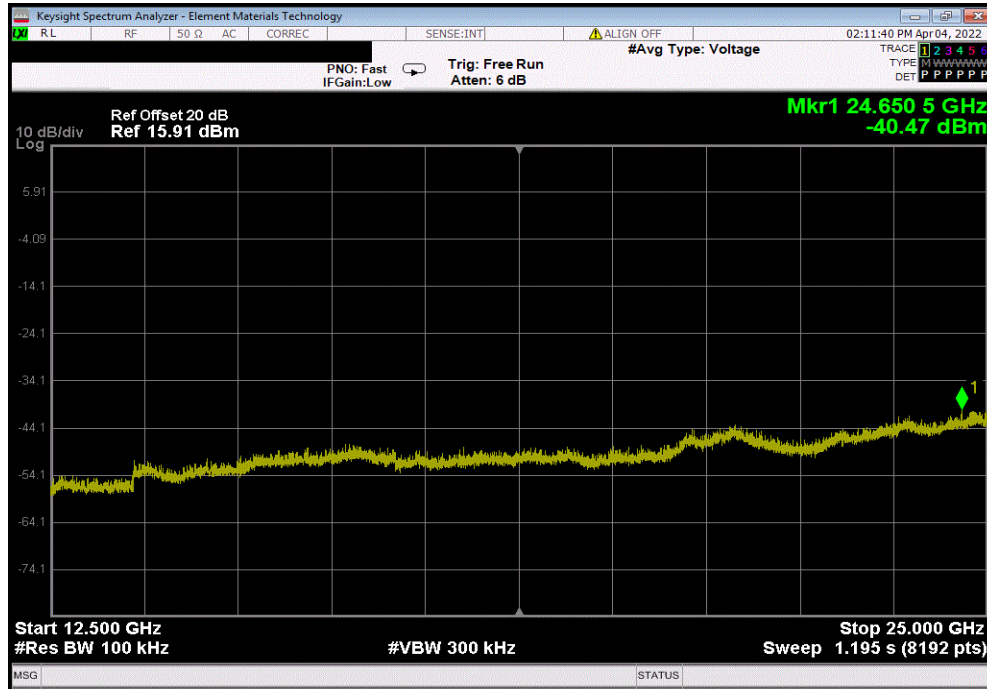


# SPURIOUS CONDUCTED EMISSIONS

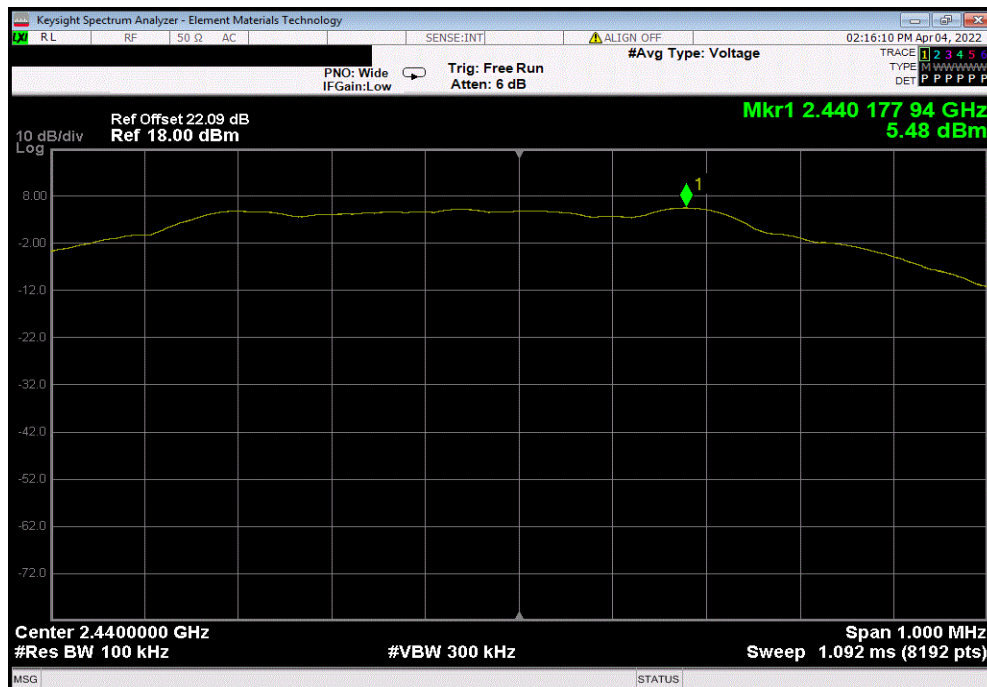


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps, Low Channel, 2402 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24650.53            | -45.92          | -20           | Pass   |  |



| BLE/GFSK 1 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| Fundamental                            | 2440.18             | N/A             | N/A           | N/A    |  |

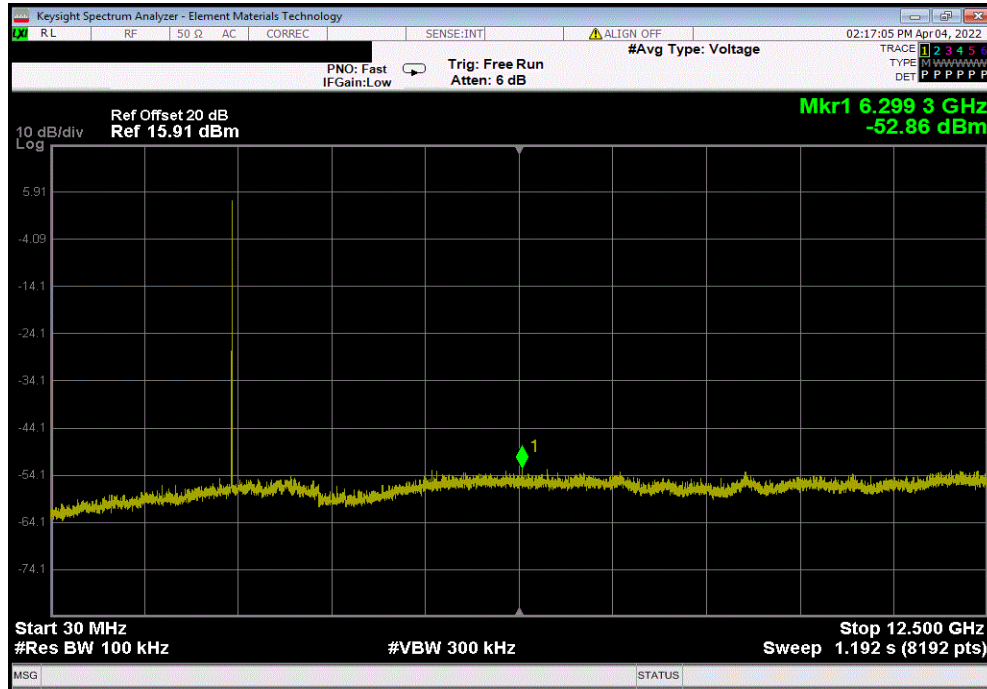


# SPURIOUS CONDUCTED EMISSIONS

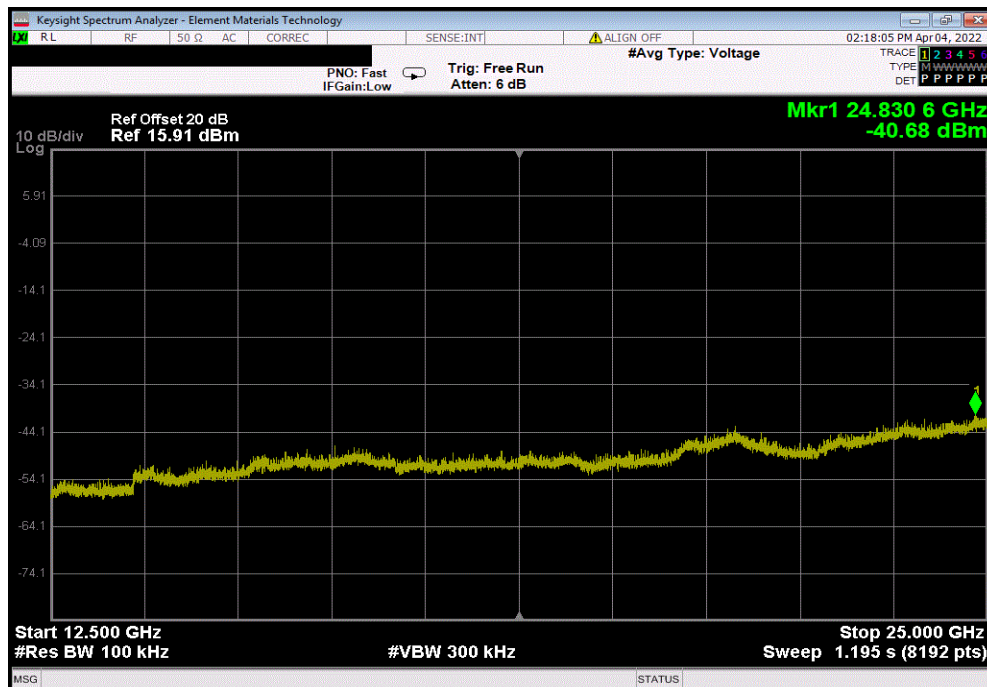


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                      | 6299.25             | -58.41          | -20           | Pass   |  |



| BLE/GFSK 1 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24830.61            | -46.23          | -20           | Pass   |  |

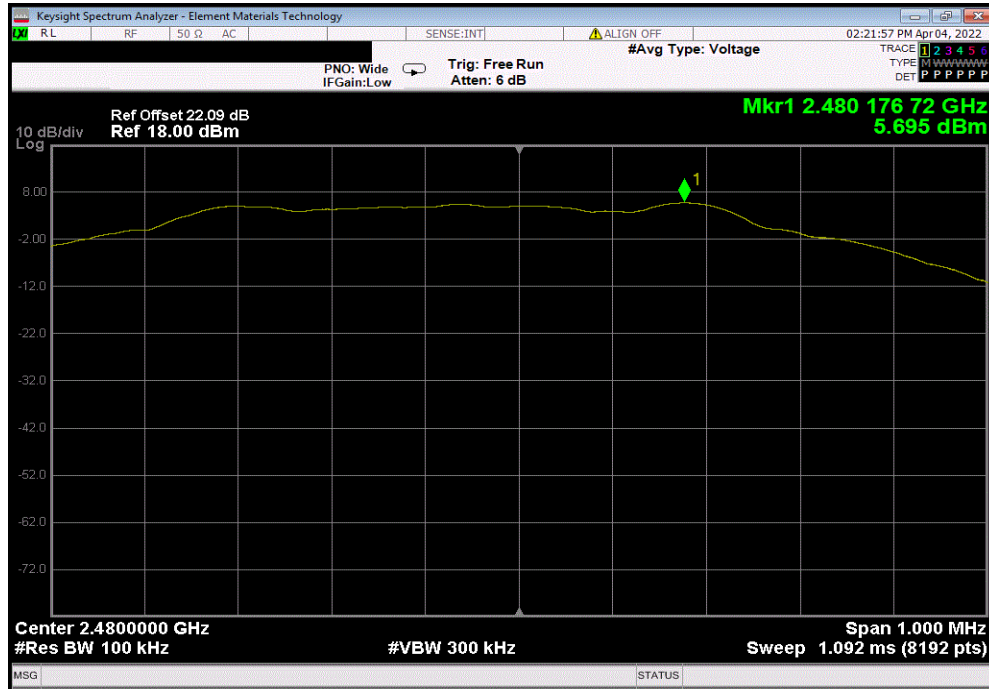


# SPURIOUS CONDUCTED EMISSIONS

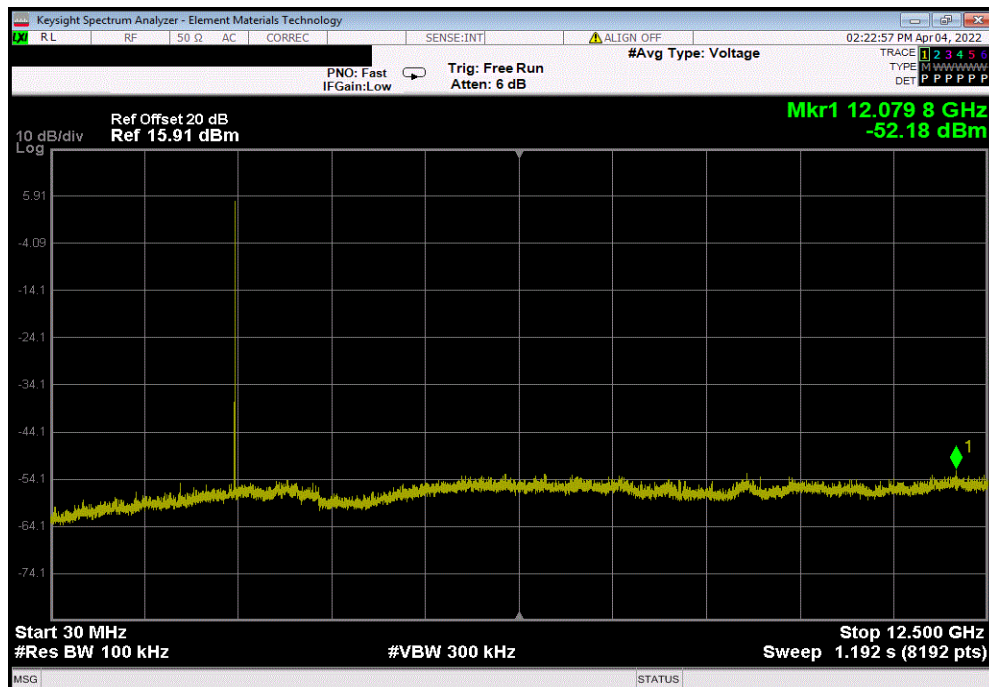


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps, High Channel, 2480 MHz |                     |                 |               |        |  |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                             | 2480.18             | N/A             | N/A           | N/A    |  |  |



| BLE/GFSK 1 Mbps, High Channel, 2480 MHz |                     |                 |               |        |  |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                       | 12079.82            | -57.87          | -20           | Pass   |  |  |

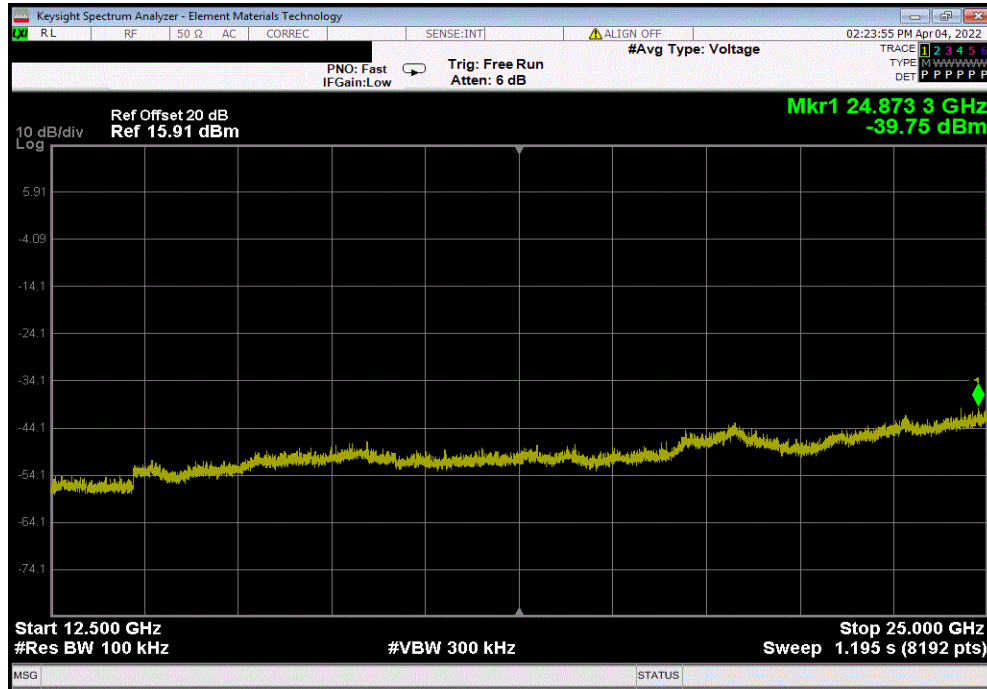


# SPURIOUS CONDUCTED EMISSIONS

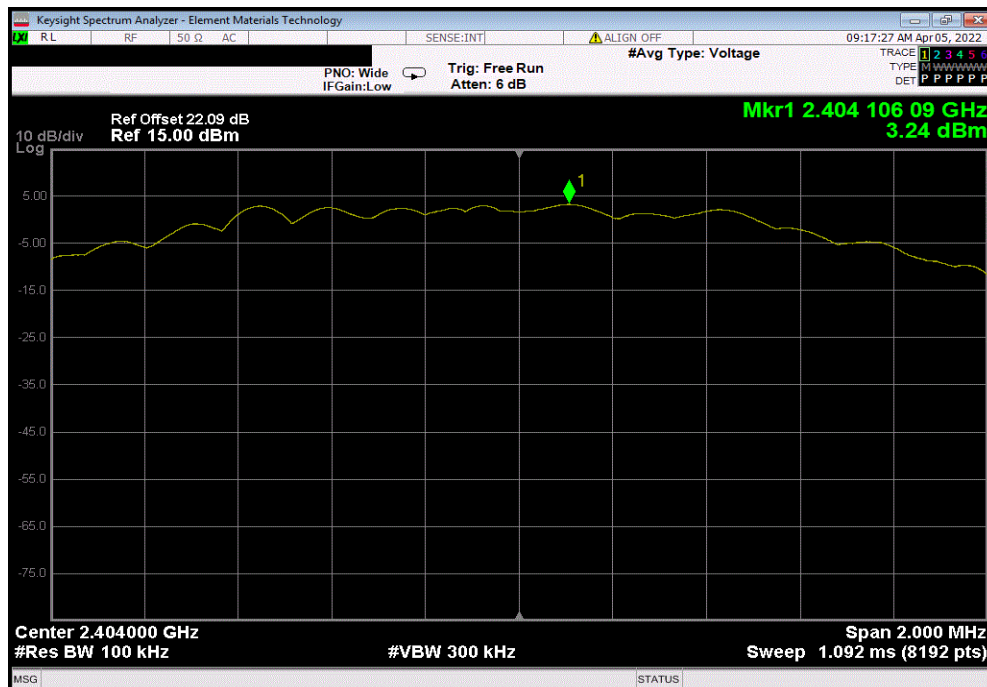


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps, High Channel, 2480 MHz |                     |                 |               |        |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                       | 24873.34            | -45.44          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps, Low Channel, 2404 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| Fundamental                            | 2404.11             | N/A             | N/A           | N/A    |  |

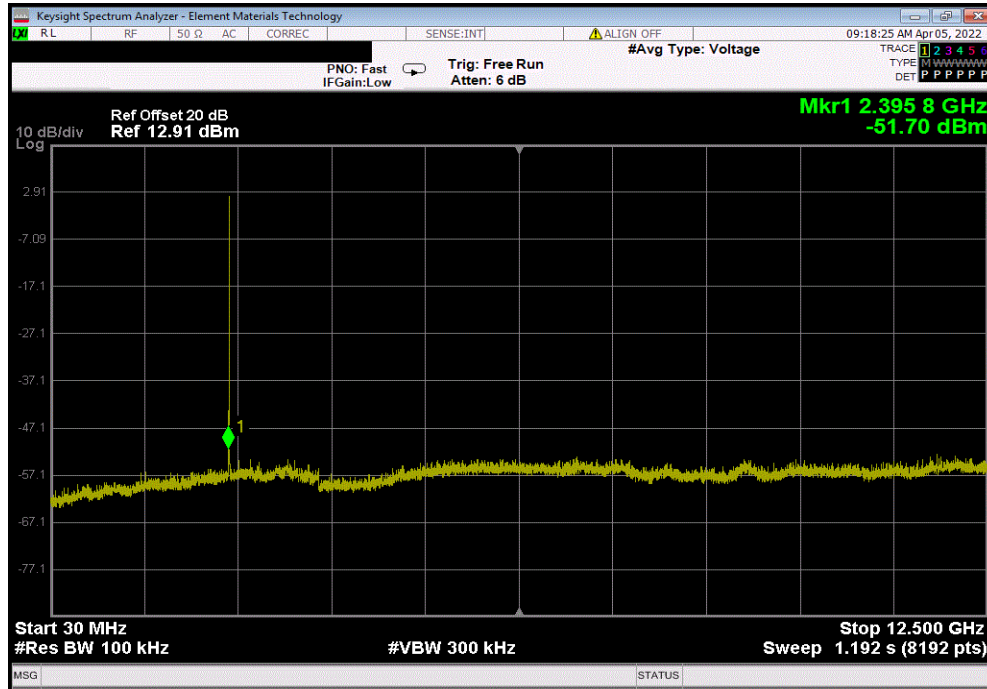


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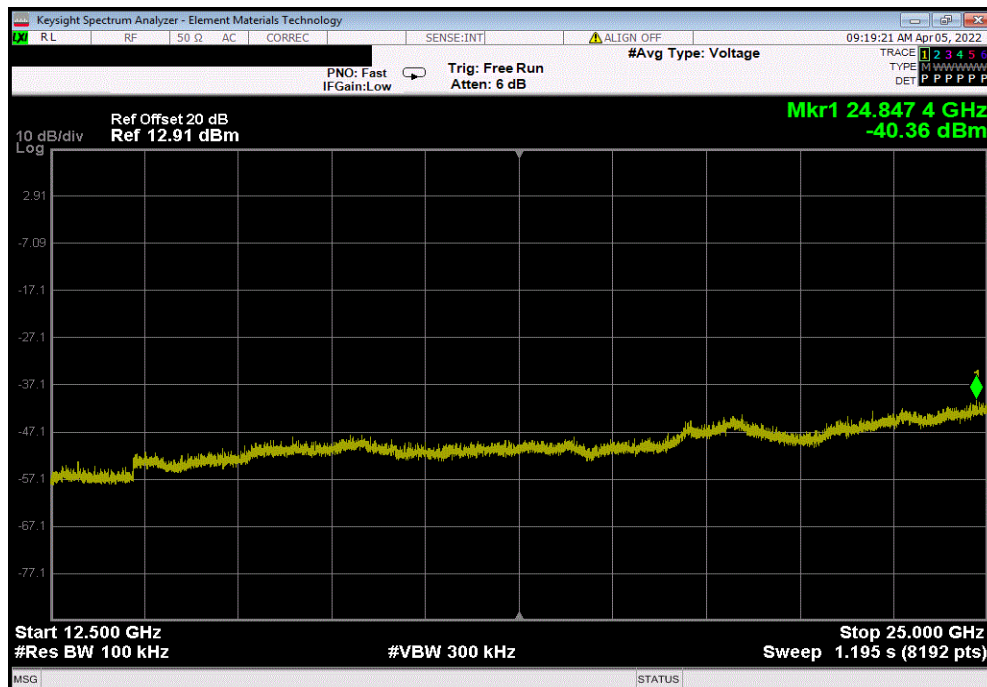


TbTx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps, Low Channel, 2404 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                      | 2395.81             | -54.94          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps, Low Channel, 2404 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24847.39            | -43.6           | -20           | Pass   |  |

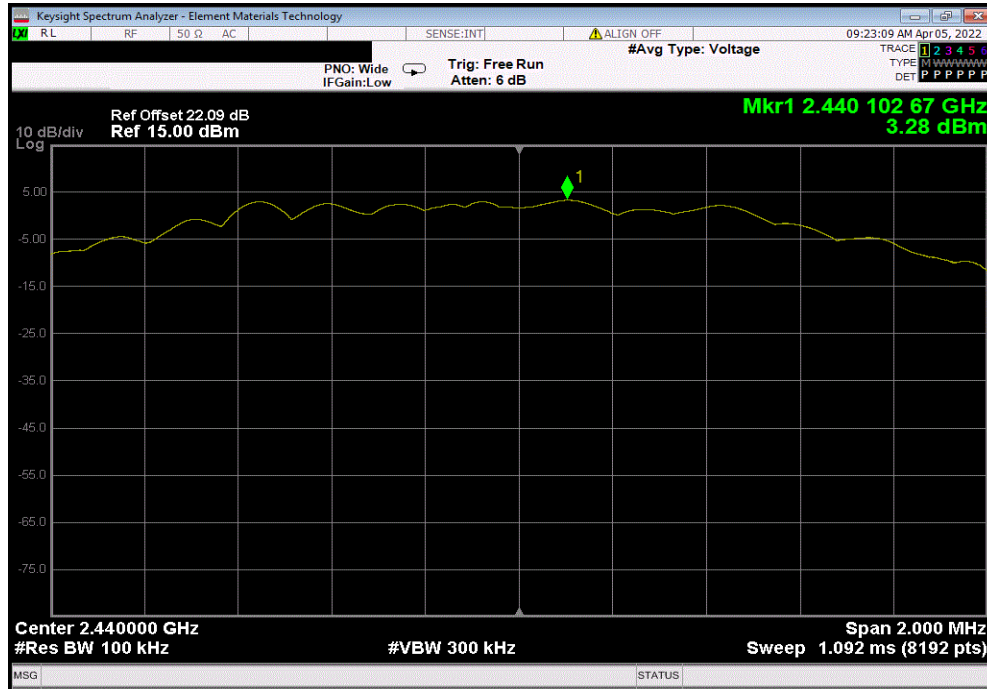


# SPURIOUS CONDUCTED EMISSIONS

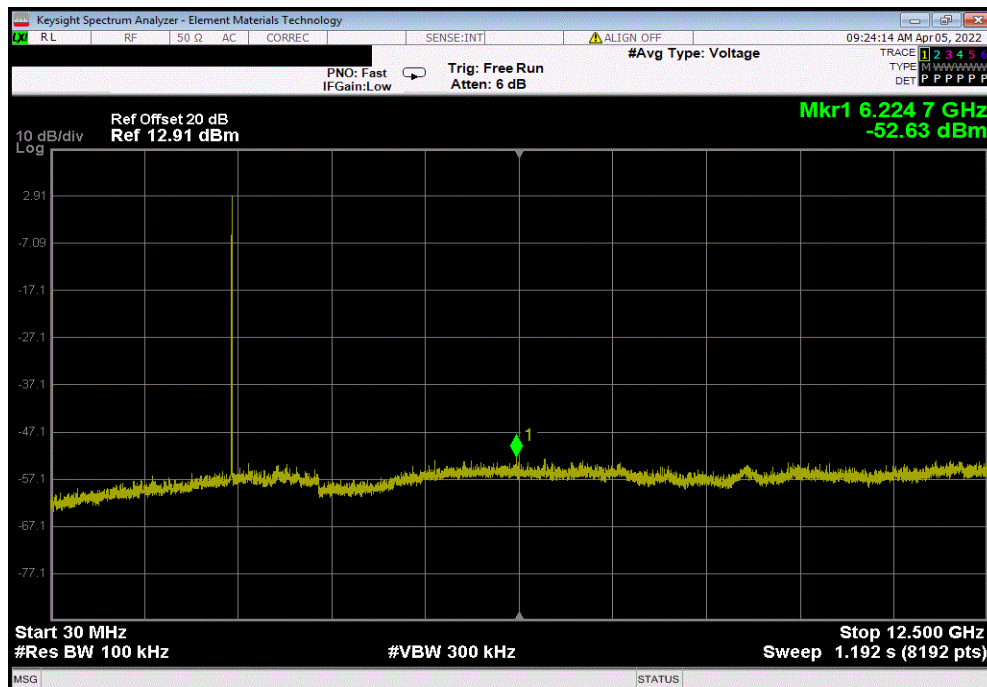


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                            | 2440.1              | N/A             | N/A           | N/A    |  |  |



| BLE/GFSK 2 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                      | 6224.66             | -55.96          | -20           | Pass   |  |  |

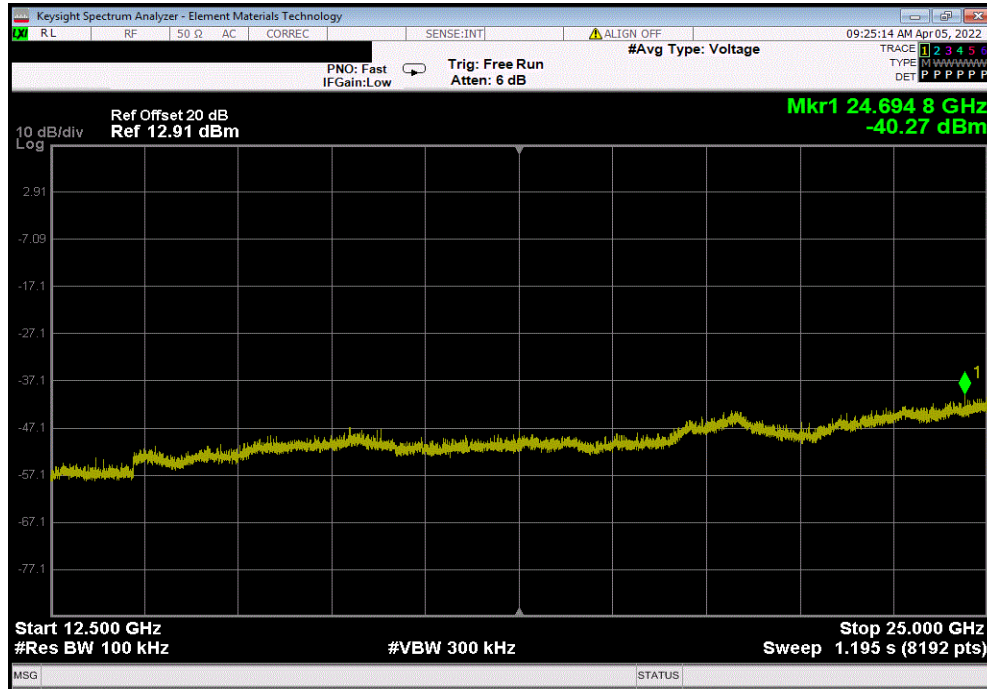


# SPURIOUS CONDUCTED EMISSIONS

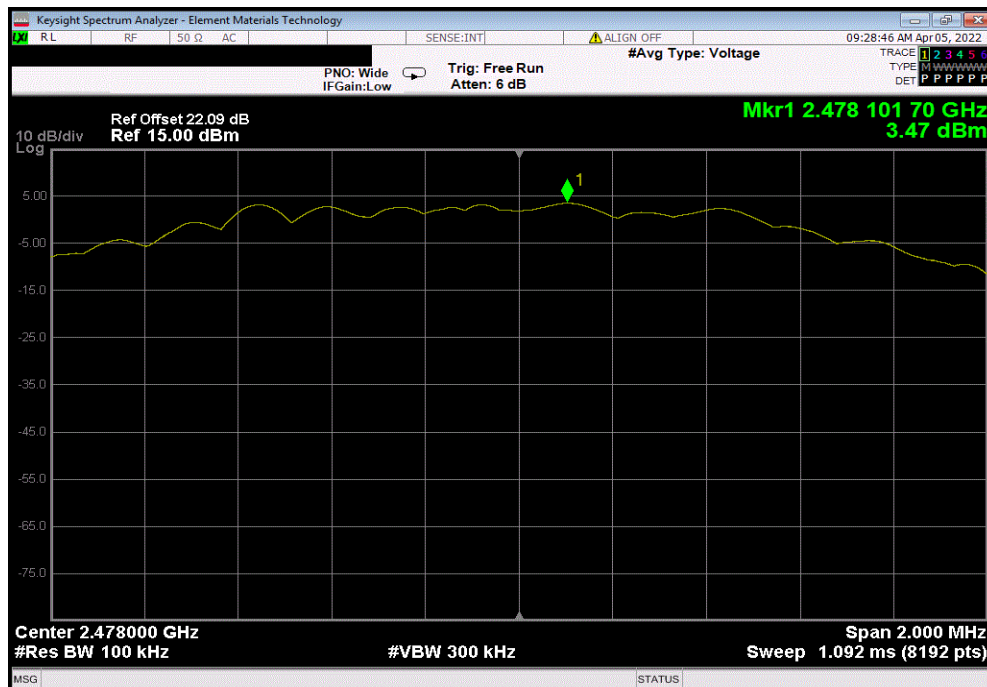


TbTtx 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps, Mid Channel, 2440 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24694.79            | -43.6           | -20           | Pass   |  |



| BLE/GFSK 2 Mbps, High Channel, 2478 MHz |                     |                 |               |        |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| Fundamental                             | 2478.1              | N/A             | N/A           | N/A    |  |

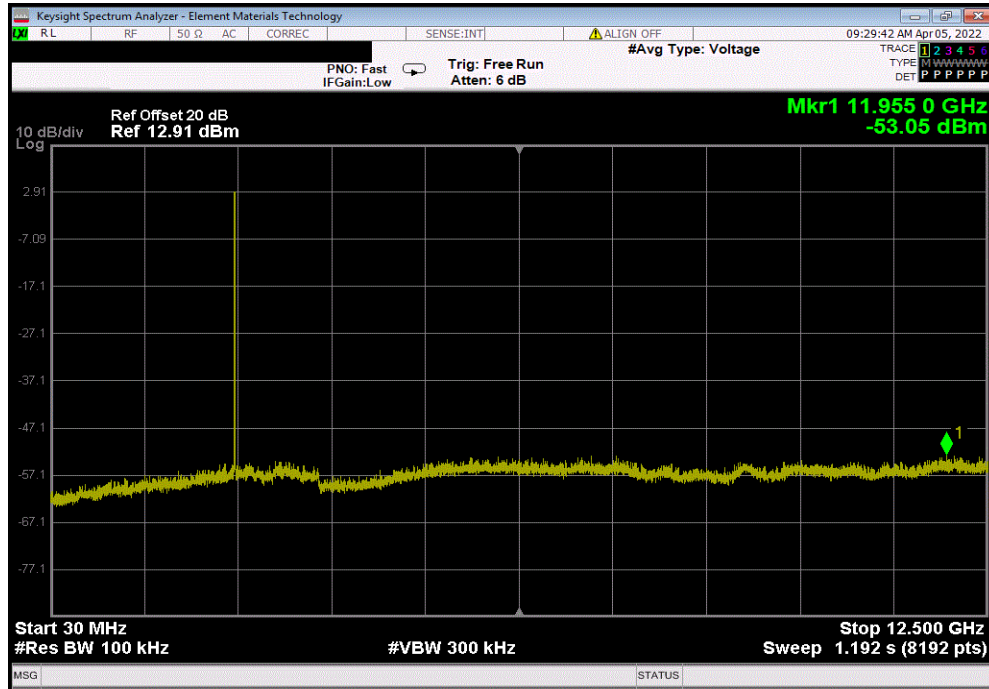


# SPURIOUS CONDUCTED EMISSIONS

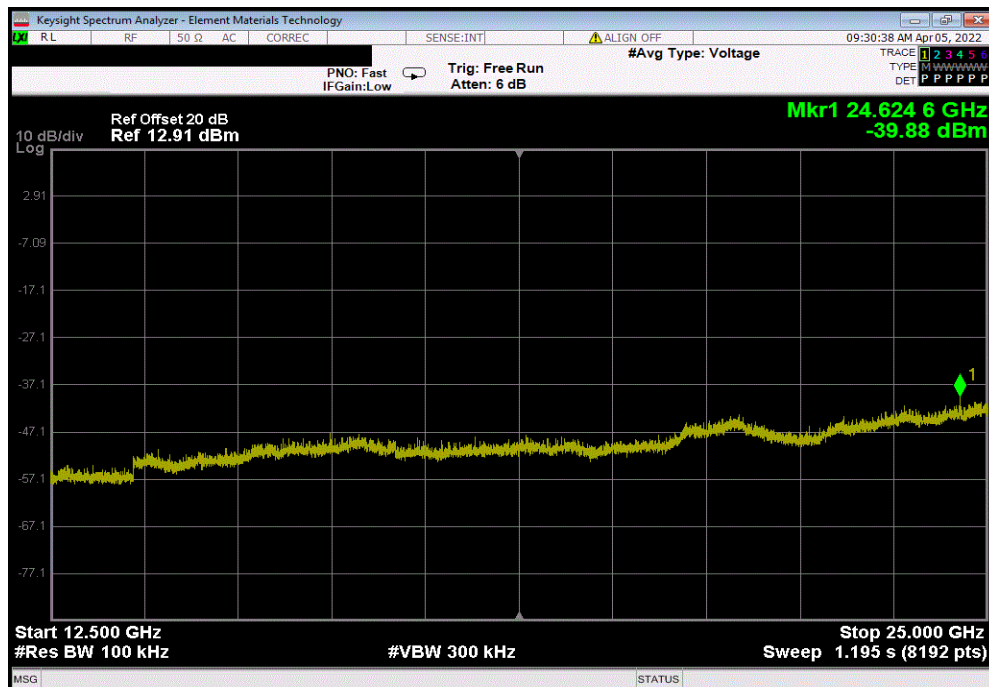


TbTtX 2021.12.14.1 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps, High Channel, 2478 MHz |                     |                 |               |        |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                       | 11954.98            | -56.52          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps, High Channel, 2478 MHz |                     |                 |               |        |  |
|-----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                         | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                       | 24624.59            | -43.35          | -20           | Pass   |  |



# SPURIOUS CONDUCTED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

| Description                  | Manufacturer       | Model                 | ID  | Last Cal.  | Cal. Due   |
|------------------------------|--------------------|-----------------------|-----|------------|------------|
| Block - DC                   | Fairview Microwave | SD3379                | AMZ | 2022-11-06 | 2023-11-06 |
| Attenuator                   | S.M. Electronics   | SA26B-20              | RFW | 2022-02-08 | 2023-02-08 |
| Cable                        | Micro-Coax         | UFD150A-1-0720-200200 | MNL | 2022-09-10 | 2023-09-10 |
| Analyzer - Spectrum Analyzer | Keysight           | N9010A                | AFM | 2022-04-25 | 2023-04-25 |
| Generator - Signal           | Agilent            | N5183A                | TIK | 2022-01-24 | 2025-01-24 |

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = "Internal" cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

# SPURIOUS CONDUCTED EMISSIONS



TSTx 2022.06.03.0 XMR 2022.02.07.0

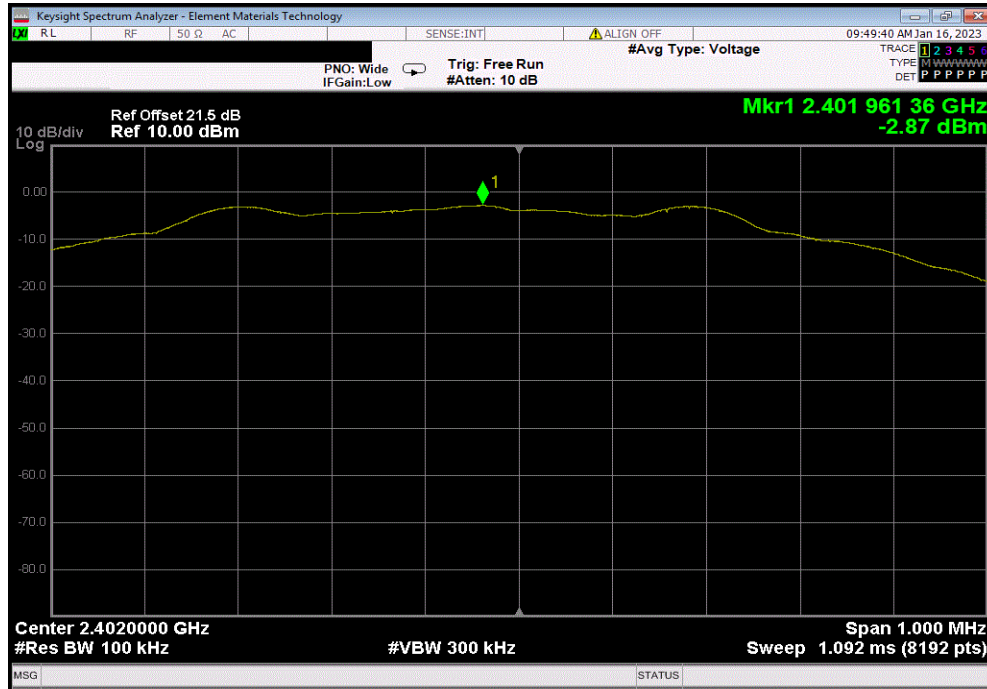
|                                        |   |                                          |                     |        |     |      |
|----------------------------------------|---|------------------------------------------|---------------------|--------|-----|------|
| EUT: XB3C2                             |   | Work Order: DGII0474                     |                     |        |     |      |
| Serial Number: 354846620001279         |   | Date: 16-Jan-23                          |                     |        |     |      |
| Customer: Digi International Inc       |   | Temperature: 21.7 °C                     |                     |        |     |      |
| Attendees: Brad Ferguson               |   | Humidity: 28.5% RH                       |                     |        |     |      |
| Project: None                          |   | Barometric Pres.: 1002 mbar              |                     |        |     |      |
| Tested by: Christopher Heintzelman     |   | Power: 5VDC via USB                      |                     |        |     |      |
|                                        |   | Job Site: MN11                           |                     |        |     |      |
| TEST SPECIFICATIONS                    |   |                                          |                     |        |     |      |
| FCC 15.247:2023                        |   | Test Method                              |                     |        |     |      |
|                                        |   | ANSI C63.10:2013                         |                     |        |     |      |
| COMMENTS                               |   |                                          |                     |        |     |      |
| Power set to -2dBm rated power.        |   |                                          |                     |        |     |      |
| DEVIATIONS FROM TEST STANDARD          |   |                                          |                     |        |     |      |
| None                                   |   |                                          |                     |        |     |      |
| Configuration #                        | 1 | Signature <i>Christopher Heintzelman</i> |                     |        |     |      |
|                                        |   | Frequency Range                          | Measured Freq (MHz) |        |     |      |
|                                        |   |                                          | Max Value (dBc)     |        |     |      |
|                                        |   |                                          | Limit ≤ (dBc)       |        |     |      |
|                                        |   |                                          | Result              |        |     |      |
| BLE/GFSK 1 Mbps Low Channel, 2402 MHz  |   | Fundamental                              | 2401.96             | N/A    | N/A |      |
| BLE/GFSK 1 Mbps Low Channel, 2402 MHz  |   | 30 MHz - 12.5 GHz                        | 6282.51             | -46.16 | -20 | Pass |
| BLE/GFSK 1 Mbps Low Channel, 2402 MHz  |   | 12.5 GHz - 25 GHz                        | 24890.12            | -34.31 | -20 | Pass |
| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz  |   | Fundamental                              | 2439.96             | N/A    | N/A | N/A  |
| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz  |   | 30 MHz - 12.5 GHz                        | 7043.71             | -46.5  | -20 | Pass |
| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz  |   | 12.5 GHz - 25 GHz                        | 24957.27            | -34.72 | -20 | Pass |
| BLE/GFSK 1 Mbps High Channel, 2480 MHz |   | Fundamental                              | 2479.96             | N/A    | N/A | N/A  |
| BLE/GFSK 1 Mbps High Channel, 2480 MHz |   | 30 MHz - 12.5 GHz                        | 5566.98             | -47.32 | -20 | Pass |
| BLE/GFSK 1 Mbps High Channel, 2480 MHz |   | 12.5 GHz - 25 GHz                        | 24964.9             | -34.83 | -20 | Pass |
| BLE/GFSK 2 Mbps Low Channel, 2404 MHz  |   | Fundamental                              | 2403.96             | N/A    | N/A | N/A  |
| BLE/GFSK 2 Mbps Low Channel, 2404 MHz  |   | 30 MHz - 12.5 GHz                        | 5871.46             | -46.34 | -20 | Pass |
| BLE/GFSK 2 Mbps Low Channel, 2404 MHz  |   | 12.5 GHz - 25 GHz                        | 24792.46            | -34.24 | -20 | Pass |
| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz  |   | Fundamental                              | 2439.96             | N/A    | N/A | N/A  |
| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz  |   | 30 MHz - 12.5 GHz                        | 5618.74             | -47.16 | -20 | Pass |
| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz  |   | 12.5 GHz - 25 GHz                        | 24887.07            | -35.12 | -20 | Pass |
| BLE/GFSK 2 Mbps High Channel, 2478 MHz |   | Fundamental                              | 2477.96             | N/A    | N/A | N/A  |
| BLE/GFSK 2 Mbps High Channel, 2478 MHz |   | 30 MHz - 12.5 GHz                        | 9289.25             | -47.22 | -20 | Pass |
| BLE/GFSK 2 Mbps High Channel, 2478 MHz |   | 12.5 GHz - 25 GHz                        | 24803.14            | -34.92 | -20 | Pass |

# SPURIOUS CONDUCTED EMISSIONS

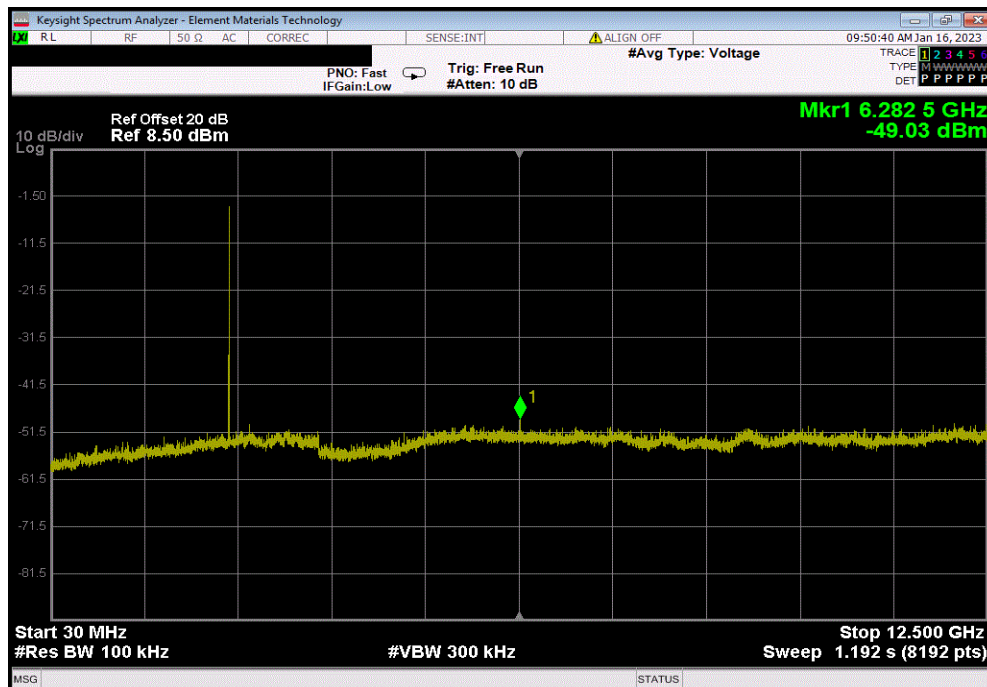


TbTx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps Low Channel, 2402 MHz |                     |                 |               |        |  |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                           | 2401.96             | N/A             | N/A           | N/A    |  |  |



| BLE/GFSK 1 Mbps Low Channel, 2402 MHz |                     |                 |               |        |  |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                     | 6282.51             | -46.16          | -20           | Pass   |  |  |

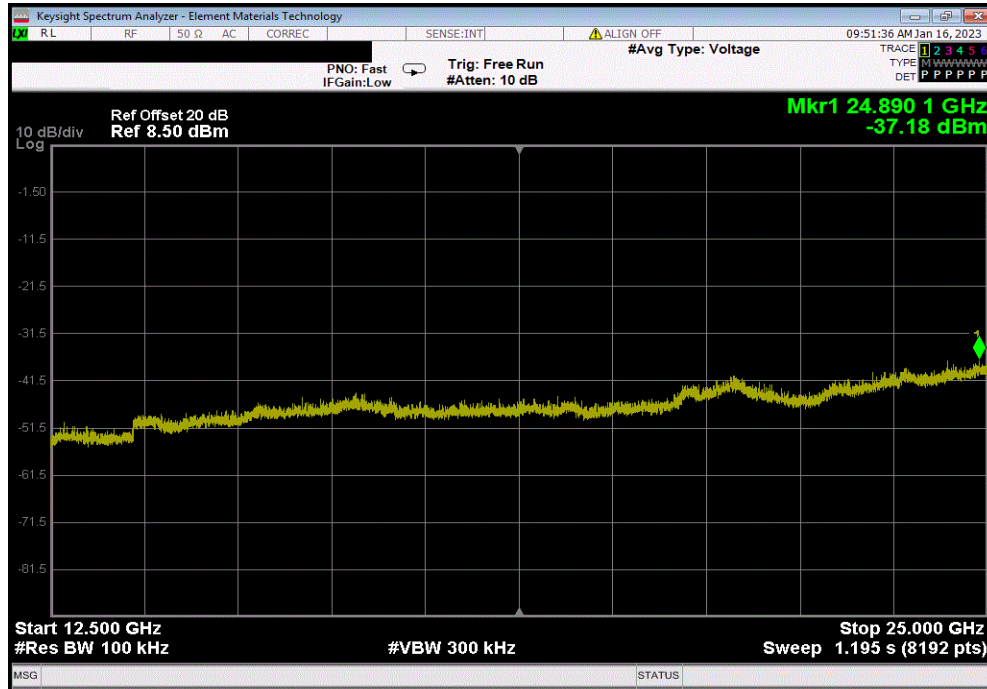


# SPURIOUS CONDUCTED EMISSIONS

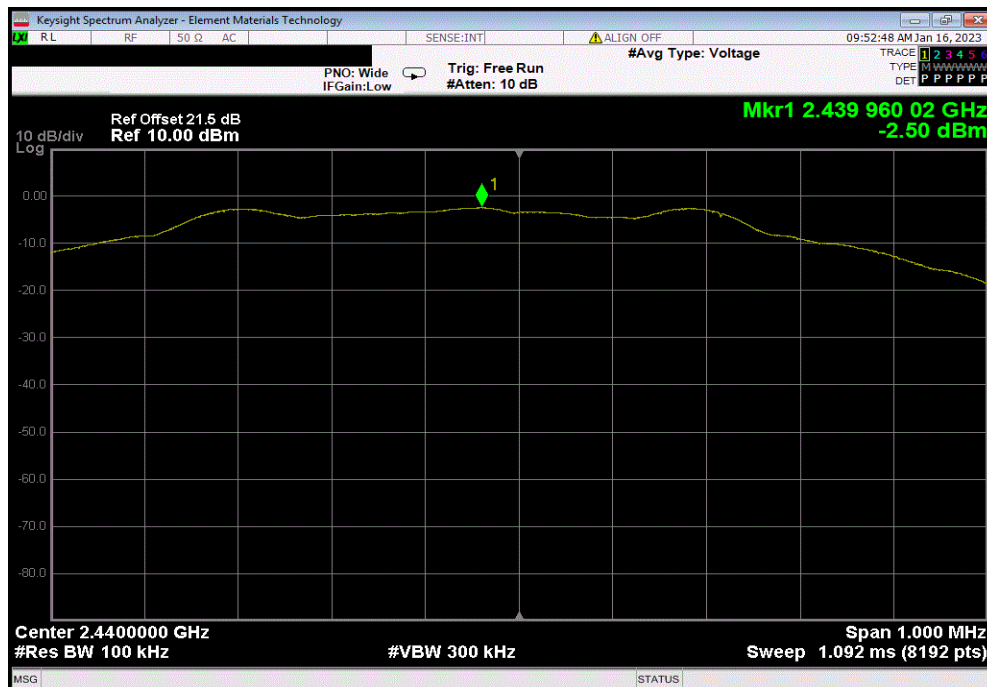


TbTx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps Low Channel, 2402 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                     | 24890.12            | -34.31          | -20           | Pass   |  |



| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| Fundamental                           | 2439.96             | N/A             | N/A           | N/A    |  |

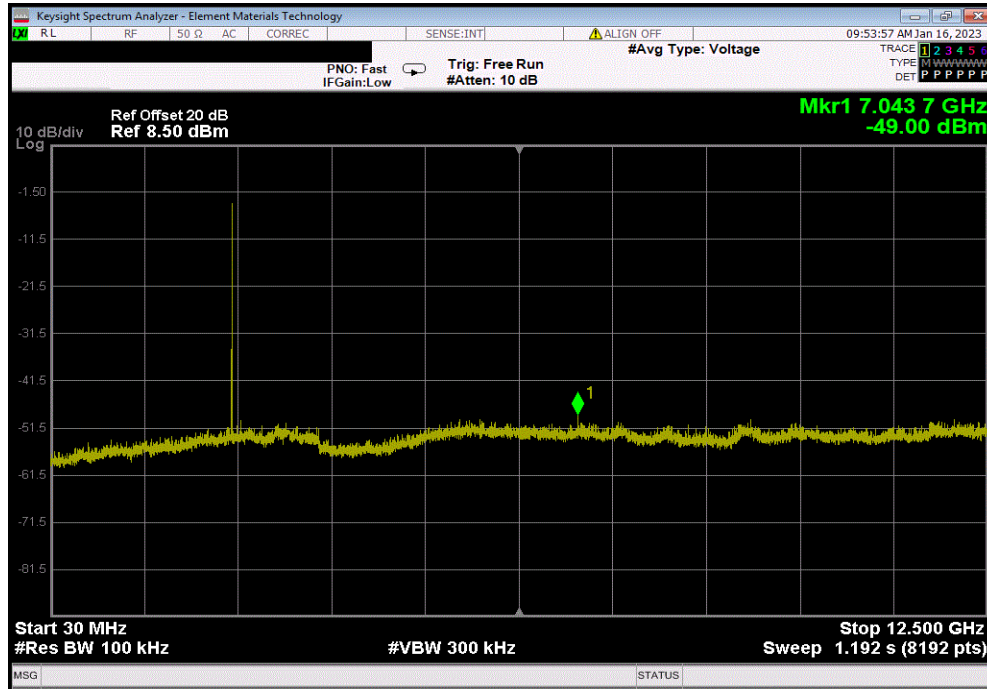


# SPURIOUS CONDUCTED EMISSIONS

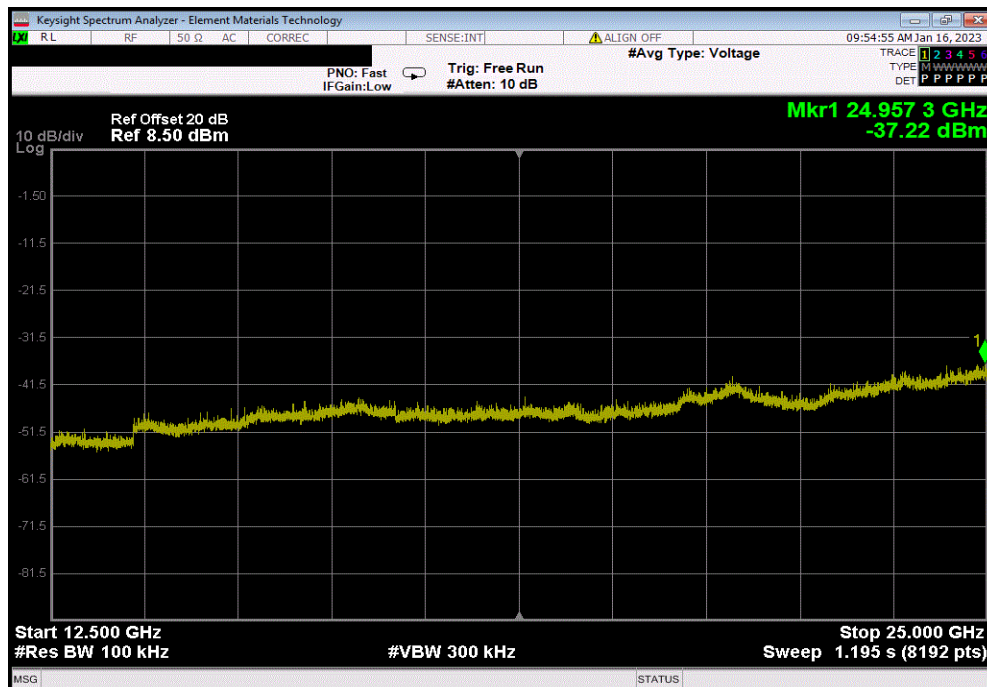


TbTtx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                     | 7043.71             | -46.5           | -20           | Pass   |  |



| BLE/GFSK 1 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                     | 24957.27            | -34.72          | -20           | Pass   |  |

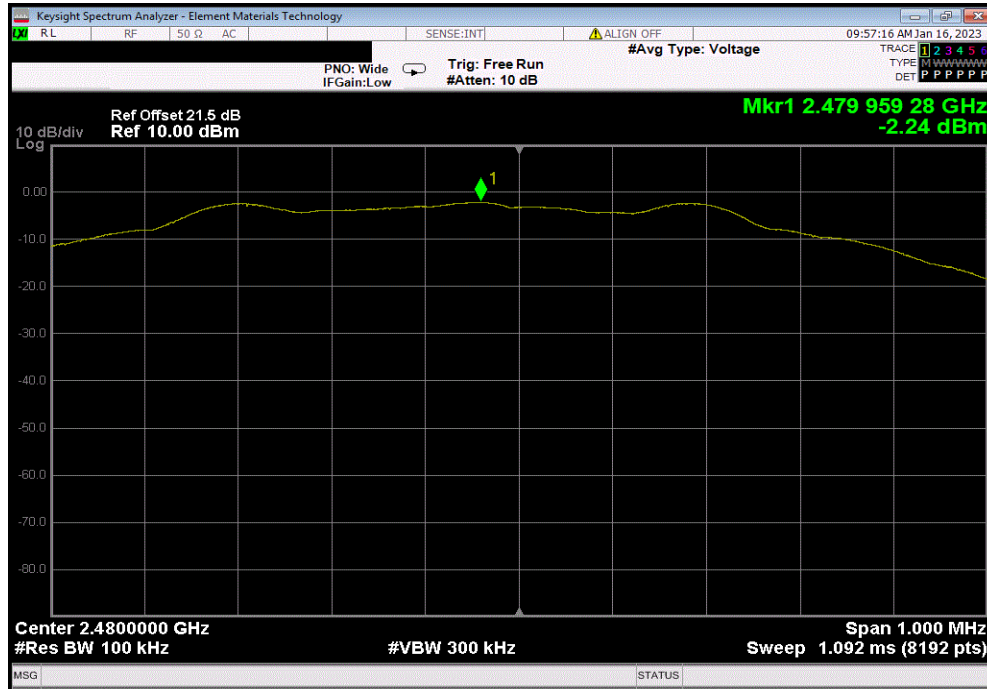


# SPURIOUS CONDUCTED EMISSIONS

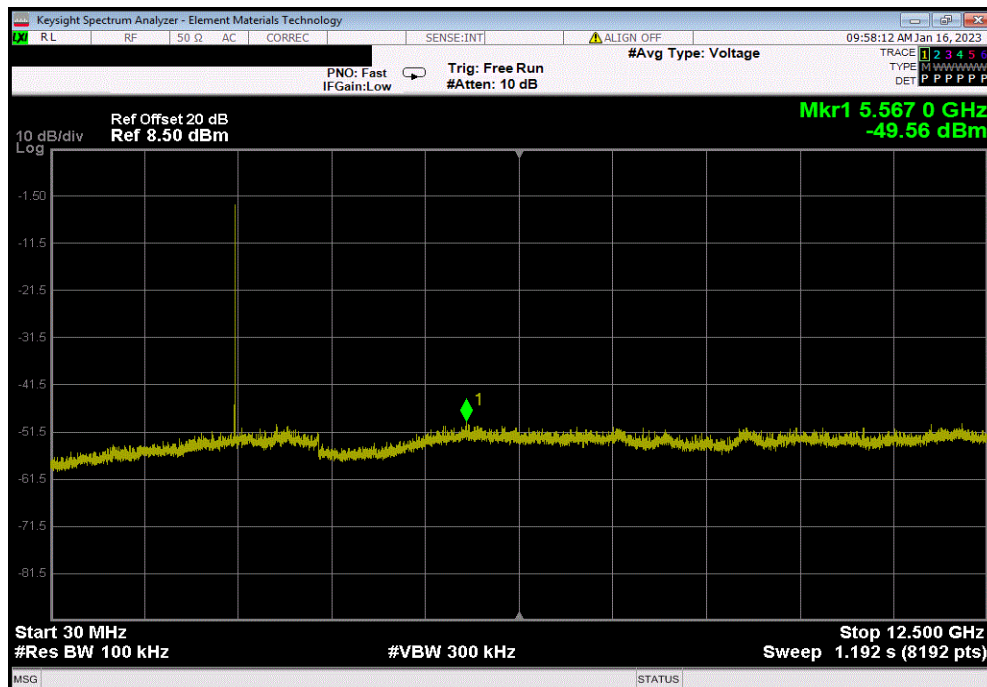


TbTx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps High Channel, 2480 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                            | 2479.96             | N/A             | N/A           | N/A    |  |  |



| BLE/GFSK 1 Mbps High Channel, 2480 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                      | 5566.98             | -47.32          | -20           | Pass   |  |  |

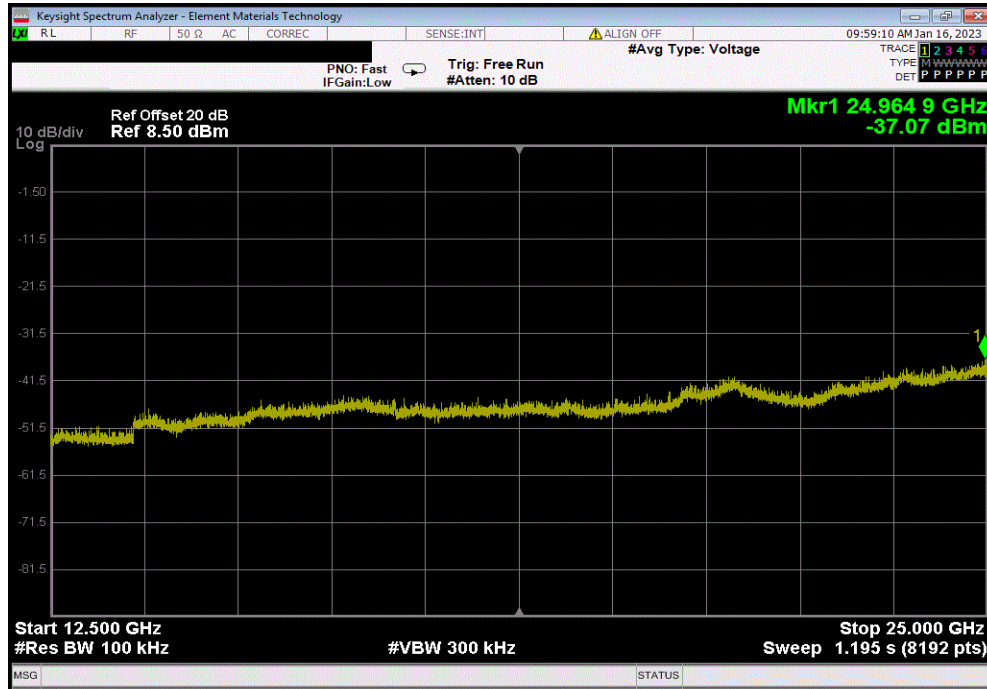


# SPURIOUS CONDUCTED EMISSIONS

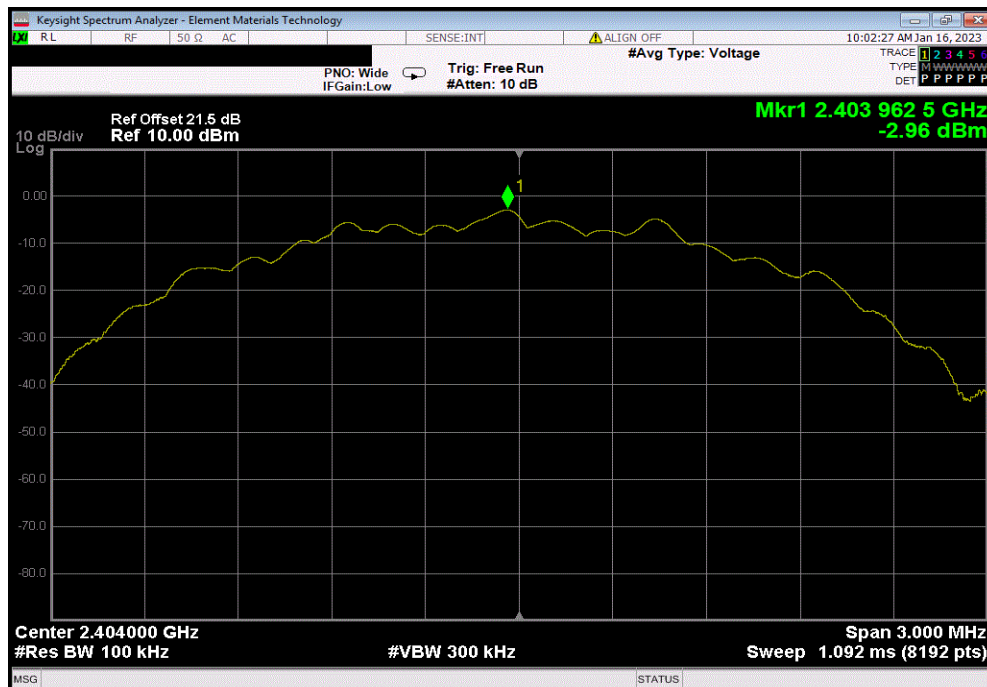


TbTtx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 1 Mbps High Channel, 2480 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24964.9             | -34.83          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps Low Channel, 2404 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| Fundamental                           | 2403.96             | N/A             | N/A           | N/A    |  |

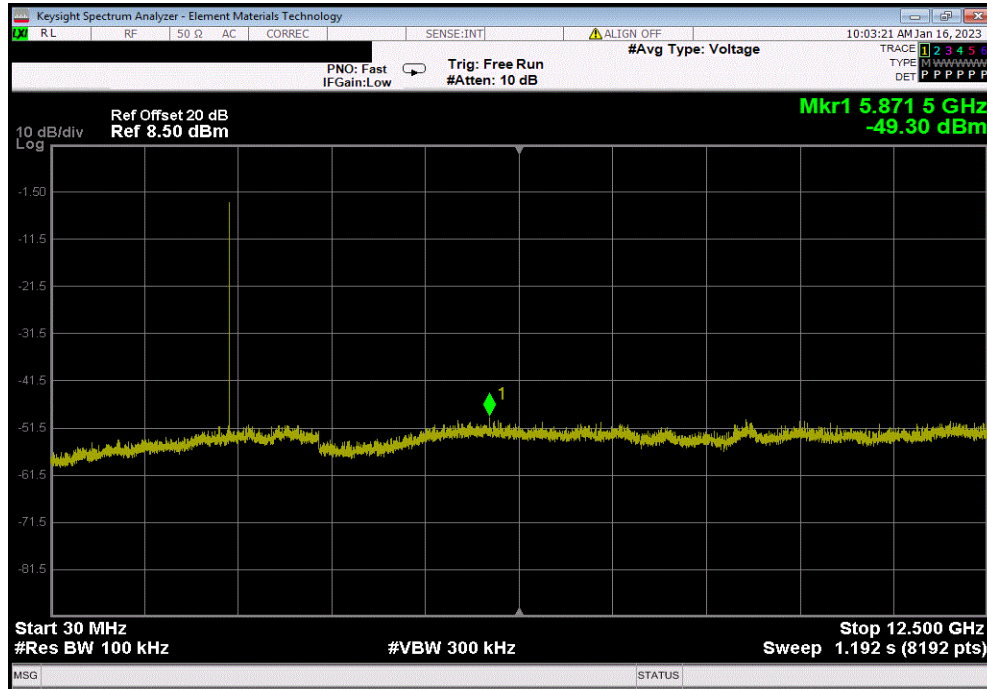


# SPURIOUS CONDUCTED EMISSIONS

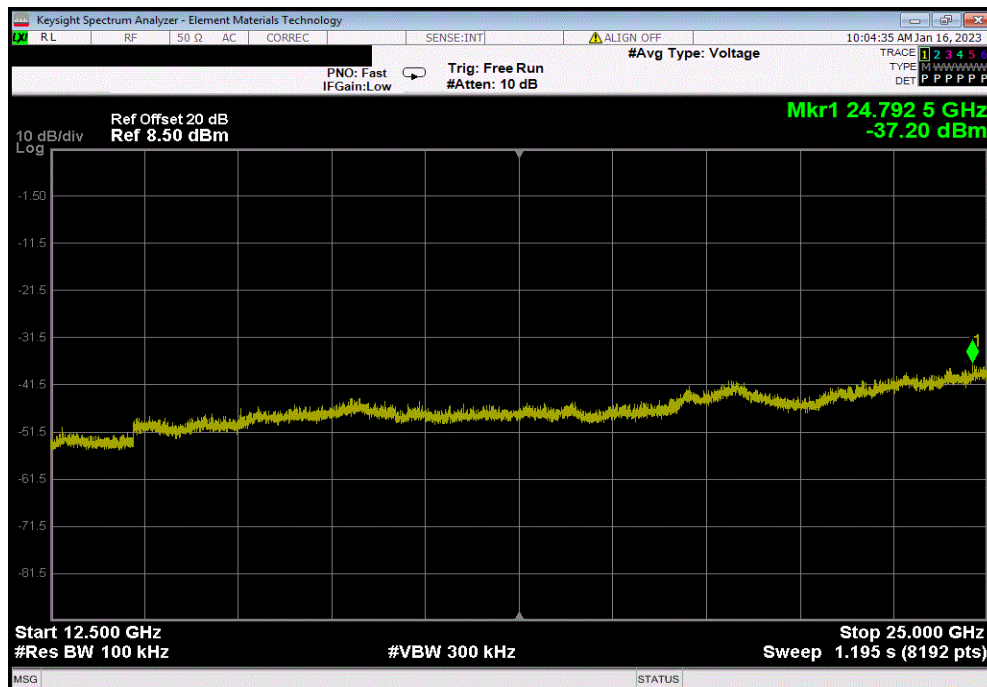


TbTtX 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps Low Channel, 2404 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                     | 5871.46             | -46.34          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps Low Channel, 2404 MHz |                     |                 |               |        |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                     | 24792.46            | -34.24          | -20           | Pass   |  |

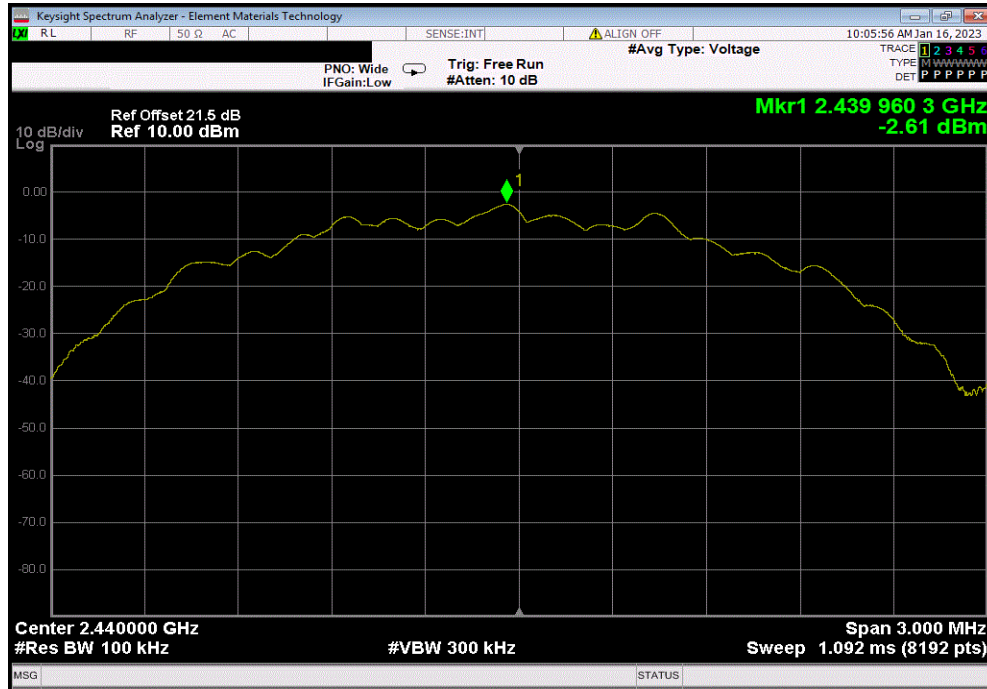


# SPURIOUS CONDUCTED EMISSIONS

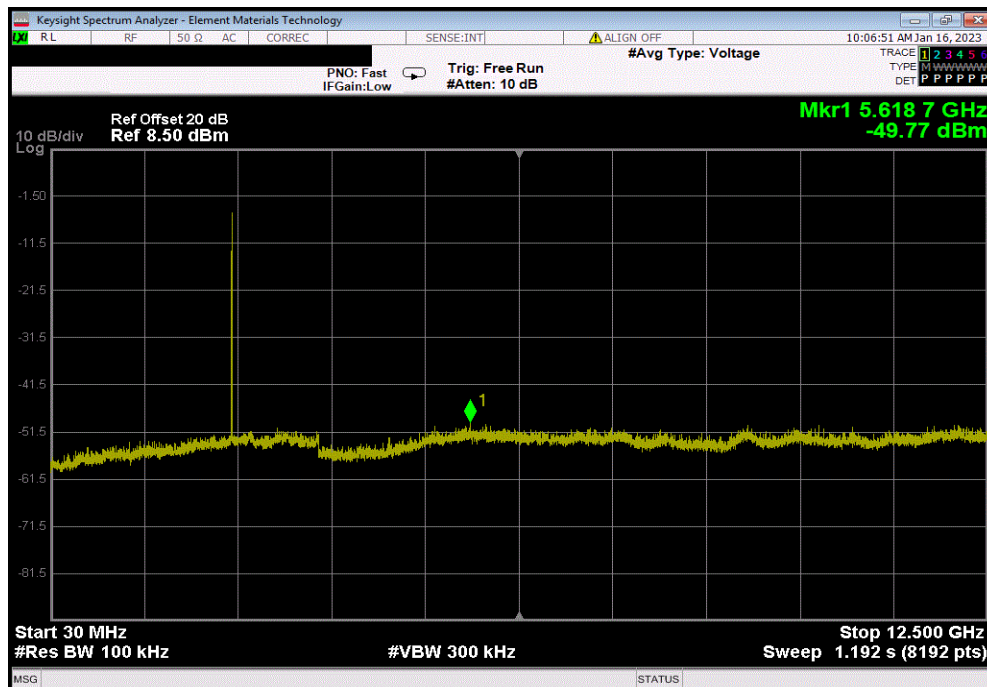


TbTtx 2022.06.03.0 XMt 2022.02.07.0

| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |  |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                           | 2439.96             | N/A             | N/A           | N/A    |  |  |



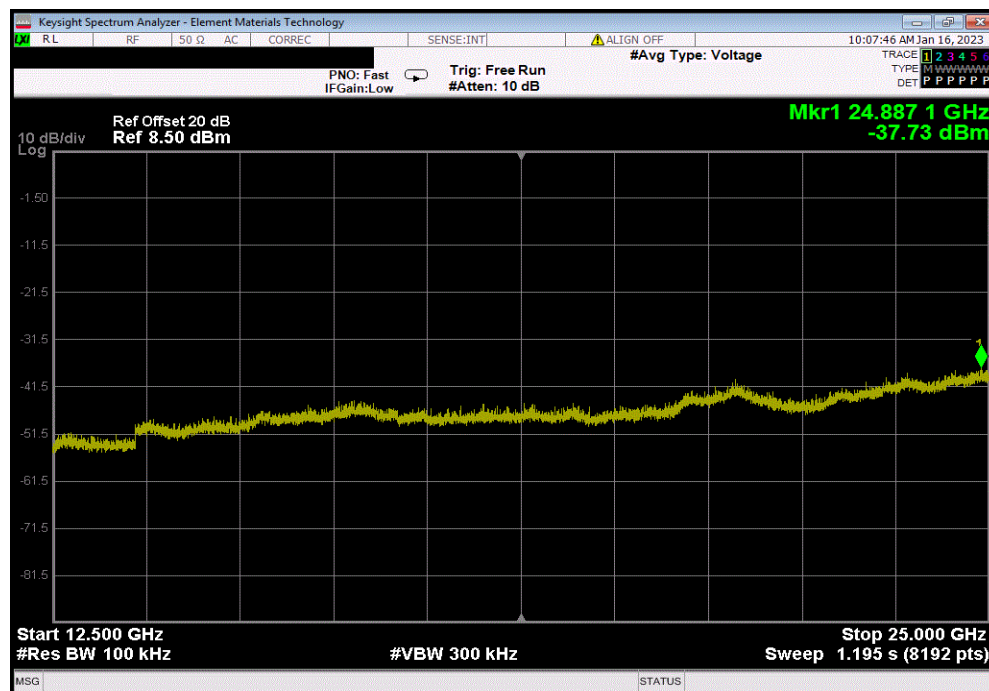
| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |  |  |
|---------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| 30 MHz - 12.5 GHz                     | 5618.74             | -47.16          | -20           | Pass   |  |  |



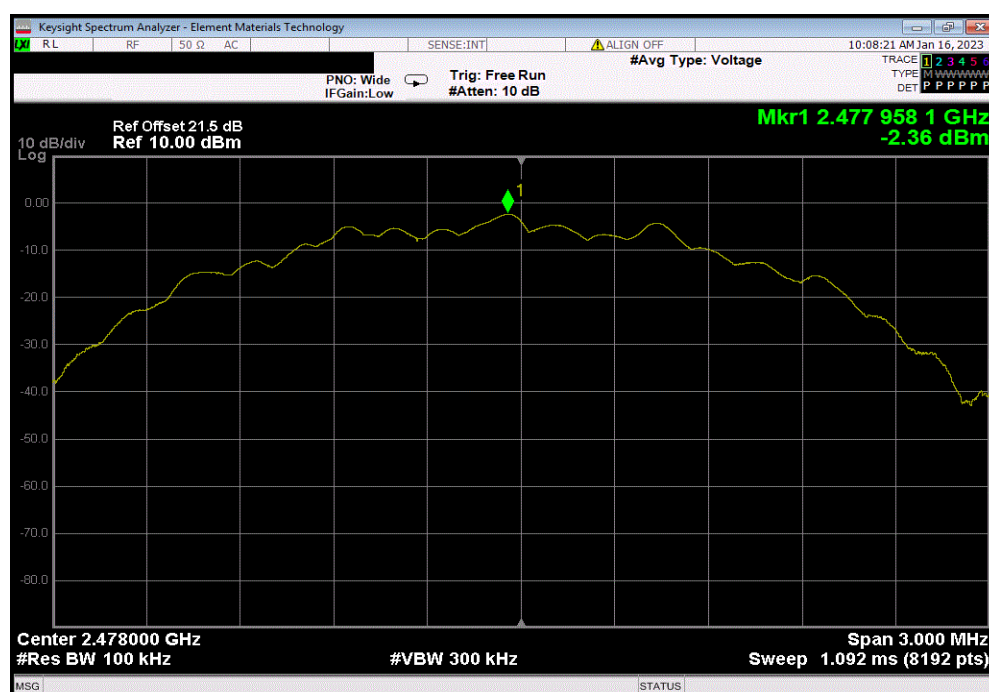


ThyTx 2022.06.03.0 YMit 2022.03.07.4

| BLE/GFSK 2 Mbps Mid Channel, 2440 MHz |                     |                 |               |        |
|---------------------------------------|---------------------|-----------------|---------------|--------|
| Frequency Range                       | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 12.5 GHz - 25 GHz                     | 24887.07            | -35.12          | -20           | Pass   |



| BLE/GFSK 2 Mbps High Channel, 2478 MHz |                     |                 |               |        |  |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |  |
| Fundamental                            | 2477.96             | N/A             | N/A           | N/A    |  |  |

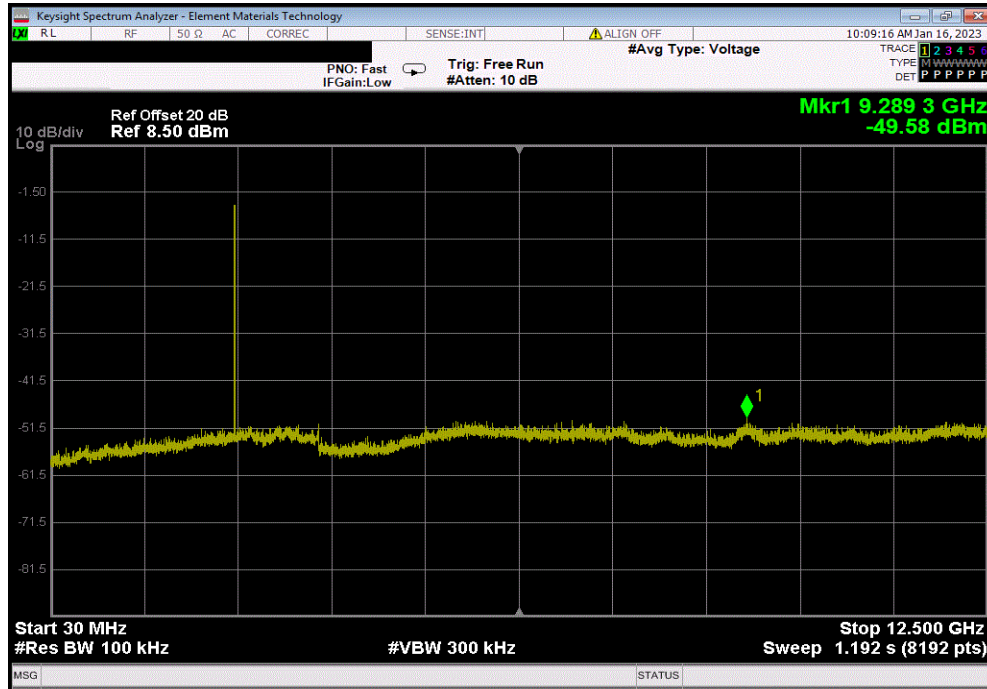


# SPURIOUS CONDUCTED EMISSIONS

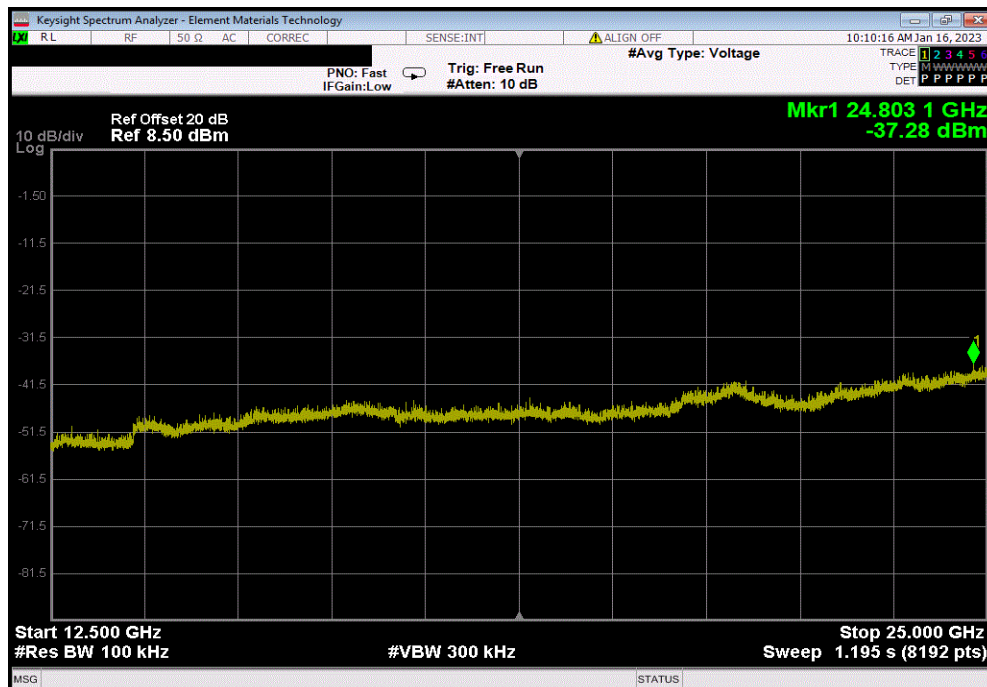


TbTtx 2022.06.03.0 XMI 2022.02.07.0

| BLE/GFSK 2 Mbps High Channel, 2478 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 30 MHz - 12.5 GHz                      | 9289.25             | -47.22          | -20           | Pass   |  |



| BLE/GFSK 2 Mbps High Channel, 2478 MHz |                     |                 |               |        |  |
|----------------------------------------|---------------------|-----------------|---------------|--------|--|
| Frequency Range                        | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |  |
| 12.5 GHz - 25 GHz                      | 24803.14            | -34.92          | -20           | Pass   |  |



# SPURIOUS RADIATED EMISSIONS

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector

PK = Peak Detector

AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of  $10 \cdot \log(1/dc)$ .

## TEST EQUIPMENT

| Description                  | Manufacturer    | Model                          | ID  | Last Cal.  | Cal. Due   |
|------------------------------|-----------------|--------------------------------|-----|------------|------------|
| Analyzer - Spectrum Analyzer | Agilent         | E4440A                         | AFG | 2021-05-18 | 2022-05-18 |
| Antenna - Double Ridge       | ETS Lindgren    | 3115                           | AIB | 2020-09-03 | 2022-09-03 |
| Cable                        | Element         | Double Ridge Guide Horn Cables | MNV | 2022-01-24 | 2023-01-24 |
| Amplifier - Pre-Amplifier    | Miteq           | AMF-3D-00100800-32-13P         | AVX | 2022-01-24 | 2023-01-24 |
| Antenna - Standard Gain      | ETS-Lindgren    | 3160-07                        | AJJ | NCR        | NCR        |
| Cable                        | Element         | Standard Gain Cable            | MNW | 2022-01-24 | 2023-01-24 |
| Amplifier - Pre-Amplifier    | Miteq           | AMF-6F-08001200-30-10P         | AVC | 2022-01-24 | 2023-01-24 |
| Antenna - Standard Gain      | ETS-Lindgren    | 3160-08                        | AJP | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | L-3 Narda-Miteq | AMF-6F-12001800-30-10P         | PAP | 2022-01-24 | 2023-01-24 |
| Filter - High Pass           | Micro-Tronics   | HPM50111                       | HFM | 2021-09-10 | 2022-09-10 |
| Attenuator                   | Coaxicom        | 3910-20                        | AXY | 2021-09-10 | 2022-09-10 |

## MEASUREMENT UNCERTAINTY

| Description  |        |         |
|--------------|--------|---------|
| Expanded k=2 | 5.2 dB | -5.2 dB |

## FREQUENCY RANGE INVESTIGATED

1 GHz TO 18 GHz

## POWER INVESTIGATED

5VDC

## CONFIGURATIONS INVESTIGATED

DGII0455-3  
DGII0455-4  
DGII0455-5

## MODES INVESTIGATED

Transmitting BLE Low, Mid and High Ch (2440 and 2480 MHz), 1 Mbps and 2Mbps. 2Mbps data rate has Low/High Chs of 2404/2478 MHz.

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-04-08 |
| Customer:         | Digi International Inc  | Temperature:          | 22.6°C     |
| Attendees:        | None                    | Relative Humidity:    | 27.2%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1014 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN09       |
| Power:            | 5VDC                    | Configuration:        | DGII0455-3 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 13 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

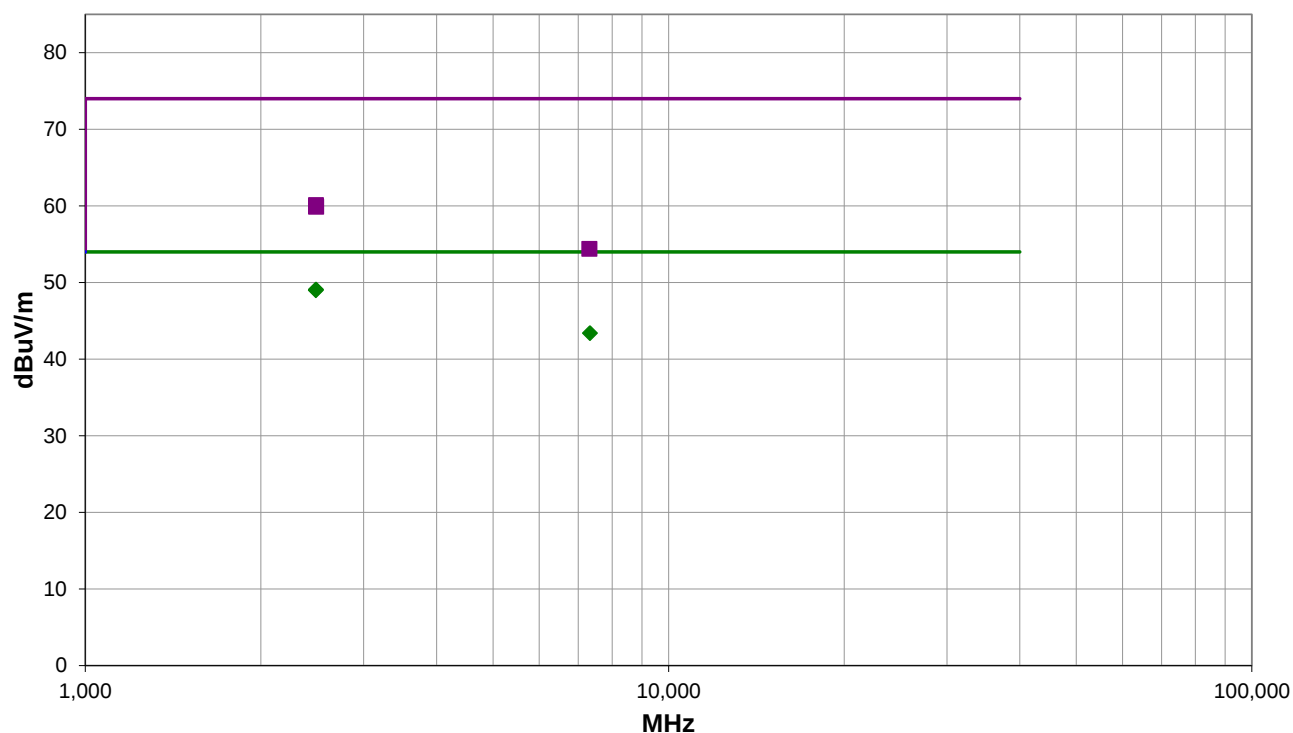
Dipole Antenna. Spot Check with 7dBm power setting.

## EUT OPERATING MODES

Transmitting BLE Low, Mid and High Ch (2440 and 2480 MHz), 1 Mbps and 2Mbps. 2Mbps data rate has Low/High Chs of 2404/2478 MHz.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 13

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #13

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                             |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|--------------------------------------|
| 2484.908   | 31.5             | -2.4          | 1.7                     | 283.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.1              | 54.0                 | -4.9                   | EUT Vert, High Ch, 2 Mbps            |
| 2483.925   | 31.4             | -2.4          | 1.5                     | 30.0              | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Vert, High Ch, 2 Mbps            |
| 7329.830   | 28.7             | 14.7          | 4.0                     | 322.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 43.4              | 54.0                 | -10.6                  | EUT Vert, noise floor, Mid Ch 1 Mbps |
| 2485.500   | 42.5             | -2.4          | 1.7                     | 283.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.1              | 74.0                 | -13.9                  | EUT Vert, High Ch, 2 Mbps            |
| 2486.458   | 42.3             | -2.4          | 1.5                     | 30.0              | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.9              | 74.0                 | -14.1                  | EUT Vert, High Ch, 2 Mbps            |
| 7311.290   | 39.9             | 14.5          | 4.0                     | 322.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 54.4              | 74.0                 | -19.6                  | EUT Vert, noise floor, Mid Ch 1 Mbps |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-04-08 |
| Customer:         | Digi International Inc  | Temperature:          | 22.6°C     |
| Attendees:        | None                    | Relative Humidity:    | 27.2%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1014 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN09       |
| Power:            | 5VDC                    | Configuration:        | DGII0455-4 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 26 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

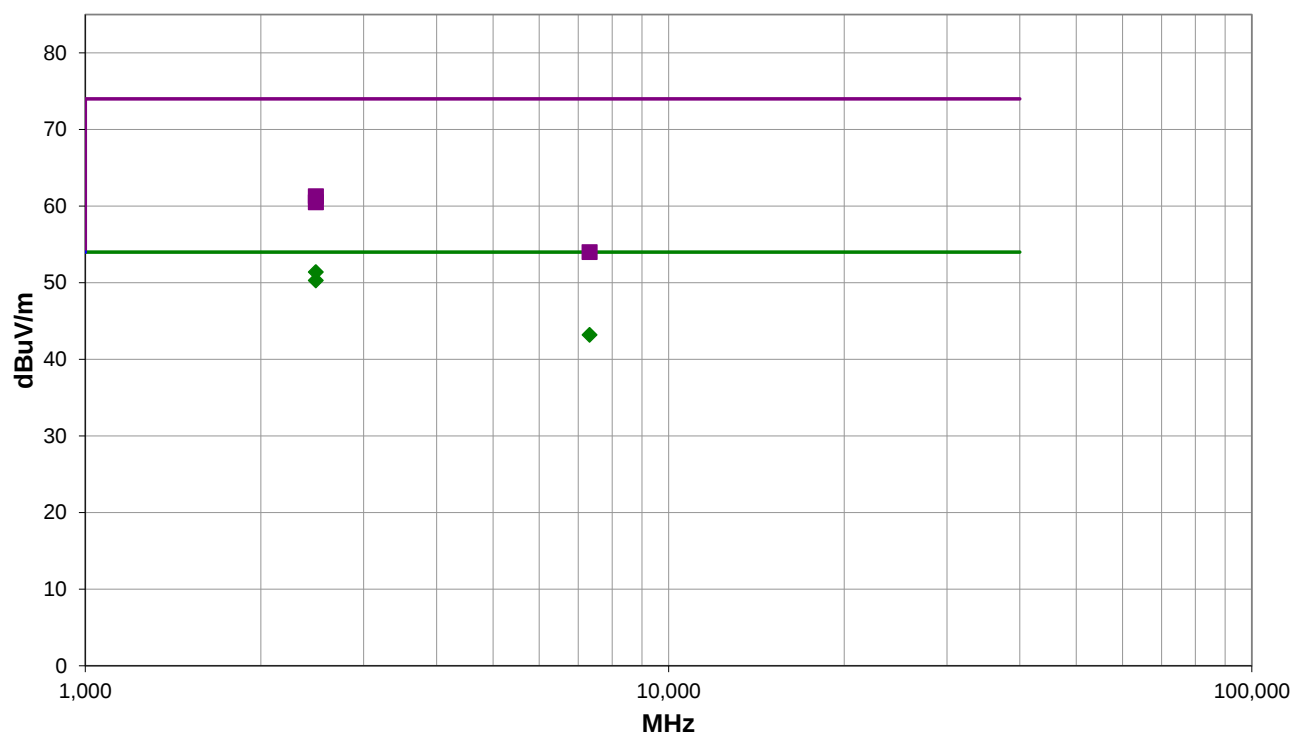
Patch Antenna. Spot Check 7dBm power setting.

## EUT OPERATING MODES

Transmitting BLE Low, Mid and High Ch (2440 and 2480 MHz), 1 Mbps and 2Mbps. 2Mbps data rate has Low/High Chs of 2404/2478 MHz.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 26

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #26

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                     |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|---------------------------|----------|--------------------------|-------------------|----------------------|------------------------|------------------------------|
| 2483.533   | 33.8             | -2.4          | 2.0                     | 316.0             | 3.0                    | 20.0                      | Horz                      | AV       | 0.0                      | 51.4              | 54.0                 | -2.6                   | EUT On Side, High Ch, 2 Mbps |
| 2483.508   | 32.7             | -2.4          | 1.5                     | 79.0              | 3.0                    | 20.0                      | Horz                      | AV       | 0.0                      | 50.3              | 54.0                 | -3.7                   | EUT On Side, High Ch, 1 Mbps |
| 7318.400   | 28.6             | 14.6          | 1.9                     | 261.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 43.2              | 54.0                 | -10.8                  | EUT Horz, Mid Ch, 1 Mbps     |
| 2484.233   | 43.7             | -2.4          | 2.0                     | 316.0             | 3.0                    | 20.0                      | Horz                      | PK       | 0.0                      | 61.3              | 74.0                 | -12.7                  | EUT On Side, High Ch, 2 Mbps |
| 2483.967   | 42.9             | -2.4          | 1.5                     | 79.0              | 3.0                    | 20.0                      | Horz                      | PK       | 0.0                      | 60.5              | 74.0                 | -13.5                  | EUT On Side, High Ch, 1 Mbps |
| 7317.858   | 39.4             | 14.6          | 1.9                     | 261.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 54.0              | 74.0                 | -20.0                  | EUT Horz, Mid Ch, 1 Mbps     |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-04-08 |
| Customer:         | Digi International Inc  | Temperature:          | 22.6°C     |
| Attendees:        | None                    | Relative Humidity:    | 27.2%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1014 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN09       |
| Power:            | 5VDC                    | Configuration:        | DGII0455-5 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 39 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

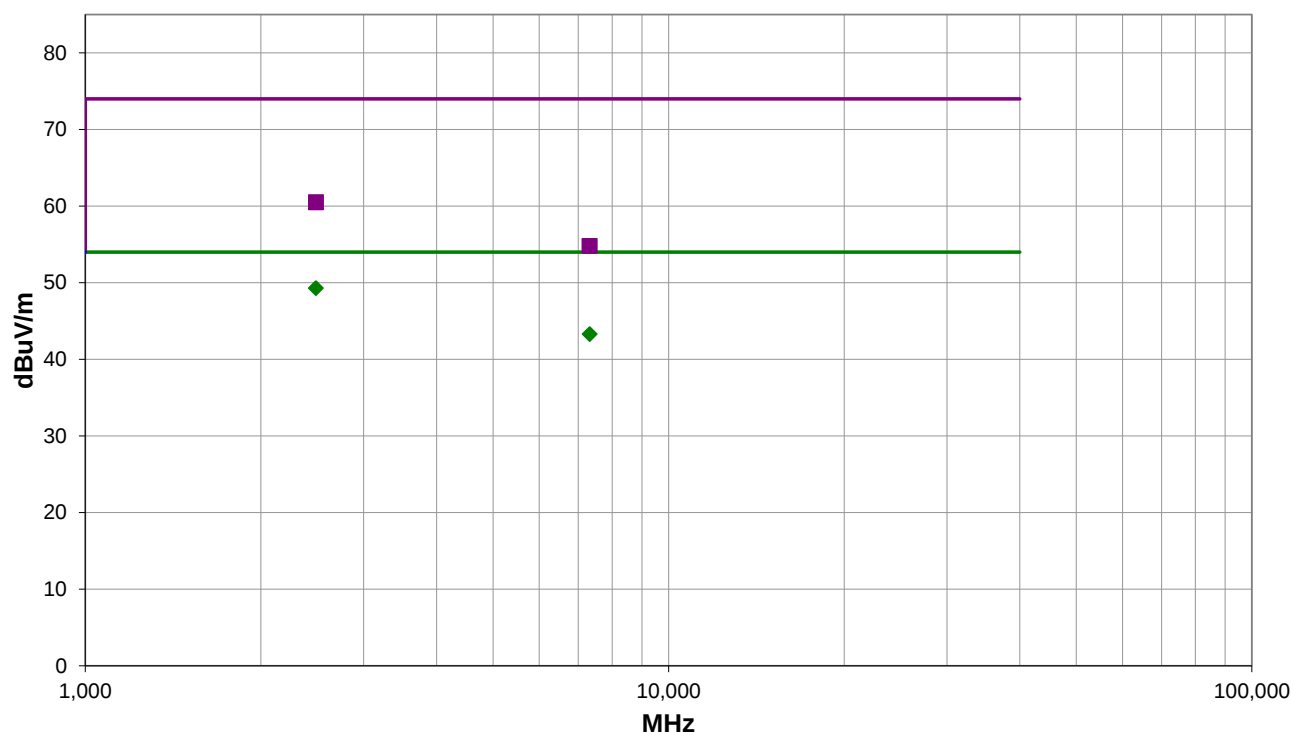
Internal Antenna. Spot Check 7dBm power setting.

## EUT OPERATING MODES

Transmitting BLE Low, Mid and High Ch (2440 and 2480 MHz), 1 Mbps and 2Mbps. 2Mbps data rate has Low/High Chs of 2404/2478 MHz.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 39

■ PK    ◆ AV    ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #39

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                    |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|-----------------------------|
| 2484.008   | 31.7             | -2.4          | 1.5                     | 3.0               | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.3              | 54.0                 | -4.7                   | EUT Vert, High Ch, 2 Mbps   |
| 7321.408   | 28.7             | 14.6          | 1.0                     | 189.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 43.3              | 54.0                 | -10.7                  | EUT On Side, Mid Ch, 1 Mbps |
| 2485.225   | 42.9             | -2.4          | 1.5                     | 3.0               | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.5              | 74.0                 | -13.5                  | EUT Vert, High Ch, 2 Mbps   |
| 7317.717   | 40.2             | 14.6          | 1.0                     | 189.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 54.8              | 74.0                 | -19.2                  | EUT On Side, Mid Ch, 1 Mbps |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector

PK = Peak Detector

AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of  $10 \cdot \log(1/dc)$ .

## TEST EQUIPMENT

| Description                  | Manufacturer       | Model                          | ID  | Last Cal.  | Cal. Due   |
|------------------------------|--------------------|--------------------------------|-----|------------|------------|
| Analyzer - Spectrum Analyzer | Agilent            | E4446A                         | AAQ | 2021-05-21 | 2022-05-21 |
| Antenna - Double Ridge       | ETS Lindgren       | 3115                           | AJQ | 2021-01-25 | 2023-01-25 |
| Cable                        | ESM Cable Corp.    | Double Ridge Guide Horn Cables | MNI | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-3D-00100800-32-13P         | AVT | 2022-01-18 | 2023-01-18 |
| Attenuator                   | Fairview Microwave | SA18E-20                       | TWZ | 2021-09-09 | 2022-09-09 |
| Attenuator                   | Fairview Microwave | SA18E-10                       | TYA | 2021-09-09 | 2022-09-09 |
| Filter - High Pass           | Micro-Tronics      | HPM50111                       | LFN | 2021-09-09 | 2022-09-09 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-07                        | AXP | NCR        | NCR        |
| Cable                        | ESM Cable Corp.    | Standard Gain Horn Cables      | MNJ | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-6F-08001200-30-10P         | AVV | 2022-01-18 | 2023-01-18 |
| Antenna - Biconilog          | ETS Lindgren       | 3142D                          | AXO | 2021-09-14 | 2023-09-14 |
| Cable                        | ESM Cable Corp.    | Bilog Cables                   | MNH | 2021-10-13 | 2022-10-13 |
| Amplifier - Pre-Amplifier    | Miteq              | AM-1616-1000                   | AVO | 2021-10-13 | 2022-10-13 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-08                        | AIQ | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-6F-12001800-30-10P         | AVW | 2022-01-18 | 2023-01-18 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-09                        | AHG | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq              | JSD4-18002600-26-8P            | APU | 2021-09-09 | 2022-09-09 |
| Cable                        | ESM Cable Corp.    | TTBJ141 KMKM-72                | MNP | 2021-09-09 | 2022-09-09 |
| Filter - Low Pass            | Micro-Tronics      | LPM50004                       | LFK | 2021-09-09 | 2022-09-09 |
| Filter - High Pass           | Micro-Tronics      | HPM50111                       | HFM | 2021-09-10 | 2022-09-10 |
| Antenna - Double Ridge       | ETS Lindgren       | 3115                           | AIB | 2020-09-03 | 2022-09-03 |
| Attenuator                   | Coaxicom           | 3910-20                        | AXY | 2021-09-10 | 2022-09-10 |
| Analyzer - Spectrum Analyzer | Agilent            | E4440A                         | AFG | 2021-05-18 | 2022-05-18 |
| Cable                        | Element            | Double Ridge Guide Horn Cables | MNV | 2022-01-24 | 2023-01-24 |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-3D-00100800-32-13P         | AVX | 2022-01-24 | 2023-01-24 |

# SPURIOUS RADIATED EMISSIONS

## MEASUREMENT UNCERTAINTY

| Description  |        |         |
|--------------|--------|---------|
| Expanded k=2 | 5.2 dB | -5.2 dB |

## FREQUENCY RANGE INVESTIGATED

|                     |
|---------------------|
| 30 MHz TO 26500 MHz |
|---------------------|

## POWER INVESTIGATED

|                 |
|-----------------|
| 5VDC via laptop |
| USB via Laptop  |

## CONFIGURATIONS INVESTIGATED

|            |
|------------|
| DGII0455-3 |
|------------|

## MODES INVESTIGATED

|                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transmitting BLE Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 Mbps. 8dBm power setting.                                                               |
| Transmitting BLE, Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps. 8dBm power setting. 2mbps data rate has low/high chs of 2404 and 2478 MHz. |

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-03-23 |
| Customer:         | Digi International Inc  | Temperature:          | 23.1°C     |
| Attendees:        | None                    | Relative Humidity:    | 30.4%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1009 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN05       |
| Power:            | USB via Laptop          | Configuration:        | DGII0455-3 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 19 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

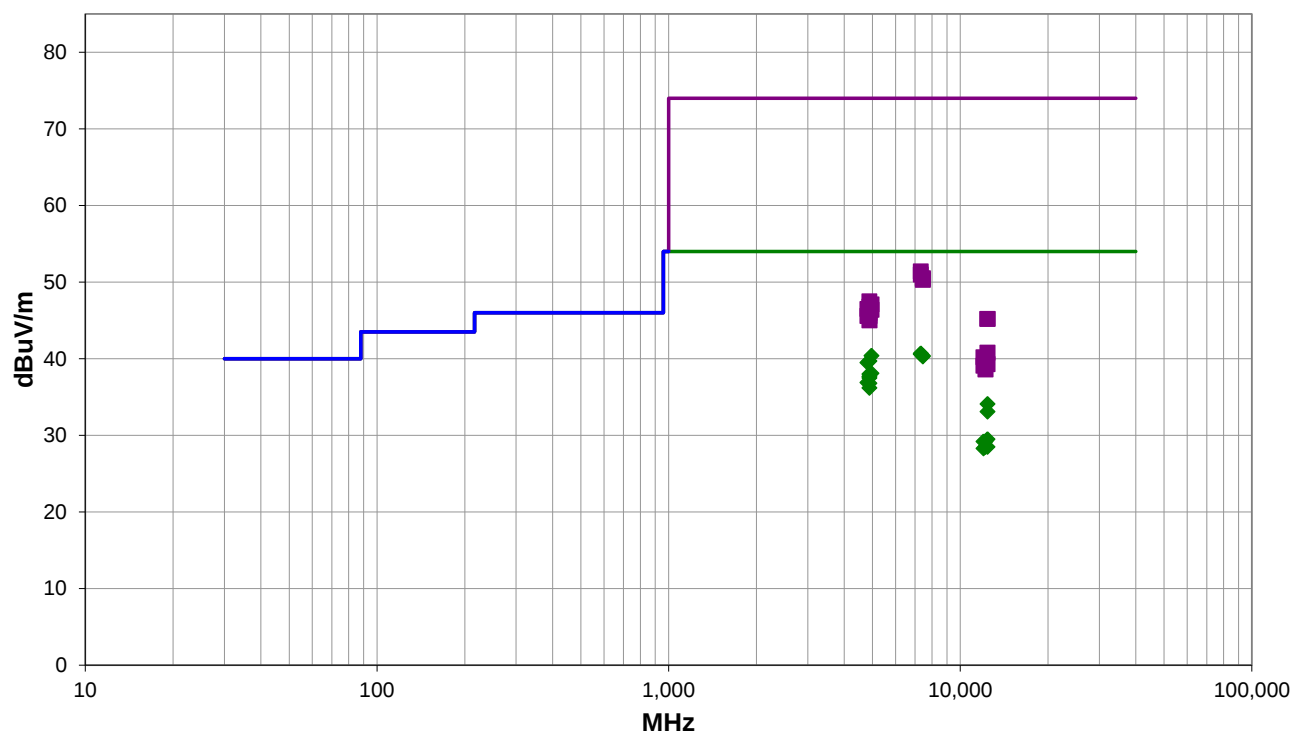
|                                                                      |
|----------------------------------------------------------------------|
| Dipole Antenna. IMEI 350588280003609. Laptop powered at 120VAC/60Hz. |
|----------------------------------------------------------------------|

## EUT OPERATING MODES

|                                                                                                 |
|-------------------------------------------------------------------------------------------------|
| Transmitting BLE Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 Mbps. 8dBm power setting. |
|-------------------------------------------------------------------------------------------------|

## DEVIATIONS FROM TEST STANDARD

|      |
|------|
| None |
|------|



Run #: 19

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #19

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                      |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|---------------------------|----------|--------------------------|-------------------|----------------------|------------------------|-------------------------------|
| 7321.308   | 30.4             | 10.3          | 1.5                     | 289.9             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 40.7              | 54.0                 | -13.3                  | EUT Vertical Mid Ch, 1 Mbps   |
| 7318.850   | 30.3             | 10.3          | 1.3                     | 51.0              | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 40.6              | 54.0                 | -13.4                  | EUT Horizontal Mid Ch, 1 Mbps |
| 7440.450   | 30.4             | 10.0          | 1.5                     | 70.9              | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 40.4              | 54.0                 | -13.6                  | EUT Vert, High Ch, 1 Mbps     |
| 4959.950   | 37.3             | 3.1           | 2.1                     | 286.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 40.4              | 54.0                 | -13.6                  | EUT Horz, High Ch, 1 Mbps     |
| 7441.208   | 30.3             | 10.0          | 1.8                     | 358.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 40.3              | 54.0                 | -13.7                  | EUT Horz, High Ch, 1 Mbps     |
| 4879.833   | 36.8             | 2.9           | 1.3                     | 289.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 39.7              | 54.0                 | -14.3                  | EUT Horizontal Mid Ch, 1 Mbps |
| 4803.867   | 36.7             | 2.8           | 2.1                     | 286.9             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 39.5              | 54.0                 | -14.5                  | EUT Horizontal Low Ch, 1 Mbps |
| 4959.842   | 35.0             | 3.1           | 1.3                     | 204.9             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 38.1              | 54.0                 | -15.9                  | EUT Vert, High Ch, 1 Mbps     |
| 4879.933   | 35.1             | 2.9           | 1.5                     | 134.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 38.0              | 54.0                 | -16.0                  | EUT Vertical Mid Ch, 1 Mbps   |
| 4879.817   | 34.8             | 2.9           | 2.3                     | 81.9              | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 37.7              | 54.0                 | -16.3                  | EUT On Side, Mid ch, 1 Mbps   |
| 4879.892   | 34.6             | 2.9           | 2.4                     | 344.9             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 37.5              | 54.0                 | -16.5                  | EUT Vertical Mid Ch, 1 Mbps   |
| 4803.867   | 34.1             | 2.8           | 2.4                     | 253.9             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 36.9              | 54.0                 | -17.1                  | EUT Vert, Low Ch, 1 Mbps      |
| 4879.833   | 33.9             | 2.9           | 3.1                     | 300.0             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 36.8              | 54.0                 | -17.2                  | EUT Horizontal Mid Ch, 1 Mbps |
| 4879.967   | 33.3             | 2.9           | 1.0                     | 66.9              | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 36.2              | 54.0                 | -17.8                  | EUT On Side, Mid ch, 1 Mbps   |
| 12400.420  | 30.2             | 3.9           | 1.5                     | 138.0             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 34.1              | 54.0                 | -19.9                  | EUT Vert, High Ch, 1 Mbps     |
| 12400.790  | 29.2             | 3.9           | 1.5                     | 178.9             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 33.1              | 54.0                 | -20.9                  | EUT Horiz, High Ch, 1 Mbps    |
| 7321.525   | 41.1             | 10.3          | 1.5                     | 289.9             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 51.4              | 74.0                 | -22.6                  | EUT Vertical Mid Ch, 1 Mbps   |
| 7321.383   | 40.7             | 10.3          | 1.3                     | 51.0              | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 51.0              | 74.0                 | -23.0                  | EUT Horizontal Mid Ch, 1 Mbps |
| 7438.683   | 40.5             | 10.0          | 1.8                     | 358.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 50.5              | 74.0                 | -23.5                  | EUT Horz, High Ch, 1 Mbps     |
| 7438.342   | 40.3             | 10.0          | 1.5                     | 70.9              | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 50.3              | 74.0                 | -23.7                  | EUT Vert, High Ch, 1 Mbps     |
| 12398.580  | 30.2             | -0.7          | 1.9                     | 6.9               | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 29.5              | 54.0                 | -24.5                  | EUT Vert, High Ch, 1 Mbps     |
| 12198.060  | 30.5             | -1.3          | 1.5                     | 155.0             | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 29.2              | 54.0                 | -24.8                  | EUT Vertical Mid Ch, 1 Mbps   |
| 12010.850  | 30.5             | -1.3          | 1.5                     | 34.9              | 3.0                    | 0.0                       | Vert                      | AV       | 0.0                      | 29.2              | 54.0                 | -24.8                  | EUT Vert, Low Ch, 1 Mbps      |
| 12197.850  | 29.8             | -1.3          | 1.5                     | 127.9             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 28.5              | 54.0                 | -25.5                  | EUT Horizontal Mid Ch, 1 Mbps |
| 12398.450  | 29.2             | -0.7          | 1.5                     | 218.9             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 28.5              | 54.0                 | -25.5                  | EUT Horiz, High Ch, 1 Mbps    |
| 12011.780  | 29.6             | -1.3          | 1.5                     | 189.0             | 3.0                    | 0.0                       | Horz                      | AV       | 0.0                      | 28.3              | 54.0                 | -25.7                  | EUT Horizontal Low Ch, 1 Mbps |
| 4880.000   | 44.6             | 2.9           | 1.3                     | 289.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 47.5              | 74.0                 | -26.5                  | EUT Horizontal Mid Ch, 1 Mbps |
| 4959.658   | 44.0             | 3.1           | 2.1                     | 286.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 47.1              | 74.0                 | -26.9                  | EUT Horz, High Ch, 1 Mbps     |
| 4880.417   | 43.9             | 2.9           | 1.5                     | 134.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 46.8              | 74.0                 | -27.2                  | EUT Vertical Mid Ch, 1 Mbps   |
| 4804.108   | 43.7             | 2.8           | 2.1                     | 286.9             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 46.5              | 74.0                 | -27.5                  | EUT Horizontal Low Ch, 1 Mbps |
| 4960.300   | 43.3             | 3.1           | 1.3                     | 204.9             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 46.4              | 74.0                 | -27.6                  | EUT Vert, High Ch, 1 Mbps     |
| 4880.333   | 43.4             | 2.9           | 2.3                     | 81.9              | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 46.3              | 74.0                 | -27.7                  | EUT On Side, Mid ch, 1 Mbps   |
| 4880.633   | 43.1             | 2.9           | 2.4                     | 344.9             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 46.0              | 74.0                 | -28.0                  | EUT Vertical Mid Ch, 1 Mbps   |
| 4880.458   | 42.7             | 2.9           | 3.1                     | 300.0             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 45.6              | 74.0                 | -28.4                  | EUT Horizontal Mid Ch, 1 Mbps |
| 4803.625   | 42.8             | 2.8           | 2.4                     | 253.9             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 45.6              | 74.0                 | -28.4                  | EUT Vert, Low Ch, 1 Mbps      |
| 12401.880  | 41.3             | 3.9           | 1.5                     | 178.9             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 45.2              | 74.0                 | -28.8                  | EUT Horiz, High Ch, 1 Mbps    |
| 12400.340  | 41.3             | 3.9           | 1.5                     | 138.0             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 45.2              | 74.0                 | -28.8                  | EUT Vert, High Ch, 1 Mbps     |
| 4880.250   | 42.1             | 2.9           | 1.0                     | 66.9              | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 45.0              | 74.0                 | -29.0                  | EUT On Side, Mid ch, 1 Mbps   |
| 12399.840  | 41.5             | -0.7          | 1.9                     | 6.9               | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 40.8              | 74.0                 | -33.2                  | EUT Vert, High Ch, 1 Mbps     |
| 12010.000  | 41.5             | -1.3          | 1.5                     | 34.9              | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 40.2              | 74.0                 | -33.8                  | EUT Vert, Low Ch, 1 Mbps      |
| 12198.230  | 40.9             | -1.3          | 1.5                     | 155.0             | 3.0                    | 0.0                       | Vert                      | PK       | 0.0                      | 39.6              | 74.0                 | -34.4                  | EUT Vertical Mid Ch, 1 Mbps   |
| 12399.340  | 40.0             | -0.7          | 1.5                     | 218.9             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 39.3              | 74.0                 | -34.7                  | EUT Horiz, High Ch, 1 Mbps    |
| 12012.390  | 40.4             | -1.3          | 1.5                     | 189.0             | 3.0                    | 0.0                       | Horz                      | PK       | 0.0                      | 39.1              | 74.0                 | -34.9                  | EUT Horizontal Low Ch, 1 Mbps |

# SPURIOUS RADIATED EMISSIONS

| Freq<br>(MHz) | Amplitude<br>(dBuV) | Factor<br>(dB/m) | Antenna Height<br>(meters) | Azimuth<br>(degrees) | Test Distance<br>(meters) | External<br>Attenuation<br>(dB) | Polarity/<br>Transducer | Detector | Distance<br>Adjustment<br>(dB) | Adjusted<br>(dBuV/m) | Spec. Limit<br>(dBuV/m) | Compared to<br>Spec.<br>(dB) | Comments                      |
|---------------|---------------------|------------------|----------------------------|----------------------|---------------------------|---------------------------------|-------------------------|----------|--------------------------------|----------------------|-------------------------|------------------------------|-------------------------------|
| 12201.960     | 39.9                | -1.3             | 1.5                        | 127.9                | 3.0                       | 0.0                             | Horz                    | PK       | 0.0                            | 38.6                 | 74.0                    | -35.4                        | EUT Horizontal Mid Ch, 1 Mbps |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-03-24 |
| Customer:         | Digi International Inc  | Temperature:          | 23.1°C     |
| Attendees:        | None                    | Relative Humidity:    | 28%        |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1012 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN09       |
| Power:            | 5VDC via laptop         | Configuration:        | DGII0455-3 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |   |                    |   |                     |           |
|--------|---|--------------------|---|---------------------|-----------|
| Run #: | 0 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|---|--------------------|---|---------------------|-----------|

## COMMENTS

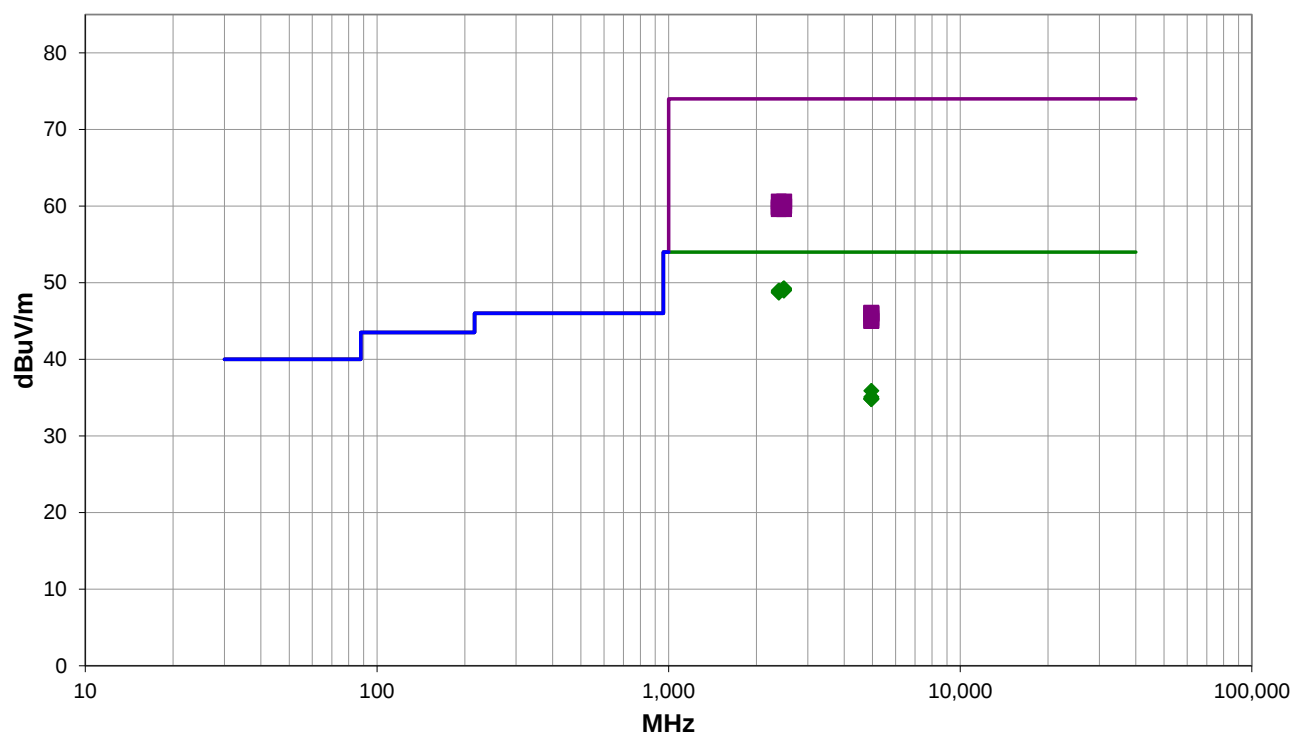
Dipole Antenna. IMEI 350588280003609. Laptop powered at 120VAC/60Hz.

## EUT OPERATING MODES

Transmitting BLE, Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps. 8dBm power setting. 2mbps data rate has low/high chs of 2404 and 2478 MHz.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 0

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #0

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                     |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|------------------------------|
| 2483.558   | 31.7             | -2.4          | 1.5                     | 171.0             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 49.3              | 54.0                 | -4.7                   | EUT Vert, High Ch, 2 Mbps    |
| 2483.667   | 31.6             | -2.4          | 3.7                     | 70.0              | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.2              | 54.0                 | -4.8                   | EUT Vert, High Ch, 1 Mbps    |
| 2484.492   | 31.6             | -2.4          | 1.5                     | 307.0             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 49.2              | 54.0                 | -4.8                   | EUT Vert, High Ch, 1 Mbps    |
| 2484.783   | 31.5             | -2.4          | 1.5                     | 298.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.1              | 54.0                 | -4.9                   | EUT On Side, High Ch, 1 Mbps |
| 2483.850   | 31.5             | -2.4          | 3.5                     | 165.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.1              | 54.0                 | -4.9                   | EUT Horz, High Ch, 1 Mbps    |
| 2483.792   | 31.4             | -2.4          | 1.5                     | 328.0             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT On Side, High Ch, 1 Mbps |
| 2483.742   | 31.4             | -2.4          | 1.3                     | 34.0              | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Horz, High Ch, 1 Mbps    |
| 2387.083   | 31.4             | -2.4          | 1.5                     | 57.0              | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Vert, Low Ch, 2 Mbps     |
| 2483.525   | 31.4             | -2.4          | 1.5                     | 43.0              | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Vert, High Ch, 2 Mbps    |
| 2385.858   | 31.2             | -2.4          | 1.5                     | 185.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT Vert, Low Ch, 1 Mbps     |
| 2385.108   | 31.2             | -2.4          | 1.5                     | 94.0              | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT Vert, Low Ch, 2 Mbps     |
| 2386.867   | 31.1             | -2.4          | 1.5                     | 224.0             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.7              | 54.0                 | -5.3                   | EUT Vert, Low Ch, 1 Mbps     |
| 2385.625   | 43.0             | -2.4          | 1.5                     | 57.0              | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.6              | 74.0                 | -13.4                  | EUT Vert, Low Ch, 2 Mbps     |
| 2488.058   | 43.0             | -2.4          | 1.5                     | 171.0             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 60.6              | 74.0                 | -13.4                  | EUT Vert, High Ch, 2 Mbps    |
| 2485.617   | 42.9             | -2.4          | 1.5                     | 307.0             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 60.5              | 74.0                 | -13.5                  | EUT Vert, High Ch, 1 Mbps    |
| 2484.342   | 42.8             | -2.4          | 1.5                     | 298.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.4              | 74.0                 | -13.6                  | EUT On Side, High Ch, 1 Mbps |
| 2484.442   | 42.5             | -2.4          | 1.5                     | 328.0             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 60.1              | 74.0                 | -13.9                  | EUT On Side, High Ch, 1 Mbps |
| 2488.408   | 42.4             | -2.4          | 3.5                     | 165.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.0              | 74.0                 | -14.0                  | EUT Horz, High Ch, 1 Mbps    |
| 2483.742   | 42.3             | -2.4          | 3.7                     | 70.0              | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.9              | 74.0                 | -14.1                  | EUT Vert, High Ch, 1 Mbps    |
| 2386.625   | 42.3             | -2.4          | 1.5                     | 224.0             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.9              | 74.0                 | -14.1                  | EUT Vert, Low Ch, 1 Mbps     |
| 2485.075   | 42.3             | -2.4          | 1.5                     | 43.0              | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.9              | 74.0                 | -14.1                  | EUT Vert, High Ch, 2 Mbps    |
| 2387.408   | 42.2             | -2.4          | 1.5                     | 185.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.8              | 74.0                 | -14.2                  | EUT Vert, Low Ch, 1 Mbps     |
| 2486.283   | 42.0             | -2.4          | 1.3                     | 34.0              | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.6              | 74.0                 | -14.4                  | EUT Horz, High Ch, 1 Mbps    |
| 2386.567   | 42.0             | -2.4          | 1.5                     | 94.0              | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.6              | 74.0                 | -14.4                  | EUT Vert, Low Ch, 2 Mbps     |
| 4955.050   | 30.3             | 5.6           | 2.2                     | 279.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 35.9              | 54.0                 | -18.1                  | EUT Horz, High Ch, 2 mbps    |
| 4955.358   | 29.5             | 5.6           | 1.4                     | 208.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 35.1              | 54.0                 | -18.9                  | EUT Horz, High Ch, 2 mbps    |
| 4953.675   | 29.3             | 5.6           | 3.3                     | 337.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 34.9              | 54.0                 | -19.1                  | EUT On Side, High Ch, 2 Mbps |
| 4954.967   | 29.3             | 5.6           | 2.4                     | 30.0              | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 34.9              | 54.0                 | -19.1                  | EUT Vert, High Ch, 2 Mbps    |
| 4955.775   | 29.2             | 5.6           | 1.5                     | 35.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 34.8              | 54.0                 | -19.2                  | EUT On Side, High Ch, 2 Mbps |
| 4954.408   | 29.2             | 5.6           | 3.0                     | 93.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 34.8              | 54.0                 | -19.2                  | EUT Vert, High Ch, 2 Mbps    |
| 4954.358   | 40.5             | 5.6           | 2.2                     | 279.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 46.1              | 74.0                 | -27.9                  | EUT Horz, High Ch, 2 mbps    |
| 4954.608   | 40.4             | 5.6           | 2.4                     | 30.0              | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 46.0              | 74.0                 | -28.0                  | EUT Vert, High Ch, 2 Mbps    |
| 4957.258   | 40.3             | 5.6           | 1.4                     | 208.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 45.9              | 74.0                 | -28.1                  | EUT Horz, High Ch, 2 mbps    |
| 4956.242   | 39.8             | 5.6           | 1.5                     | 35.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 45.4              | 74.0                 | -28.6                  | EUT On Side, High Ch, 2 Mbps |
| 4956.225   | 39.5             | 5.6           | 3.0                     | 93.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 45.1              | 74.0                 | -28.9                  | EUT Vert, High Ch, 2 Mbps    |
| 4953.542   | 39.4             | 5.6           | 3.3                     | 337.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 45.0              | 74.0                 | -29.0                  | EUT On Side, High Ch, 2 Mbps |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector  
PK = Peak Detector  
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of  $10 \cdot \log(1/dc)$ .

## TEST EQUIPMENT

| Description                  | Manufacturer       | Model                          | ID  | Last Cal.  | Cal. Due   |
|------------------------------|--------------------|--------------------------------|-----|------------|------------|
| Analyzer - Spectrum Analyzer | Agilent            | E4446A                         | AAQ | 2021-05-21 | 2022-05-21 |
| Antenna - Double Ridge       | ETS Lindgren       | 3115                           | AJQ | 2021-01-25 | 2023-01-25 |
| Cable                        | ESM Cable Corp.    | Double Ridge Guide Horn Cables | MNI | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-3D-00100800-32-13P         | AVT | 2022-01-18 | 2023-01-18 |
| Attenuator                   | Fairview Microwave | SA18E-20                       | TWZ | 2021-09-09 | 2022-09-09 |
| Filter - High Pass           | Micro-Tronics      | HPM50111                       | LFN | 2021-09-09 | 2022-09-09 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-07                        | AXP | NCR        | NCR        |
| Cable                        | ESM Cable Corp.    | Standard Gain Horn Cables      | MNJ | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-6F-08001200-30-10P         | AVV | 2022-01-18 | 2023-01-18 |
| Antenna - Biconilog          | ETS Lindgren       | 3142D                          | AXO | 2021-09-14 | 2023-09-14 |
| Cable                        | ESM Cable Corp.    | Bilog Cables                   | MNH | 2021-10-13 | 2022-10-13 |
| Amplifier - Pre-Amplifier    | Miteq              | AM-1616-1000                   | AVO | 2021-10-13 | 2022-10-13 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-08                        | AIQ | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq              | AMF-6F-12001800-30-10P         | AVW | 2022-01-18 | 2023-01-18 |
| Antenna - Standard Gain      | ETS Lindgren       | 3160-09                        | AHG | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq              | JSD4-18002600-26-8P            | APU | 2021-09-09 | 2022-09-09 |
| Cable                        | ESM Cable Corp.    | TTBJ141 KMKM-72                | MNP | 2021-09-09 | 2022-09-09 |
| Filter - Low Pass            | Micro-Tronics      | LPM50004                       | LFK | 2021-09-09 | 2022-09-09 |

## MEASUREMENT UNCERTAINTY

| Description  |        |         |
|--------------|--------|---------|
| Expanded k=2 | 5.2 dB | -5.2 dB |

# SPURIOUS RADIATED EMISSIONS

## **FREQUENCY RANGE INVESTIGATED**

30 MHz TO 26500 MHz

## **POWER INVESTIGATED**

5VDC

## **CONFIGURATIONS INVESTIGATED**

DGII0455-5

## **MODES INVESTIGATED**

Transmitting BLE. 8dBm power setting. Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps.

# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-03-25 |
| Customer:         | Digi International Inc  | Temperature:          | 23.7°C     |
| Attendees:        | None                    | Relative Humidity:    | 26.6%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1011 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN05       |
| Power:            | 5VDC                    | Configuration:        | DGII0455-5 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 57 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

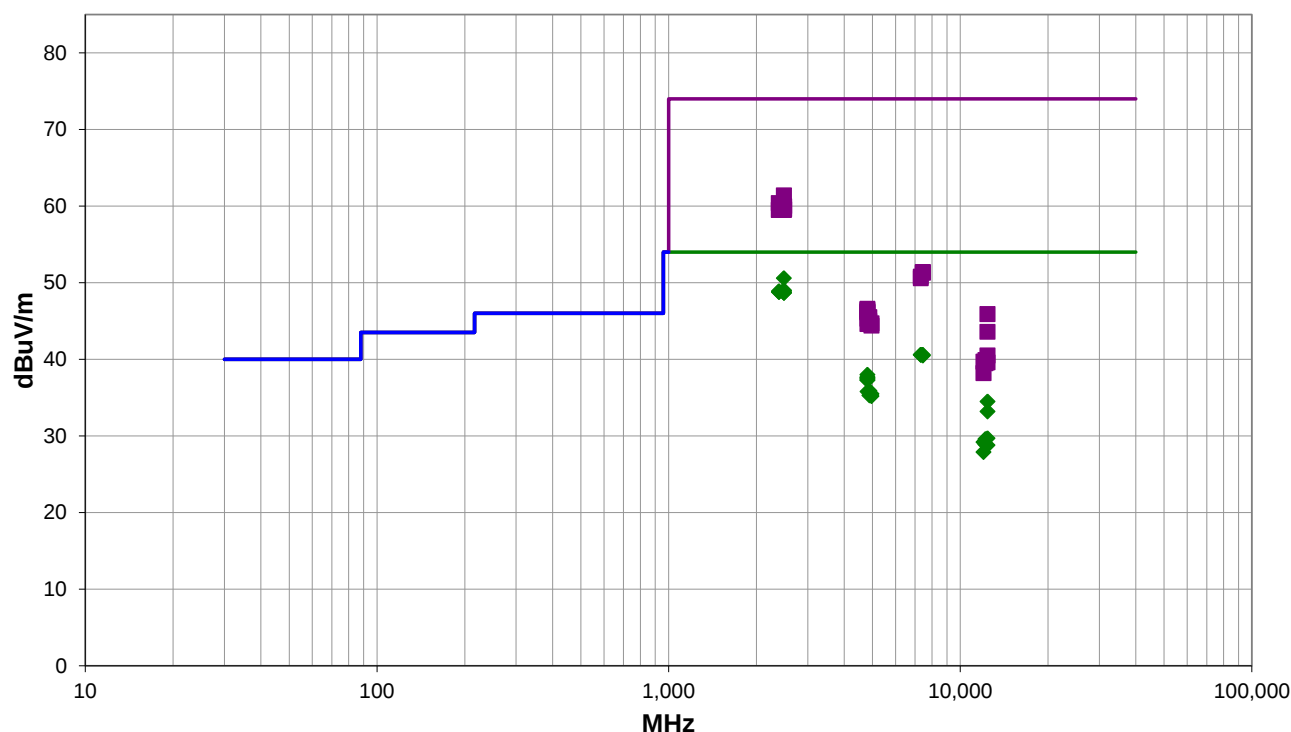
IMEI 350588280003609. -0.67 dBi Internal antenna. 2mbps data rate has low/high chs of 2404 and 2478 MHz. Test mode is 100% duty cycle.

## EUT OPERATING MODES

Transmitting BLE. 8dBm power setting. Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 57

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #57

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                     |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|------------------------------|
| 2483.517   | 34.4             | -3.8          | 1.5                     | 322.9             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 50.6              | 54.0                 | -3.4                   | EUT Vert, High Ch, 2 Mbps    |
| 2483.542   | 32.8             | -3.8          | 1.5                     | 131.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Vert, High Ch, 1 Mbps    |
| 2483.500   | 32.8             | -3.8          | 1.5                     | 65.0              | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Horz, High Ch, 1 Mbps    |
| 2483.575   | 32.7             | -3.8          | 3.6                     | 253.9             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.9              | 54.0                 | -5.1                   | EUT Horz, High Ch, 1 Mbps    |
| 2388.958   | 32.4             | -3.5          | 2.3                     | 123.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 48.9              | 54.0                 | -5.1                   | EUT Vert, Low Ch, 2 Mbps     |
| 2389.600   | 32.3             | -3.5          | 1.5                     | 243.9             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT Horz, Low Ch, 1 Mbps     |
| 2388.758   | 32.3             | -3.5          | 1.5                     | 333.0             | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT Vert, Low Ch, 1 Mbps     |
| 2487.317   | 32.5             | -3.8          | 1.5                     | 88.0              | 3.0                    | 20.0                      | Horz                     | AV       | 0.0                      | 48.7              | 54.0                 | -5.3                   | EUT On Side, High Ch, 1 Mbps |
| 2484.375   | 32.5             | -3.8          | 1.5                     | 128.9             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.7              | 54.0                 | -5.3                   | EUT On Side, High Ch, 1 Mbps |
| 2483.517   | 32.5             | -3.8          | 1.5                     | 293.0             | 3.0                    | 20.0                      | Vert                     | AV       | 0.0                      | 48.7              | 54.0                 | -5.3                   | EUT Vert, High Ch, 1 Mbps    |
| 2484.100   | 45.2             | -3.8          | 1.5                     | 322.9             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 61.4              | 74.0                 | -12.6                  | EUT Vert, High Ch, 2 Mbps    |
| 7322.075   | 30.3             | 10.3          | 1.5                     | 175.9             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 40.6              | 54.0                 | -13.4                  | EUT On Side, Mid Ch, 1 Mbps  |
| 7320.258   | 30.3             | 10.3          | 1.4                     | 48.0              | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 40.6              | 54.0                 | -13.4                  | EUT Vert, Mid Ch, 1 Mbps     |
| 7437.717   | 30.6             | 10.0          | 1.5                     | 207.9             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 40.6              | 54.0                 | -13.4                  | EUT Vert, High Ch, 1 Mbps    |
| 7442.108   | 30.5             | 10.0          | 3.8                     | 138.9             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 40.5              | 54.0                 | -13.5                  | EUT On Side, High Ch, 1 Mbps |
| 2386.492   | 43.9             | -3.5          | 2.3                     | 123.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 60.4              | 74.0                 | -13.6                  | EUT Vert, Low Ch, 2 Mbps     |
| 2487.458   | 43.8             | -3.8          | 3.6                     | 253.9             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 60.0              | 74.0                 | -14.0                  | EUT Horz, High Ch, 1 Mbps    |
| 2388.467   | 43.5             | -3.5          | 1.5                     | 243.9             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 60.0              | 74.0                 | -14.0                  | EUT Horz, Low Ch, 1 Mbps     |
| 2483.942   | 43.6             | -3.8          | 1.5                     | 65.0              | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.8              | 74.0                 | -14.2                  | EUT Horz, High Ch, 1 Mbps    |
| 2484.067   | 43.5             | -3.8          | 1.5                     | 131.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.7              | 74.0                 | -14.3                  | EUT Vert, High Ch, 1 Mbps    |
| 2488.467   | 43.4             | -3.8          | 1.5                     | 128.9             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.6              | 74.0                 | -14.4                  | EUT On Side, High Ch, 1 Mbps |
| 2485.808   | 43.4             | -3.8          | 1.5                     | 293.0             | 3.0                    | 20.0                      | Vert                     | PK       | 0.0                      | 59.6              | 74.0                 | -14.4                  | EUT Vert, High Ch, 1 Mbps    |
| 2484.242   | 43.3             | -3.8          | 1.5                     | 88.0              | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.5              | 74.0                 | -14.5                  | EUT On Side, High Ch, 1 Mbps |
| 2386.267   | 43.0             | -3.5          | 1.5                     | 333.0             | 3.0                    | 20.0                      | Horz                     | PK       | 0.0                      | 59.5              | 74.0                 | -14.5                  | EUT Vert, Low Ch, 1 Mbps     |
| 4803.917   | 35.2             | 2.8           | 3.5                     | 184.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 38.0              | 54.0                 | -16.0                  | EUT On Side, Low Ch, 1 Mbps  |
| 4803.933   | 34.9             | 2.8           | 2.8                     | 9.9               | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 37.7              | 54.0                 | -16.3                  | EUT Vert, Low Ch, 1 Mbps     |
| 4803.842   | 34.8             | 2.8           | 2.1                     | 2.9               | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 37.6              | 54.0                 | -16.4                  | EUT Horz, Low Ch, 1 Mbps     |
| 4803.942   | 34.7             | 2.8           | 1.4                     | 90.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 37.5              | 54.0                 | -16.5                  | EUT Vert, Low Ch, 1 Mbps     |
| 4803.892   | 34.5             | 2.8           | 1.8                     | 5.9               | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 37.3              | 54.0                 | -16.7                  | EUT On Side, Low Ch, 1 Mbps  |
| 4803.942   | 34.5             | 2.8           | 2.7                     | 335.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 37.3              | 54.0                 | -16.7                  | EUT Horz, Low Ch, 1 Mbps     |
| 4879.950   | 33.0             | 2.9           | 2.3                     | 232.9             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 35.9              | 54.0                 | -18.1                  | EUT On Side, Mid Ch, 1 Mbps  |
| 4808.792   | 33.0             | 2.8           | 2.9                     | 124.9             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 35.8              | 54.0                 | -18.2                  | EUT On Side, Low Ch, 2 Mbps  |
| 4959.883   | 32.4             | 3.1           | 1.4                     | 141.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 35.5              | 54.0                 | -18.5                  | EUT On Side, High Ch, 1 Mbps |
| 4879.825   | 32.4             | 2.9           | 4.0                     | 72.0              | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 35.3              | 54.0                 | -18.7                  | EUT Vert, Mid Ch, 1 Mbps     |
| 4959.925   | 32.1             | 3.1           | 1.5                     | 132.9             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 35.2              | 54.0                 | -18.8                  | EUT Vert, High Ch, 1 Mbps    |
| 12401.550  | 30.6             | 3.9           | 1.5                     | 153.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 34.5              | 54.0                 | -19.5                  | EUT Vert, High Ch, 1 Mbps    |
| 12400.280  | 29.3             | 3.9           | 1.3                     | 243.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 33.2              | 54.0                 | -20.8                  | EUT On Side, High Ch, 1 Mbps |
| 7438.467   | 41.4             | 10.0          | 1.5                     | 207.9             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 51.4              | 74.0                 | -22.6                  | EUT Vert, High Ch, 1 Mbps    |
| 7440.808   | 41.3             | 10.0          | 3.8                     | 138.9             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 51.3              | 74.0                 | -22.7                  | EUT On Side, High Ch, 1 Mbps |
| 7319.133   | 40.5             | 10.3          | 1.4                     | 48.0              | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 50.8              | 74.0                 | -23.2                  | EUT Vert, Mid Ch, 1 Mbps     |
| 7320.350   | 40.3             | 10.3          | 1.5                     | 175.9             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 50.6              | 74.0                 | -23.4                  | EUT On Side, Mid Ch, 1 Mbps  |
| 12398.400  | 30.4             | -0.7          | 1.5                     | 315.0             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 29.7              | 54.0                 | -24.3                  | EUT Vert, High Ch, 1 Mbps    |
| 12198.380  | 30.9             | -1.3          | 1.5                     | 236.9             | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 29.6              | 54.0                 | -24.4                  | EUT Vert, Mid Ch, 1 Mbps     |

# SPURIOUS RADIATED EMISSIONS

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                     |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|--------------------------|----------|--------------------------|-------------------|----------------------|------------------------|------------------------------|
| 12012.140  | 30.5             | -1.3          | 1.5                     | 55.9              | 3.0                    | 0.0                       | Vert                     | AV       | 0.0                      | 29.2              | 54.0                 | -24.8                  | EUT Vert, Low Ch, 1 Mbps     |
| 12197.780  | 30.2             | -1.3          | 2.3                     | 225.9             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 28.9              | 54.0                 | -25.1                  | EUT On Side, Mid Ch, 1 Mbps  |
| 12398.390  | 29.5             | -0.7          | 1.5                     | 47.0              | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 28.8              | 54.0                 | -25.2                  | EUT On Side, High Ch, 1 Mbps |
| 12012.280  | 29.2             | -1.3          | 1.8                     | 303.0             | 3.0                    | 0.0                       | Horz                     | AV       | 0.0                      | 27.9              | 54.0                 | -26.1                  | EUT On Side, Low Ch, 1 Mbps  |
| 4803.758   | 43.8             | 2.8           | 2.7                     | 335.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 46.6              | 74.0                 | -27.4                  | EUT Horz, Low Ch, 1 Mbps     |
| 4803.408   | 43.7             | 2.8           | 1.4                     | 90.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 46.5              | 74.0                 | -27.5                  | EUT Vert, Low Ch, 1 Mbps     |
| 4804.100   | 43.5             | 2.8           | 2.1                     | 2.9               | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 46.3              | 74.0                 | -27.7                  | EUT Horz, Low Ch, 1 Mbps     |
| 4803.008   | 43.4             | 2.8           | 3.5                     | 184.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 46.2              | 74.0                 | -27.8                  | EUT On Side, Low Ch, 1 Mbps  |
| 4803.683   | 43.3             | 2.8           | 1.8                     | 5.9               | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 46.1              | 74.0                 | -27.9                  | EUT On Side, Low Ch, 1 Mbps  |
| 12402.190  | 42.0             | 3.9           | 1.5                     | 153.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 45.9              | 74.0                 | -28.1                  | EUT Vert, High Ch, 1 Mbps    |
| 4879.583   | 42.6             | 2.9           | 4.0                     | 72.0              | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 45.5              | 74.0                 | -28.5                  | EUT Vert, Mid Ch, 1 Mbps     |
| 4803.150   | 42.5             | 2.8           | 2.8                     | 9.9               | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 45.3              | 74.0                 | -28.7                  | EUT Vert, Low Ch, 1 Mbps     |
| 4879.642   | 42.1             | 2.9           | 2.3                     | 232.9             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 45.0              | 74.0                 | -29.0                  | EUT On Side, Mid Ch, 1 Mbps  |
| 4960.483   | 41.6             | 3.1           | 1.5                     | 132.9             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 44.7              | 74.0                 | -29.3                  | EUT Vert, High Ch, 1 Mbps    |
| 4808.992   | 41.8             | 2.8           | 2.9                     | 124.9             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 44.6              | 74.0                 | -29.4                  | EUT On Side, Low Ch, 2 Mbps  |
| 4959.700   | 41.3             | 3.1           | 1.4                     | 141.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 44.4              | 74.0                 | -29.6                  | EUT On Side, High Ch, 1 Mbps |
| 12401.280  | 39.7             | 3.9           | 1.3                     | 243.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 43.6              | 74.0                 | -30.4                  | EUT On Side, High Ch, 1 Mbps |
| 12397.750  | 41.2             | -0.7          | 1.5                     | 315.0             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 40.5              | 74.0                 | -33.5                  | EUT Vert, High Ch, 1 Mbps    |
| 12198.060  | 41.2             | -1.3          | 1.5                     | 236.9             | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 39.9              | 74.0                 | -34.1                  | EUT Vert, Mid Ch, 1 Mbps     |
| 12010.620  | 41.0             | -1.3          | 1.5                     | 55.9              | 3.0                    | 0.0                       | Vert                     | PK       | 0.0                      | 39.7              | 74.0                 | -34.3                  | EUT Vert, Low Ch, 1 Mbps     |
| 12398.570  | 40.3             | -0.7          | 1.5                     | 47.0              | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 39.6              | 74.0                 | -34.4                  | EUT On Side, High Ch, 1 Mbps |
| 12198.260  | 40.8             | -1.3          | 2.3                     | 225.9             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 39.5              | 74.0                 | -34.5                  | EUT On Side, Mid Ch, 1 Mbps  |
| 12007.720  | 39.4             | -1.2          | 1.8                     | 303.0             | 3.0                    | 0.0                       | Horz                     | PK       | 0.0                      | 38.2              | 74.0                 | -35.8                  | EUT On Side, Low Ch, 1 Mbps  |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector  
PK = Peak Detector  
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of  $10 \cdot \log(1/dc)$ .

## TEST EQUIPMENT

| Description                  | Manufacturer           | Model                          | ID  | Last Cal.  | Cal. Due   |
|------------------------------|------------------------|--------------------------------|-----|------------|------------|
| Filter - Band Reject         | Wainwright Instruments | WTRCT10-2400-2700-20-30-40EEK  | CUO | 2022-01-28 | 2023-01-28 |
| Analyzer - Spectrum Analyzer | Agilent                | E4446A                         | AAQ | 2021-05-21 | 2022-05-21 |
| Antenna - Double Ridge       | ETS Lindgren           | 3115                           | AJQ | 2021-01-25 | 2023-01-25 |
| Cable                        | ESM Cable Corp.        | Double Ridge Guide Horn Cables | MNI | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq                  | AMF-3D-00100800-32-13P         | AVT | 2022-01-18 | 2023-01-18 |
| Attenuator                   | Fairview Microwave     | SA18E-20                       | TWZ | 2021-09-09 | 2022-09-09 |
| Attenuator                   | Fairview Microwave     | SA18E-10                       | TYA | 2021-09-09 | 2022-09-09 |
| Filter - High Pass           | Micro-Tronics          | HPM50111                       | LFN | 2021-09-09 | 2022-09-09 |
| Antenna - Standard Gain      | ETS Lindgren           | 3160-07                        | AXP | NCR        | NCR        |
| Cable                        | ESM Cable Corp.        | Standard Gain Horn Cables      | MNJ | 2022-01-18 | 2023-01-18 |
| Amplifier - Pre-Amplifier    | Miteq                  | AMF-6F-08001200-30-10P         | AVV | 2022-01-18 | 2023-01-18 |
| Antenna - Biconilog          | ETS Lindgren           | 3142D                          | AXO | 2021-09-14 | 2023-09-14 |
| Cable                        | ESM Cable Corp.        | Bilog Cables                   | MNH | 2021-10-13 | 2022-10-13 |
| Amplifier - Pre-Amplifier    | Miteq                  | AM-1616-1000                   | AVO | 2021-10-13 | 2022-10-13 |
| Antenna - Standard Gain      | ETS Lindgren           | 3160-08                        | AIQ | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq                  | AMF-6F-12001800-30-10P         | AVW | 2022-01-18 | 2023-01-18 |
| Antenna - Standard Gain      | ETS Lindgren           | 3160-09                        | AHG | NCR        | NCR        |
| Amplifier - Pre-Amplifier    | Miteq                  | JSD4-18002600-26-8P            | APU | 2021-09-09 | 2022-09-09 |
| Cable                        | ESM Cable Corp.        | TTBJ141 KMKM-72                | MNP | 2021-09-09 | 2022-09-09 |
| Filter - Low Pass            | Micro-Tronics          | LPM50004                       | LFK | 2021-09-09 | 2022-09-09 |

## MEASUREMENT UNCERTAINTY

| Description  |
|--------------|
| Expanded k=2 |
| 5.2 dB       |
| -5.2 dB      |

## FREQUENCY RANGE INVESTIGATED

30 MHz TO 26500 MHz

# SPURIOUS RADIATED EMISSIONS

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## POWER INVESTIGATED

5VDC

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## CONFIGURATIONS INVESTIGATED

DGII0455-4

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## MODES INVESTIGATED

Transmitting BLE. 8dBm power setting. Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps. 2mbps data rate has low/high chs of 2404 and 2478 MHz. Test mode is 100% duty cycle.

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# SPURIOUS RADIATED EMISSIONS

|                   |                         |                       |            |
|-------------------|-------------------------|-----------------------|------------|
| EUT:              | XB3C2                   | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609         | Date:                 | 2022-03-25 |
| Customer:         | Digi International Inc  | Temperature:          | 22.9°C     |
| Attendees:        | None                    | Relative Humidity:    | 28.3%      |
| Customer Project: | None                    | Bar. Pressure (PMSL): | 1010 mb    |
| Tested By:        | Christopher Heintzelman | Job Site:             | MN05       |
| Power:            | 5VDC                    | Configuration:        | DGII0455-4 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 37 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

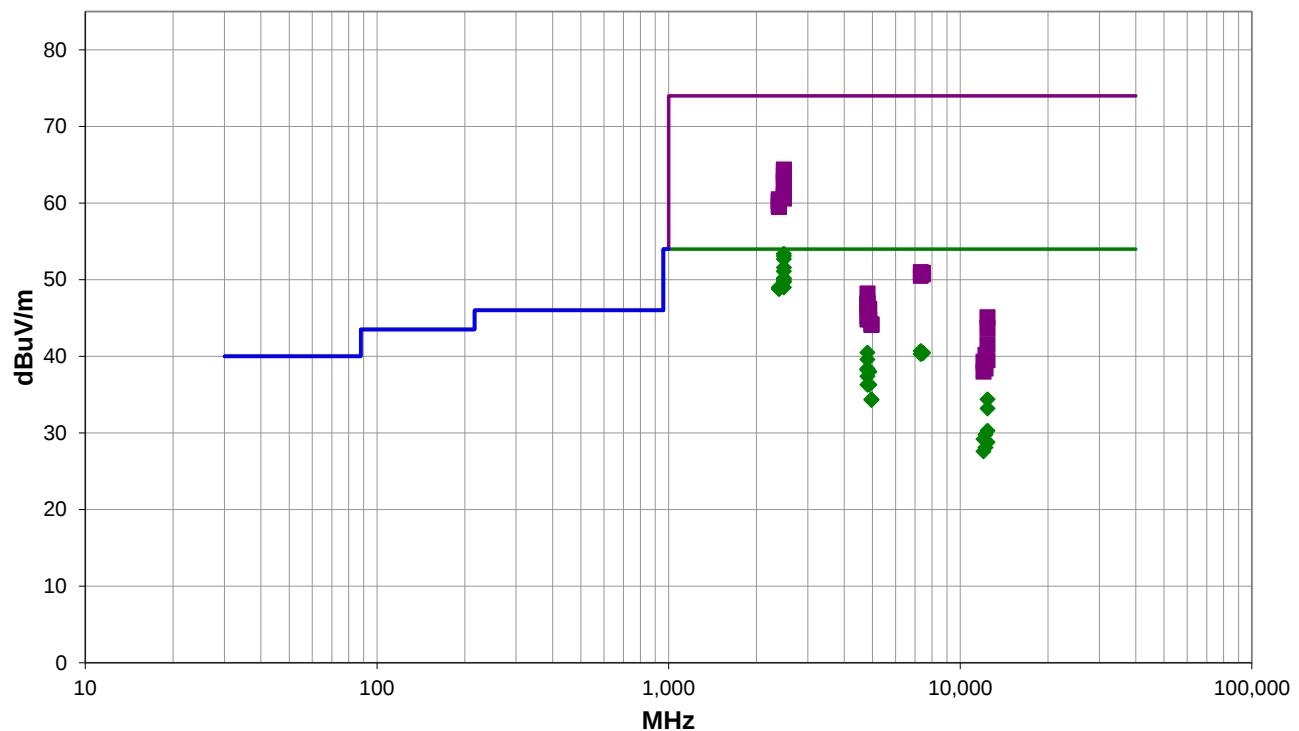
IMEI 350588280003609. 4.0 dBi gain Flat Patch antenna.

## EUT OPERATING MODES

Transmitting BLE. 8dBm power setting. Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps. 2mbps data rate has low/high chs of 2404 and 2478 MHz. Test mode is 100% duty cycle.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 37

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #37

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                                           |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|---------------------|----------|--------------------------|-------------------|----------------------|------------------------|----------------------------------------------------|
| 2483.525   | 37.2             | -3.8          | 1.3                     | 88.9              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 53.4              | 54.0                 | -0.6                   | EUT On Side, High Ch, 2 Mbps                       |
| 2483.525   | 36.9             | -3.8          | 1.3                     | 87.0              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 53.1              | 54.0                 | -0.9                   | EUT On Side, High Ch, 2 Mbps                       |
| 2483.508   | 36.5             | -3.8          | 1.1                     | 37.9              | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 52.7              | 54.0                 | -1.3                   | EUT On Side, High Ch, 2 Mbps                       |
| 2485.558   | 35.4             | -3.8          | 2.9                     | 25.0              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 51.6              | 54.0                 | -2.4                   | EUT On Side, High Ch, 2 Mbps, 2 MHz from band edge |
| 2483.500   | 34.9             | -3.8          | 1.1                     | 91.9              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 51.1              | 54.0                 | -2.9                   | EUT On Side, High Ch, 1 Mbps                       |
| 2483.550   | 34.0             | -3.8          | 1.5                     | 12.9              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 50.2              | 54.0                 | -3.8                   | EUT Horz, High Ch, 1 Mbps                          |
| 2483.500   | 33.8             | -3.8          | 1.5                     | 240.9             | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 50.0              | 54.0                 | -4.0                   | EUT On Side, High Ch, 1 Mbps                       |
| 2483.550   | 33.6             | -3.8          | 1.9                     | 346.0             | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 49.8              | 54.0                 | -4.2                   | EUT Vert, High Ch, 1 Mbps                          |
| 2483.558   | 33.5             | -3.8          | 3.6                     | 268.9             | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 49.7              | 54.0                 | -4.3                   | EUT Horz, High Ch, 1 Mbps                          |
| 2483.567   | 32.8             | -3.8          | 1.0                     | 44.0              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT Vert, High Ch, 1 Mbps                          |
| 2388.825   | 32.5             | -3.5          | 1.5                     | 37.9              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 49.0              | 54.0                 | -5.0                   | EUT On Side, Low Ch, 2 Mbps                        |
| 2388.567   | 32.4             | -3.5          | 1.5                     | 81.0              | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 48.9              | 54.0                 | -5.1                   | EUT On Side, Low Ch, 2 Mbps                        |
| 2389.425   | 32.4             | -3.5          | 1.5                     | 34.0              | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 48.9              | 54.0                 | -5.1                   | EUT On Side, Low Ch, 2 Mbps                        |
| 2389.775   | 32.4             | -3.5          | 1.5                     | 23.9              | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 48.9              | 54.0                 | -5.1                   | EUT On Side, Low Ch, 2 Mbps                        |
| 2389.658   | 32.3             | -3.5          | 1.5                     | 250.0             | 3.0                    | 20.0                      | Horz                | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT On Side, Low Ch, 1 Mbps                        |
| 2389.658   | 32.3             | -3.5          | 1.5                     | 126.0             | 3.0                    | 20.0                      | Vert                | AV       | 0.0                      | 48.8              | 54.0                 | -5.2                   | EUT On Side, Low Ch, 1 Mbps                        |
| 2483.558   | 48.2             | -3.8          | 2.9                     | 25.0              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 64.4              | 74.0                 | -9.6                   | EUT On Side, High Ch, 2 Mbps                       |
| 2483.558   | 48.0             | -3.8          | 2.9                     | 24.9              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 64.2              | 74.0                 | -9.8                   | EUT On Side, High Ch, 2 Mbps                       |
| 2483.608   | 47.4             | -3.8          | 1.1                     | 37.9              | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 63.6              | 74.0                 | -10.4                  | EUT On Side, High Ch, 2 Mbps                       |
| 2483.667   | 46.7             | -3.8          | 1.3                     | 87.0              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 62.9              | 74.0                 | -11.1                  | EUT On Side, High Ch, 2 Mbps                       |
| 2484.683   | 46.6             | -3.8          | 1.3                     | 88.9              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 62.8              | 74.0                 | -11.2                  | EUT On Side, High Ch, 2 Mbps                       |
| 2485.700   | 46.4             | -3.8          | 2.9                     | 25.0              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 62.6              | 74.0                 | -11.4                  | EUT On Side, High Ch, 2 Mbps, 2 MHz from band edge |
| 2483.558   | 45.0             | -3.8          | 1.1                     | 91.9              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 61.2              | 74.0                 | -12.8                  | EUT On Side, High Ch, 1 Mbps                       |
| 2485.775   | 44.8             | -3.8          | 1.0                     | 44.0              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 61.0              | 74.0                 | -13.0                  | EUT Vert, High Ch, 1 Mbps                          |
| 2484.067   | 44.7             | -3.8          | 3.6                     | 268.9             | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 60.9              | 74.0                 | -13.1                  | EUT Horz, High Ch, 1 Mbps                          |
| 2484.358   | 44.6             | -3.8          | 1.5                     | 12.9              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 60.8              | 74.0                 | -13.2                  | EUT Horz, High Ch, 1 Mbps                          |
| 2483.825   | 44.6             | -3.8          | 1.5                     | 240.9             | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 60.8              | 74.0                 | -13.2                  | EUT On Side, High Ch, 1 Mbps                       |
| 7318.242   | 30.4             | 10.3          | 1.5                     | 131.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 40.7              | 54.0                 | -13.3                  | EUT Horz, Mid Ch, 1 Mbps                           |
| 2485.958   | 44.4             | -3.8          | 1.9                     | 346.0             | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 60.6              | 74.0                 | -13.4                  | EUT Vert, High Ch, 1 Mbps                          |
| 4803.817   | 37.7             | 2.8           | 3.4                     | 333.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 40.5              | 54.0                 | -13.5                  | EUT Horz, Low Ch, 1 Mbps                           |
| 7440.942   | 30.5             | 10.0          | 1.5                     | 336.0             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 40.5              | 54.0                 | -13.5                  | EUT Vert, High Ch, 1 Mbps                          |
| 2387.500   | 44.0             | -3.5          | 1.5                     | 37.9              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 60.5              | 74.0                 | -13.5                  | EUT On Side, Low Ch, 2 Mbps                        |
| 7439.900   | 30.4             | 10.0          | 1.5                     | 145.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 40.4              | 54.0                 | -13.6                  | EUT Horz, High Ch, 1 Mbps                          |
| 7321.283   | 30.0             | 10.3          | 1.5                     | 229.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 40.3              | 54.0                 | -13.7                  | EUT Vert, Mid Ch, 1 Mbps                           |
| 2387.325   | 43.7             | -3.5          | 1.5                     | 250.0             | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 60.2              | 74.0                 | -13.8                  | EUT On Side, Low Ch, 1 Mbps                        |
| 2385.850   | 43.7             | -3.5          | 1.5                     | 34.0              | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 60.2              | 74.0                 | -13.8                  | EUT On Side, Low Ch, 2 Mbps                        |
| 2387.217   | 43.2             | -3.5          | 1.5                     | 81.0              | 3.0                    | 20.0                      | Horz                | PK       | 0.0                      | 59.7              | 74.0                 | -14.3                  | EUT On Side, Low Ch, 2 Mbps                        |
| 4803.850   | 36.8             | 2.8           | 1.4                     | 90.0              | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 39.6              | 54.0                 | -14.4                  | EUT Vert, Low Ch, 1 Mbps                           |
| 2388.883   | 43.0             | -3.5          | 1.5                     | 126.0             | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 59.5              | 74.0                 | -14.5                  | EUT On Side, Low Ch, 1 Mbps                        |
| 2387.917   | 43.0             | -3.5          | 1.5                     | 23.9              | 3.0                    | 20.0                      | Vert                | PK       | 0.0                      | 59.5              | 74.0                 | -14.5                  | EUT On Side, Low Ch, 2 Mbps                        |
| 4803.750   | 35.6             | 2.8           | 1.5                     | 182.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 38.4              | 54.0                 | -15.6                  | EUT Vert, Low Ch, 1 Mbps                           |
| 4803.925   | 35.5             | 2.8           | 3.5                     | 333.0             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 38.3              | 54.0                 | -15.7                  | EUT Horz, Low Ch, 1 Mbps                           |

# SPURIOUS RADIATED EMISSIONS

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                    |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|---------------------|----------|--------------------------|-------------------|----------------------|------------------------|-----------------------------|
| 4807.200   | 35.4             | 2.8           | 2.0                     | 311.0             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 38.2              | 54.0                 | -15.8                  | EUT Horz, Low Ch, 2 Mbps    |
| 4879.917   | 35.1             | 2.9           | 2.7                     | 335.0             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 38.0              | 54.0                 | -16.0                  | EUT Horz, Mid Ch, 1 Mbps    |
| 4803.842   | 34.6             | 2.8           | 3.7                     | 192.0             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 37.4              | 54.0                 | -16.6                  | EUT On Side, Low Ch, 1 Mbps |
| 4803.875   | 33.5             | 2.8           | 1.5                     | 217.0             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 36.3              | 54.0                 | -17.7                  | EUT On Side, Low Ch, 1 Mbps |
| 4879.908   | 33.4             | 2.9           | 3.5                     | 311.0             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 36.3              | 54.0                 | -17.7                  | EUT Vert, Mid Ch, 1 Mbps    |
| 4959.667   | 31.3             | 3.1           | 1.8                     | 95.9              | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 34.4              | 54.0                 | -19.6                  | EUT Horz, High Ch, 1 Mbps   |
| 12400.440  | 30.5             | 3.9           | 1.3                     | 210.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 34.4              | 54.0                 | -19.6                  | EUT Vert, High Ch, 1 Mbps   |
| 4959.908   | 31.2             | 3.1           | 1.6                     | 181.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 34.3              | 54.0                 | -19.7                  | EUT Vert, High Ch, 1 Mbps   |
| 12400.200  | 29.3             | 3.9           | 1.3                     | 329.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 33.2              | 54.0                 | -20.8                  | EUT Horz, High Ch, 1 Mbps   |
| 7321.317   | 40.7             | 10.3          | 1.5                     | 131.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 51.0              | 74.0                 | -23.0                  | EUT Horz, Mid Ch, 1 Mbps    |
| 7440.625   | 40.9             | 10.0          | 1.5                     | 336.0             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 50.9              | 74.0                 | -23.1                  | EUT Vert, High Ch, 1 Mbps   |
| 7441.600   | 40.7             | 10.0          | 1.5                     | 145.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 50.7              | 74.0                 | -23.3                  | EUT Horz, High Ch, 1 Mbps   |
| 7319.500   | 40.2             | 10.3          | 1.5                     | 229.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 50.5              | 74.0                 | -23.5                  | EUT Vert, Mid Ch, 1 Mbps    |
| 12398.770  | 31.0             | -0.7          | 1.5                     | 330.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 30.3              | 54.0                 | -23.7                  | EUT Vert, High Ch, 1 Mbps   |
| 12197.840  | 31.1             | -1.3          | 1.5                     | 182.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 29.8              | 54.0                 | -24.2                  | EUT Vert, Mid Ch, 1 Mbps    |
| 12012.200  | 30.5             | -1.3          | 1.5                     | 243.9             | 3.0                    | 0.0                       | Vert                | AV       | 0.0                      | 29.2              | 54.0                 | -24.8                  | EUT Vert, Low Ch, 1 Mbps    |
| 12397.930  | 29.5             | -0.7          | 3.0                     | 193.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 28.8              | 54.0                 | -25.2                  | EUT Horz, High Ch, 1 Mbps   |
| 4804.350   | 45.4             | 2.8           | 3.4                     | 333.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 48.2              | 74.0                 | -25.8                  | EUT Horz, Low Ch, 1 Mbps    |
| 12197.850  | 29.4             | -1.3          | 2.3                     | 292.0             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 28.1              | 54.0                 | -25.9                  | EUT Horz, Mid Ch, 1 Mbps    |
| 12009.930  | 28.9             | -1.3          | 1.5                     | 149.9             | 3.0                    | 0.0                       | Horz                | AV       | 0.0                      | 27.6              | 54.0                 | -26.4                  | EUT Horz, Low Ch, 1 Mbps    |
| 4806.817   | 44.2             | 2.8           | 2.0                     | 311.0             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 47.0              | 74.0                 | -27.0                  | EUT Horz, Low Ch, 2 Mbps    |
| 4804.150   | 44.1             | 2.8           | 1.4                     | 90.0              | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 46.9              | 74.0                 | -27.1                  | EUT Vert, Low Ch, 1 Mbps    |
| 4804.200   | 43.8             | 2.8           | 3.5                     | 333.0             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 46.6              | 74.0                 | -27.4                  | EUT Horz, Low Ch, 1 Mbps    |
| 4803.608   | 43.8             | 2.8           | 1.5                     | 182.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 46.6              | 74.0                 | -27.4                  | EUT Vert, Low Ch, 1 Mbps    |
| 4880.092   | 43.3             | 2.9           | 2.7                     | 335.0             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 46.2              | 74.0                 | -27.8                  | EUT Horz, Mid Ch, 1 Mbps    |
| 4804.392   | 42.4             | 2.8           | 3.7                     | 192.0             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 45.2              | 74.0                 | -28.8                  | EUT On Side, Low Ch, 1 Mbps |
| 12401.830  | 41.2             | 3.9           | 1.3                     | 210.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 45.1              | 74.0                 | -28.9                  | EUT Vert, High Ch, 1 Mbps   |
| 4804.333   | 42.0             | 2.8           | 1.5                     | 217.0             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 44.8              | 74.0                 | -29.2                  | EUT On Side, Low Ch, 1 Mbps |
| 4879.458   | 41.9             | 2.9           | 3.5                     | 311.0             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 44.8              | 74.0                 | -29.2                  | EUT Vert, Mid Ch, 1 Mbps    |
| 4959.850   | 41.1             | 3.1           | 1.8                     | 95.9              | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 44.2              | 74.0                 | -29.8                  | EUT Horz, High Ch, 1 Mbps   |
| 4960.000   | 41.0             | 3.1           | 1.6                     | 181.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 44.1              | 74.0                 | -29.9                  | EUT Vert, High Ch, 1 Mbps   |
| 12400.790  | 39.8             | 3.9           | 1.3                     | 329.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 43.7              | 74.0                 | -30.3                  | EUT Horz, High Ch, 1 Mbps   |
| 12397.980  | 42.3             | -0.7          | 1.5                     | 330.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 41.6              | 74.0                 | -32.4                  | EUT Vert, High Ch, 1 Mbps   |
| 12200.330  | 41.5             | -1.3          | 1.5                     | 182.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 40.2              | 74.0                 | -33.8                  | EUT Vert, Mid Ch, 1 Mbps    |
| 12398.620  | 40.2             | -0.7          | 3.0                     | 193.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 39.5              | 74.0                 | -34.5                  | EUT Horz, High Ch, 1 Mbps   |
| 12010.180  | 40.6             | -1.3          | 1.5                     | 243.9             | 3.0                    | 0.0                       | Vert                | PK       | 0.0                      | 39.3              | 74.0                 | -34.7                  | EUT Vert, Low Ch, 1 Mbps    |
| 12197.970  | 39.7             | -1.3          | 2.3                     | 292.0             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 38.4              | 74.0                 | -35.6                  | EUT Horz, Mid Ch, 1 Mbps    |
| 12011.920  | 39.3             | -1.3          | 1.5                     | 149.9             | 3.0                    | 0.0                       | Horz                | PK       | 0.0                      | 38.0              | 74.0                 | -36.0                  | EUT Horz, Low Ch, 1 Mbps    |

## CONCLUSION

Pass



Tested By

# SPURIOUS RADIATED EMISSIONS

|                   |                                        |                       |            |
|-------------------|----------------------------------------|-----------------------|------------|
| EUT:              | XB3C2                                  | Work Order:           | DGII0455   |
| Serial Number:    | 350588280003609                        | Date:                 | 2022-03-25 |
| Customer:         | Digi International Inc                 | Temperature:          | 22.9°C     |
| Attendees:        | None                                   | Relative Humidity:    | 28.3%      |
| Customer Project: | None                                   | Bar. Pressure (PMSL): | 1010 mb    |
| Tested By:        | Christopher Heintzelman, Kyle McMullan | Job Site:             | MN05       |
| Power:            | 5VDC                                   | Configuration:        | DGII0455-4 |

## TEST SPECIFICATIONS

|                 |                  |
|-----------------|------------------|
| Specification:  | Method:          |
| FCC 15.247:2022 | ANSI C63.10:2013 |

## TEST PARAMETERS

|        |    |                    |   |                     |           |
|--------|----|--------------------|---|---------------------|-----------|
| Run #: | 44 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |
|--------|----|--------------------|---|---------------------|-----------|

## COMMENTS

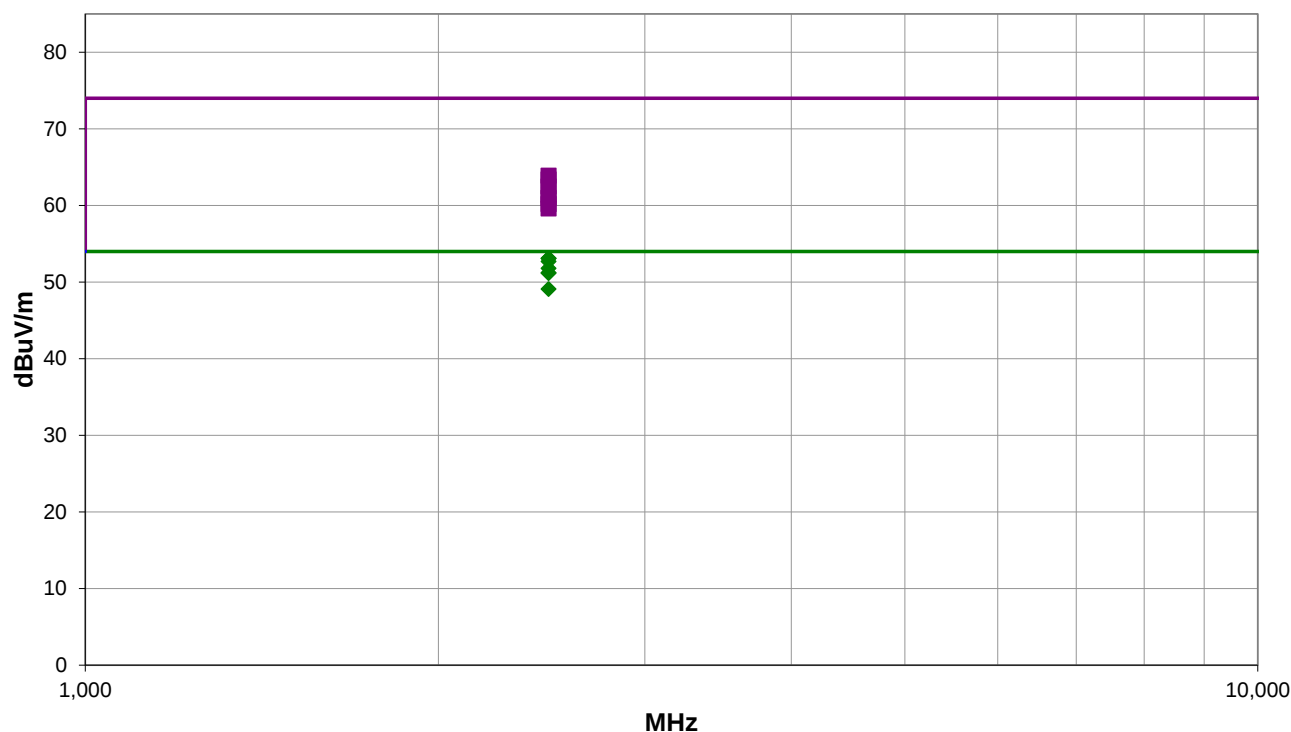
IMEI 350588280003609. 4.4dBi gain Flat Patch antenna. Manually added 3.6dB due to added filter/cable loss @ 2483.5MHz. This was added under the 'factor' column.

## EUT OPERATING MODES

Transmitting BLE. 8dBm power setting. Low, Mid, and High Chs (2402, 2440, and 2480 MHz), 1 and 2 Mbps. 2mbps data rate has low/high chs of 2404 and 2478 MHz. Test mode is 100% duty cycle.

## DEVIATIONS FROM TEST STANDARD

None



Run #: 44

■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS

## RESULTS - Run #44

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/Transducer | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments                                                     |
|------------|------------------|---------------|-------------------------|-------------------|------------------------|---------------------------|---------------------|----------|--------------------------|-------------------|----------------------|------------------------|--------------------------------------------------------------|
| 2483.500   | 43.3             | -0.2          | 2.87                    | 25.0              | 3.0                    | 10.0                      | Horz                | AV       | 0.0                      | 53.1              | 54.0                 | -0.9                   | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.733   | 43.3             | -0.2          | 1.5                     | 310.0             | 3.0                    | 10.0                      | Vert                | AV       | 0.0                      | 53.1              | 54.0                 | -0.9                   | Notch filter, 10dB attenuation. EUT Vert, High Ch, 2 Mbps    |
| 2483.558   | 42.9             | -0.2          | 2.89                    | 23.0              | 3.0                    | 10.0                      | Horz                | AV       | 0.0                      | 52.7              | 54.0                 | -1.3                   | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.517   | 42.0             | -0.2          | 3.83                    | 70.0              | 3.0                    | 10.0                      | Vert                | AV       | 0.0                      | 51.8              | 54.0                 | -2.2                   | Notch filter, 10dB attenuation. EUT Horz, High Ch, 2 Mbps    |
| 2483.525   | 41.4             | -0.2          | 3.72                    | 38.9              | 3.0                    | 10.0                      | Vert                | AV       | 0.0                      | 51.2              | 54.0                 | -2.8                   | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.500   | 41.4             | -0.2          | 1.34                    | 24.9              | 3.0                    | 10.0                      | Horz                | AV       | 0.0                      | 51.2              | 54.0                 | -2.8                   | Notch filter, 10dB attenuation. EUT Horz, High Ch, 2 Mbps    |
| 2483.525   | 39.3             | -0.2          | 1.48                    | 92.9              | 3.0                    | 10.0                      | Horz                | AV       | 0.0                      | 49.1              | 54.0                 | -4.9                   | Notch filter, 10dB attenuation. EUT Vert, High Ch, 2 Mbps    |
| 2483.500   | 54.1             | -0.2          | 2.89                    | 23.0              | 3.0                    | 10.0                      | Horz                | PK       | 0.0                      | 63.9              | 74.0                 | -10.1                  | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.750   | 53.6             | -0.2          | 2.87                    | 25.0              | 3.0                    | 10.0                      | Horz                | PK       | 0.0                      | 63.4              | 74.0                 | -10.6                  | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.517   | 52.7             | -0.2          | 3.83                    | 70.0              | 3.0                    | 10.0                      | Vert                | PK       | 0.0                      | 62.5              | 74.0                 | -11.5                  | Notch filter, 10dB attenuation. EUT Horz, High Ch, 2 Mbps    |
| 2483.958   | 51.6             | -0.2          | 3.72                    | 38.9              | 3.0                    | 10.0                      | Vert                | PK       | 0.0                      | 61.4              | 74.0                 | -12.6                  | Notch filter, 10dB attenuation. EUT On Side, High Ch, 2 Mbps |
| 2483.592   | 51.2             | -0.2          | 1.34                    | 24.9              | 3.0                    | 10.0                      | Horz                | PK       | 0.0                      | 61.0              | 74.0                 | -13.0                  | Notch filter, 10dB attenuation. EUT Horz, High Ch, 2 Mbps    |
| 2483.850   | 50.4             | -0.2          | 1.5                     | 310.0             | 3.0                    | 10.0                      | Vert                | PK       | 0.0                      | 60.2              | 74.0                 | -13.8                  | Notch filter, 10dB attenuation. EUT Vert, High Ch, 2 Mbps    |
| 2483.558   | 49.8             | -0.2          | 1.48                    | 92.9              | 3.0                    | 10.0                      | Horz                | PK       | 0.0                      | 59.6              | 74.0                 | -14.4                  | Notch filter, 10dB attenuation. EUT Vert, High Ch, 2 Mbps    |

## CONCLUSION

Pass



Tested By

End of Test Report