

Test Report

Report No.: MTi230612014-04E1

Date of issue: 2023-07-14

Applicant: Kingtec Branch (Vietnam) Technologies Co., Ltd.

Product: Remote control

Model(s): 30010

FCC ID: 2BBU7-30010

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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| Test Result Certification | |
|----------------------------------|--|
| Applicant: | Kingtec Branch (Vietnam) Technologies Co., Ltd. |
| Address: | Lot 35, Street 3, Tan Duc Industrial Zone, Duc Hoa Ha Commune, Duc Hoa District, Long An Province, Vietnam |
| Manufacturer: | Kingtec Branch (Vietnam) Technologies Co., Ltd. |
| Address: | Lot 35, Street 3, Tan Duc Industrial Zone, Duc Hoa Ha Commune, Duc Hoa District, Long An Province, Vietnam |
| Product description | |
| Product name: | Remote control |
| Trademark: | prime |
| Model name: | 30010 |
| Series Model: | N/A |
| Standards: | FCC 47 CFR Part 15 Subpart C |
| Test method: | ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Date of Test | |
| Date of test: | 2023-07-04 to 2023-07-11 |
| Test result: | Pass |

| | | |
|----------------------|---|---|
| Test Engineer | : |  |
| | | (Maleah Deng) |
| Reviewed By | : |  |
| | | (Leon Chen) |
| Approved By | : |  |
| | | (Tom Xue) |

1 General Description

1.1 Description of the EUT

| | |
|----------------------------|------------------------------------|
| Product name: | Remote control |
| Model name: | 30010 |
| Series Model: | N/A |
| Model difference: | N/A |
| Electrical rating: | Input: DC 3V Button cell: DC 3V |
| Accessories: | N/A |
| Hardware version: | 1.0 |
| Software version: | 1.0 |
| Test sample(s) number: | MTi230612014-03S1001 |
| RF specification | |
| Operating frequency range: | 2402MHz to 2480MHz |
| Channel number: | 40 |
| Modulation type: | GFSK |
| Antenna(s) type: | PCB Antenna |
| Antenna(s) gain: | 0.11dBi |

1.2 Description of test modes

All the test modes were carried out with the EUT in normal operation, the final test mode of the EUT was the worst test mode for emission test, which was shown in this report and defined as:

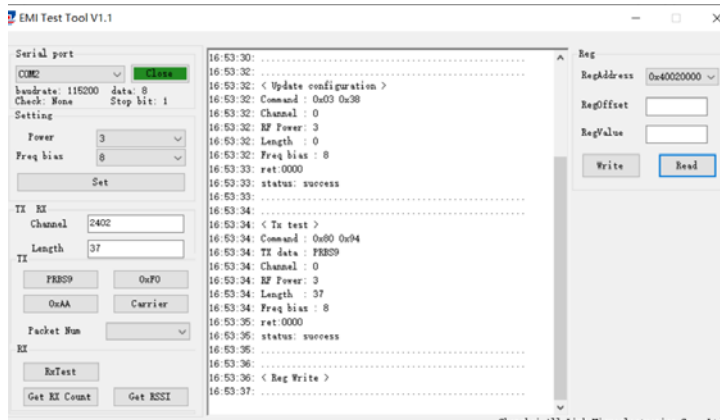
| No. | Emission test modes |
|-------|--------------------------|
| Mode1 | TX-GFSK (CH00,CH19,CH39) |

1.2.1 peration channel list

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

Note: The test software has been used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

| Mode | Test Software | EMI Test Tool V1.1 | | |
|------|---------------|--------------------|---------|---------|
| | Channel | 2402MHz | 2440MHz | 2480MHz |
| GFSK | Power setting | 3 | 3 | 3 |

The test software:


1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|-----------------------|------------------|
| Temperature: | 15°C ~ 35°C |
| Humidity: | 20% RH ~ 75% RH |
| Atmospheric pressure: | 98 kPa ~ 101 kPa |

1.4 Description of support units

The EUT was tested as an independent device.

1.5 Measurement uncertainty

| Measurement | Uncertainty |
|--|-------------|
| Occupied channel bandwidth | ±3 % |
| RF output power, conducted | ±1 dB |
| Power Spectral Density, conducted | ±1 dB |
| Unwanted Emissions, conducted | ±1 dB |
| Radiated spurious emissions (1GHz~25GHz) | 5.3dB |
| Radiated spurious emissions (9kHz~30MHz) | 4.3dB |
| Radiated spurious emissions (30MHz~1GHz) | 4.7dB |
| Temperature | ±1 °C |
| Humidity | ± 5 % |

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

2 Summary of Test Result

| No. | FCC reference | Description of test | Result |
|-----|-----------------------------|-------------------------------------|--------|
| 1 | § 15.203 | Antenna requirement | Pass |
| 2 | § 15.207 | AC power line conducted emissions | N/A |
| 3 | § 15.247(d), 15.209, 15.205 | Radiated spurious emissions | Pass |
| 4 | § 15.247(a)(2) | DTS bandwidth | Pass |
| 5 | § 15.247(b)(3) | Maximum conducted output power | Pass |
| 6 | § 15.247(e) | Power Spectral Density | Pass |
| 7 | § 15.247(d) | Conducted emission at the band edge | Pass |
| 8 | § 15.247(d) | Conducted spurious emissions | Pass |
| 9 | / | Duty Cycle | Pass |

Notes:

N/A means not applicable.

Since EUT is only a battery powered product, AC power is not required

3 Test Facilities and accreditations

3.1 Test laboratory

| | |
|------------------------|--|
| Test laboratory: | Shenzhen Microtest Co., Ltd. |
| Test site location: | 101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| Telephone: | (86-755)88850135 |
| Fax: | (86-755)88850136 |
| CNAS Registration No.: | CNAS L5868 |
| FCC Registration No.: | 448573 |

4 List of test equipment

| No. | Equipment | Manufacturer | Model | Serial No. | Cal. date | Cal. Due |
|--------------------------------|-------------------------------------|---------------|----------|------------|------------|------------|
| Occupied Bandwidth | | | | | | |
| 1 | Wideband Radio Communication Tester | Rohde&schwarz | CMW500 | 149155 | 2023-04-26 | 2024-04-25 |
| 2 | ESG Series Analog Ssignal Generator | Agilent | E4421B | GB40051240 | 2023-04-25 | 2024-04-24 |
| 3 | PXA Signal Analyzer | Agilent | N9030A | MY51350296 | 2023-04-25 | 2024-04-24 |
| 4 | Synthesized Sweeper | Agilent | 83752A | 3610A01957 | 2023-04-25 | 2024-04-24 |
| 5 | MXA Signal Analyzer | Agilent | N9020A | MY50143483 | 2023-04-26 | 2024-04-25 |
| 6 | RF Control Unit | Tonscend | JS0806-1 | 19D8060152 | 2023-04-26 | 2024-04-25 |
| 7 | Band Reject Filter Group | Tonscend | JS0806-F | 19D8060160 | 2023-05-05 | 2024-05-04 |
| 8 | ESG Vector Signal Generator | Agilent | N5182A | MY50143762 | 2023-04-25 | 2024-04-24 |
| 9 | DC Power Supply | Agilent | E3632A | MY40027695 | 2023-05-05 | 2024-05-04 |
| Maximum Conducted Output Power | | | | | | |
| 1 | Wideband Radio Communication Tester | Rohde&schwarz | CMW500 | 149155 | 2023-04-26 | 2024-04-25 |
| 2 | ESG Series Analog Ssignal Generator | Agilent | E4421B | GB40051240 | 2023-04-25 | 2024-04-24 |
| 3 | PXA Signal Analyzer | Agilent | N9030A | MY51350296 | 2023-04-25 | 2024-04-24 |
| 4 | Synthesized Sweeper | Agilent | 83752A | 3610A01957 | 2023-04-25 | 2024-04-24 |
| 5 | MXA Signal Analyzer | Agilent | N9020A | MY50143483 | 2023-04-26 | 2024-04-25 |
| 6 | RF Control Unit | Tonscend | JS0806-1 | 19D8060152 | 2023-04-26 | 2024-04-25 |
| 7 | Band Reject Filter Group | Tonscend | JS0806-F | 19D8060160 | 2023-05-05 | 2024-05-04 |
| 8 | ESG Vector Signal Generator | Agilent | N5182A | MY50143762 | 2023-04-25 | 2024-04-24 |
| 9 | DC Power Supply | Agilent | E3632A | MY40027695 | 2023-05-05 | 2024-05-04 |
| Power Spectral Density | | | | | | |
| 1 | Wideband Radio Communication Tester | Rohde&schwarz | CMW500 | 149155 | 2023-04-26 | 2024-04-25 |
| 2 | ESG Series Analog Ssignal Generator | Agilent | E4421B | GB40051240 | 2023-04-25 | 2024-04-24 |
| 3 | PXA Signal Analyzer | Agilent | N9030A | MY51350296 | 2023-04-25 | 2024-04-24 |
| 4 | Synthesized Sweeper | Agilent | 83752A | 3610A01957 | 2023-04-25 | 2024-04-24 |
| 5 | MXA Signal Analyzer | Agilent | N9020A | MY50143483 | 2023-04-26 | 2024-04-25 |
| 6 | RF Control Unit | Tonscend | JS0806-1 | 19D8060152 | 2023-04-26 | 2024-04-25 |
| 7 | Band Reject Filter Group | Tonscend | JS0806-F | 19D8060160 | 2023-05-05 | 2024-05-04 |
| 8 | ESG Vector Signal Generator | Agilent | N5182A | MY50143762 | 2023-04-25 | 2024-04-24 |

| No. | Equipment | Manufacturer | Model | Serial No. | Cal. date | Cal. Due |
|--|--------------------------------------|-----------------|-------------|------------|------------|------------|
| 9 | DC Power Supply | Agilent | E3632A | MY40027695 | 2023-05-05 | 2024-05-04 |
| Emissions in non-restricted frequency bands | | | | | | |
| 1 | Wideband Radio Communication Tester | Rohde&schwarz | CMW500 | 149155 | 2023-04-26 | 2024-04-25 |
| 2 | ESG Series Analog Ssignal Generator | Agilent | E4421B | GB40051240 | 2023-04-25 | 2024-04-24 |
| 3 | PXA Signal Analyzer | Agilent | N9030A | MY51350296 | 2023-04-25 | 2024-04-24 |
| 4 | Synthesized Sweeper | Agilent | 83752A | 3610A01957 | 2023-04-25 | 2024-04-24 |
| 5 | MXA Signal Analyzer | Agilent | N9020A | MY50143483 | 2023-04-26 | 2024-04-25 |
| 6 | RF Control Unit | Tonscend | JS0806-1 | 19D8060152 | 2023-04-26 | 2024-04-25 |
| 7 | Band Reject Filter Group | Tonscend | JS0806-F | 19D8060160 | 2023-05-05 | 2024-05-04 |
| 8 | ESG Vector Signal Generator | Agilent | N5182A | MY50143762 | 2023-04-25 | 2024-04-24 |
| 9 | DC Power Supply | Agilent | E3632A | MY40027695 | 2023-05-05 | 2024-05-04 |
| Band edge emissions (Radiated) | | | | | | |
| 1 | EMI Test Receiver | Rohde&schwarz | ESCI7 | 101166 | 2023-04-26 | 2024-04-25 |
| 2 | Double Ridged Broadband Horn Antenna | schwarabeck | BBHA 9120 D | 2278 | 2023-05-26 | 2024-05-25 |
| 3 | Amplifier | Agilent | 8449B | 3008A01120 | 2023-05-26 | 2024-05-25 |
| 4 | Multi-device Controller | TuoPu | TPMDC | / | / | / |
| 5 | MXA signal analyzer | Agilent | N9020A | MY54440859 | 2023-05-05 | 2024-05-04 |
| Emissions in restricted frequency bands (below 1GHz) | | | | | | |
| 1 | EMI Test Receiver | Rohde&schwarz | ESCI7 | 101166 | 2023-04-26 | 2024-04-25 |
| 2 | TRILOG Broadband Antenna | schwarabeck | VULB 9163 | 9163-1338 | 2023-06-11 | 2025-06-10 |
| 3 | Amplifier | Hewlett-Packard | 8447F | 3113A06184 | 2023-04-26 | 2024-04-25 |
| 4 | Multi-device Controller | TuoPu | TPMDC | / | / | / |
| Emissions in restricted frequency bands (above 1GHz) | | | | | | |
| 1 | EMI Test Receiver | Rohde&schwarz | ESCI7 | 101166 | 2023-04-26 | 2024-04-25 |
| 2 | Double Ridged Broadband Horn Antenna | schwarabeck | BBHA 9120 D | 2278 | 2023-05-26 | 2024-05-25 |
| 3 | Amplifier | Agilent | 8449B | 3008A01120 | 2023-05-26 | 2024-05-25 |
| 4 | Multi-device Controller | TuoPu | TPMDC | / | / | / |
| 5 | MXA signal analyzer | Agilent | N9020A | MY54440859 | 2023-05-05 | 2024-05-04 |

5 Evaluation Results (Evaluation)

5.1 Antenna requirement

| | |
|------------------------------------|--|
| Test Requirement: | An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. |
| Description of the antenna of EUT: | The antenna of the EUT is permanently attached. |
| Conclusion: | The EUT complies with the requirement of FCC PART 15.203. |

6 Radio Spectrum Matter Test Results (RF)

6.1 Occupied Bandwidth

| | |
|-------------------|--|
| Test Requirement: | Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Test Limit: | Section (a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Test Method: | DTS bandwidth |
| Procedure: | a) Set RBW = 100 kHz. b) Set the VBW \geq [3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. |

6.1.1 E.U.T. Operation:

| | | | |
|------------------------|-------|-----------|------|
| Operating Environment: | | | |
| Temperature: | 26 °C | Humidity: | 57 % |
| Atmospheric Pressure: | | 101 kPa | |
| Pre test mode: | Mode1 | | |
| Final test mode: | Mode1 | | |

6.1.2 Test Data:

Please Refer to Appendix for Details.

6.2 Maximum Conducted Output Power

| | |
|-------------------|--|
| Test Requirement: | For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode. |
| Test Limit: | For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode. |
| Test Method: | Maximum peak conducted output power |
| Procedure: | ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power |

6.2.1 E.U.T. Operation:

| | | | | | |
|------------------------|-------|-----------|------|-----------------------|---------|
| Operating Environment: | | | | | |
| Temperature: | 26 °C | Humidity: | 57 % | Atmospheric Pressure: | 101 kPa |
| Pre test mode: | Mode1 | | | | |
| Final test mode: | Mode1 | | | | |

6.2.2 Test Data:

Please Refer to Appendix for Details.

6.3 Power Spectral Density

| | |
|-------------------|--|
| Test Requirement: | For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. |
| Test Limit: | For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. |
| Test Method: | Maximum power spectral density level in the fundamental emission |

6.3.1 E.U.T. Operation:

| | | | | | |
|------------------------|-------|-----------|------|-----------------------|---------|
| Operating Environment: | | | | | |
| Temperature: | 26 °C | Humidity: | 57 % | Atmospheric Pressure: | 101 kPa |
| Pre test mode: | Mode1 | | | | |
| Final test mode: | Mode1 | | | | |

6.3.2 Test Data:

Please Refer to Appendix for Details.

6.4 Emissions in non-restricted frequency bands

| | |
|-------------------|--|
| Test Requirement: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. |
| Test Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. |
| Test Method: | Emissions in nonrestricted frequency bands |
| Procedure: | ANSI C63.10-2013 Section 11.11.1, Section 11.11.2, Section 11.11.3 |

6.4.1 E.U.T. Operation:

| | | | | | |
|------------------------|-------|-----------|------|-----------------------|---------|
| Operating Environment: | | | | | |
| Temperature: | 26 °C | Humidity: | 57 % | Atmospheric Pressure: | 101 kPa |
| Pre test mode: | Mode1 | | | | |
| Final test mode: | Mode1 | | | | |

6.4.2 Test Data:

Please Refer to Appendix for Details.

6.5 Band edge emissions (Radiated)

| | | | |
|-------------------|---|-----------------------------------|-------------------------------|
| Test Requirement: | In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).` | | |
| Test Limit: | Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
| | 0.009-0.490 | 2400/F(kHz) | 300 |
| | 0.490-1.705 | 24000/F(kHz) | 30 |
| | 1.705-30.0 | 30 | 30 |
| | 30-88 | 100 ** | 3 |
| | 88-216 | 150 ** | 3 |
| | 216-960 | 200 ** | 3 |
| | Above 960 | 500 | 3 |
| | ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. | | |
| Test Method: | Radiated emissions tests | | |
| Procedure: | ANSI C63.10-2013 section 6.10.5.2 | | |

6.5.1 E.U.T. Operation:

| | | | |
|------------------------|-------|-----------------------|---------|
| Operating Environment: | | | |
| Temperature: | 25 °C | Humidity: | 58 % |
| | | Atmospheric Pressure: | 101 kPa |
| Pre test mode: | Mode1 | | |
| Final test mode: | Mode1 | | |

6.5.2 Test Data:

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 00

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 2310.000 | 56.09 | -8.08 | 48.01 | 74.00 | -25.99 | peak |
| 2 | | 2310.000 | 37.82 | -8.08 | 29.74 | 54.00 | -24.26 | AVG |
| 3 | * | 2390.000 | 72.07 | -7.71 | 64.36 | 74.00 | -9.64 | peak |
| 4 | | 2390.000 | 45.20 | -7.71 | 37.49 | 54.00 | -16.51 | AVG |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 00

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 2310.000 | 48.61 | -8.08 | 40.53 | 74.00 | -33.47 | peak |
| 2 | | 2310.000 | 37.70 | -8.08 | 29.62 | 54.00 | -24.38 | AVG |
| 3 | * | 2390.000 | 62.54 | -7.71 | 54.83 | 74.00 | -19.17 | peak |
| 4 | | 2390.000 | 39.27 | -7.71 | 31.56 | 54.00 | -22.44 | AVG |

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 39

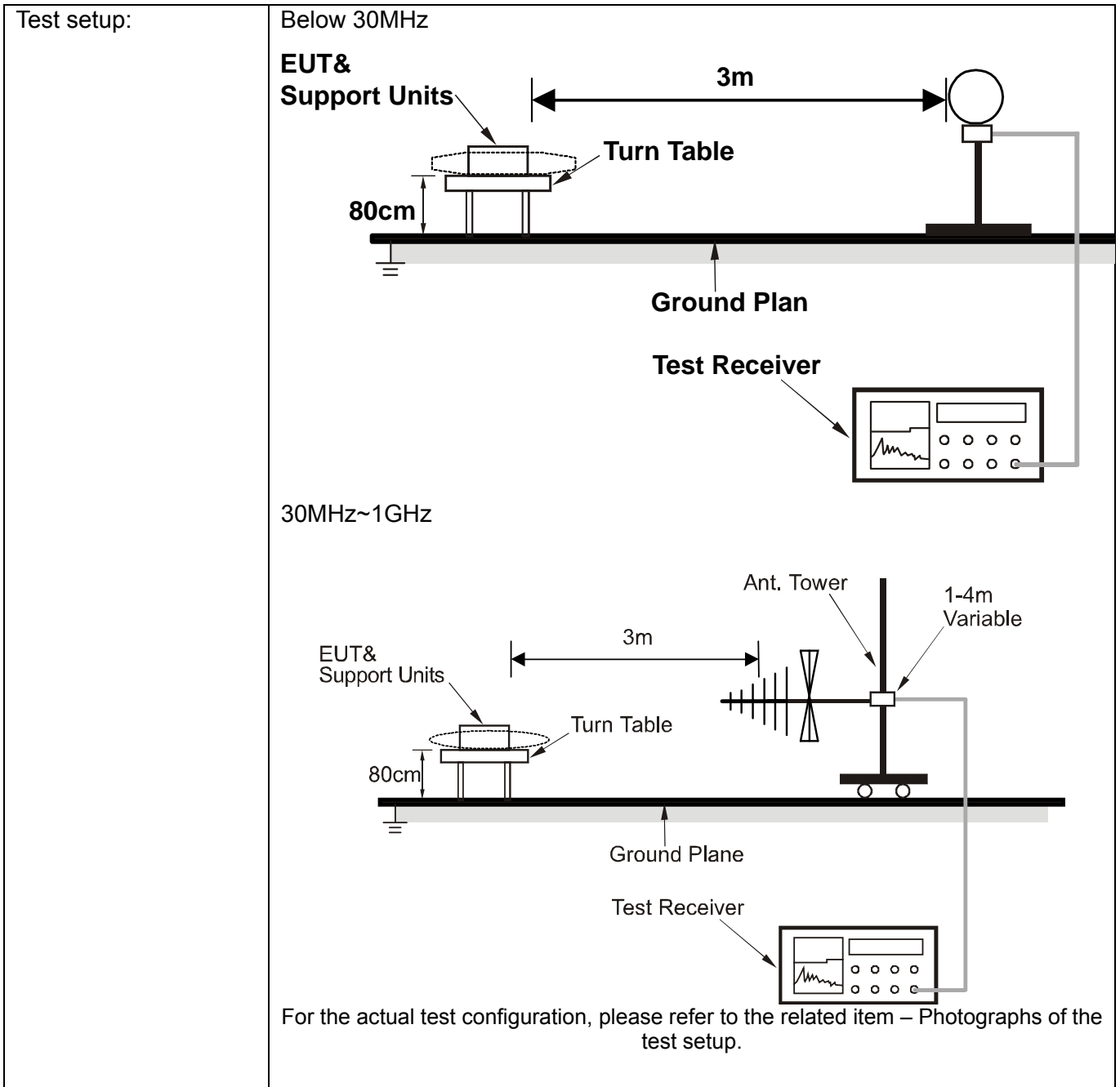
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1 * | 2483.500 | 76.60 | -7.24 | 69.36 | 74.00 | -4.64 | peak |
| 2 | 2483.500 | 49.87 | -7.24 | 42.63 | 54.00 | -11.37 | AVG |
| 3 | 2500.000 | 65.87 | -7.17 | 58.70 | 74.00 | -15.30 | peak |
| 4 | 2500.000 | 41.23 | -7.17 | 34.06 | 54.00 | -19.94 | AVG |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 39

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1 * | 2483.500 | 71.84 | -7.24 | 64.60 | 74.00 | -9.40 | peak |
| 2 | 2483.500 | 45.48 | -7.24 | 38.24 | 54.00 | -15.76 | AVG |
| 3 | 2500.000 | 55.26 | -7.17 | 48.09 | 74.00 | -25.91 | peak |
| 4 | 2500.000 | 38.13 | -7.17 | 30.96 | 54.00 | -23.04 | AVG |

6.6 Emissions in restricted frequency bands (below 1GHz)

| | | | |
|-------------------|---|-----------------------------------|-------------------------------|
| Test Requirement: | In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).` | | |
| Test Limit: | Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
| | 0.009-0.490 | 2400/F(kHz) | 300 |
| | 0.490-1.705 | 24000/F(kHz) | 30 |
| | 1.705-30.0 | 30 | 30 |
| | 30-88 | 100 ** | 3 |
| | 88-216 | 150 ** | 3 |
| | 216-960 | 200 ** | 3 |
| | Above 960 | 500 | 3 |
| | ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. | | |
| Test Method: | Radiated emissions tests | | |
| Procedure: | ANSI C63.10-2013 section 6.6.4 | | |

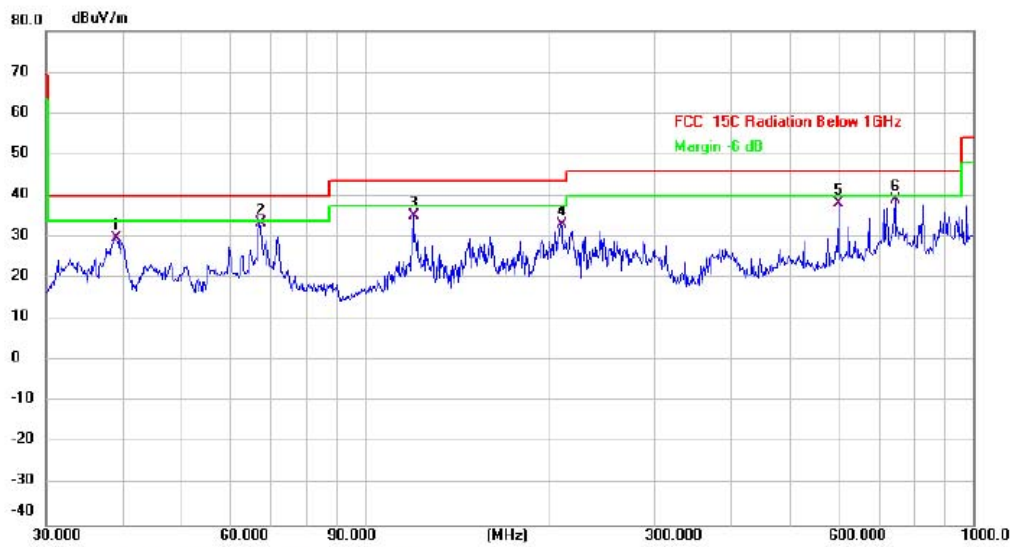


6.6.1 E.U.T. Operation:

| | | | |
|--|-------|-----------|------|
| Operating Environment: | | | |
| Temperature: | 26 °C | Humidity: | 54 % |
| Atmospheric Pressure: | | 101 kPa | |
| Pre test mode: | Mode1 | | |
| Final test mode: | Mode1 | | |
| Note: | | | |
| The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. | | | |
| All modes of operation of the EUT were investigated, and only the worst-case results are reported. There were no emissions found below 30MHz within 20dB of the limit. | | | |

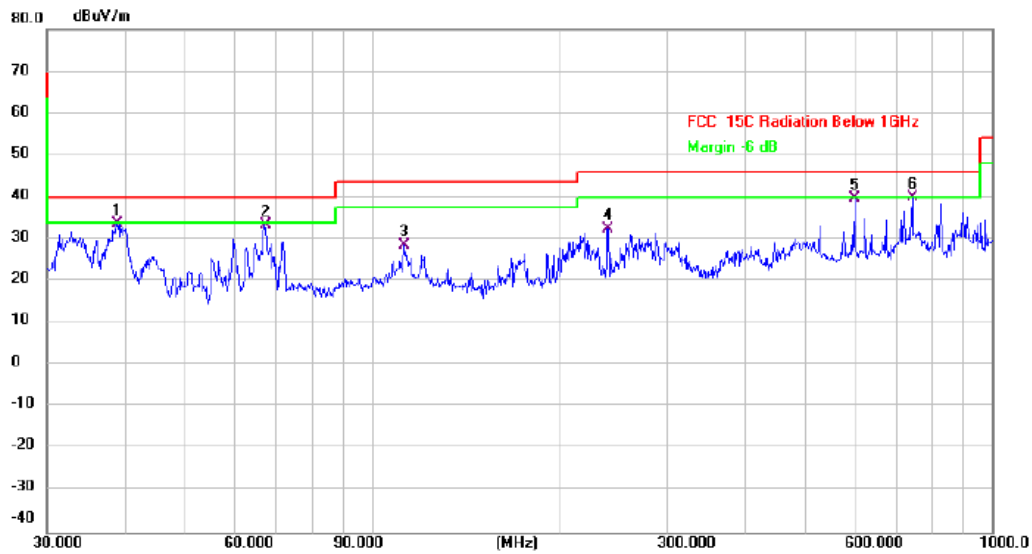
6.6.2 Test Data:

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 39



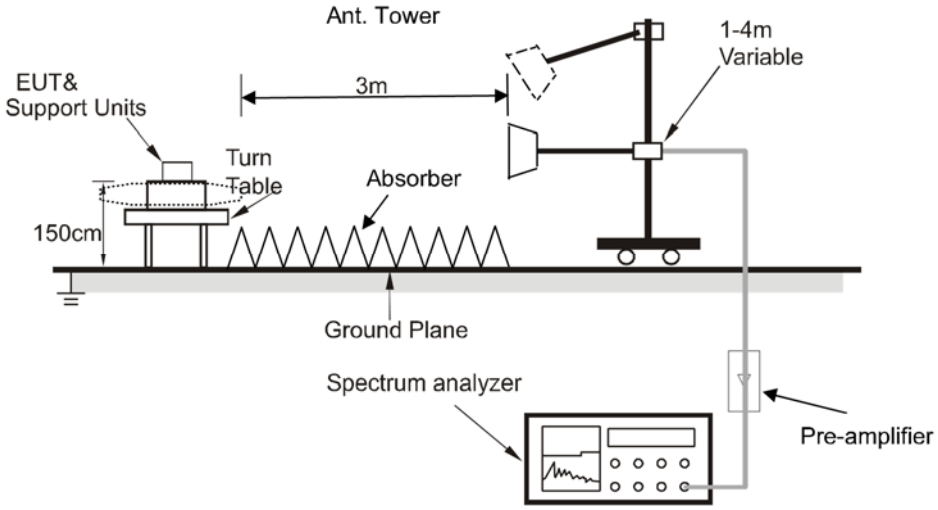
| No. Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measurement dBuV/m | Limit dBuV/m | Over dB | Detector | Comment |
|---------|-----------|--------------------|-------------------|--------------------|--------------|---------|----------|---------|
| 1 | 38.8878 | 37.53 | -7.64 | 29.89 | 40.00 | -10.11 | QP | |
| 2 * | 67.2022 | 42.12 | -8.88 | 33.24 | 40.00 | -6.76 | QP | |
| 3 | 120.2766 | 45.36 | -10.30 | 35.06 | 43.50 | -8.44 | QP | |
| 4 | 210.0482 | 41.17 | -8.25 | 32.92 | 43.50 | -10.58 | QP | |
| 5 | 601.4265 | 40.44 | -2.42 | 38.02 | 46.00 | -7.98 | QP | |
| 6 | 744.8661 | 36.86 | 2.33 | 39.19 | 46.00 | -6.81 | QP | |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 39



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|---------|
| 1 | | 38.7518 | 41.37 | -7.64 | 33.73 | 40.00 | -6.27 | QP | |
| 2 | | 67.2022 | 42.34 | -8.88 | 33.46 | 40.00 | -6.54 | QP | |
| 3 | | 112.9196 | 37.86 | -9.18 | 28.68 | 43.50 | -14.82 | QP | |
| 4 | | 239.9874 | 38.82 | -6.41 | 32.41 | 46.00 | -13.59 | QP | |
| 5 | | 601.4265 | 42.13 | -2.42 | 39.71 | 46.00 | -6.29 | QP | |
| 6 | * | 744.8661 | 37.52 | 2.33 | 39.85 | 46.00 | -6.15 | QP | |

6.7 Emissions in restricted frequency bands (above 1GHz)

| | | | |
|---|--|-----------------------------------|-------------------------------|
| Test Requirement: | In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).` | | |
| Test Limit: | Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
| | 0.009-0.490 | 2400/F(kHz) | 300 |
| | 0.490-1.705 | 24000/F(kHz) | 30 |
| | 1.705-30.0 | 30 | 30 |
| | 30-88 | 100 ** | 3 |
| | 88-216 | 150 ** | 3 |
| | 216-960 | 200 ** | 3 |
| | Above 960 | 500 | 3 |
| ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. | | | |
| Test Method: | Radiated emissions tests | | |
| Procedure: | ANSI C63.10-2013 section 6.6.4 | | |
| Test setup: | Above 1GHz | | |
| |  <p>For the actual test configuration, please refer to the related item – Photographs of the test setup.</p> | | |

6.7.1 E.U.T. Operation:

| | | | | | |
|--|-------|-----------|------|-----------------------|---------|
| Operating Environment: | | | | | |
| Temperature: | 26 °C | Humidity: | 54 % | Atmospheric Pressure: | 101 kPa |
| Pre test mode: | Mode1 | | | | |
| Final test mode: | Mode1 | | | | |
| Note: Test frequency are from 1GHz to 25GHz, the amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. All modes of operation of the EUT were investigated, and only the worst-case results are reported. | | | | | |

6.7.2 Test Data:

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 00

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4804.000 | 50.09 | 0.74 | 50.83 | 74.00 | -23.17 | peak |
| 2 | | 4804.000 | 44.34 | 0.74 | 45.08 | 54.00 | -8.92 | AVG |
| 3 | | 7206.000 | 48.89 | 6.02 | 54.91 | 74.00 | -19.09 | peak |
| 4 | * | 7206.000 | 43.19 | 6.02 | 49.21 | 54.00 | -4.79 | AVG |
| 5 | | 9608.000 | 41.41 | 5.88 | 47.29 | 74.00 | -26.71 | peak |
| 6 | | 9608.000 | 35.30 | 5.88 | 41.18 | 54.00 | -12.82 | AVG |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 00

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4804.000 | 45.02 | 0.74 | 45.76 | 74.00 | -28.24 | peak |
| 2 | | 4804.000 | 39.52 | 0.74 | 40.26 | 54.00 | -13.74 | AVG |
| 3 | | 7206.000 | 46.68 | 6.02 | 52.70 | 74.00 | -21.30 | peak |
| 4 | * | 7206.000 | 41.37 | 6.02 | 47.39 | 54.00 | -6.61 | AVG |
| 5 | | 9608.000 | 41.89 | 5.88 | 47.77 | 74.00 | -26.23 | peak |
| 6 | | 9608.000 | 35.34 | 5.88 | 41.22 | 54.00 | -12.78 | AVG |

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 19

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4880.000 | 50.34 | 1.04 | 51.38 | 74.00 | -22.62 | peak |
| 2 | | 4880.000 | 45.18 | 1.04 | 46.22 | 54.00 | -7.78 | AVG |
| 3 | | 7320.000 | 47.37 | 5.93 | 53.30 | 74.00 | -20.70 | peak |
| 4 | * | 7320.000 | 42.30 | 5.93 | 48.23 | 54.00 | -5.77 | AVG |
| 5 | | 9760.000 | 41.04 | 6.55 | 47.59 | 74.00 | -26.41 | peak |
| 6 | | 9760.000 | 34.67 | 6.55 | 41.22 | 54.00 | -12.78 | AVG |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 19

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4880.000 | 46.57 | 1.04 | 47.61 | 74.00 | -26.39 | peak |
| 2 | | 4880.000 | 41.19 | 1.04 | 42.23 | 54.00 | -11.77 | AVG |
| 3 | | 7320.000 | 45.27 | 5.93 | 51.20 | 74.00 | -22.80 | peak |
| 4 | * | 7320.000 | 40.40 | 5.93 | 46.33 | 54.00 | -7.67 | AVG |
| 5 | | 9760.000 | 40.70 | 6.55 | 47.25 | 74.00 | -26.75 | peak |
| 6 | | 9760.000 | 34.57 | 6.55 | 41.12 | 54.00 | -12.88 | AVG |

Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: 39

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4960.000 | 49.48 | 1.50 | 50.98 | 74.00 | -23.02 | peak |
| 2 | | 4960.000 | 43.86 | 1.50 | 45.36 | 54.00 | -8.64 | AVG |
| 3 | | 7440.000 | 47.13 | 5.61 | 52.74 | 74.00 | -21.26 | peak |
| 4 | * | 7440.000 | 41.64 | 5.61 | 47.25 | 54.00 | -6.75 | AVG |
| 5 | | 9920.000 | 41.75 | 6.10 | 47.85 | 74.00 | -26.15 | peak |
| 6 | | 9920.000 | 35.32 | 6.10 | 41.42 | 54.00 | -12.58 | AVG |

Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: 39

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 4960.000 | 48.07 | 1.50 | 49.57 | 74.00 | -24.43 | peak |
| 2 | | 4960.000 | 42.73 | 1.50 | 44.23 | 54.00 | -9.77 | AVG |
| 3 | | 7440.000 | 46.51 | 5.61 | 52.12 | 74.00 | -21.88 | peak |
| 4 | * | 7440.000 | 41.44 | 5.61 | 47.05 | 54.00 | -6.95 | AVG |
| 5 | | 9920.000 | 41.84 | 6.10 | 47.94 | 74.00 | -26.06 | peak |
| 6 | | 9920.000 | 35.28 | 6.10 | 41.38 | 54.00 | -12.62 | AVG |

Photographs of the test setup

Refer to Appendix - Test Setup Photo

Photographs of the EUT

Refer to Appendix - EUT Photos

Appendix A: DTS Bandwidth

Test Result

| Test Mode | Antenna | Frequency [MHz] | DTS BW [MHz] | Limit [MHz] | Verdict |
|-----------|---------|-----------------|--------------|-------------|---------|
| GFSK | Ant1 | 2402 | 0.756 | 0.5 | PASS |
| | | 2440 | 0.768 | 0.5 | PASS |
| | | 2480 | 0.748 | 0.5 | PASS |

Test Graphs

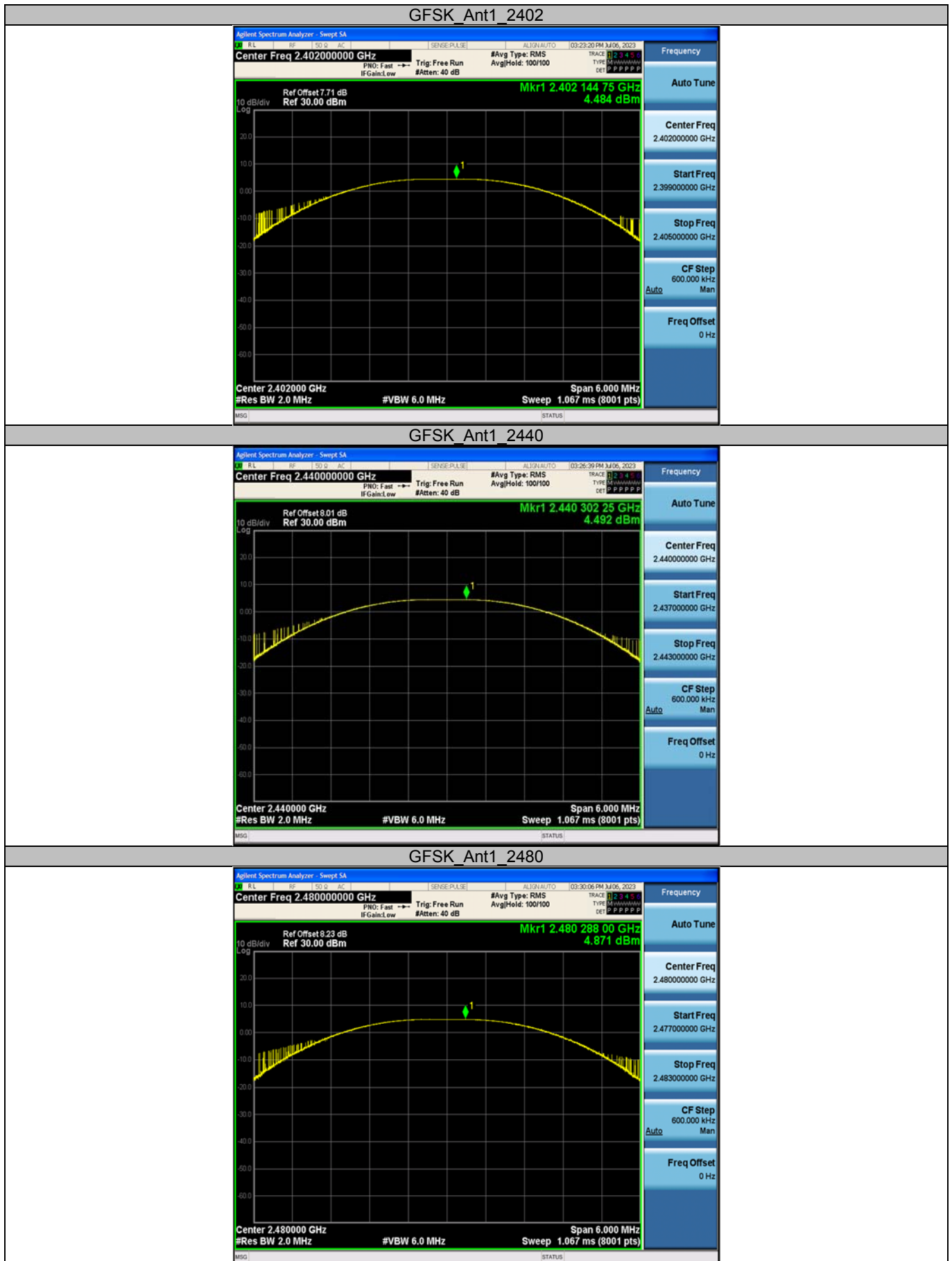


Appendix B: Maximum conducted output power

Test Result-Peak

| Test Mode | Antenna | Frequency [MHz] | Conducted Peak Power [dBm] | Limit [dBm] | Verdict |
|-----------|---------|-----------------|----------------------------|-------------|---------|
| GFSK | Ant1 | 2402 | 4.48 | ≤30 | PASS |
| | | 2440 | 4.49 | ≤30 | PASS |
| | | 2480 | 4.87 | ≤30 | PASS |

Test Graphs

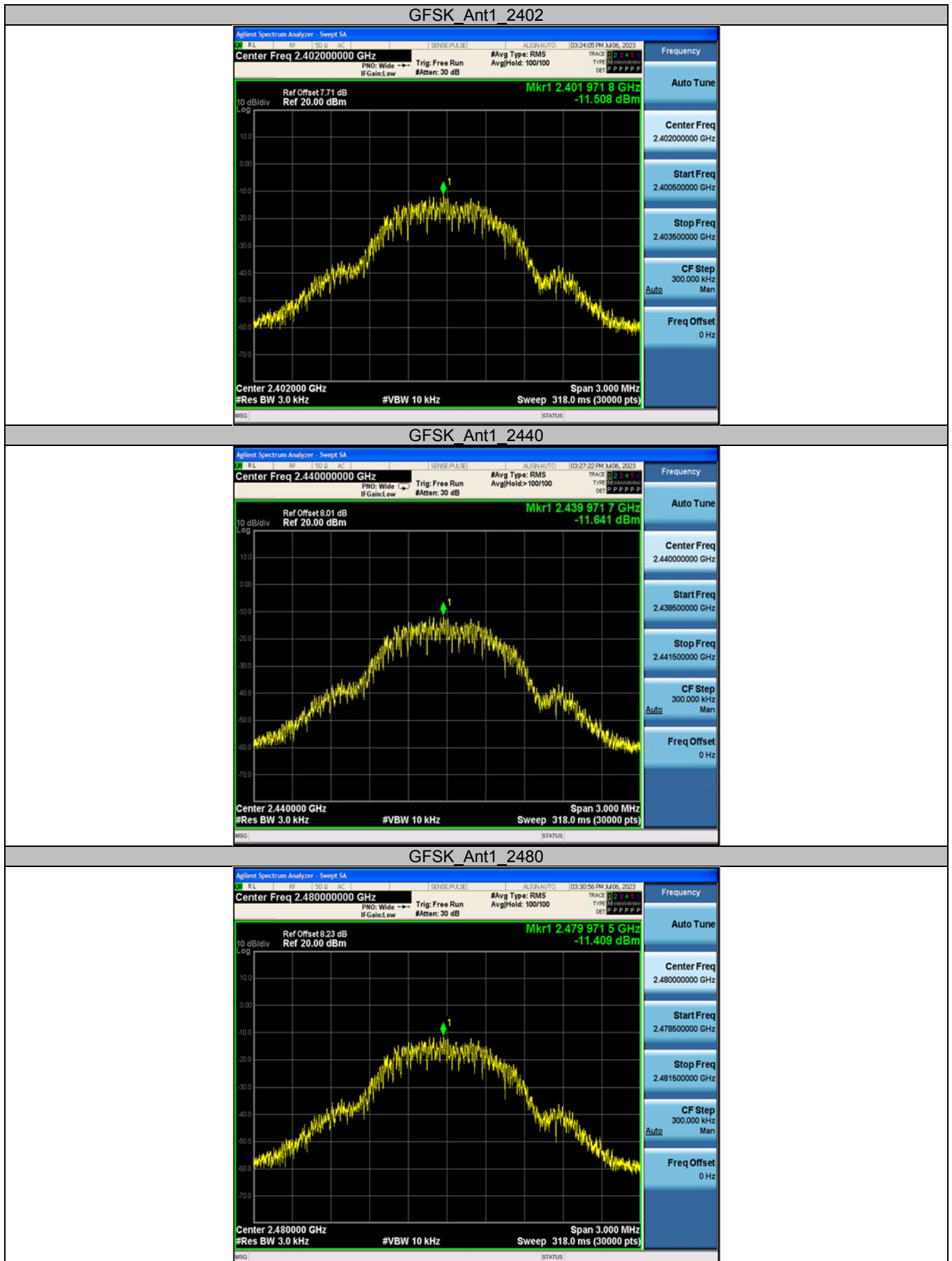


Appendix C: Maximum power spectral density

Test Result

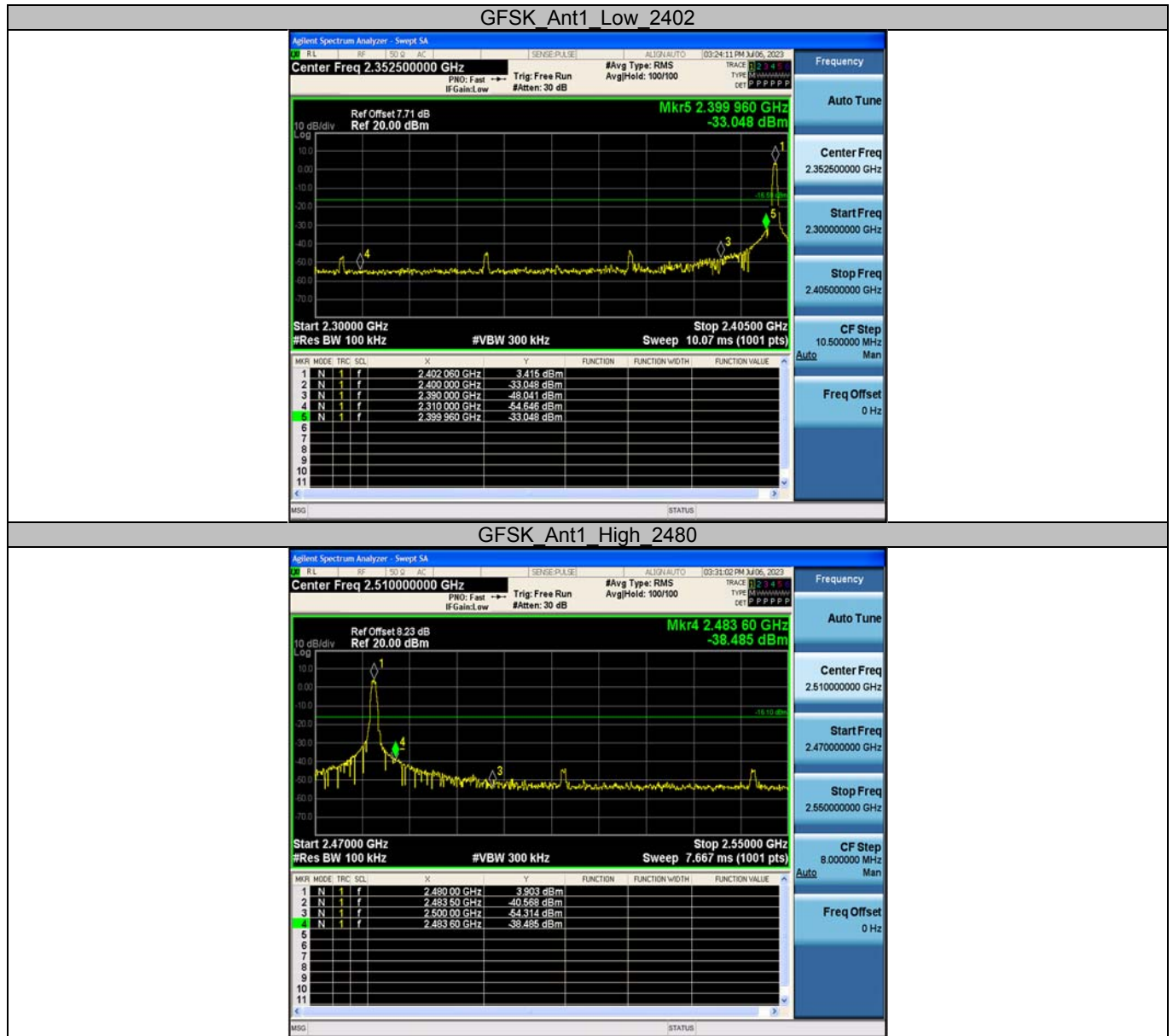
| Test Mode | Antenna | Frequency [MHz] | Result [dBm/3kHz] | Limit [dBm/3kHz] | Verdict |
|-----------|---------|-----------------|-------------------|------------------|---------|
| GFSK | Ant1 | 2402 | -11.51 | ≤8.00 | PASS |
| | | 2440 | -11.64 | ≤8.00 | PASS |
| | | 2480 | -11.41 | ≤8.00 | PASS |

Test Graphs



Appendix D: Band edge measurements

Test Graphs

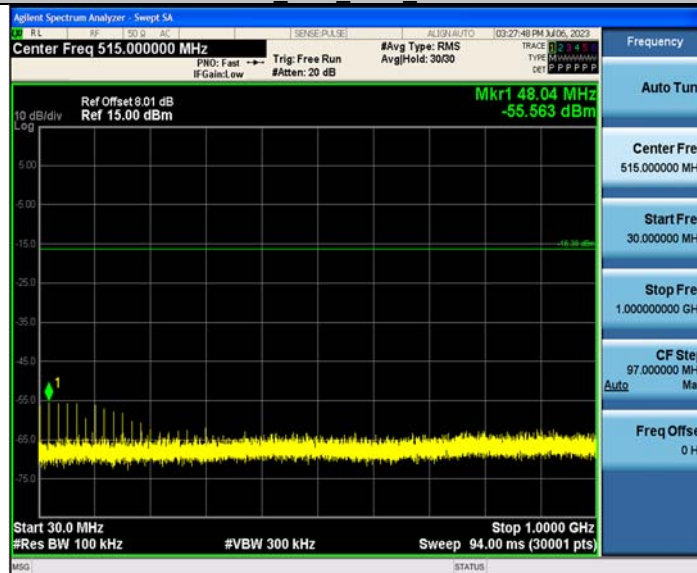
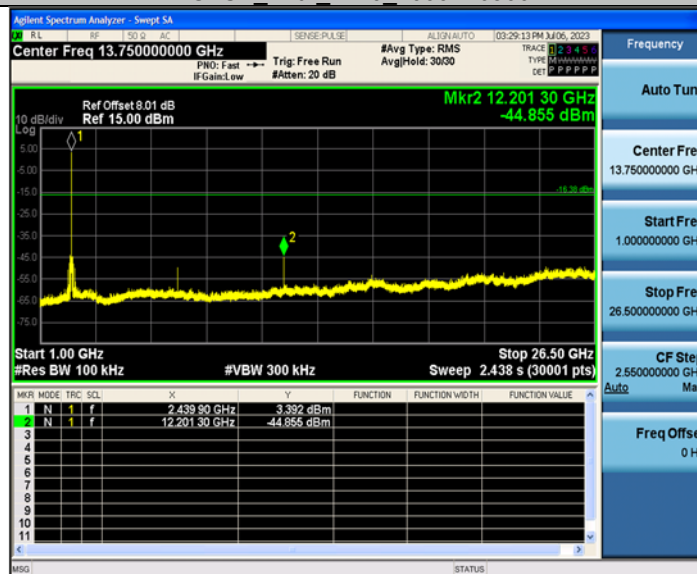


Appendix E: Conducted Spurious Emission

Test Graphs

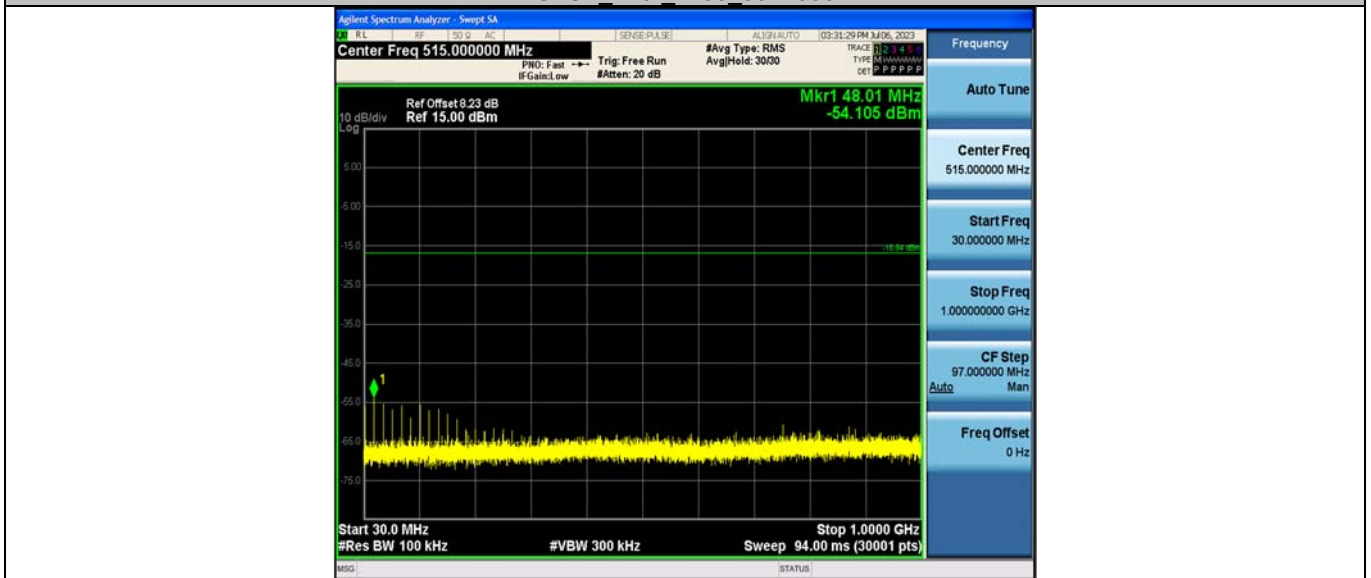


GFSK Ant1 2440 0~Reference

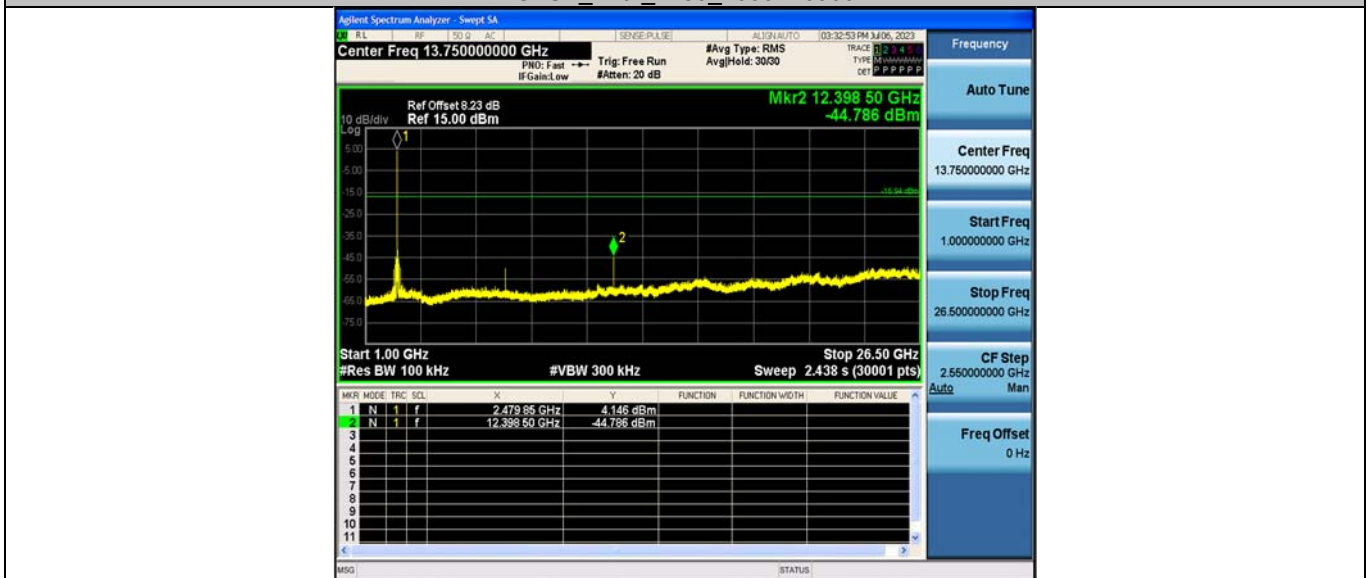
GFSK Ant1 2440 30~1000

GFSK Ant1 2440 1000~26500

GFSK Ant1 2480 0~Reference



GFSK_Ant1_2480_30~1000



GFSK_Ant1_2480_1000~26500



Appendix F: Duty Cycle

Test Result

| Test Mode | Antenna | Frequency [MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] |
|-----------|---------|--------------------|-----------------|----------------|-------------------|--------------------------|
| GFSK | Ant1 | 2402 | 0.39 | 0.63 | 61.90 | 2.08 |
| | | 2440 | 0.39 | 0.63 | 61.90 | 2.08 |
| | | 2480 | 0.39 | 0.63 | 61.90 | 2.08 |

Test Graphs



----End of Report----