



CERTIFICATION TEST REPORT

Report Number. : 12943451-E2V3

Applicant : APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A2218

FCC ID : BCG-E3308A

IC : 579C-E3308A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

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Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888



NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|-------------------------------------|--------------------|
| V1 | 8/14/2019 | Initial Issue | Chin Pang |
| V2 | 8/20/2019 | Address TCB Questions | Francisco Guarnero |
| V3 | 8/22/2019 | Address TCB Question on section 5.2 | Chin Pang |

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: SMARTPHONE

MODEL: A2218

SERIAL NUMBER: G6TYW006N39Y (Conducted), G6TYW03SN39P (Radiated)

DATE TESTED: MAY 31, 2019 – AUGUST 20, 2019

| APPLICABLE STANDARDS | |
|--------------------------|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart C | Complies |
| ISED RSS-247 Issue 2 | Complies |
| ISED RSS-GEN Issue 5 | Complies |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

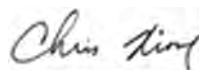
This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



Chin Pang
Senior Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:



Chris Xiong
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street | 47266 Benicia Street | 47658 Kato Rd. |
|--|--|---|
| <input type="checkbox"/> Chamber A (IC:2324B-1) | <input type="checkbox"/> Chamber D (IC:22541-1) | <input type="checkbox"/> Chamber I (IC: 2324A-5) |
| <input checked="" type="checkbox"/> Chamber B (IC:2324B-2) | <input type="checkbox"/> Chamber E (IC:22541-2) | <input type="checkbox"/> Chamber J (IC: 2324A-6) |
| <input type="checkbox"/> Chamber C (IC:2324B-3) | <input checked="" type="checkbox"/> Chamber F (IC:22541-3) | <input checked="" type="checkbox"/> Chamber K (IC: 2324A-1) |
| | <input checked="" type="checkbox"/> Chamber G (IC:22541-4) | <input type="checkbox"/> Chamber L (IC: 2324A-3) |
| | <input type="checkbox"/> Chamber H (IC:22541-5) | |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|-------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz | 3.84 dB |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz | 3.65 dB |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz | 2.52 dB |
| Worst Case Radiated Disturbance, 30 to 1000 MHz | 4.88 dB |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz | 4.24 dB |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB |

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, TD-SCDMA, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wide band, GPS and NFC. All models support at least one UICC based SIM. The second SIM, if present, is either UICC based pSIM (physical SIM) or e-SIM (electronic SIM). The device has a built-in inductive charging receiver. The rechargeable battery is also not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Antenna | Configuration | Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|-------------------|---------------|-----------------------|--------|--------------------|-------------------|
| Ant 4 | High Power | 2402-2480 | BLE 1M | 17.28 | 53.46 |
| | Low Power | | | 12.72 | 18.71 |
| | High Power | | BLE 2M | 17.24 | 52.97 |
| | Low Power | | | 12.77 | 18.92 |
| Ant 3 | High Power | 2402-2480 | BLE 1M | 19.75 | 94.41 |
| | Low Power | | | 12.72 | 18.71 |
| | High Power | | BLE 2M | 19.71 | 93.54 |
| | Low Power | | | 12.78 | 18.97 |
| BF, Ant 4 + Ant 3 | High Power | 2402-2480 | BLE 1M | 20.21 | 104.95 |
| | Low Power | | | 15.73 | 37.41 |
| | High Power | | BLE 2M | 20.25 | 105.93 |
| | Low Power | | | 15.71 | 37.24 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

| Frequency Range (GHz) | Ant. 4 (UAT) (dBi) | Ant.3 (LAT) (dBi) |
|-----------------------|--------------------|-------------------|
| 2.4 | -0.9 | -2.3 |

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v1.29.99992

The test utility software used during testing was QRCT v3.0.264.0.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z on Ant 4 (Antenna 4) and Ant 3 (Antenna 3). It was determined that X (Flatbed) orientation was the worst-case orientation for Ant 4, Ant 3 and TxBF.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT was set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario.

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop. There were no emissions found below 30MHz within 20dB of the limit.

For simultaneous transmission of multiple channels in the 2.4GHz BLE and 5GHz bands. No noticeable emission was found.

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The WiFi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | |
|------------------------|-------------------|-------------|-------------------|--------------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| laptop | Apple | A1398 | C02PM012G3QD | QDS-BRCM1069 |
| Laptop AC/DC adapter | Liteon Technology | PA-1450-BA1 | B123 | NA |
| EUT AC Adapter | Apple | A1385 | D29325SM03XDHLHC9 | NA |

I/O CABLES

| I/O Cable List | | | | | | |
|----------------|---------|----------------------|----------------|-------------|------------------|----------------------|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | Antenna | 1 | SMA | Un-Shielded | 0.2 | To spectrum Analyzer |
| 2 | USB | 1 | USB | Shielded | 1 | N/A |
| 3 | AC | 1 | AC | Un-shielded | 2 | N/A |

I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

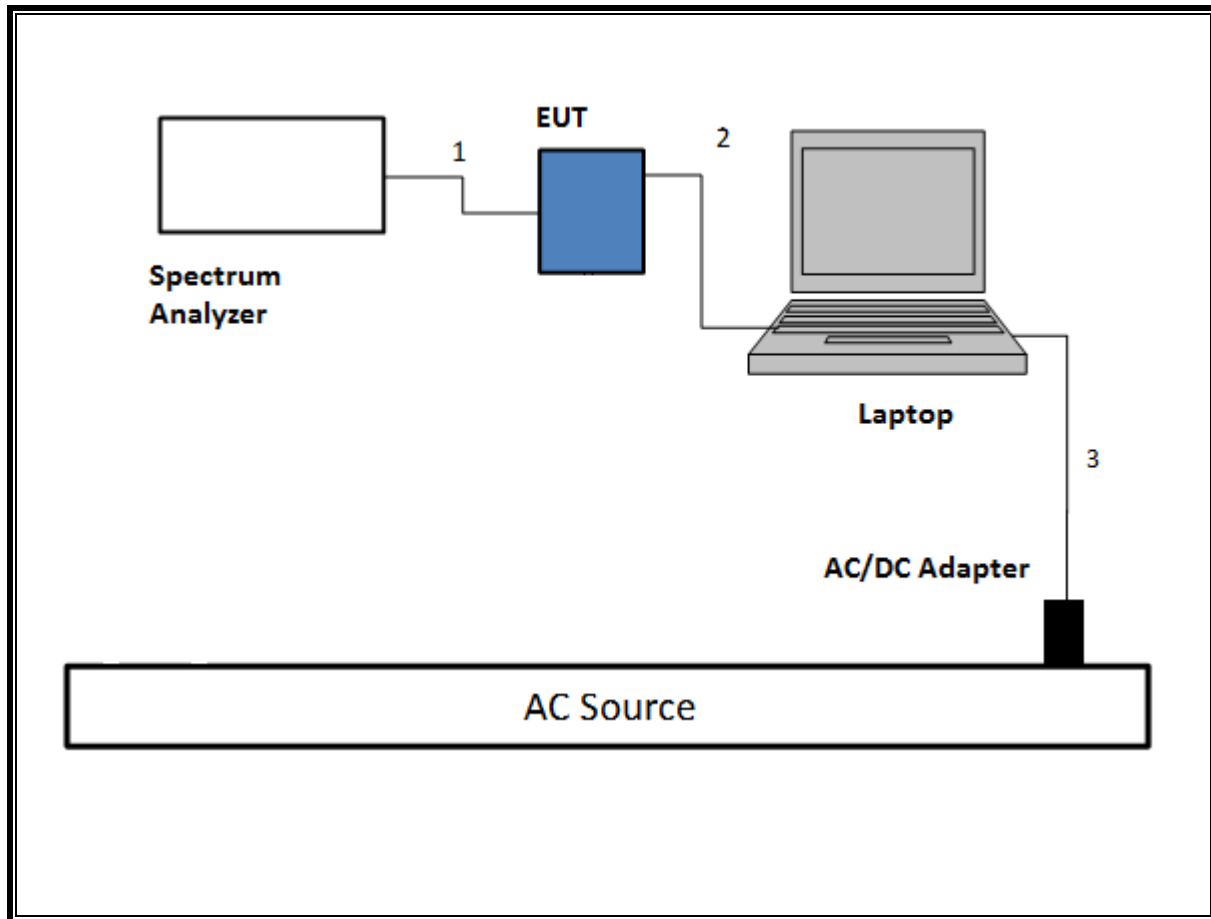
| I/O Cable List | | | | | | |
|----------------|------|----------------|----------------|-------------|------------------|---------|
| Cable No | Port | # of identical | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | AC | 1 | AC | Un-shielded | 2 | N/A |
| 2 | USB | 1 | USB | Un-shielded | 1 | N/A |

TEST SETUP

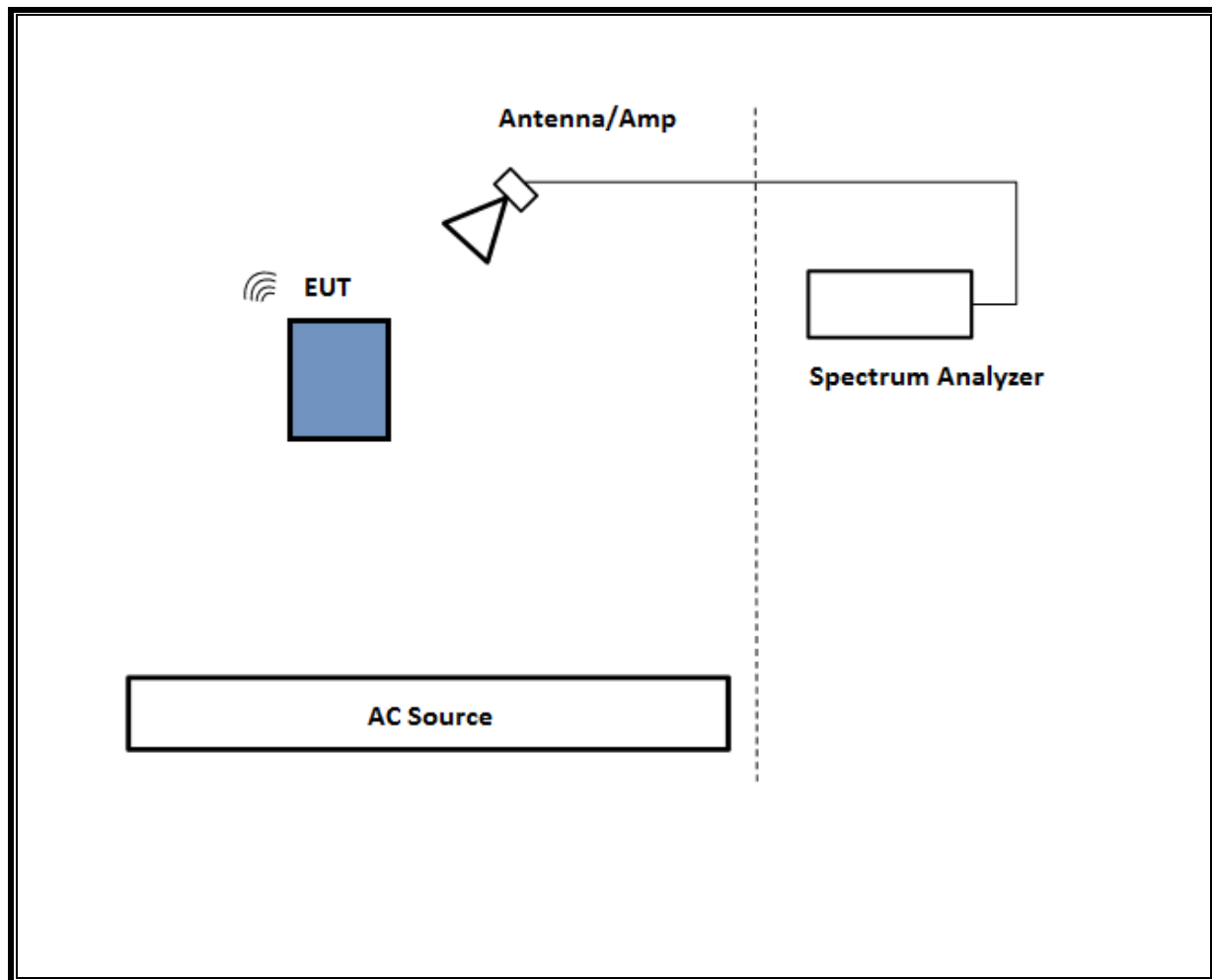
The EUT is connected to a test laptop during the tests. Test software exercised the radio card.

SETUP DIAGRAMS

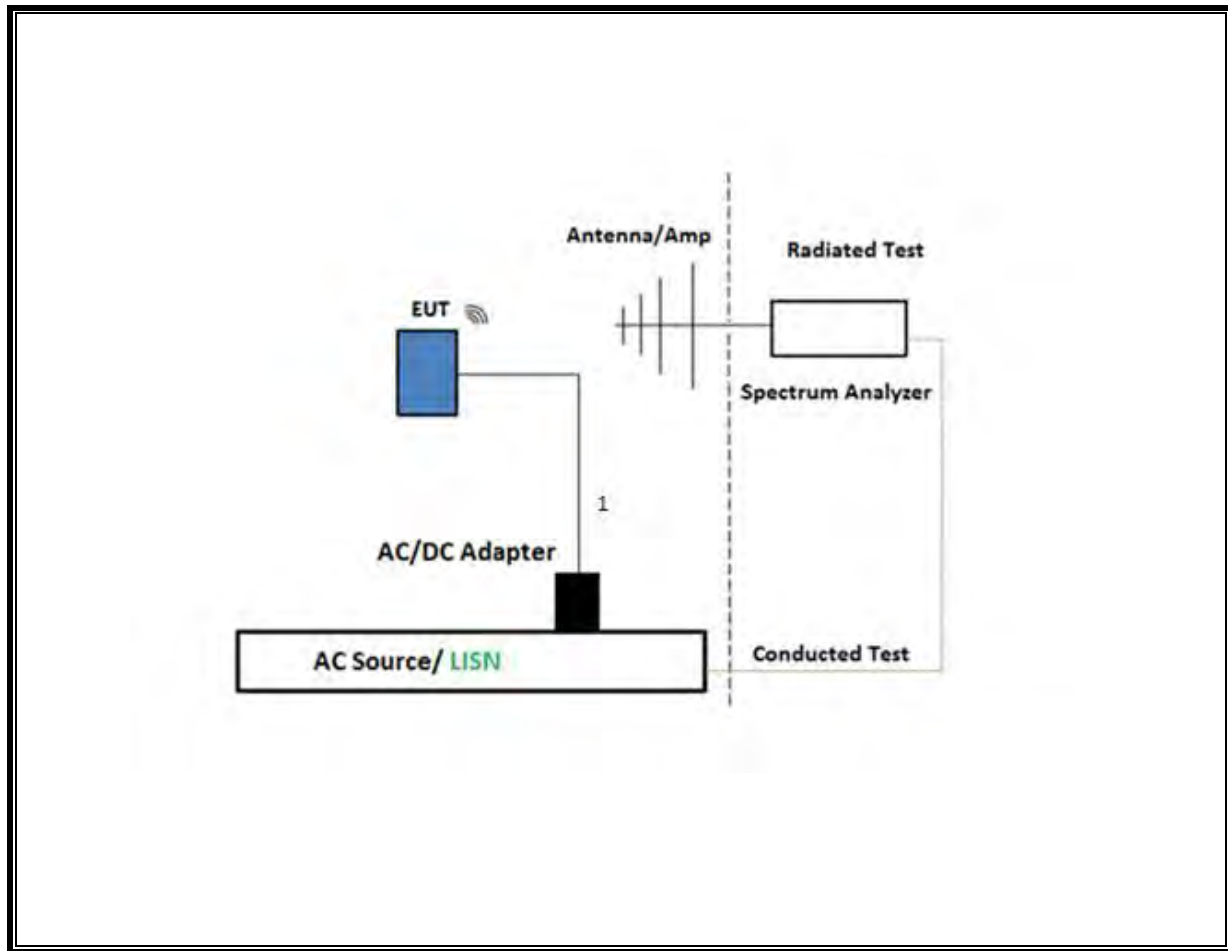
SETUP DIAGRAM FOR CONDUCTED TESTS



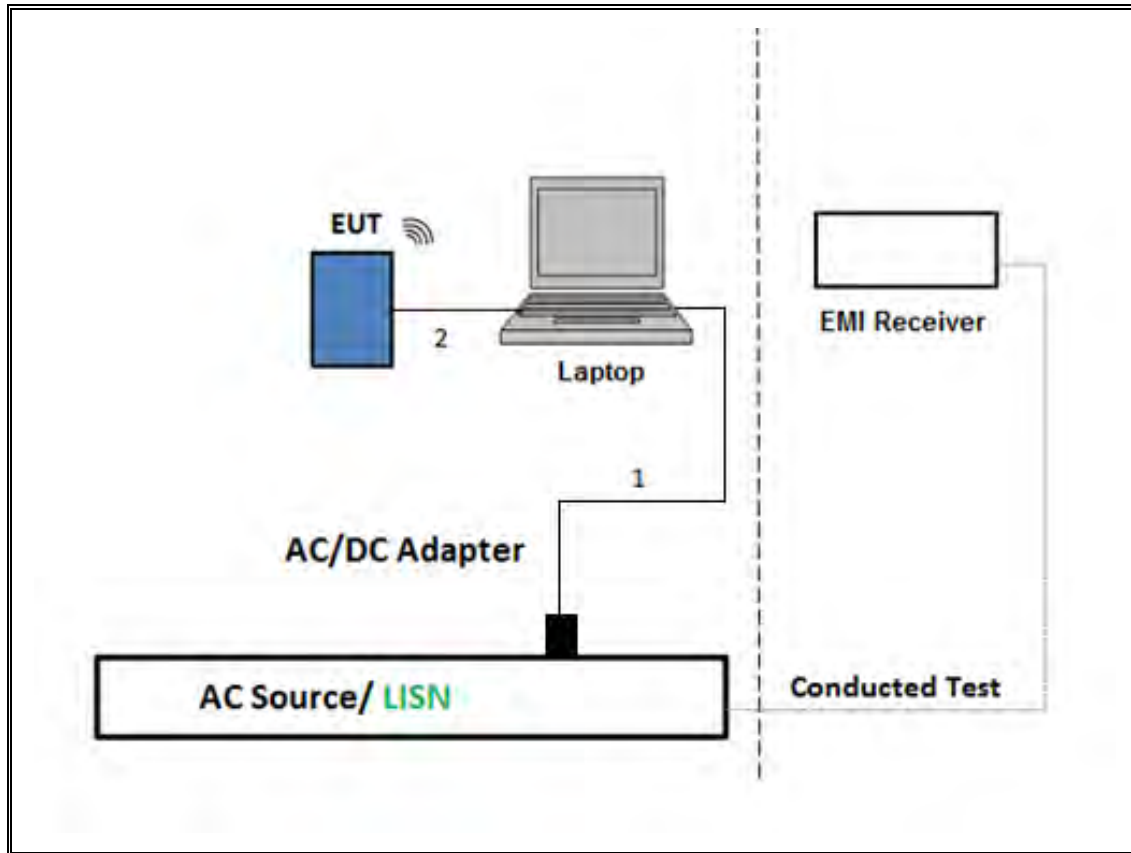
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v05r02, Section 6.

6 dB BW: ANSI C63.10 Subclause -11.8.1 RBW \geq DTS BW

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Measurement using gated average power meter

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.2 Integration method -Peak detection

Band-edge: ANSI C63.10 Subclause -11.13.3.3 Integration method -Trace averaging with continuous transmission at full power

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

NOTE: All conducted antenna port tests for Beamforming applied the same test procedures as BLE 1Mbps and BLE 2Mbps normal modes

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | | |
|---|---------------------------------|------------------------|---------------------------|------------|------------|
| Description | Manufacturer | Model | ID Num | Cal Due | Last Cal |
| Antenna, Horn 1-18GHz | ETS-Lindgren | 3117 | T345 | 04/20/2020 | 04/20/2019 |
| Amplifier, 1 to 18GHz | Miteq | AFS42-00101800-25-S-42 | T742 | 12/15/2019 | 12/15/2018 |
| *Antenna, Double Ridge Guide Horn Antenna 700MHz to 18GHz | A.H. SYSTEMS, INC. | SAS-571 | PRE0190811 | 07/12/2019 | 07/12/2018 |
| Amplifier, 1 to 18GHz | Miteq | AFS42-00101800-25-S-42 | 138301 | 09/15/2019 | 09/15/2018 |
| Antenna, Horn 1-18GHz | ETS Lindgren | 3117 | T136 | 06/14/2020 | 06/14/2019 |
| *Spectrum Analyzer, PXA 3Hz to 44GHz | Keysight | N9030A-544 | T1210 | 08/06/2019 | 08/06/2018 |
| Amplifier, 1 to 18GHz, 35dB | Ampical | AFS42-00101800-25-S-42 | T1567 | 1/26/2020 | 1/26/2019 |
| Amplifier, 1 to 18GHz | Miteq | AFS42-00101800-25-S-42 | T931 | 05/11/2020 | 05/11/2019 |
| *Antenna, Horn 1-18GHz | ETS Lindgren | 3117 | T120 | 07/02/2019 | 07/02/2018 |
| Amplifier, 1 to 18GHz | Miteq | AFS42-00101800-25-S-42 | T491 | 05/30/2020 | 05/30/2019 |
| *Antenna, Broadband Hybrid, 30MHz to 2000MHz | Sunol Sciences Corp. | JB3 | T900 | 06/18/2019 | 06/18/2018 |
| *Amplifier, 10KHz to 1GHz, 32dB | Sonoma | 310N | T285 | 07/06/2019 | 07/06/2018 |
| *Antenna Horn 18 to 26.5GHz | ARA | MWH-1826/B | T449 | 06/29/2019 | 06/29/2018 |
| Pre-Amp 18-26GHz | Agilent Technology | 8449B | T404 | 03/23/2020 | 03/23/2019 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Agilent (Keysight) Technologies | N9030A | T342 | 01/23/2020 | 01/23/2018 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Agilent (Keysight) Technologies | N9030A | T340 | 01/22/2020 | 01/22/2018 |
| Spectrum Analyzer, PXA 3Hz to 44GHz | Keysight | N9030A | T1450 | 01/23/2020 | 01/23/2019 |
| EMI TEST RECEIVER | Rohde & Schwarz | ESW44 | PRE0179367 | 05/16/2020 | 05/16/2019 |
| Power Meter, P-series single channel | Keysight | N1912A | T1273 | 01/30/2020 | 01/30/2019 |
| Power Sensor | Keysight | N1921A | T1224 | 02/22/2020 | 02/22/2019 |
| Antenna, Active Loop 9KHz to 30MHz | ETS-Lindgren | 6502 | T757 | 09/25/2019 | 09/25/2018 |
| AC Line Conducted | | | | | |
| EMI Test Receiver 9KHz-7GHz | Rohde & Schwarz | ESC17 | T1436 | 02/14/2020 | 02/14/2019 |
| Power Cable, Line Conducted Emissions | UL | PG1 | T861 | 08/31/2019 | 08/31/2018 |
| *LISN for Conducted Emissions CISPR-16 | Fischer | 50/250-25-2-01 | T1310 | 06/19/2019 | 06/19/2018 |
| UL AUTOMATION SOFTWARE | | | | | |
| Radiated Software | UL | UL EMC | Ver 9.5, April 26, 2016 | | |
| Conducted Software | UL | UL EMC | Ver 5.4, October 13, 2016 | | |
| AC Line Conducted Software | UL | UL EMC | Ver 9.5, May 26, 2015 | | |

*Testing is completed before equipment expiration date.

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

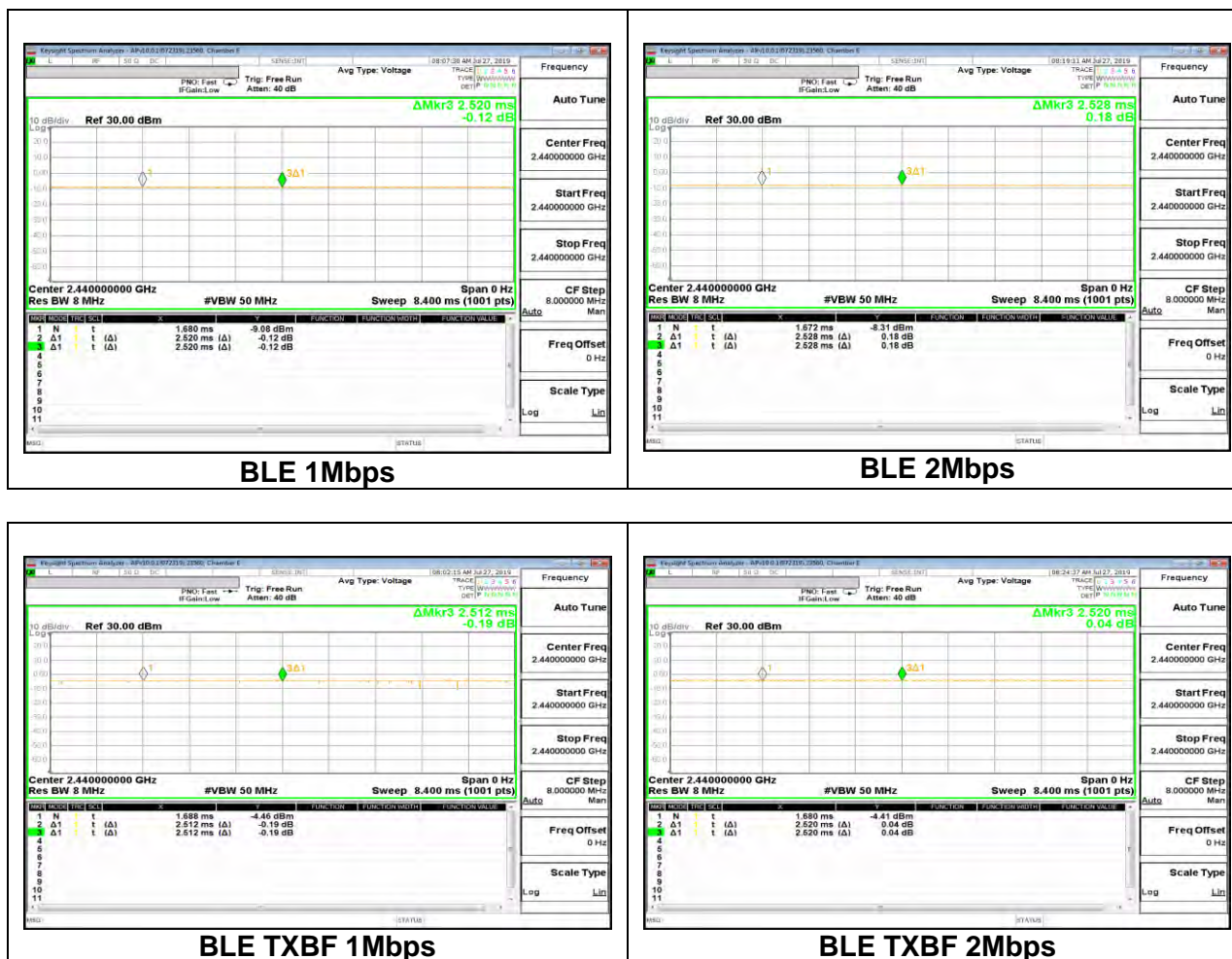
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|--------------------|------------------------|------------------|-----------------------------|----------------------|---|-----------------------------|
| 2.4GHz Band | | | | | | |
| BLE, 1Mbps | 2.520 | 2.520 | 1.000 | 100.00% | 0.00 | 0.010 |
| BLE, 2Mbps | 2.528 | 2.528 | 1.000 | 100.00% | 0.00 | 0.010 |
| BLE, TXBF, 1Mbps | 2.512 | 2.512 | 1.000 | 100.00% | 0.00 | 0.010 |
| BLE, TXBF, 2Mbps | 2.520 | 2.520 | 1.000 | 100.00% | 0.00 | 0.010 |

DUTY CYCLE BLE



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

8.2.1. High Power BLE (1Mbps)

Antenna 4

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 1.0543 |
| Middle | 2440 | 1.0565 |
| High | 2480 | 1.0572 |



LOW CHANNEL



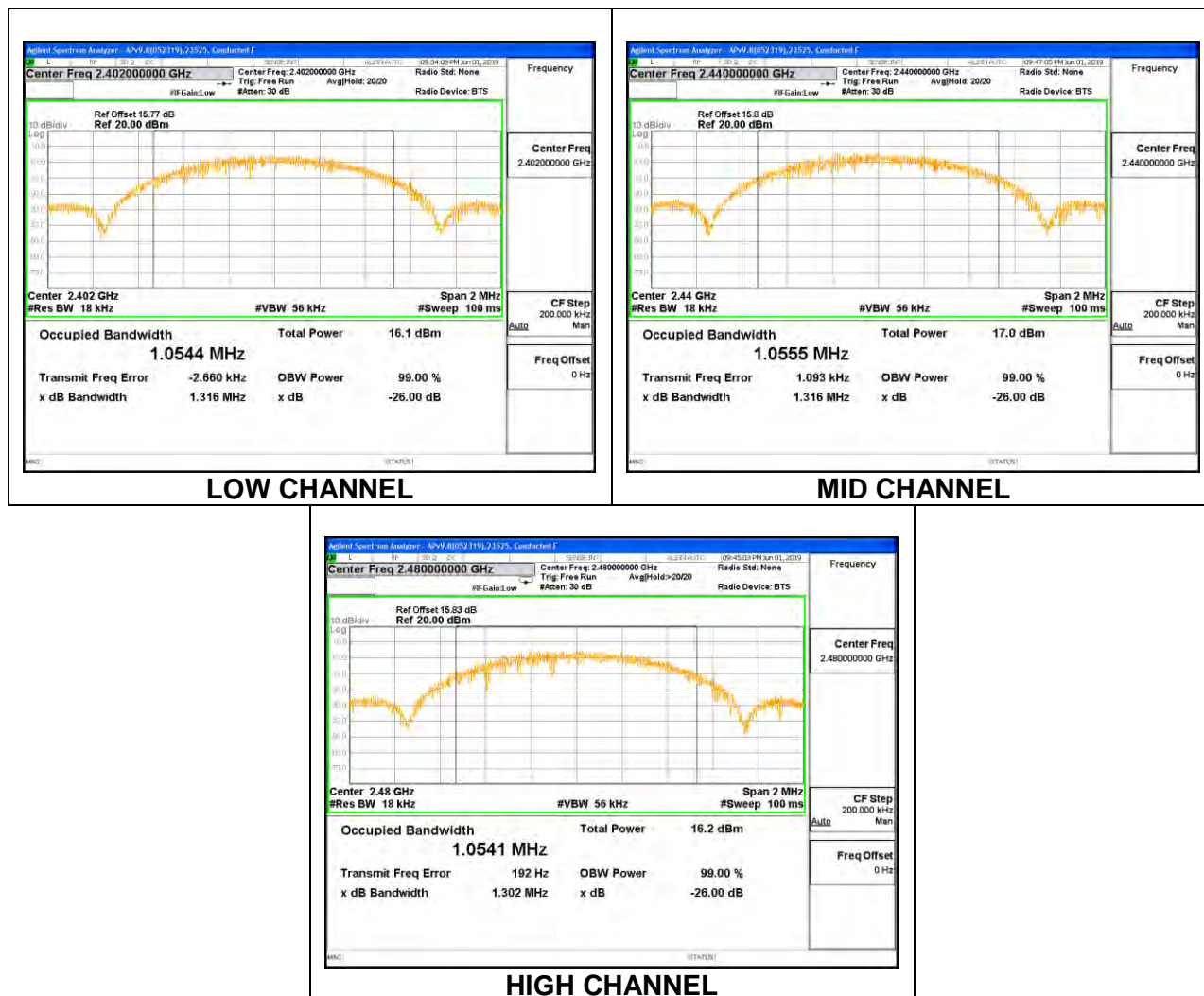
MID CHANNEL



HIGH CHANNEL

Antenna 3

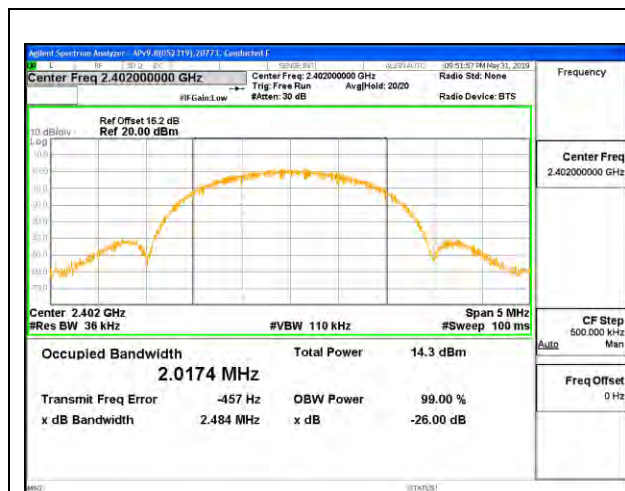
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 1.0544 |
| Middle | 2440 | 1.0555 |
| High | 2480 | 1.0541 |



8.2.2. High Power BLE (2Mbps)

Antenna 4

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 2.0174 |
| Middle | 2440 | 2.0204 |
| High | 2480 | 2.0195 |



Antenna 3

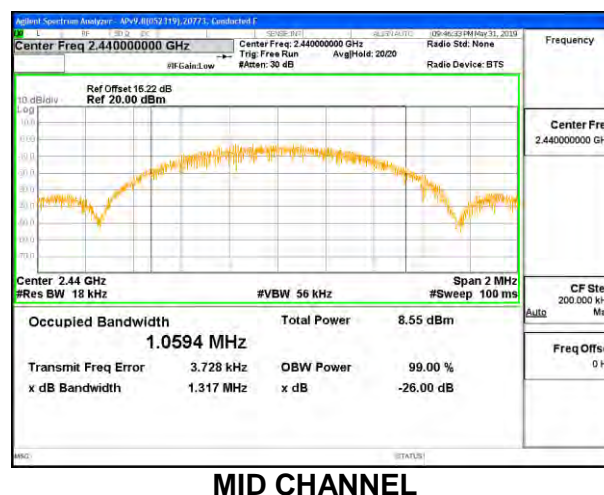
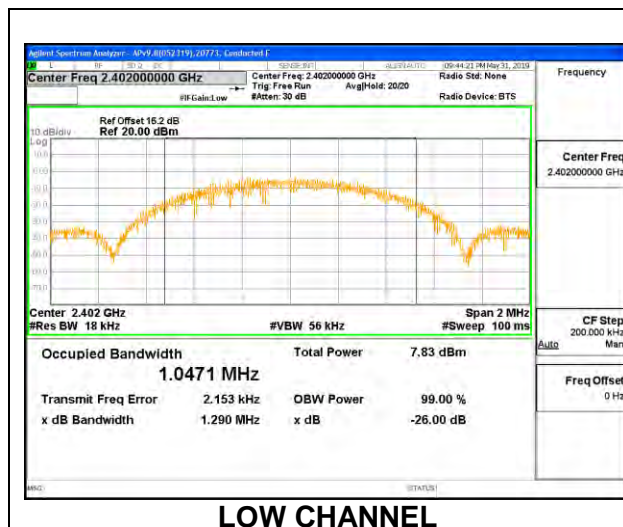
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 2.0318 |
| Middle | 2440 | 2.0427 |
| High | 2480 | 2.0289 |



8.2.3 Low Power BLE (1Mbps)

Antenna 4

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 1.0471 |
| Middle | 2440 | 1.0594 |
| High | 2480 | 1.0505 |



Antenna 3

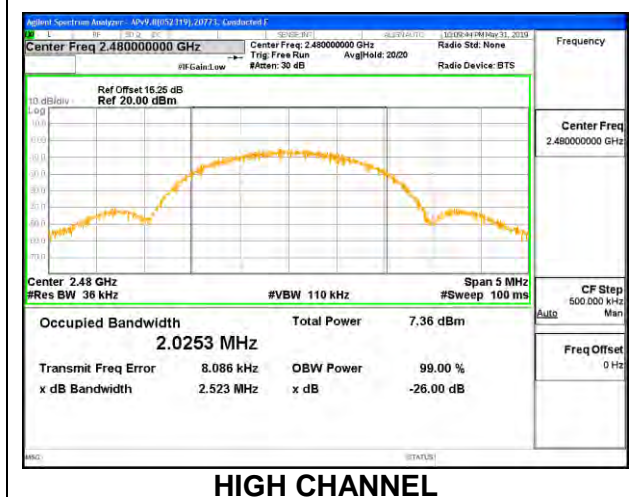
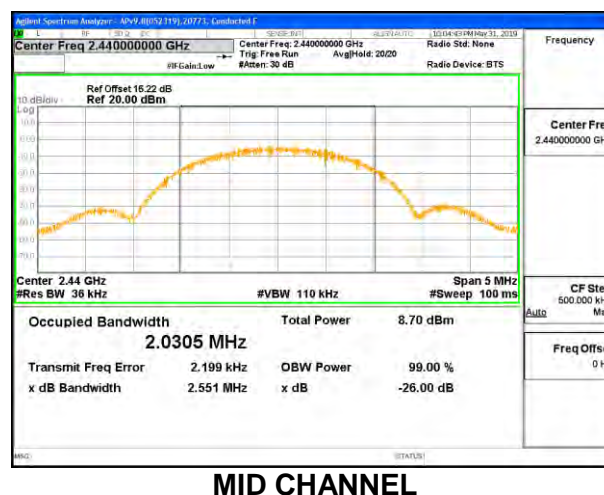
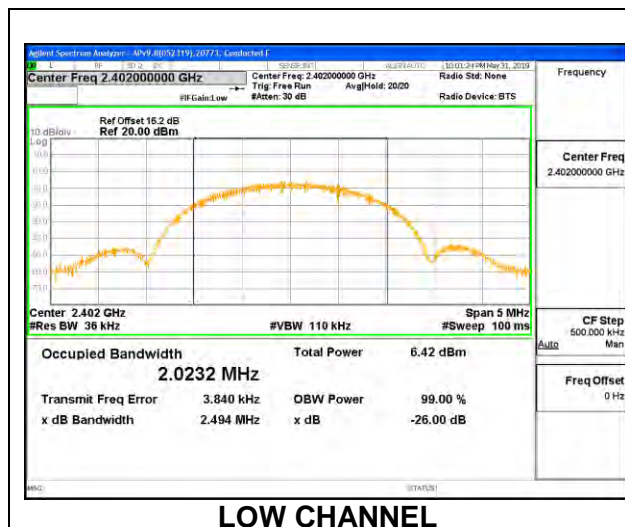
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 1.0494 |
| Middle | 2440 | 1.0580 |
| High | 2480 | 1.0618 |



8.2.4 Low Power BLE (2Mbps)

Antenna 4

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 2.0232 |
| Middle | 2440 | 2.0305 |
| High | 2480 | 2.0253 |



Antenna 3

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2402 | 2.0352 |
| Middle | 2440 | 2.0315 |
| High | 2480 | 2.0252 |



8.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

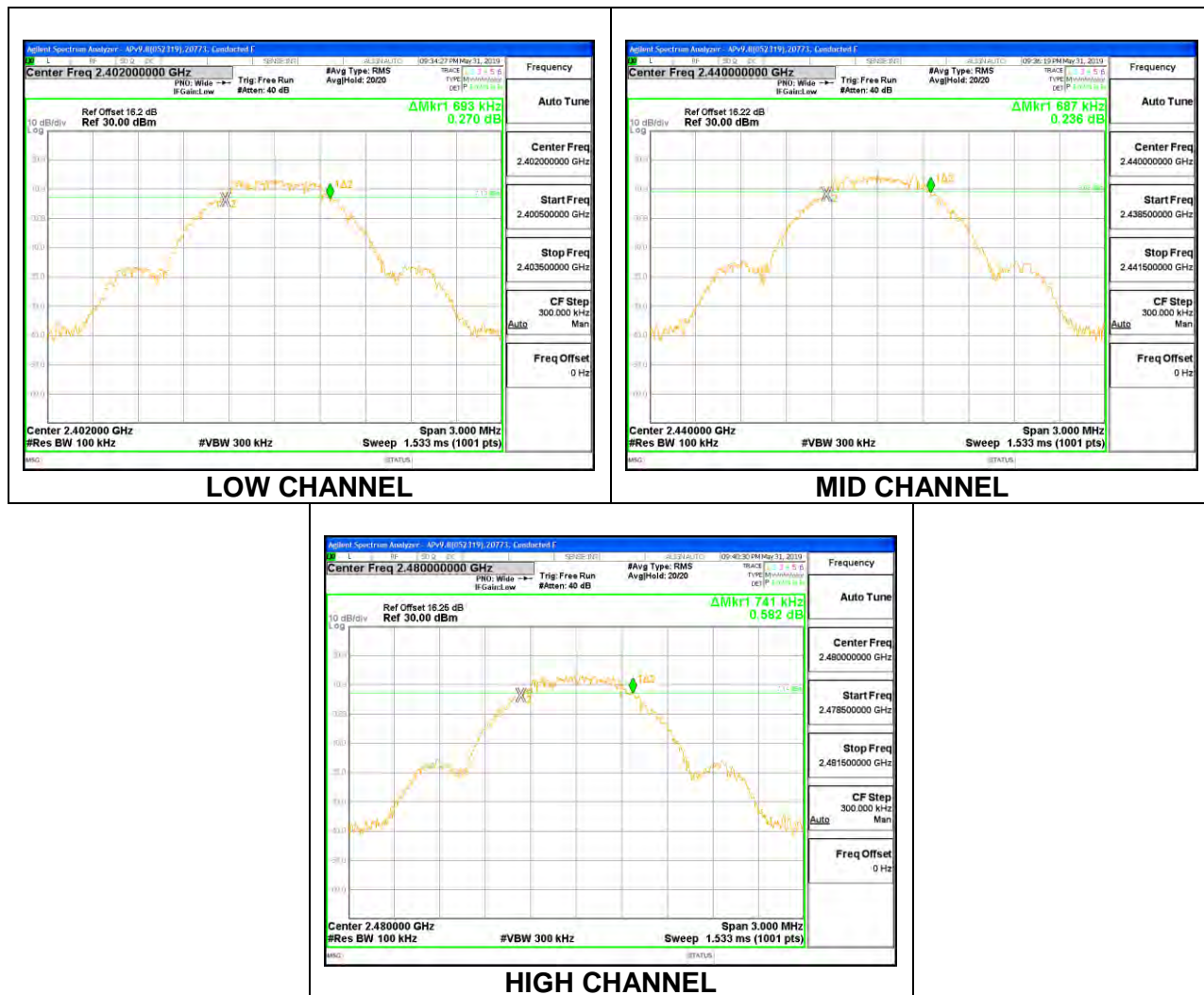
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

8.3.1. High Power BLE (1Mbps)

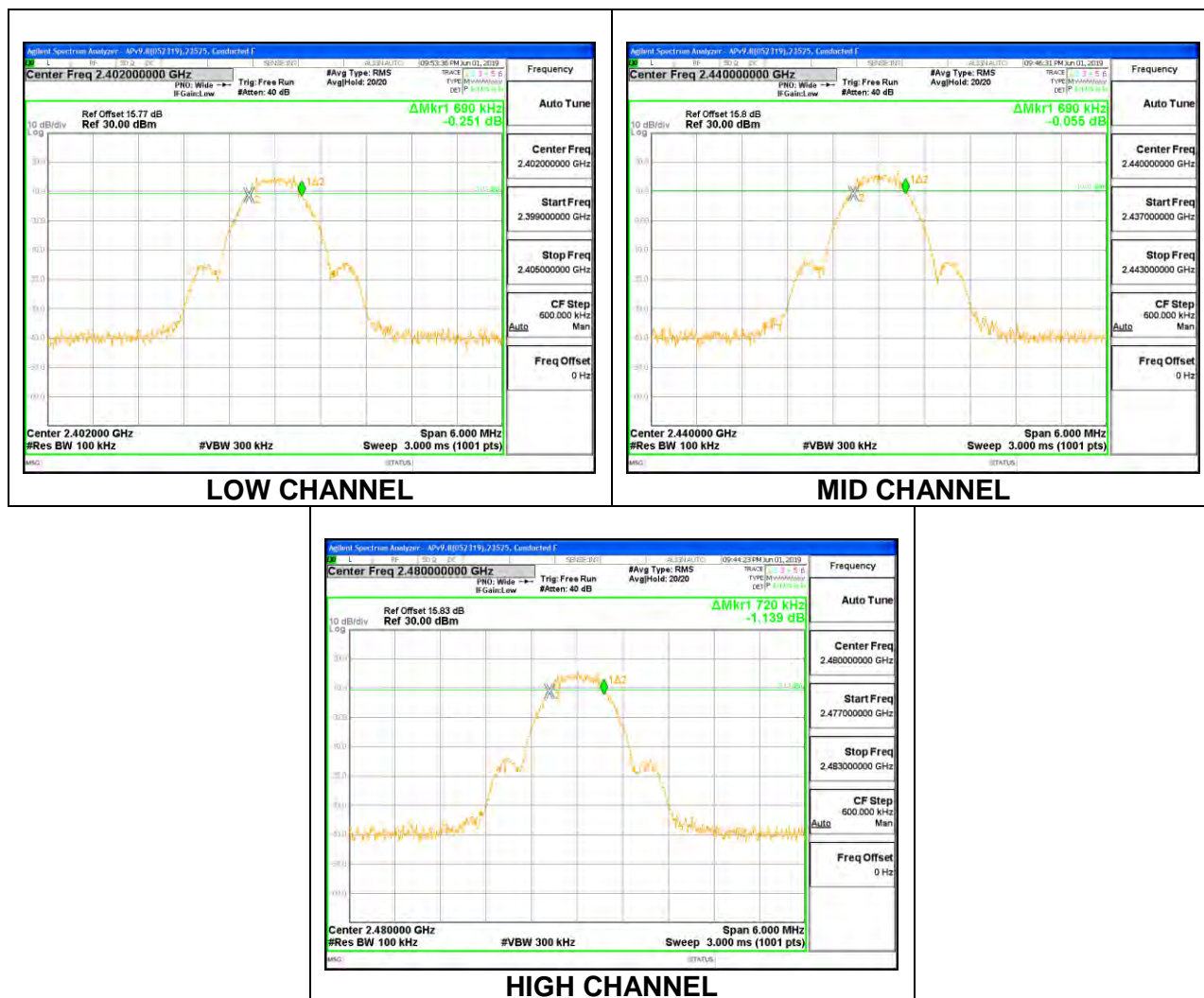
Antenna 4

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 0.6930 | 0.5 |
| Middle | 2440 | 0.6870 | 0.5 |
| High | 2480 | 0.7410 | 0.5 |



Antenna 3

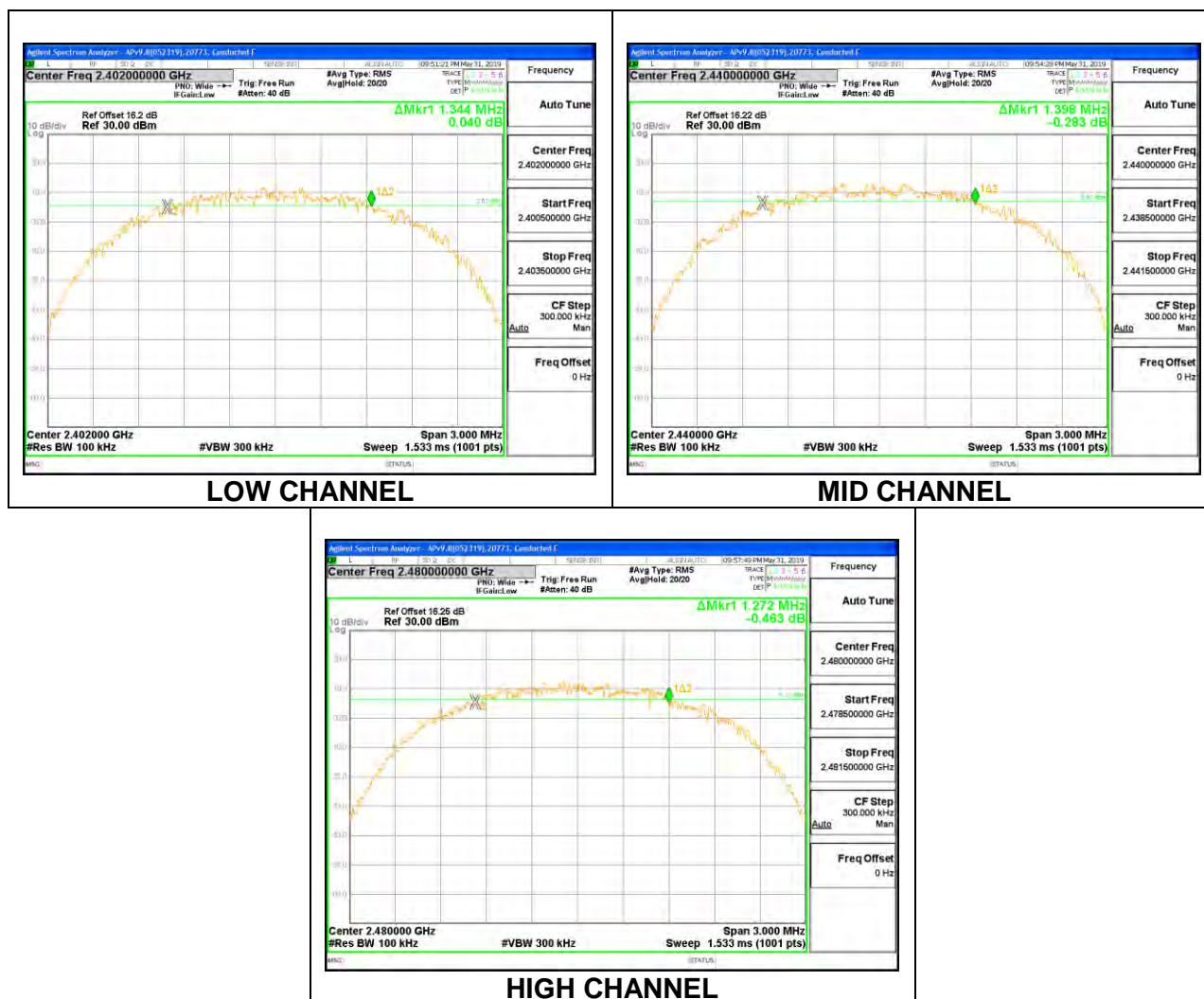
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 0.6900 | 0.5 |
| Middle | 2440 | 0.6900 | 0.5 |
| High | 2480 | 0.7200 | 0.5 |



8.3.2. High Power BLE (2Mbps)

Antenna 4

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 1.3440 | 0.5 |
| Middle | 2440 | 1.3980 | 0.5 |
| High | 2480 | 1.2720 | 0.5 |



Antenna 3

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 1.3980 | 0.5 |
| Middle | 2440 | 1.3200 | 0.5 |
| High | 2480 | 1.4100 | 0.5 |



LOW CHANNEL



MID CHANNEL

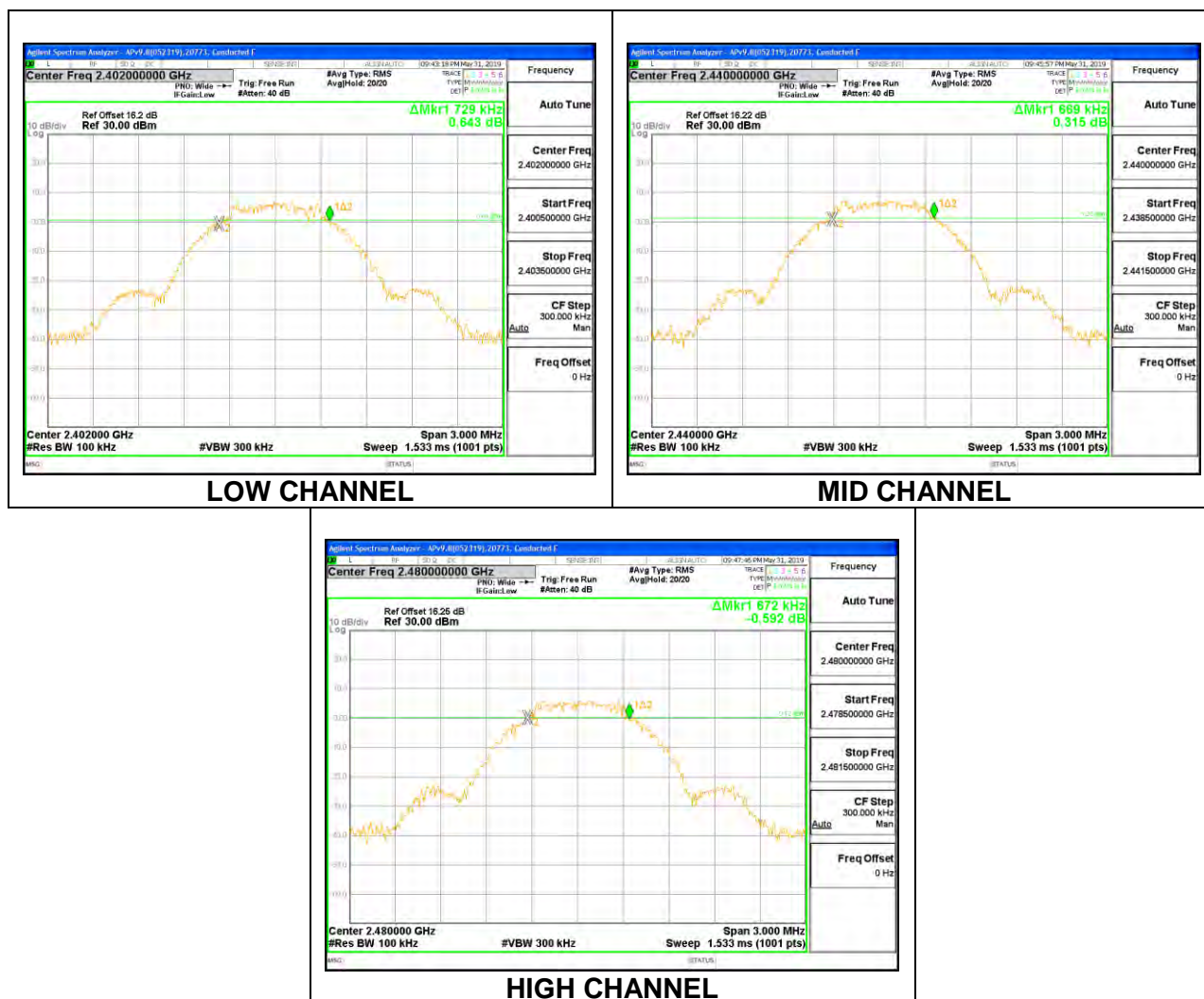


HIGH CHANNEL

8.3.3 Low Power BLE (1Mbps)

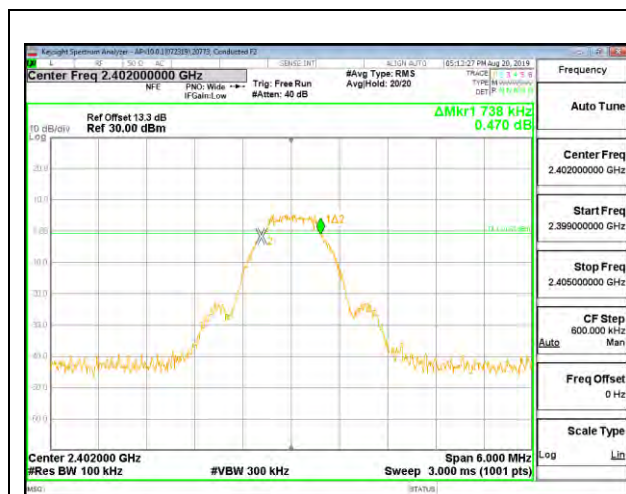
Antenna 4

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 0.7290 | 0.5 |
| Middle | 2440 | 0.6690 | 0.5 |
| High | 2480 | 0.6720 | 0.5 |



Antenna 3

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 0.7380 | 0.5 |
| Middle | 2440 | 0.7620 | 0.5 |
| High | 2480 | 0.7080 | 0.5 |



LOW CHANNEL



MID CHANNEL

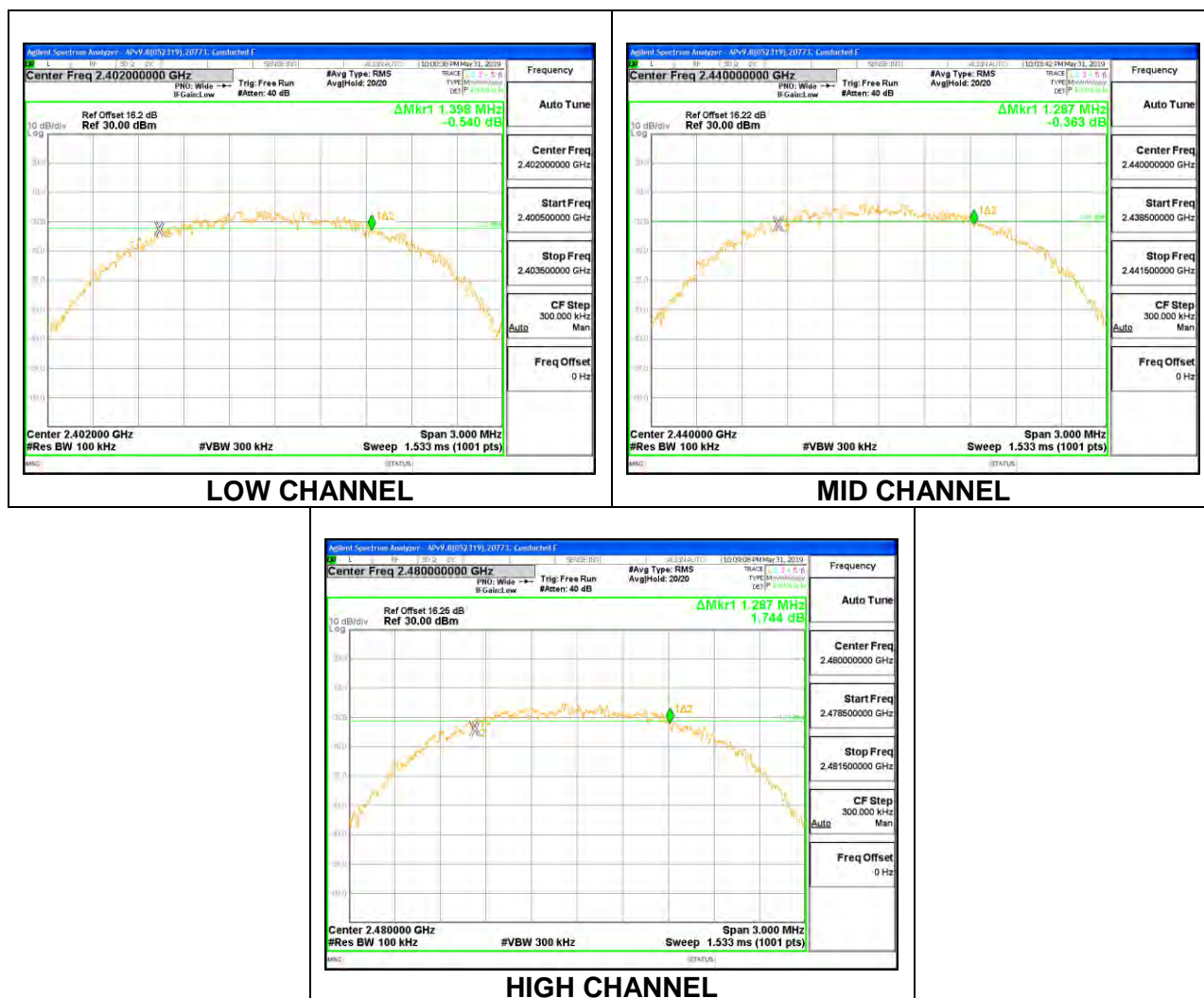


HIGH CHANNEL

8.3.4 Low Power BLE (2Mbps)

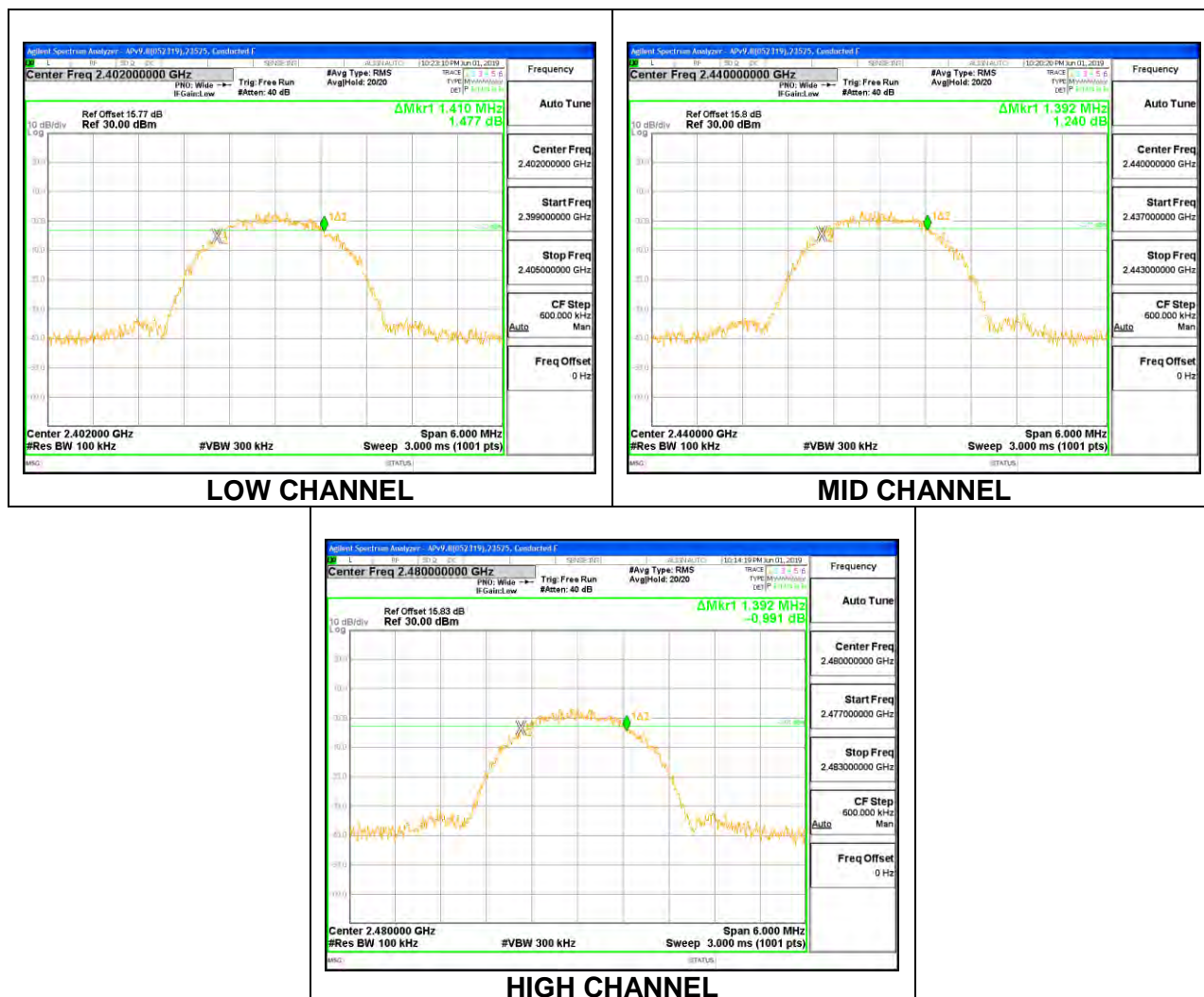
Antenna 4

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 1.3980 | 0.5 |
| Middle | 2440 | 1.2870 | 0.5 |
| High | 2480 | 1.2870 | 0.5 |



Antenna 3

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low | 2402 | 1.4100 | 0.5 |
| Middle | 2440 | 1.3920 | 0.5 |
| High | 2480 | 1.3920 | 0.5 |



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.4.1. High Power BLE (1Mbps)

Antenna 4

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|----------------|----------------------------|---|------------------------|------------------------|
| Low | 2402 | 17.13 | 30 | -12.87 |
| Middle | 2440 | 17.28 | 30 | -12.72 |
| High | 2480 | 17.21 | 30 | -12.79 |

Antenna 3

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|----------------|----------------------------|---|------------------------|------------------------|
| Low | 2402 | 19.62 | 30 | -10.38 |
| Middle | 2440 | 19.75 | 30 | -10.25 |
| High | 2480 | 19.69 | 30 | -10.31 |

8.4.2. High Power BLE (2Mbps)

Antenna 4

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 17.16 | 30 | -12.84 |
| Middle | 2440 | 17.24 | 30 | -12.76 |
| High | 2480 | 17.19 | 30 | -12.81 |

Antenna 3

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 19.71 | 30 | -10.29 |
| Middle | 2440 | 19.68 | 30 | -10.32 |
| High | 2480 | 19.63 | 30 | -10.37 |

8.4.3. Low Power BLE (1Mbps)

Antenna 4

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 12.69 | 30 | -17.31 |
| Middle | 2440 | 12.67 | 30 | -17.33 |
| High | 2480 | 12.72 | 30 | -17.28 |

Antenna 3

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 12.59 | 30 | -17.41 |
| Middle | 2440 | 12.72 | 30 | -17.28 |
| High | 2480 | 12.66 | 30 | -17.34 |

8.4.4. Low Power BLE (2Mbps)

Antenna 4

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 12.71 | 30 | -17.29 |
| Middle | 2440 | 12.66 | 30 | -17.34 |
| High | 2480 | 12.77 | 30 | -17.23 |

Antenna 3

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low | 2402 | 12.71 | 30 | -17.29 |
| Middle | 2440 | 12.78 | 30 | -17.22 |
| High | 2480 | 12.68 | 30 | -17.32 |

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

8.5.1. High Power BLE (1Mbps)

Antenna 4

| | |
|--------------|-----------|
| Date: | 7/24/2019 |
|--------------|-----------|

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 16.95 |
| Middle | 2440 | 16.85 |
| High | 2480 | 16.97 |

Antenna 3

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 19.42 |
| Middle | 2440 | 19.41 |
| High | 2480 | 19.43 |

8.5.2. High Power BLE (2Mbps)

Antenna 4

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 16.95 |
| Middle | 2440 | 16.89 |
| High | 2480 | 16.92 |

Antenna 3

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 19.42 |
| Middle | 2440 | 19.45 |
| High | 2480 | 19.43 |

8.5.3 Low Power BLE (1Mbps)

Antenna 4

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 12.41 |
| Middle | 2440 | 12.43 |
| High | 2480 | 12.45 |

Antenna 3

| | |
|-------------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|----------------|----------------------------|---------------------------|
| Low | 2402 | 12.43 |
| Middle | 2440 | 12.47 |
| High | 2480 | 12.39 |

8.5.4 Low Power BLE (2Mbps)

Antenna 4

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---------|--------------------|-------------------|
| Low | 2402 | 12.39 |
| Middle | 2440 | 12.38 |
| High | 2480 | 12.44 |

Antenna 3

| | |
|-------|-----------|
| Date: | 7/24/2019 |
|-------|-----------|

| Channel | Frequency (MHz) | AV power (dBm) |
|---------|--------------------|-------------------|
| Low | 2402 | 12.44 |
| Middle | 2440 | 12.39 |
| High | 2480 | 12.41 |

8.6 POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

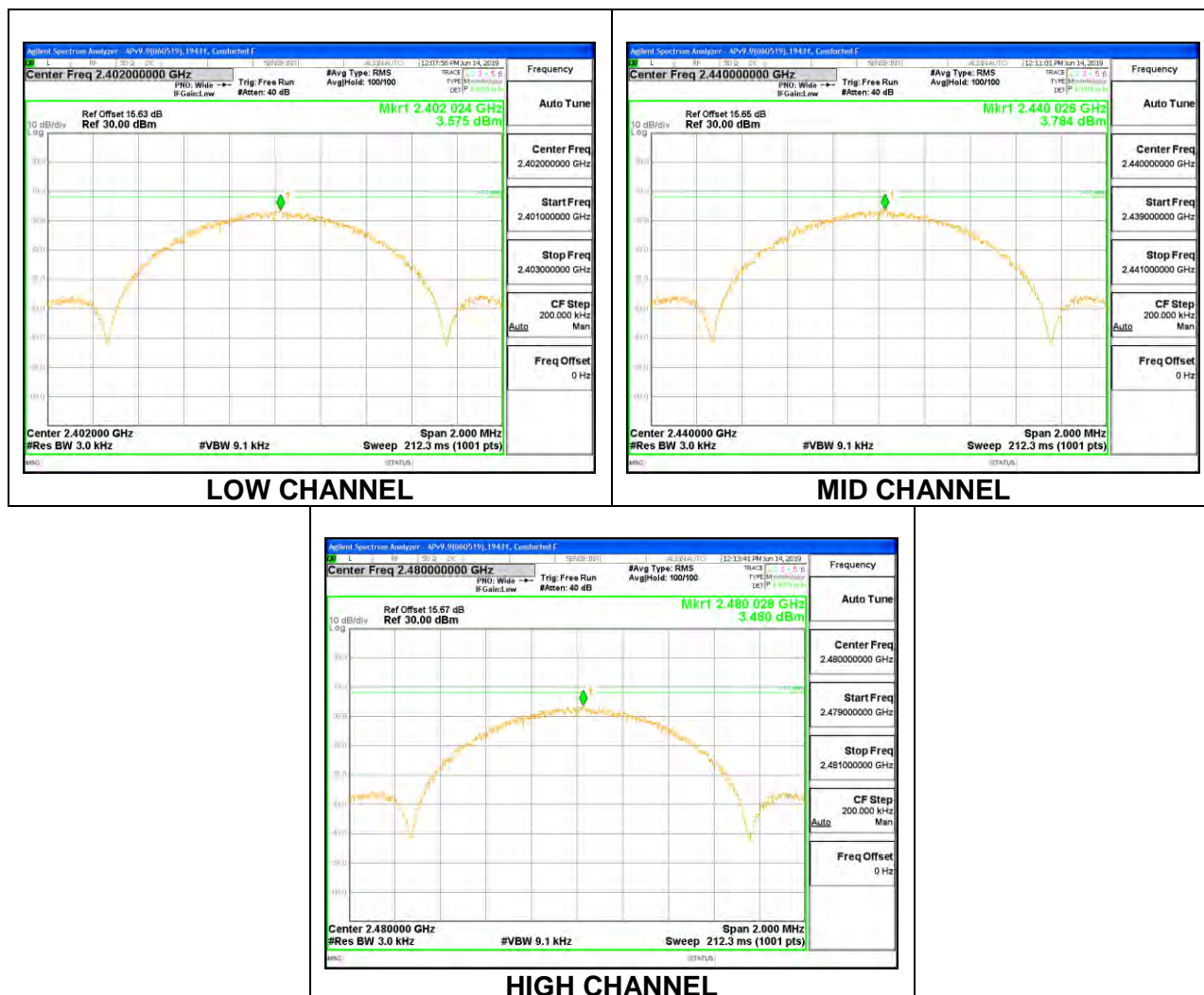
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

8.6.1 High Power BLE (1Mbps)

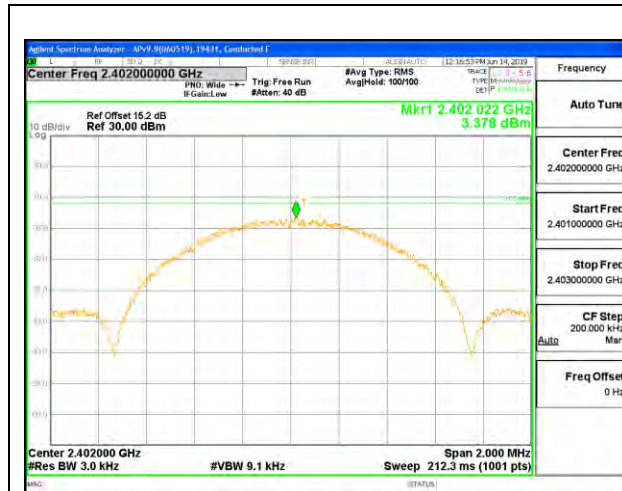
Antenna 4

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | 3.58 | 8 | -4.43 |
| Middle | 2440 | 3.78 | 8 | -4.22 |
| High | 2480 | 3.48 | 8 | -4.52 |



Antenna 3

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | 3.38 | 8 | -4.62 |
| Middle | 2440 | 3.88 | 8 | -4.12 |
| High | 2480 | 3.60 | 8 | -4.40 |



LOW CHANNEL



MID CHANNEL

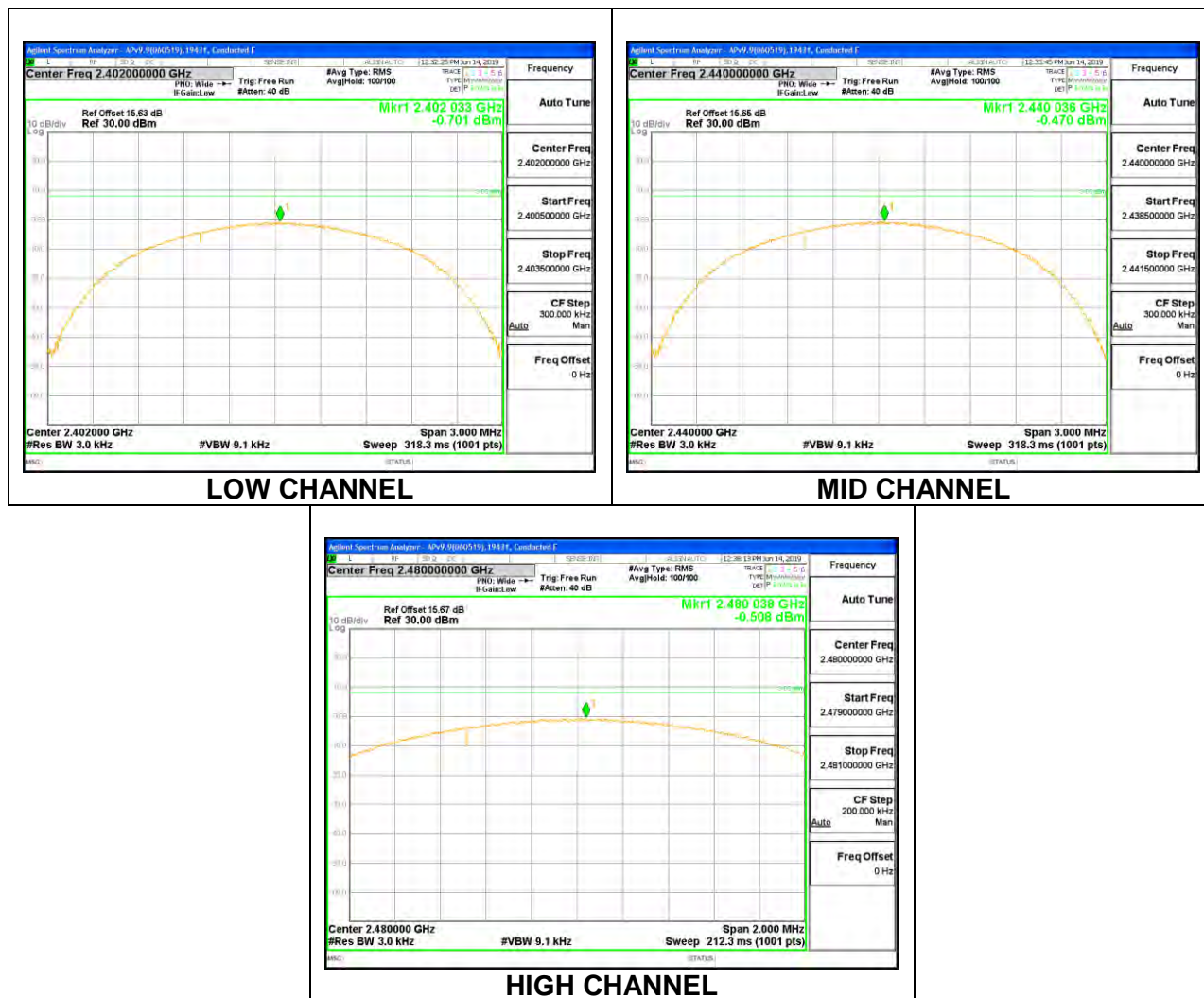


HIGH CHANNEL

8.6.2 High Power BLE (2Mbps)

Antenna 4

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -0.70 | 8 | -8.70 |
| Middle | 2440 | -0.47 | 8 | -8.47 |
| High | 2480 | -0.51 | 8 | -8.51 |



Antenna 3

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -0.35 | 8 | -8.35 |
| Middle | 2440 | -0.54 | 8 | -8.54 |
| High | 2480 | -1.70 | 8 | -9.70 |



LOW CHANNEL



MID CHANNEL

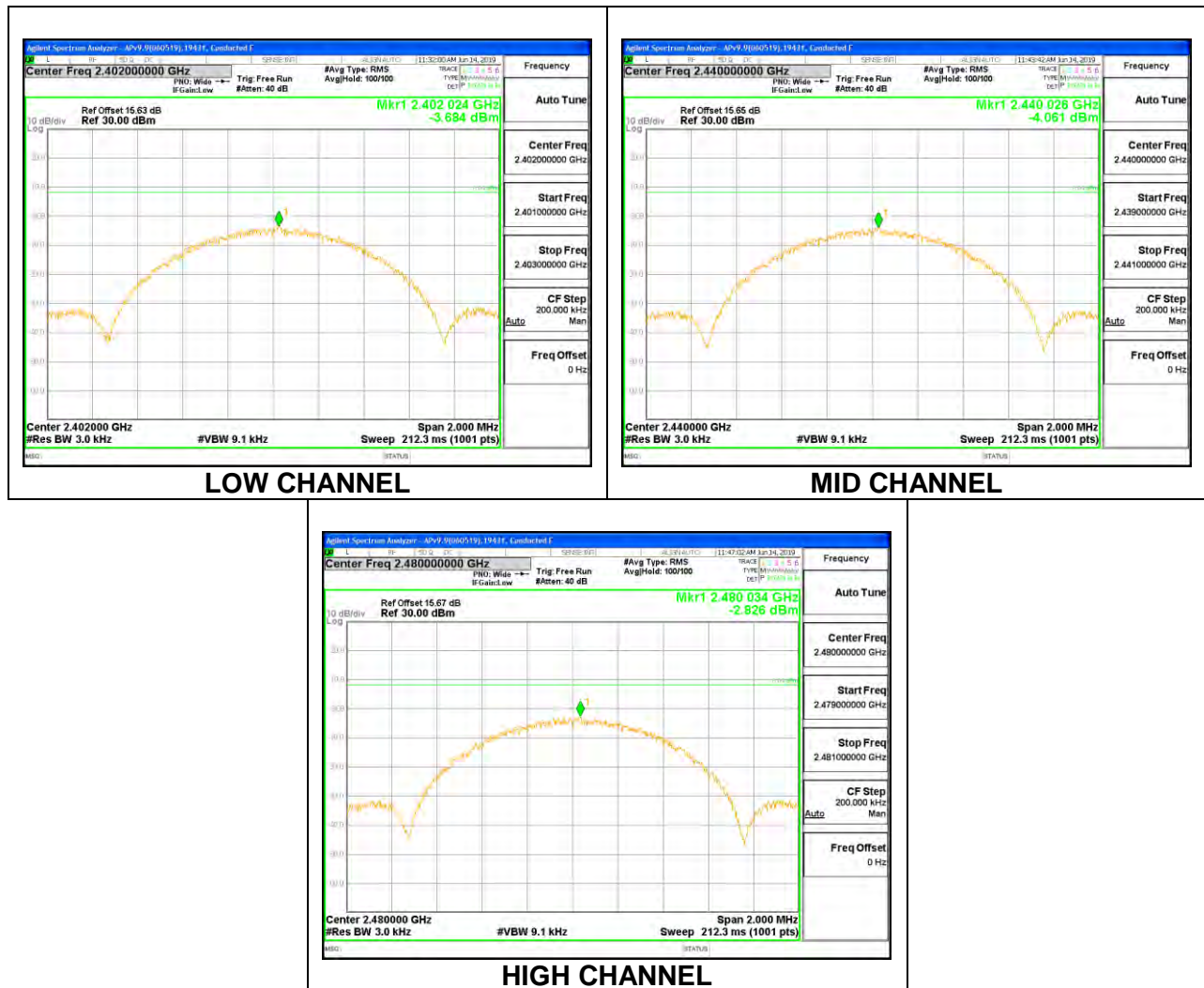


HIGH CHANNEL

8.6.3 Low Power BLE (1Mbps)

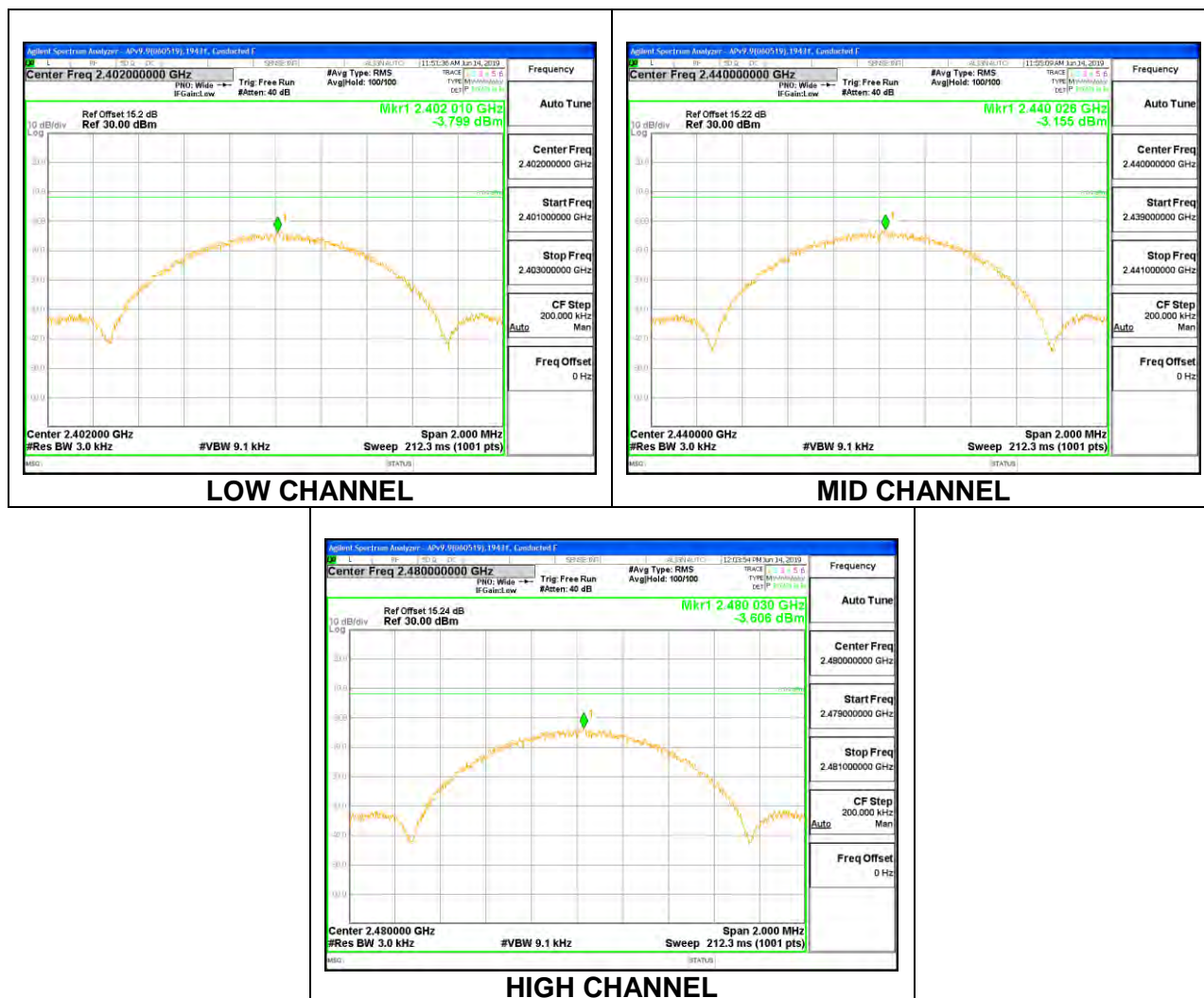
Antenna 4

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -3.68 | 8 | -11.68 |
| Middle | 2440 | -4.06 | 8 | -12.06 |
| High | 2480 | -2.83 | 8 | -10.83 |



Antenna 3

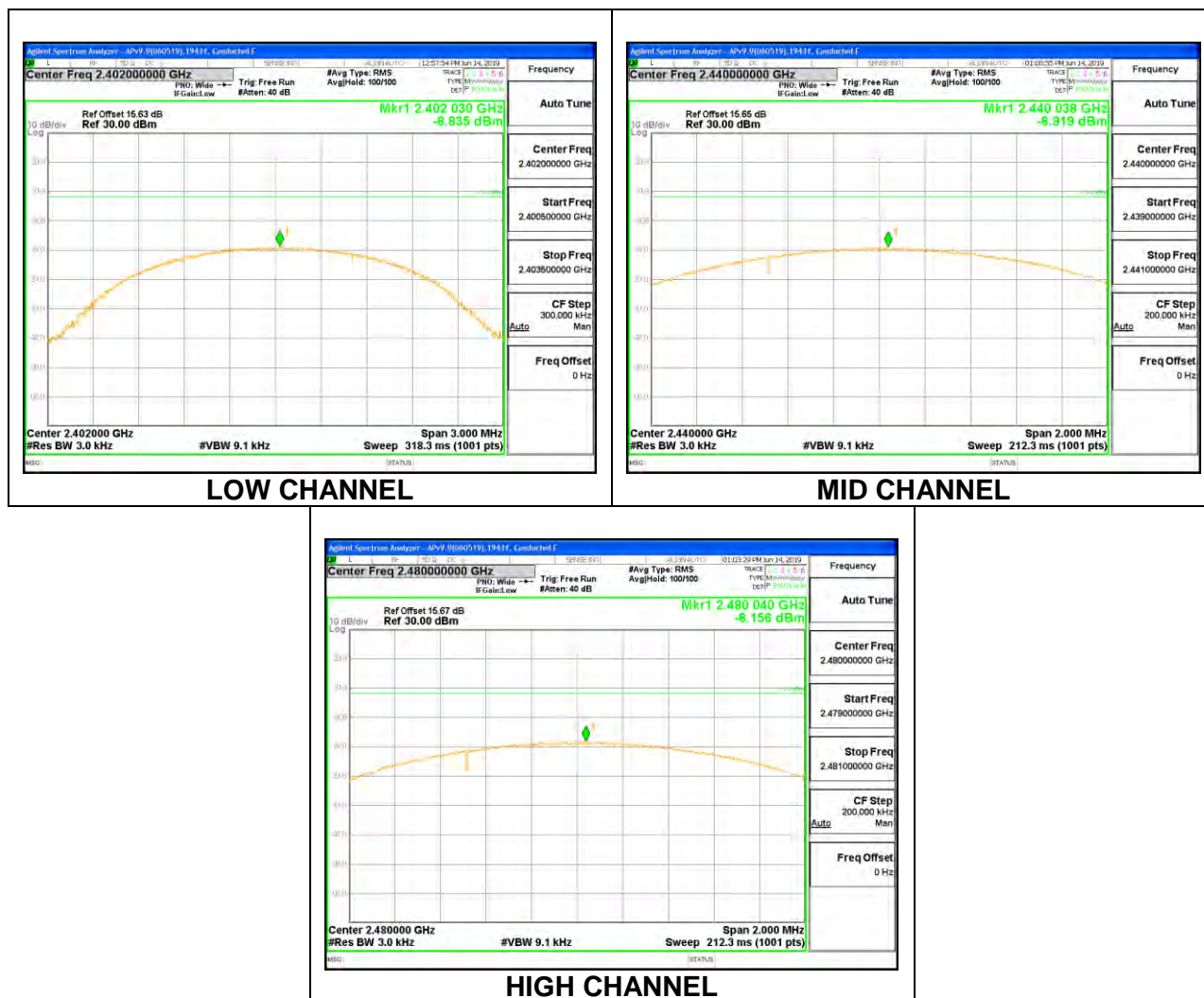
| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -3.80 | 8 | -11.80 |
| Middle | 2440 | -3.16 | 8 | -11.16 |
| High | 2480 | -3.61 | 8 | -11.61 |



8.6.4 Low Power BLE (2Mbps)

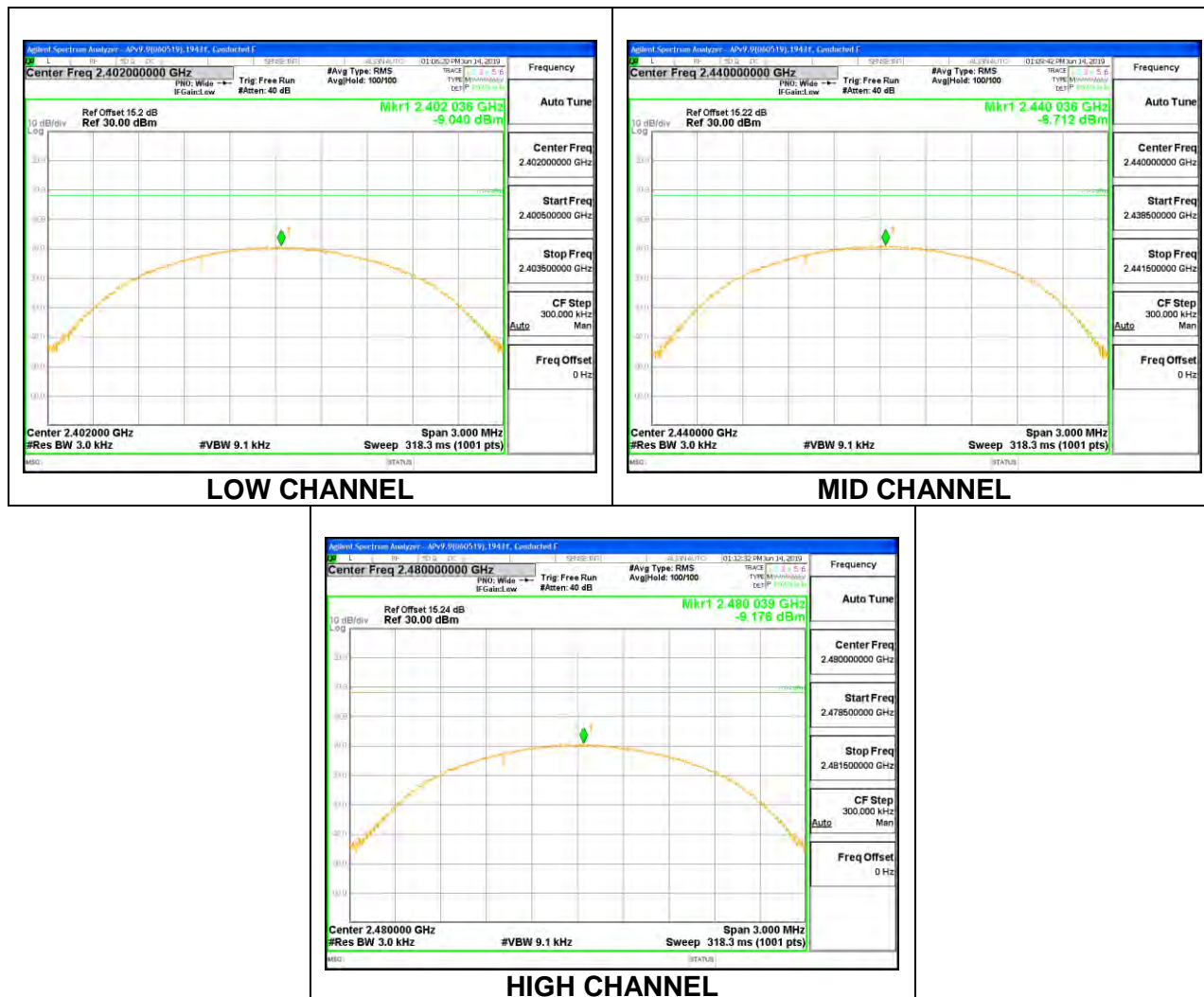
Antenna 4

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -8.84 | 8 | -16.84 |
| Middle | 2440 | -8.92 | 8 | -16.92 |
| High | 2480 | -8.16 | 8 | -16.16 |



Antenna 3

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low | 2402 | -9.04 | 8 | -17.04 |
| Middle | 2440 | -8.71 | 8 | -16.71 |
| High | 2480 | -9.18 | 8 | -17.18 |



8.7 CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

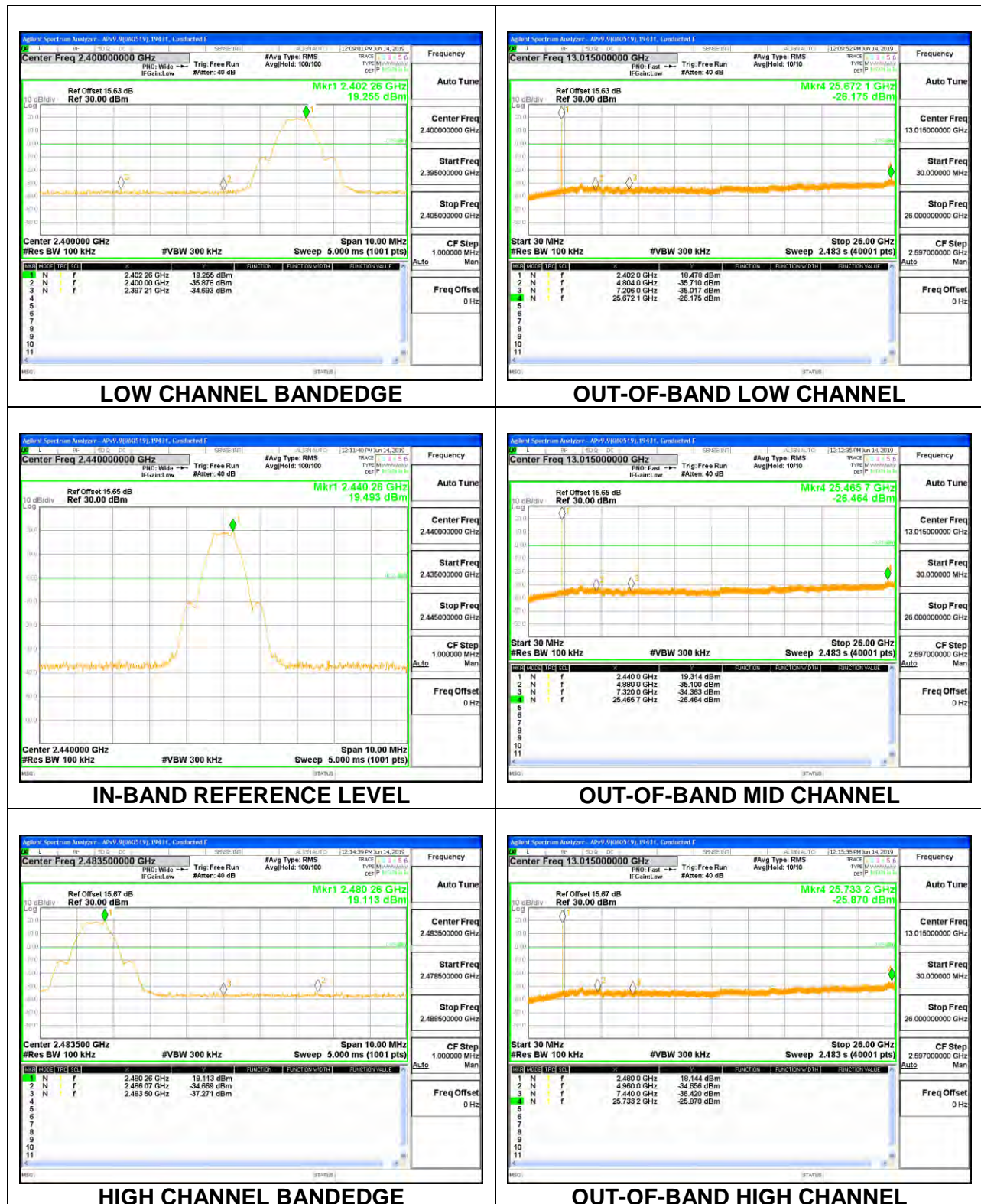
RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

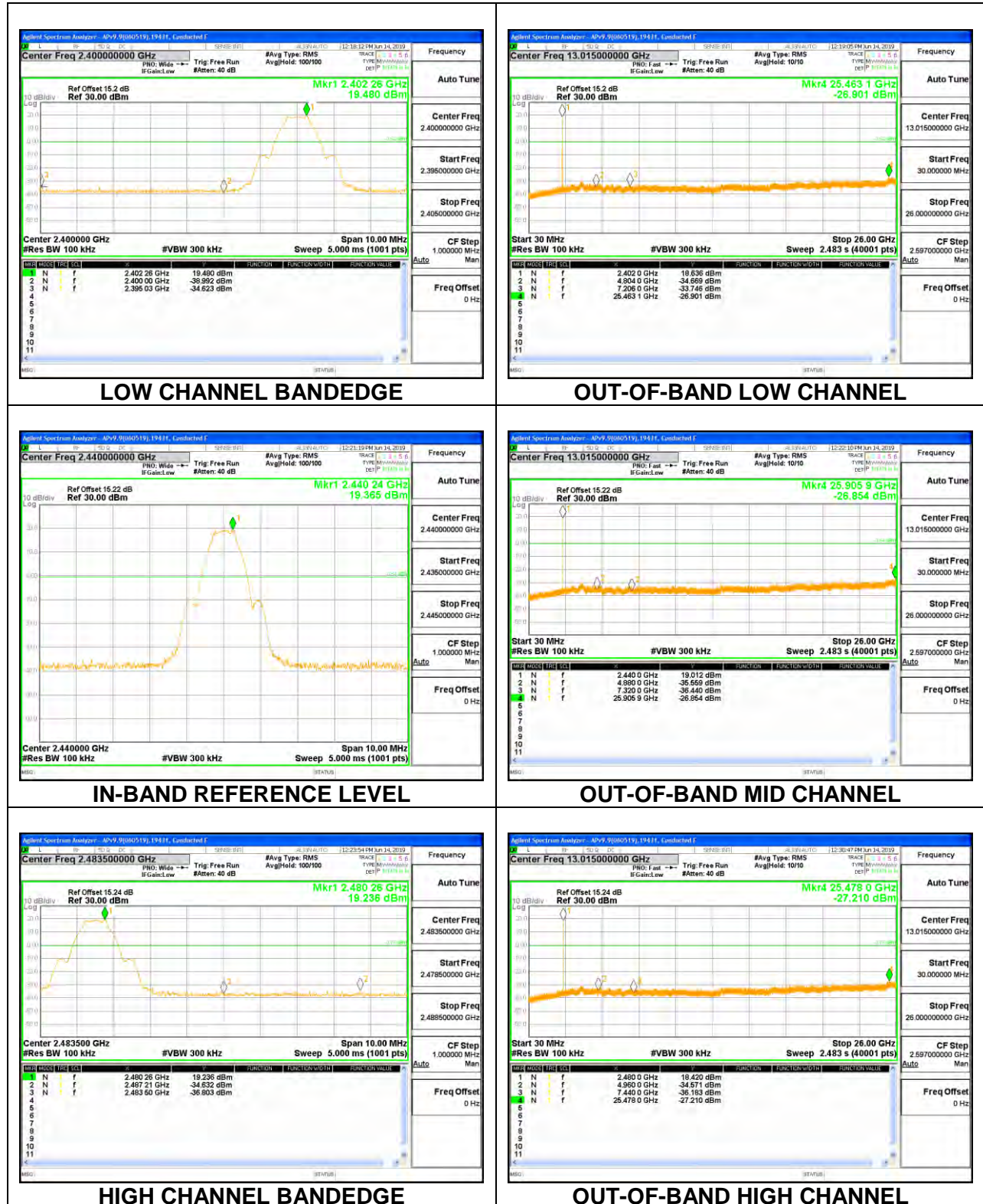
RESULTS

8.7.1 High Power BLE (1Mbps)

Antenna 4

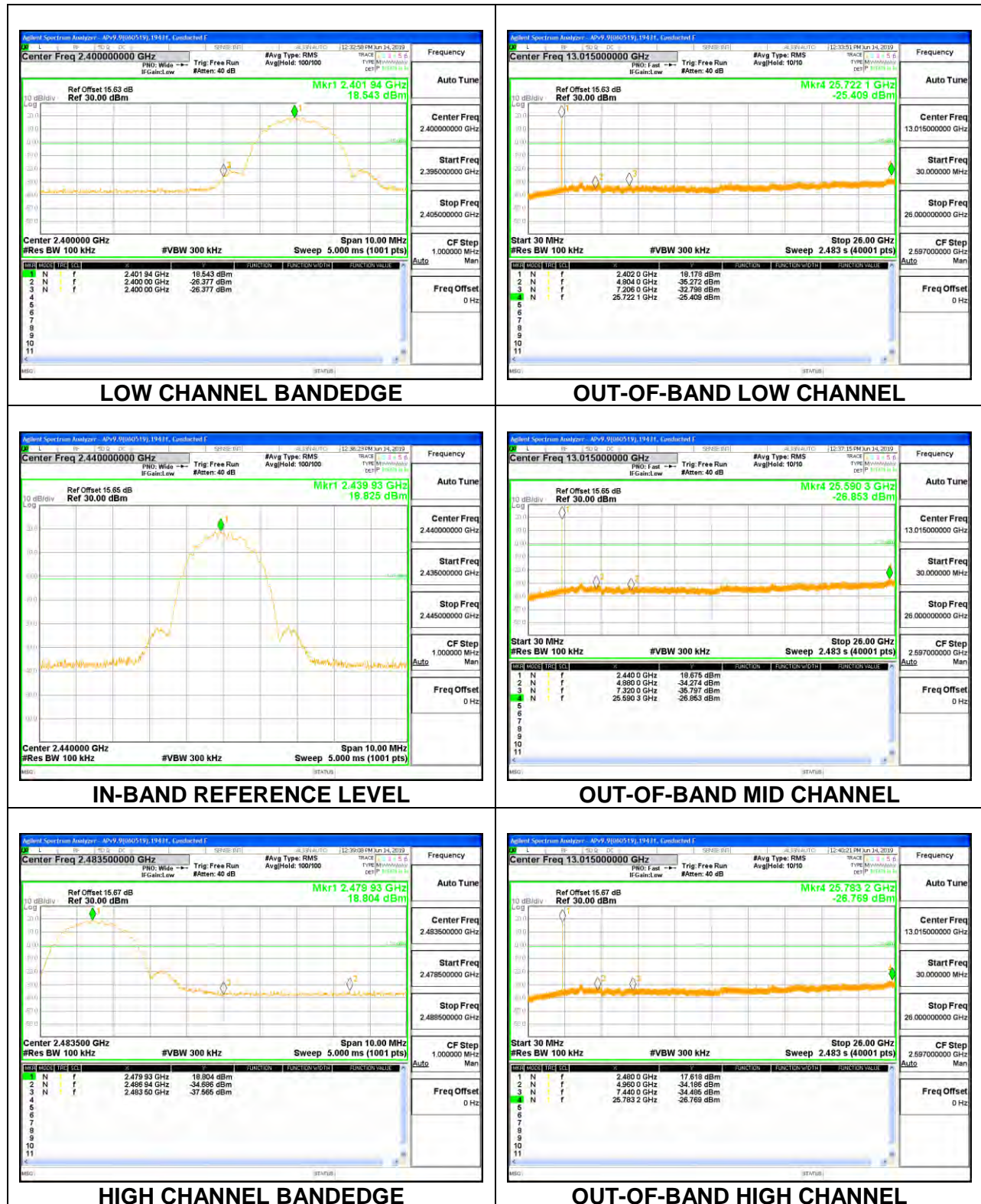


Antenna 3

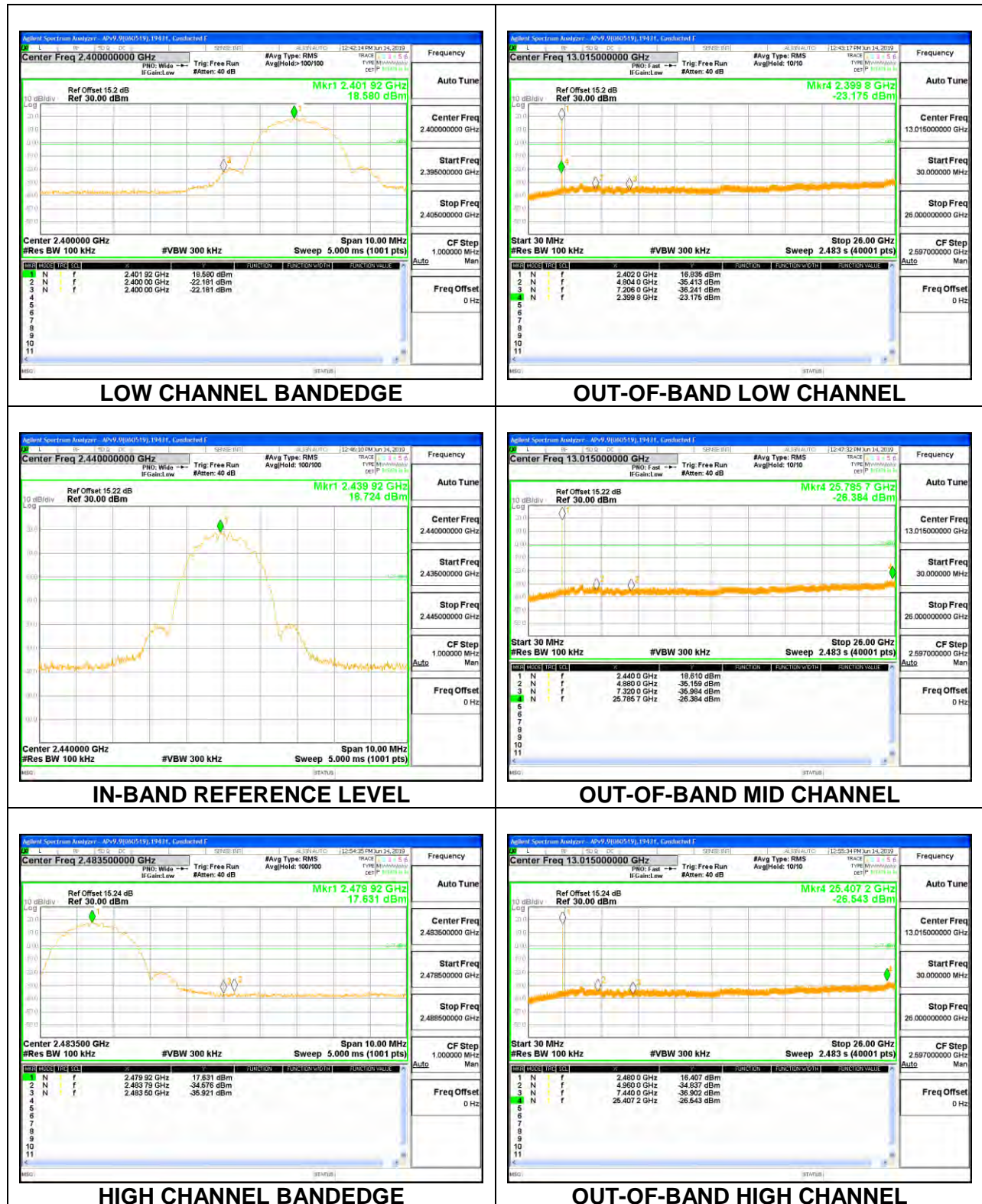


8.7.2 High Power BLE (2Mbps)

Antenna 4

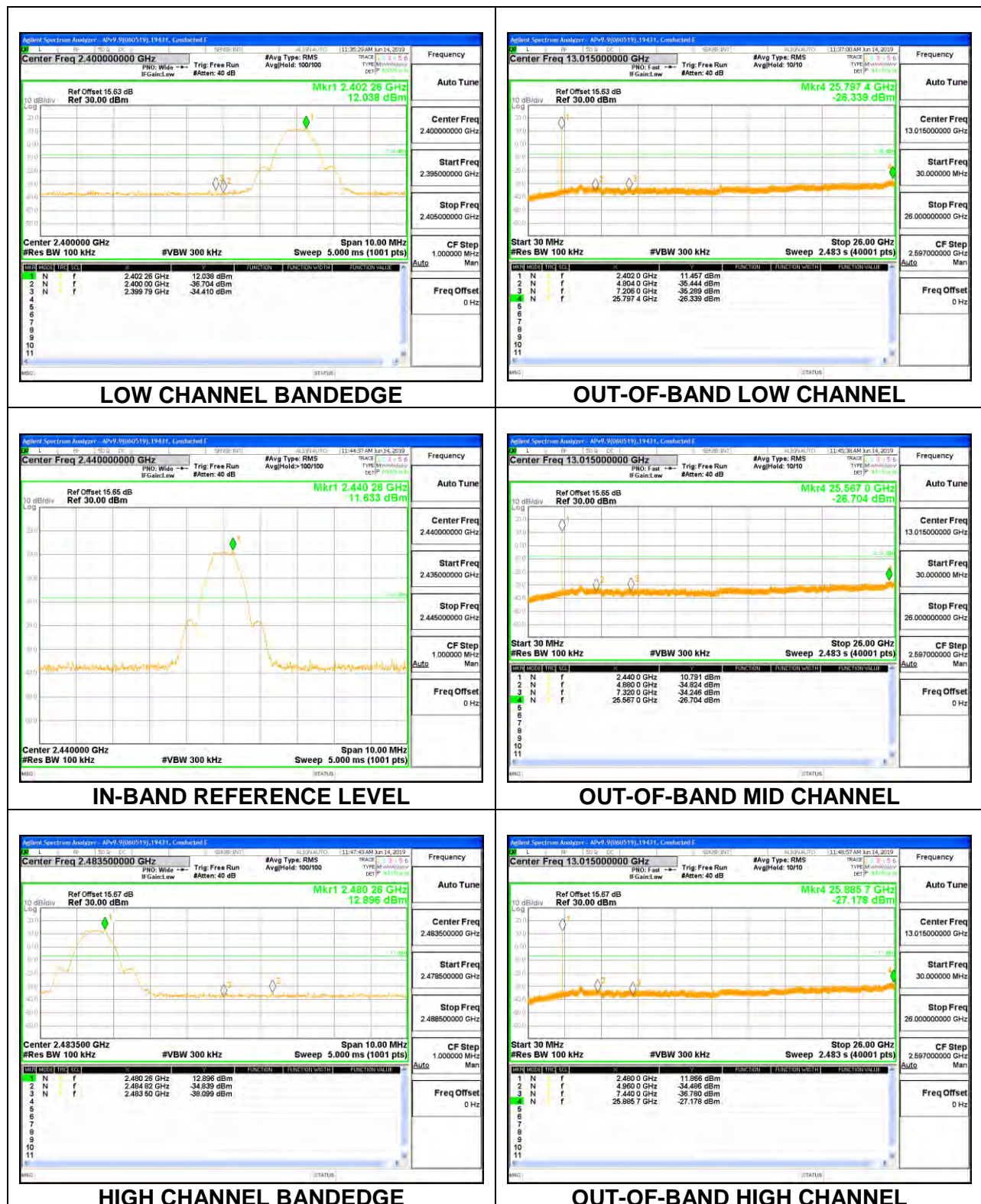


Antenna 3

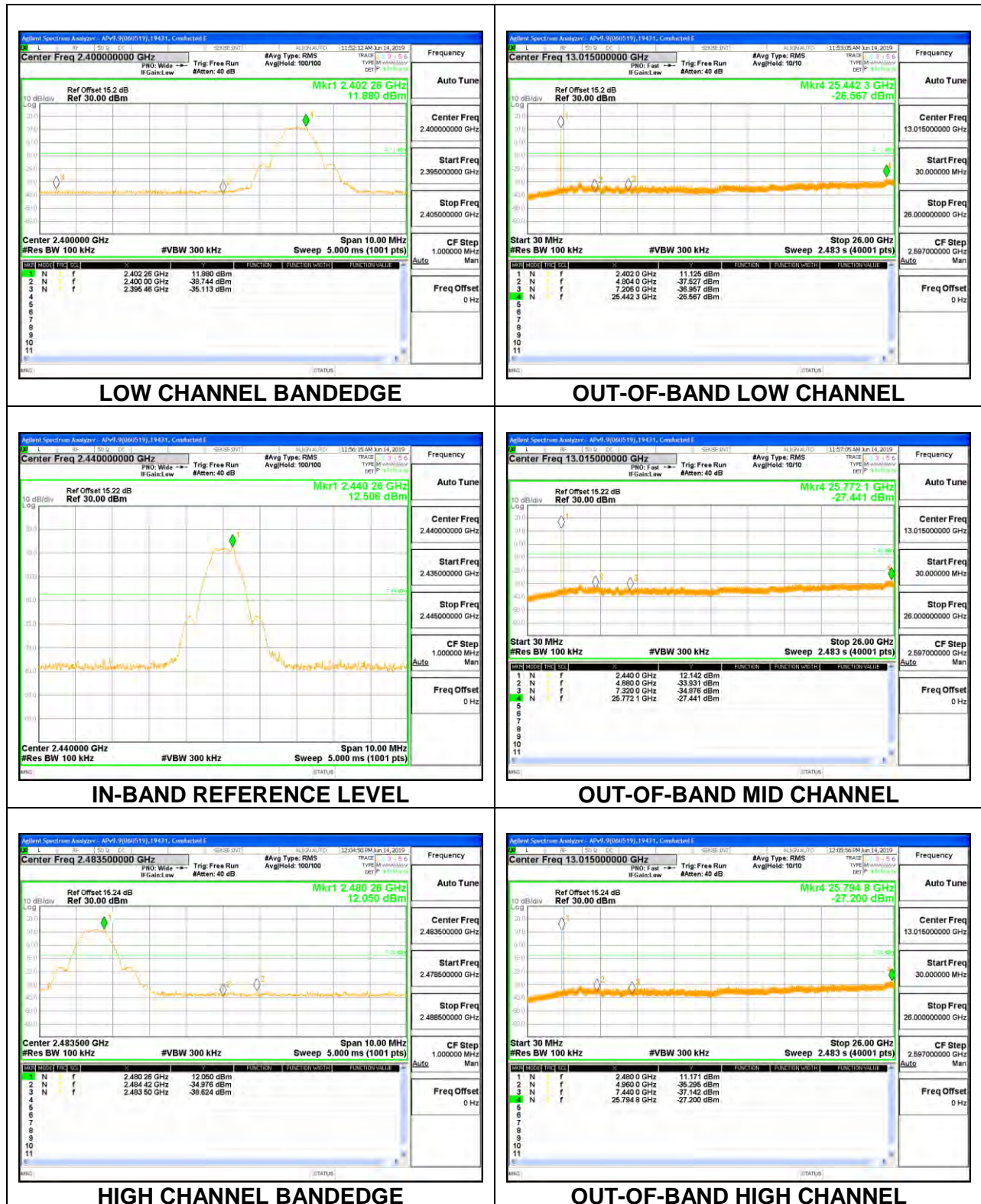


8.7.3 Low Power BLE (1Mbps)

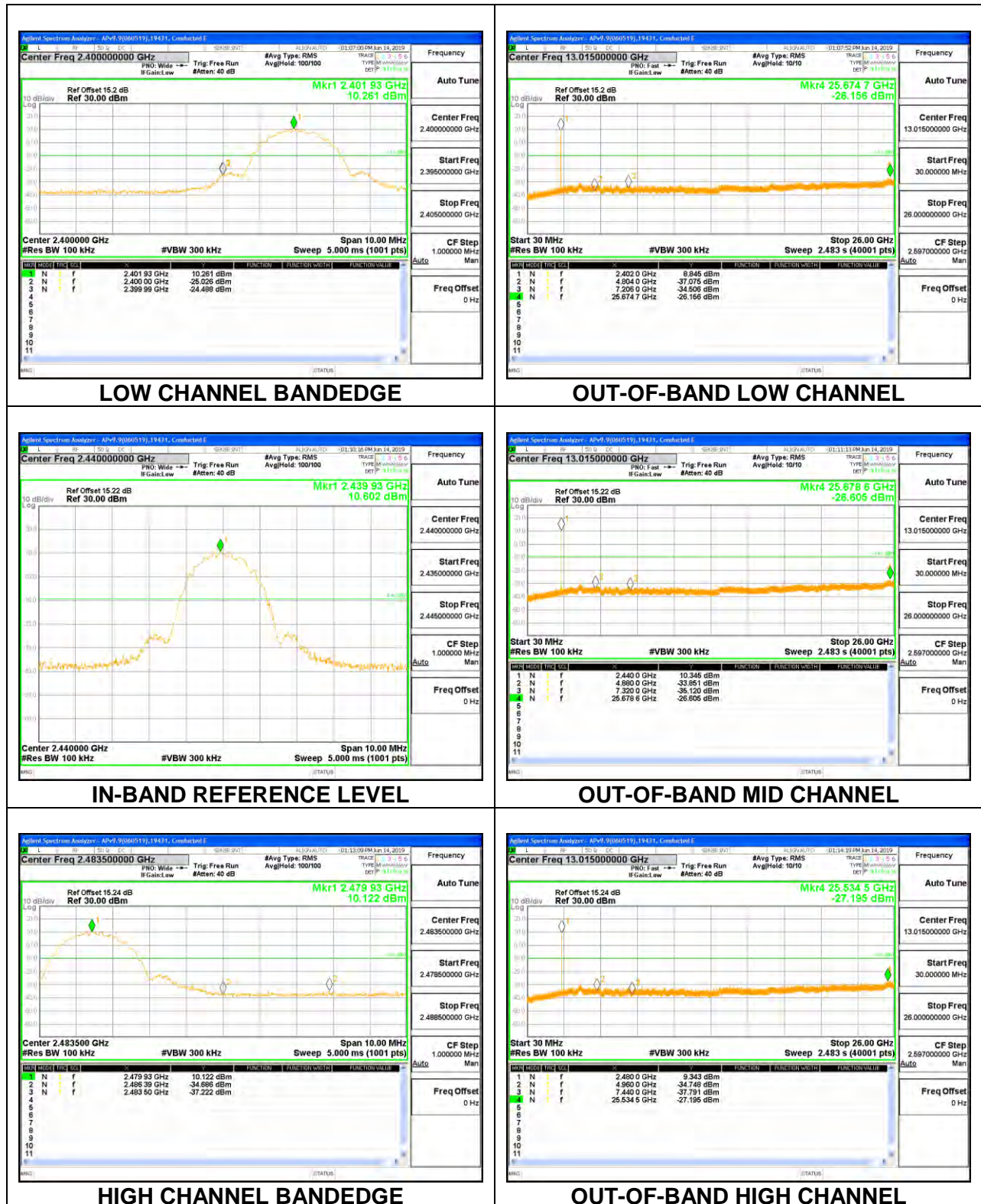
Antenna 4



Antenna 3



Antenna 3

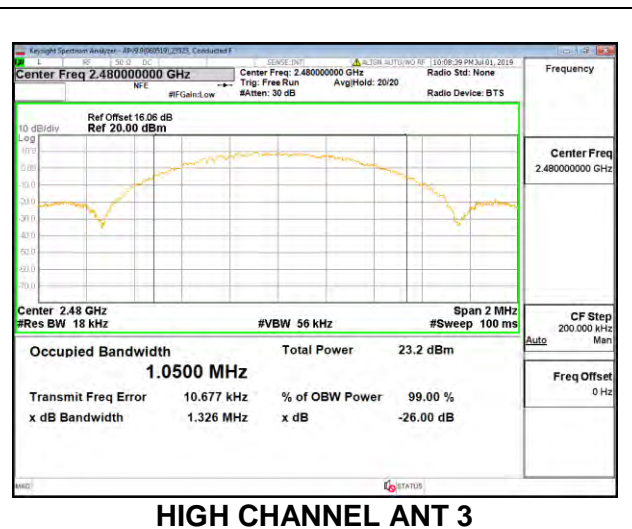
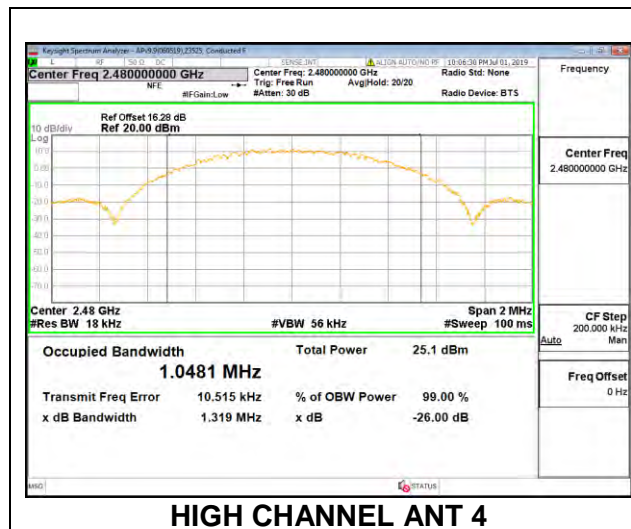
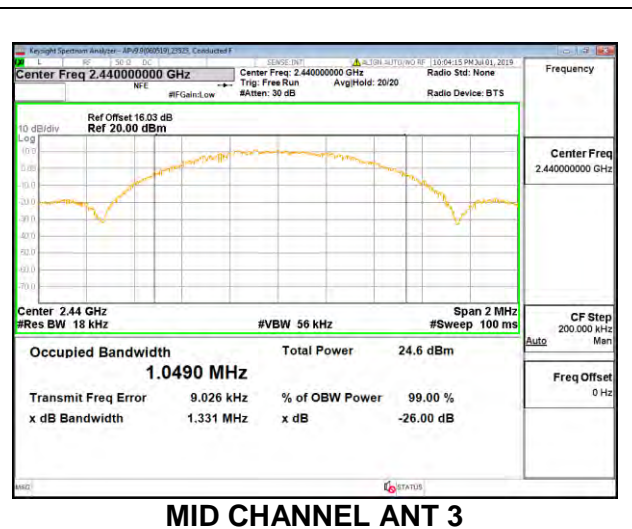
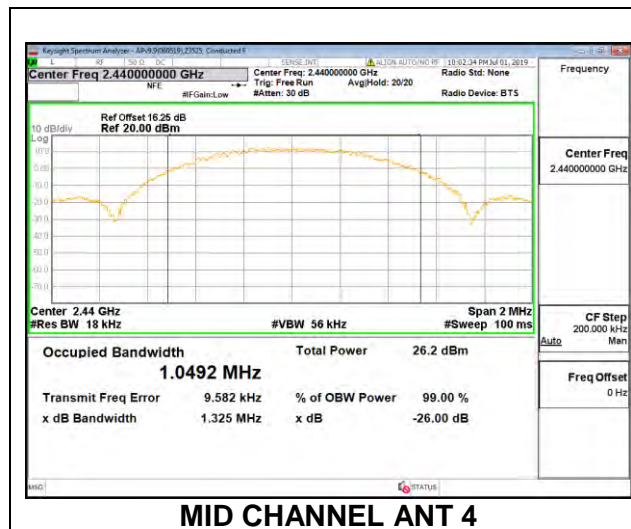
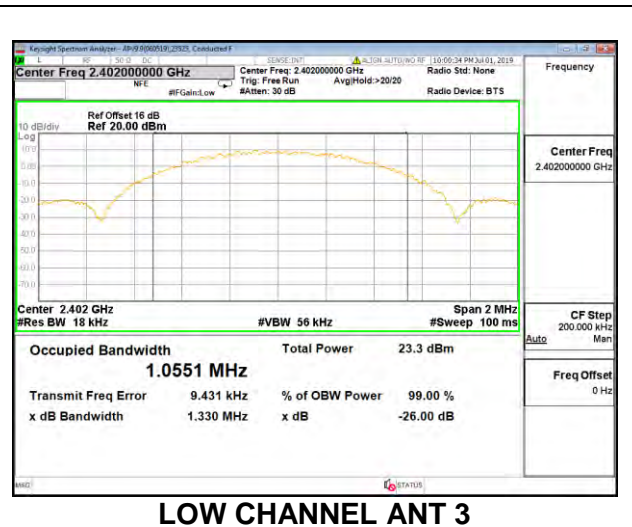
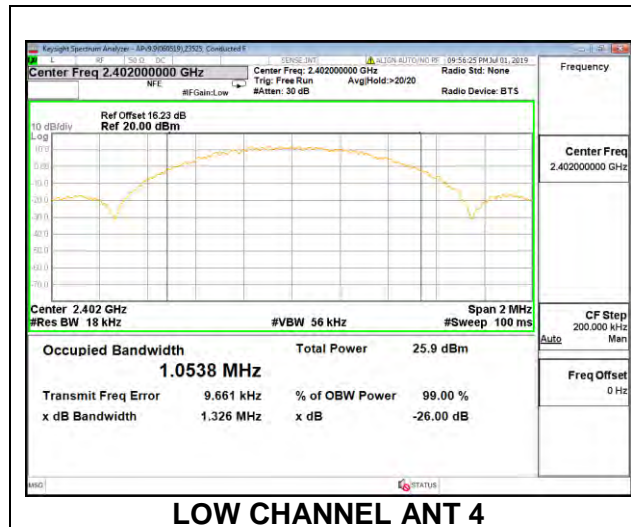


8.8 BEAMFORMING, 99% BANDWIDTH

8.8.1 HIGH POWER BLE (1Mbps)

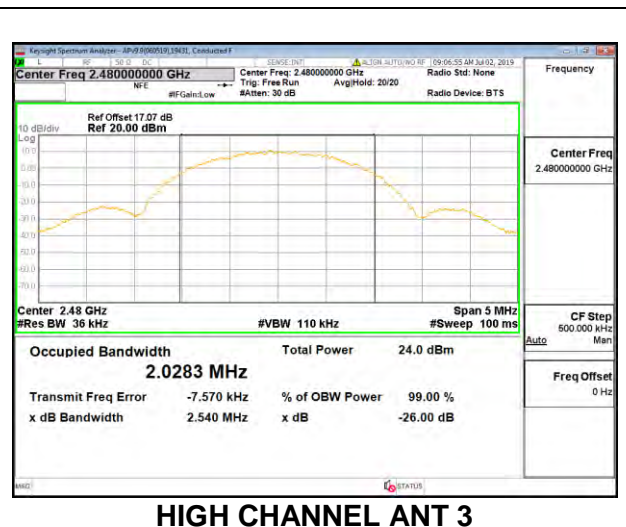
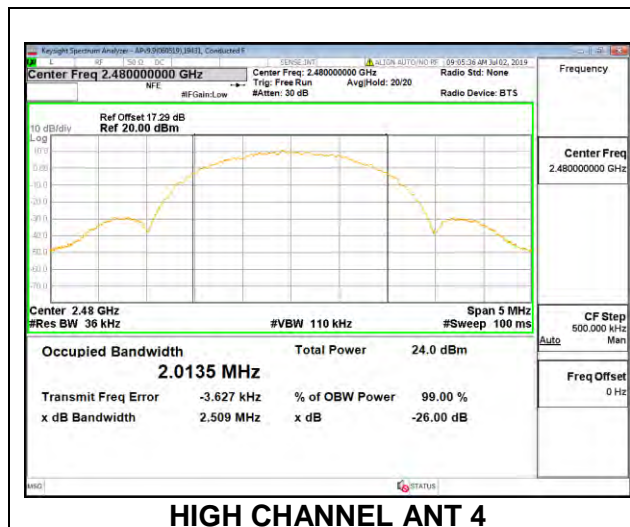
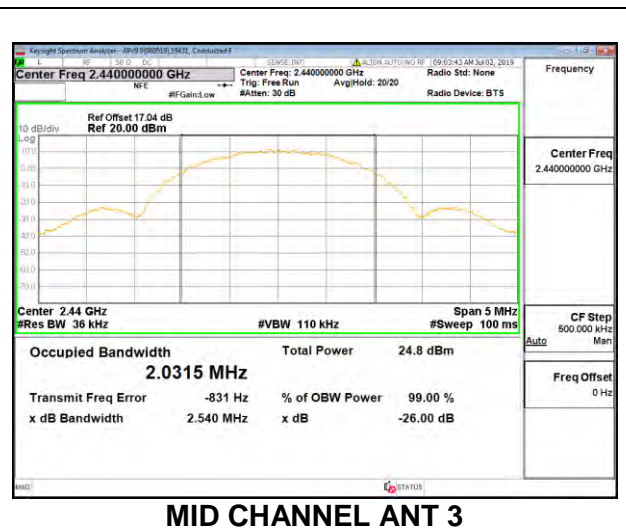
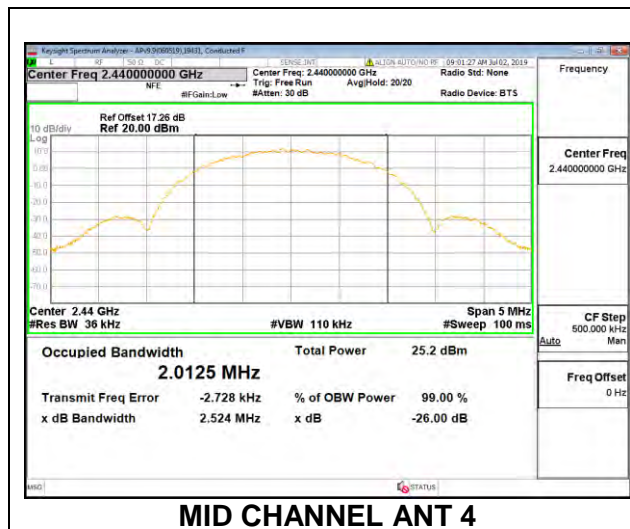
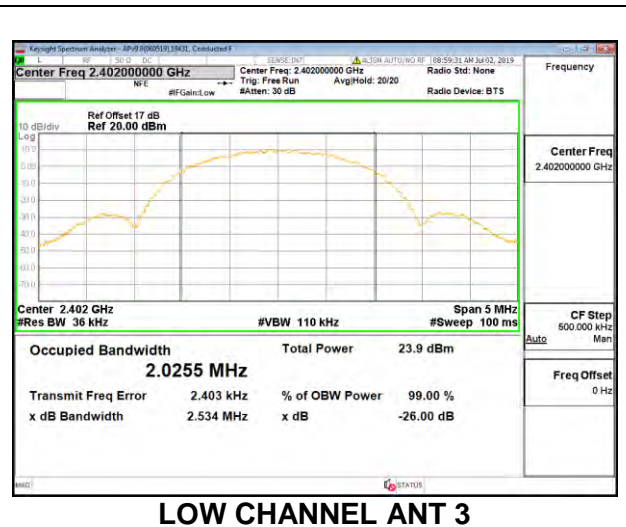
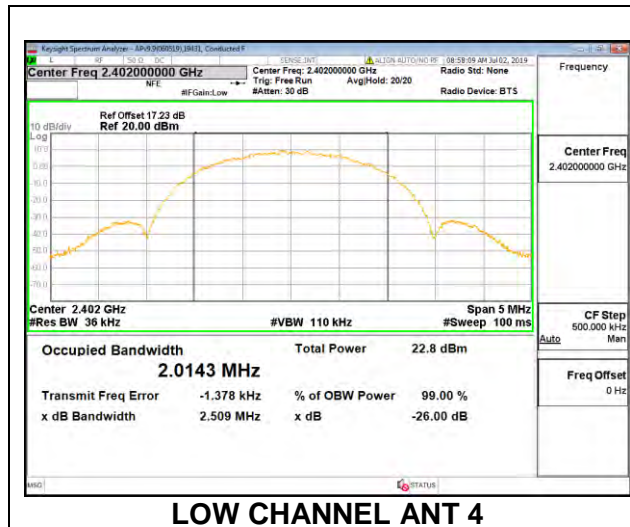
| Channel | Frequency (MHz) | 99% Bandwidth ANT 4 (MHz) | 99% Bandwidth ANT 3 (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|
| Low | 2402 | 1.0538 | 1.0551 |
| Mid | 2440 | 1.0492 | 1.0490 |
| High | 2480 | 1.0481 | 1.5000 |

Note: Test procedures and setting are same as BLE normal mode.



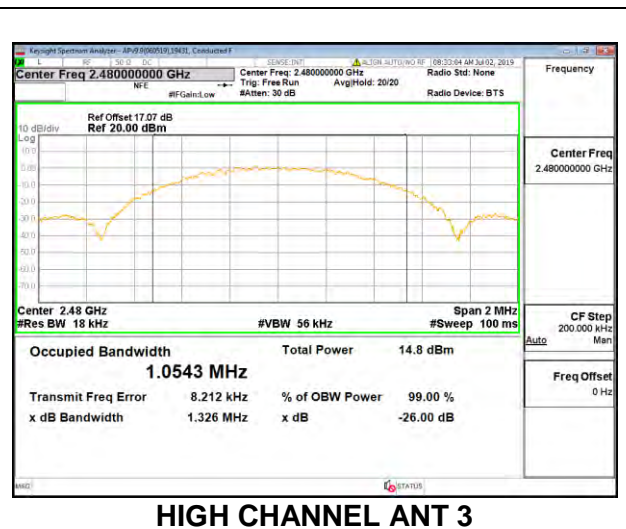
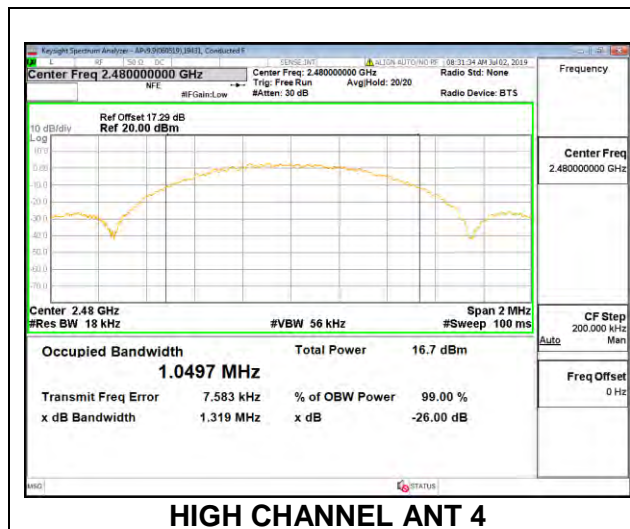
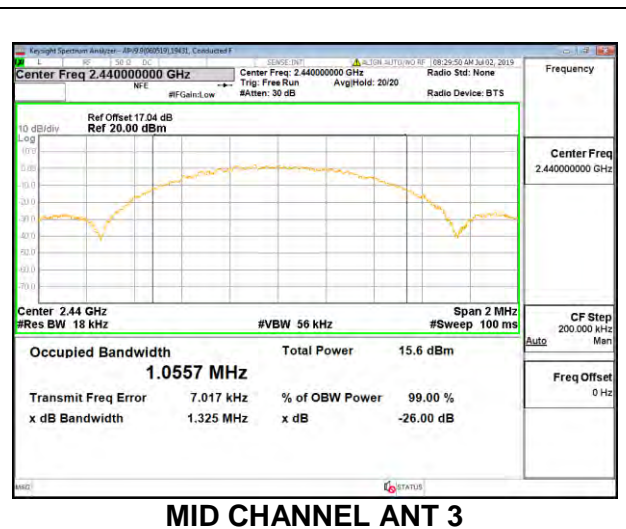
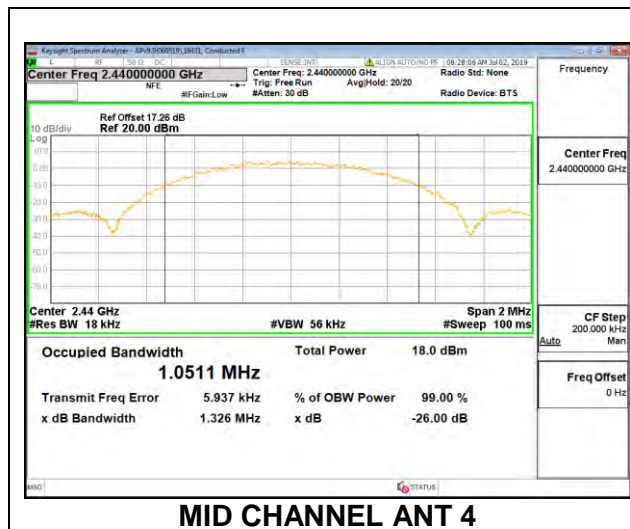
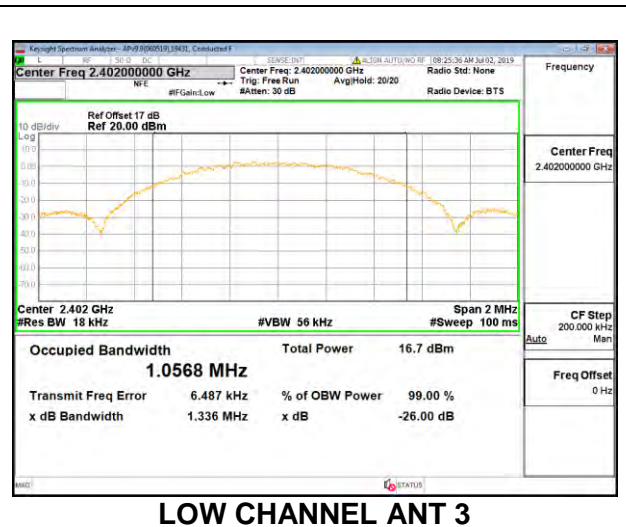
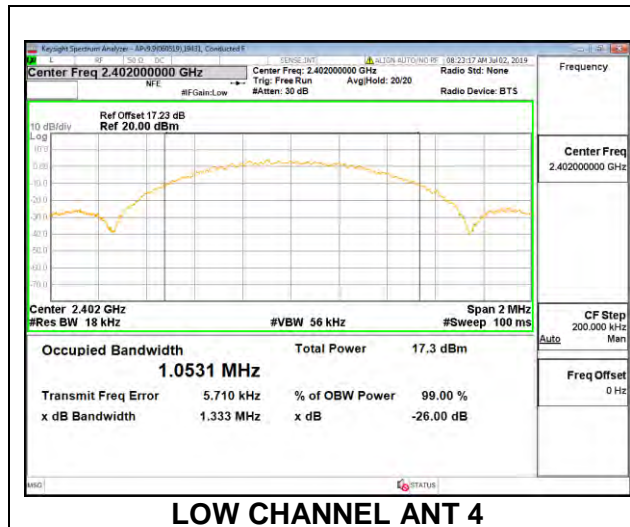
8.8.2 HIGH POWER BLE (2Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth Ant 4 (MHz) | 99% Bandwidth Ant 3 (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|
| Low | 2402 | 2.0143 | 2.0255 |
| Mid | 2440 | 2.0125 | 2.0315 |
| High | 2480 | 2.0135 | 2.0283 |



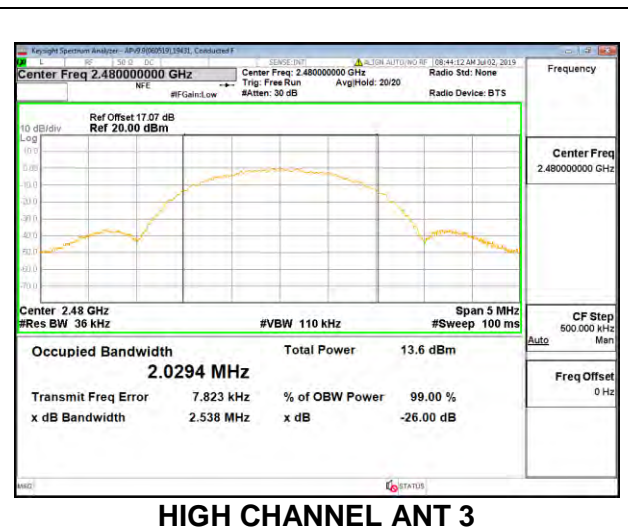
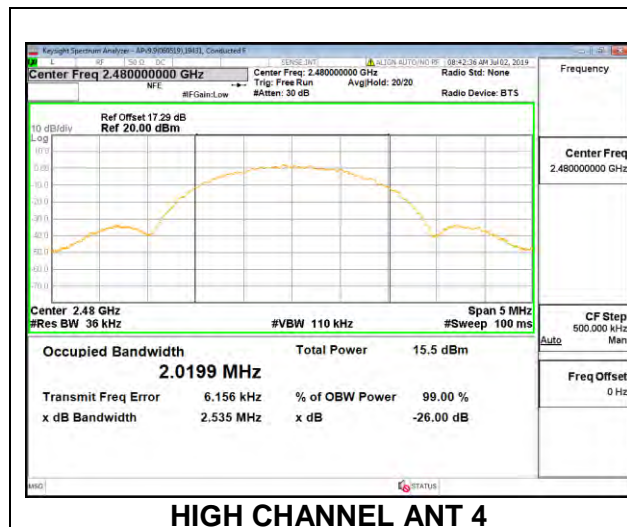
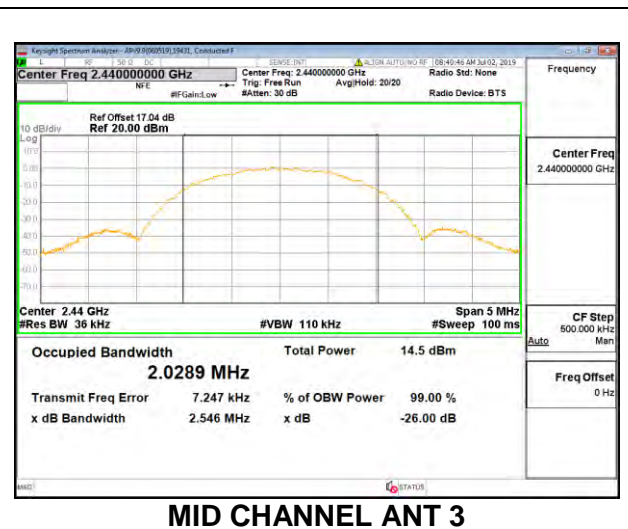
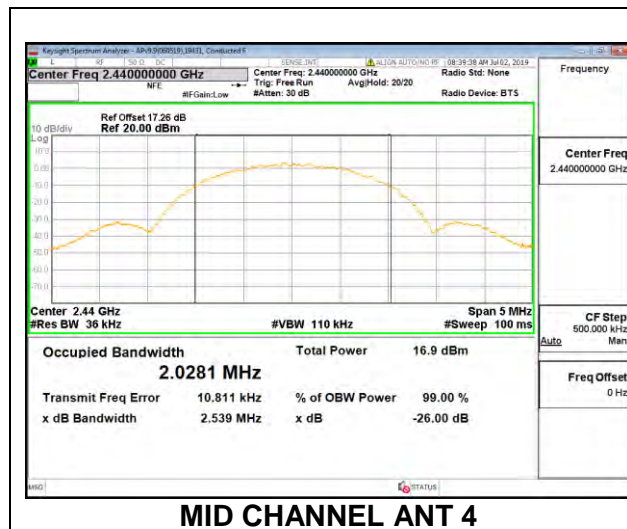
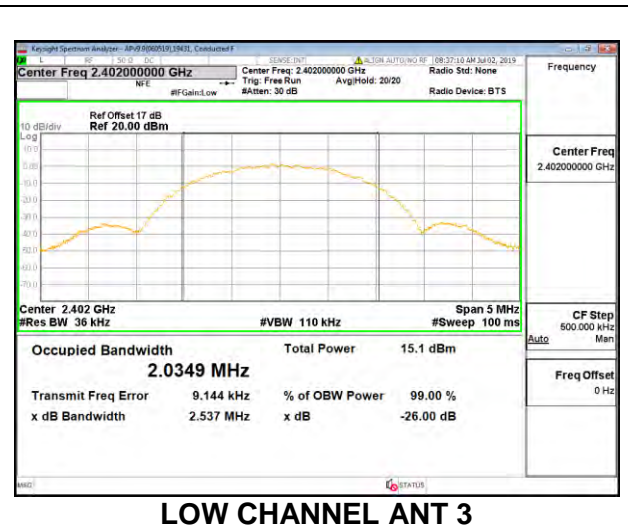
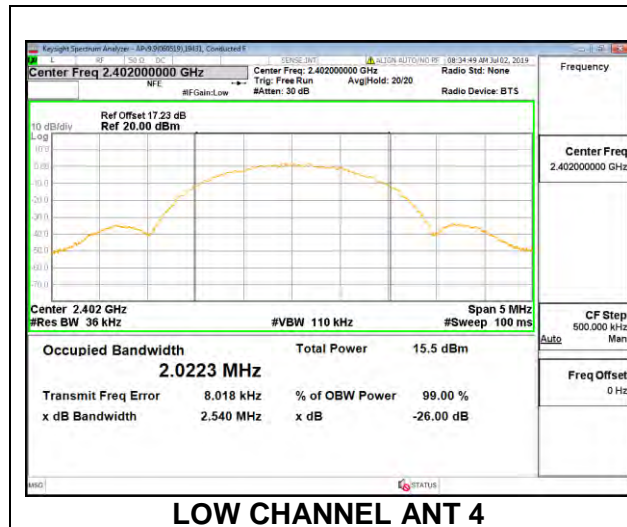
8.8.3 LOW POWER BLE (1Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth ANT 4 (MHz) | 99% Bandwidth ANT 3 (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|
| Low | 2402 | 1.0531 | 1.0568 |
| Mid | 2440 | 1.0511 | 1.0557 |
| High | 2480 | 1.0497 | 1.0543 |



8.8.4 LOW POWER BLE (2Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth ANT 4 (MHz) | 99% Bandwidth ANT 3 (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|
| Low | 2402 | 2.0223 | 2.0349 |
| Mid | 2440 | 2.0281 | 2.0289 |
| High | 2480 | 2.0199 | 2.0294 |

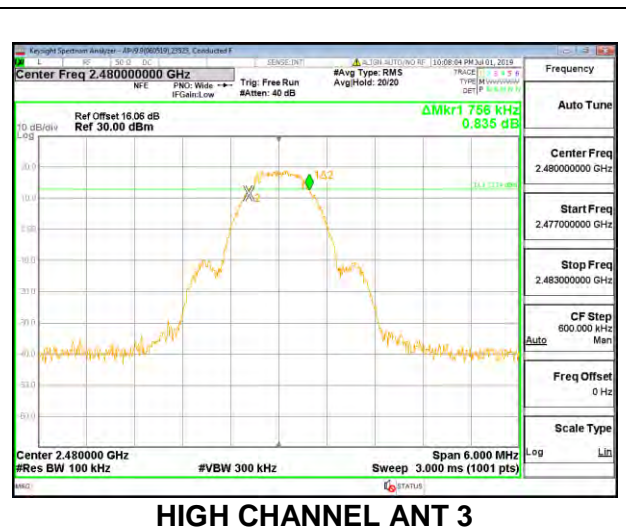
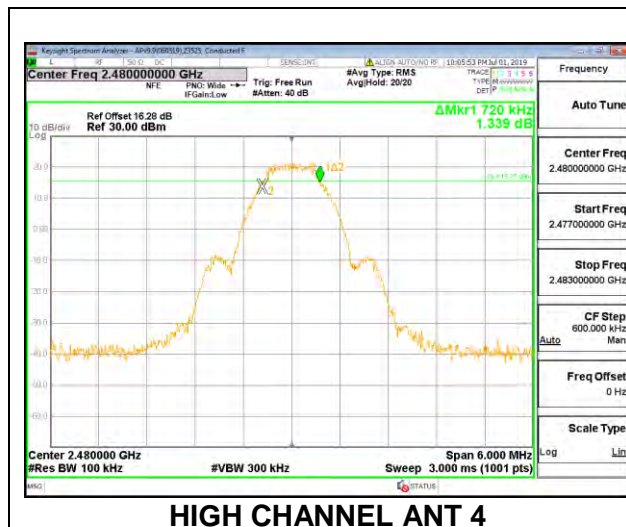
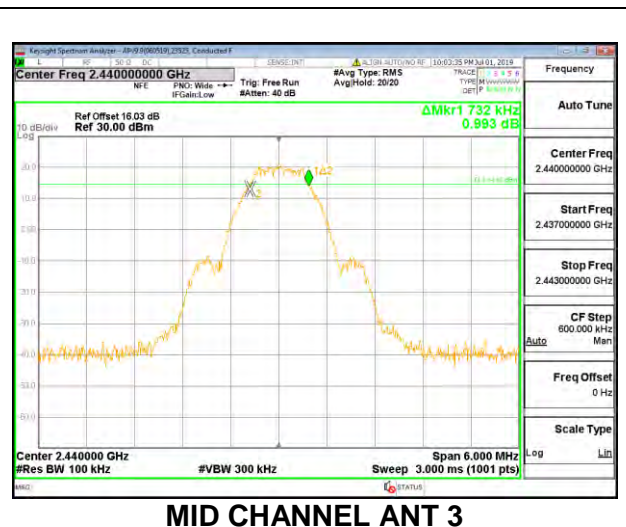
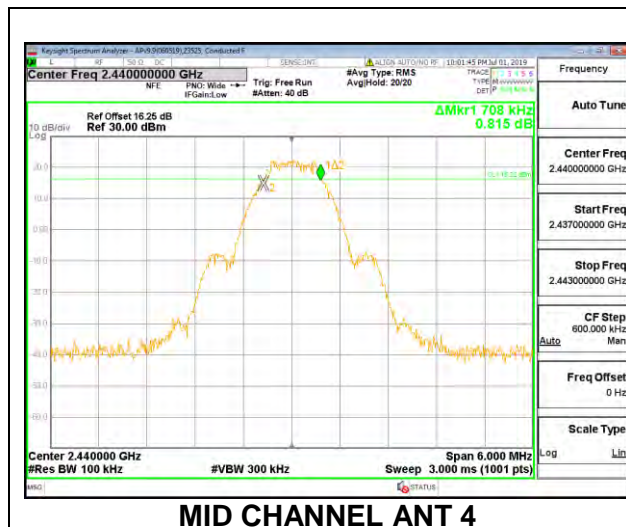
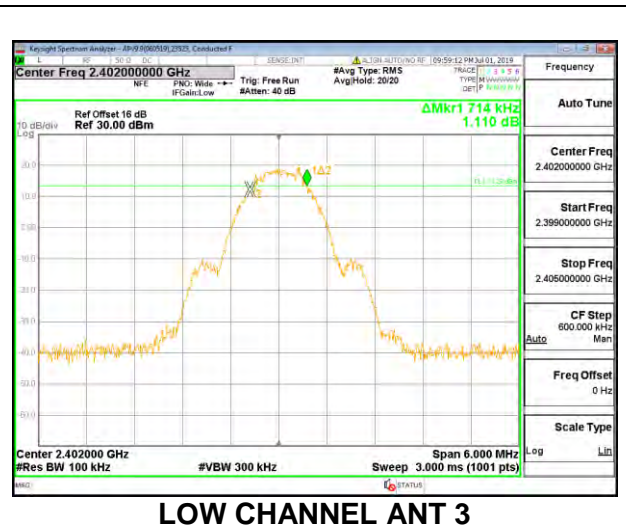
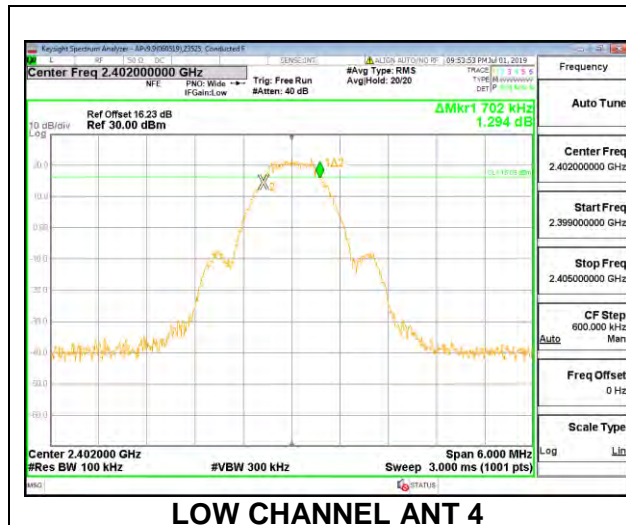


8.9 BEAMFORMING, 6dB BANDWIDTH

8.9.1 HIGH POWER BLE (1Mbps)

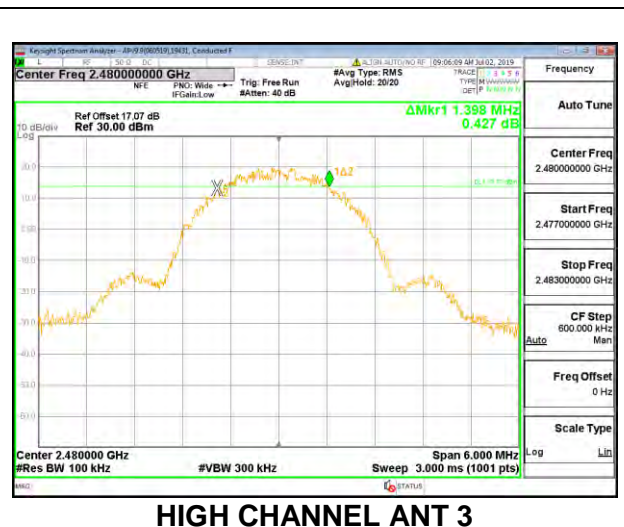
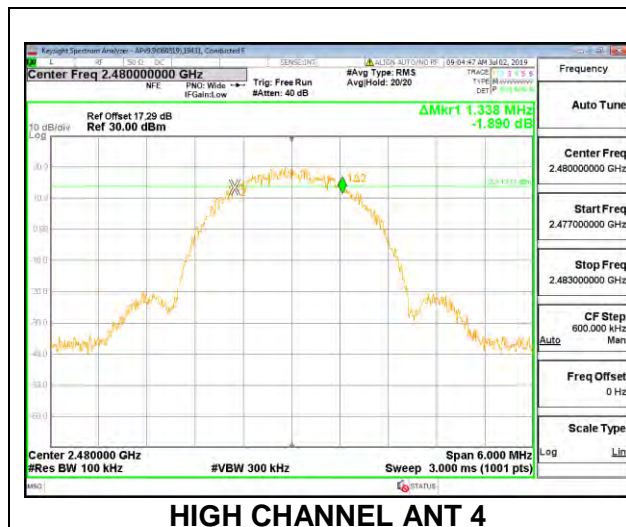
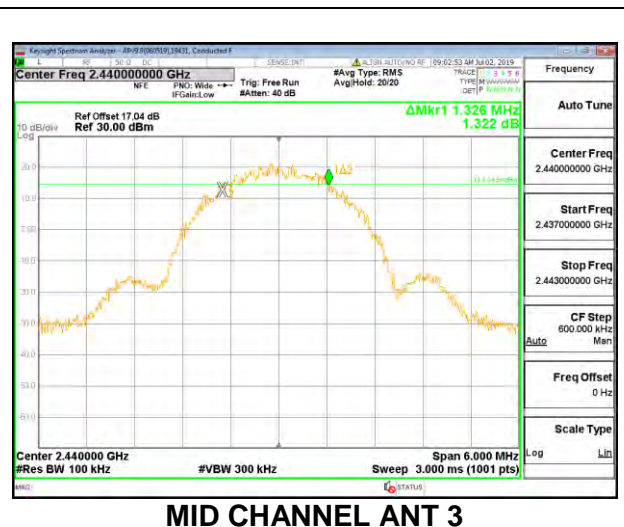
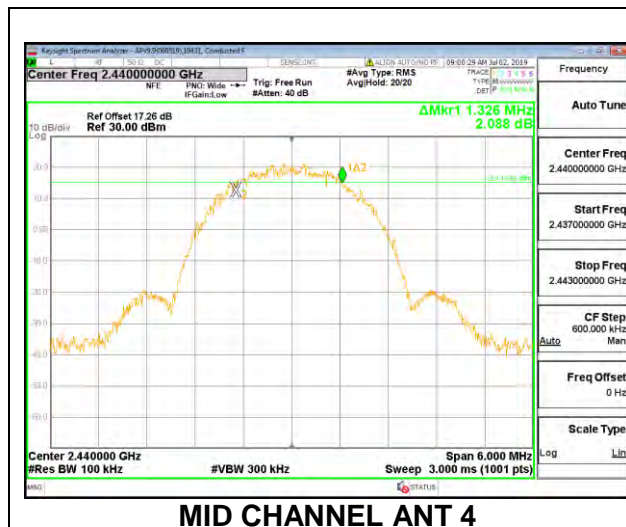
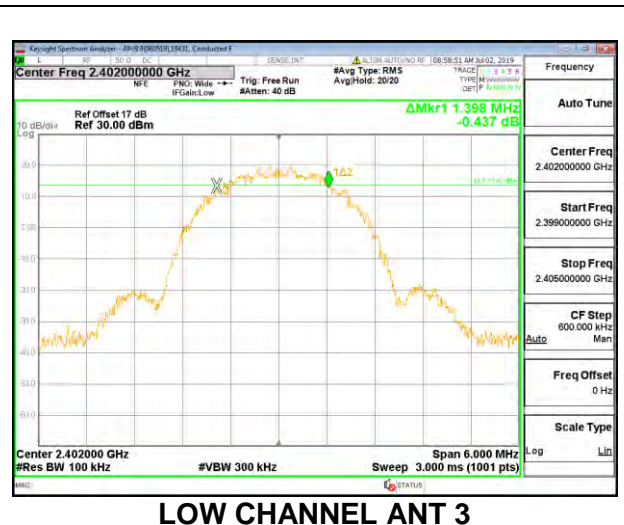
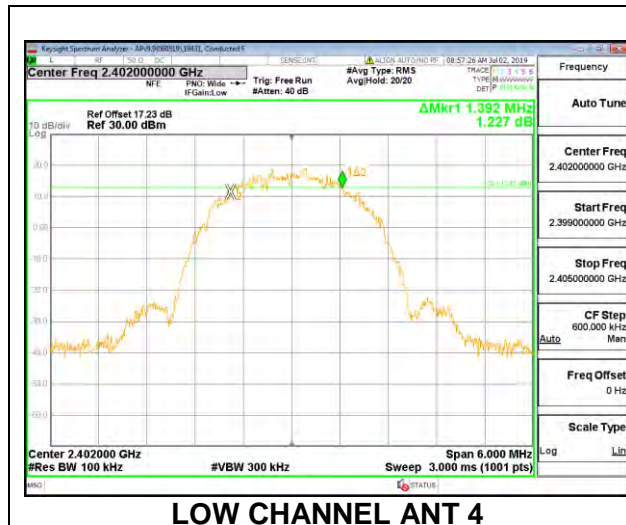
| Channel | Frequency (MHz) | 6dB Bandwidth ANT 4 (MHz) | 6dB Bandwidth ANT 3 (MHz) | Minimum Limit (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------|
| Low | 2402 | 0.702 | 0.714 | 0.500 |
| Mid | 2440 | 0.708 | 0.732 | 0.500 |
| High | 2480 | 0.720 | 0.756 | 0.500 |

Note: Test procedures and setting are same as BLE normal mode.



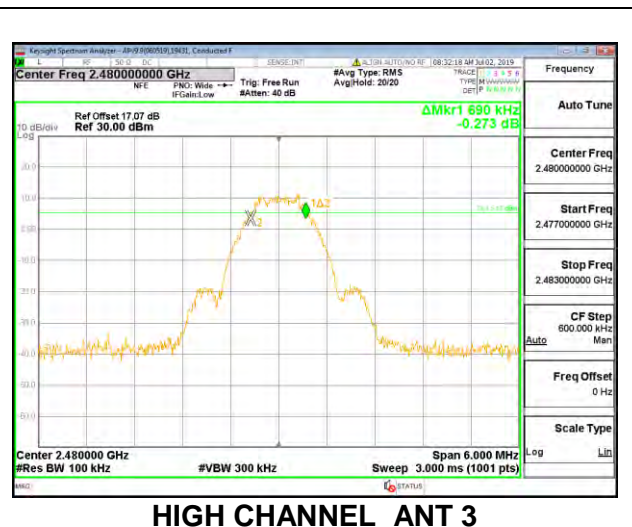
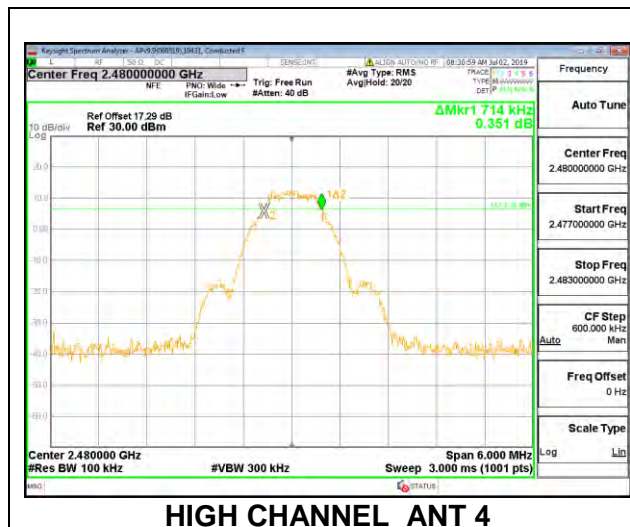
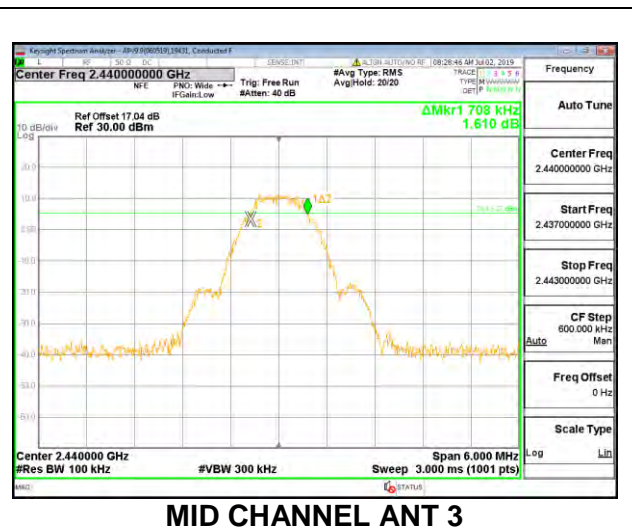
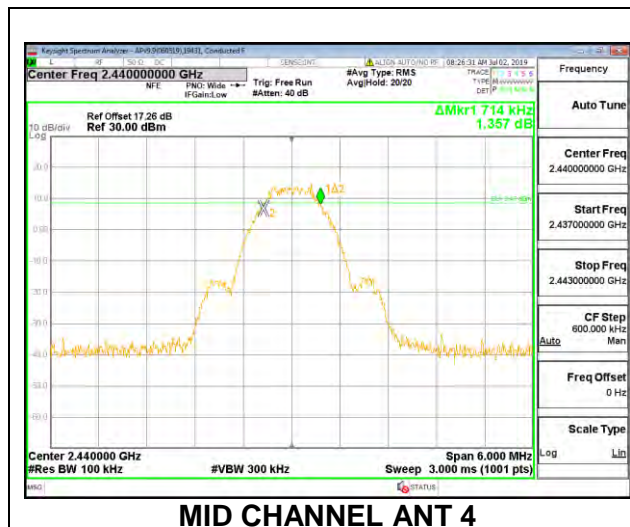
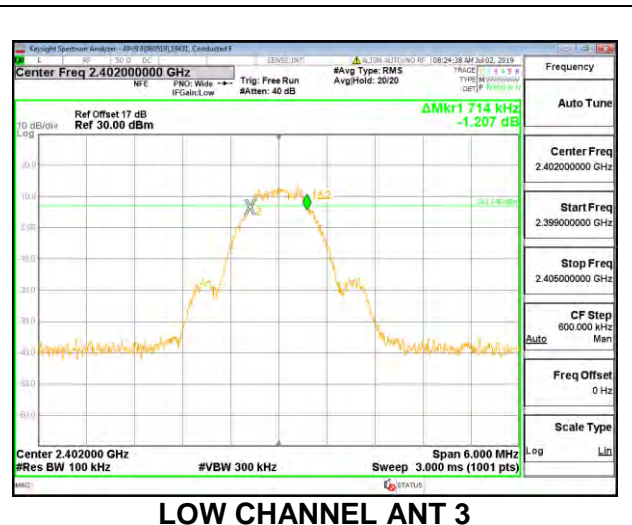
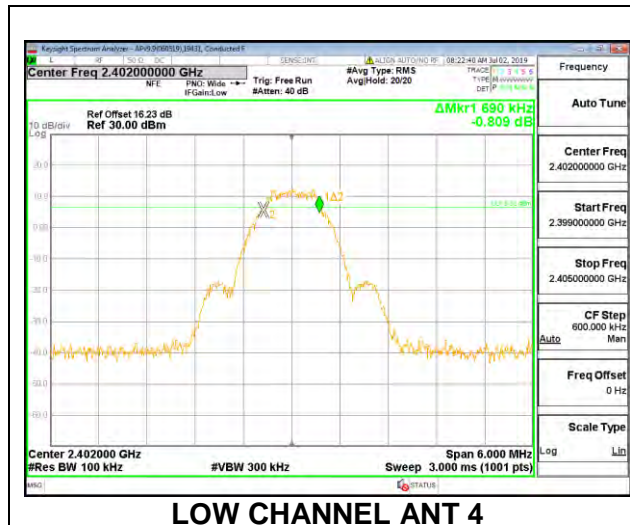
8.9.2 HIGH POWER BLE (2Mbps)

| Channel | Frequency (MHz) | 6dB Bandwidth ANT 4 (MHz) | 6dB Bandwidth ANT 3 (MHz) | Minimum Limit (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------|
| Low | 2402 | 1.392 | 1.398 | 0.500 |
| Mid | 2440 | 1.326 | 1.326 | 0.500 |
| High | 2480 | 1.338 | 1.398 | 0.500 |



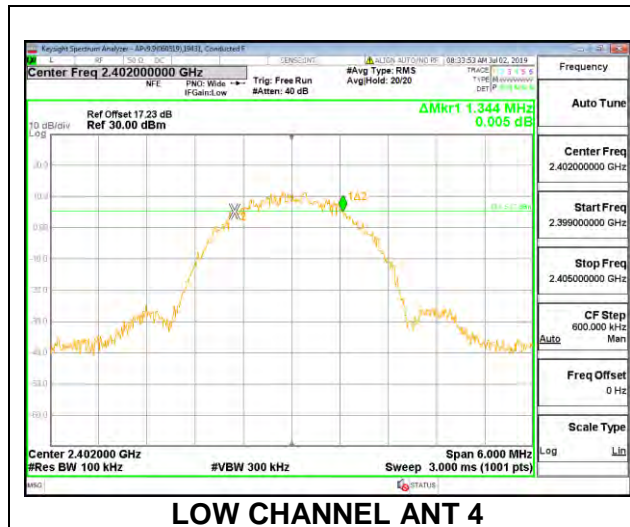
8.9.3 LOW POWER BLE (1Mbps)

| Channel | Frequency (MHz) | 6dB Bandwidth ANT 4 (MHz) | 6dB Bandwidth ANT 3 (MHz) | Minimum Limit (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------|
| Low | 2402 | 0.690 | 0.714 | 0.500 |
| Mid | 2440 | 0.714 | 0.708 | 0.500 |
| High | 2480 | 0.714 | 0.690 | 0.500 |

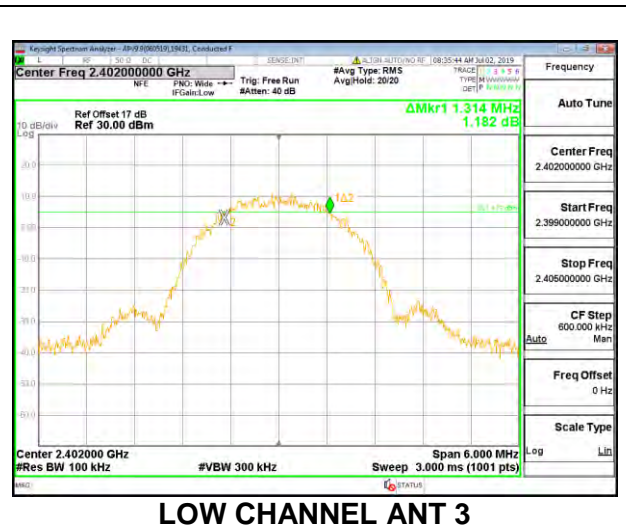


8.9.4 LOW POWER BLE (2Mbps)

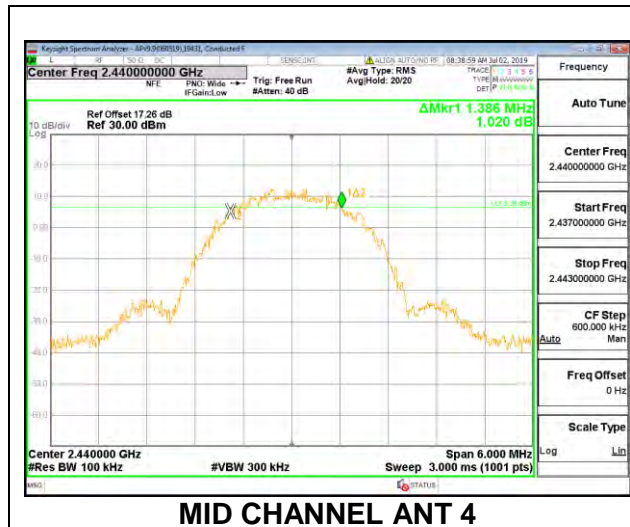
| Channel | Frequency (MHz) | 6dB Bandwidth ANT 4 (MHz) | 6dB Bandwidth ANT 3 (MHz) | Minimum Limit (MHz) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------|
| Low | 2402 | 1.344 | 1.314 | 0.500 |
| Mid | 2440 | 1.386 | 1.338 | 0.500 |
| High | 2480 | 1.386 | 1.404 | 0.500 |



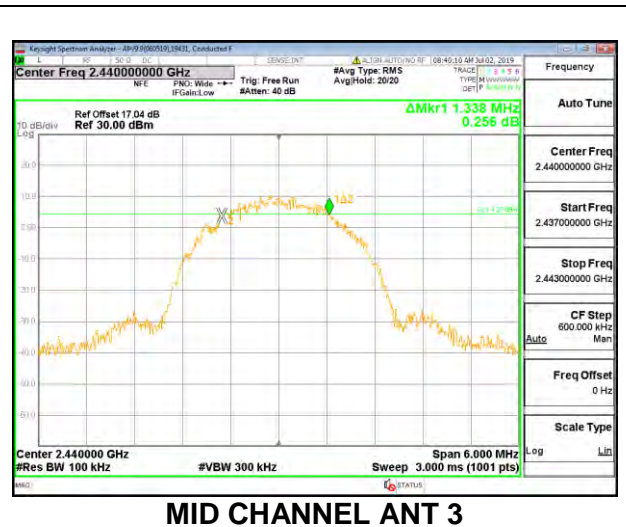
LOW CHANNEL ANT 4



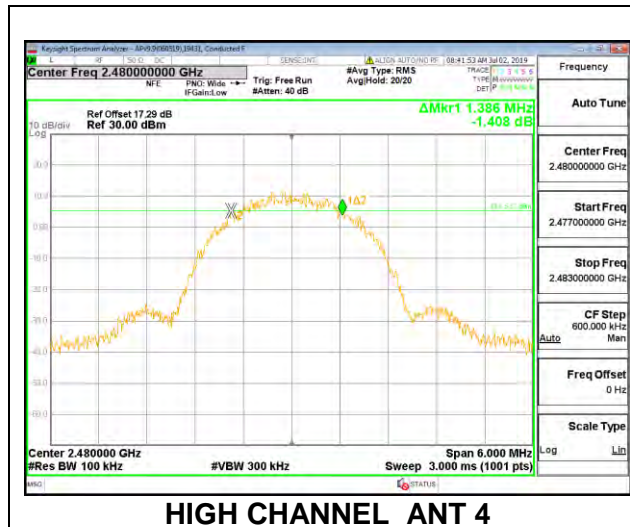
LOW CHANNEL ANT 3



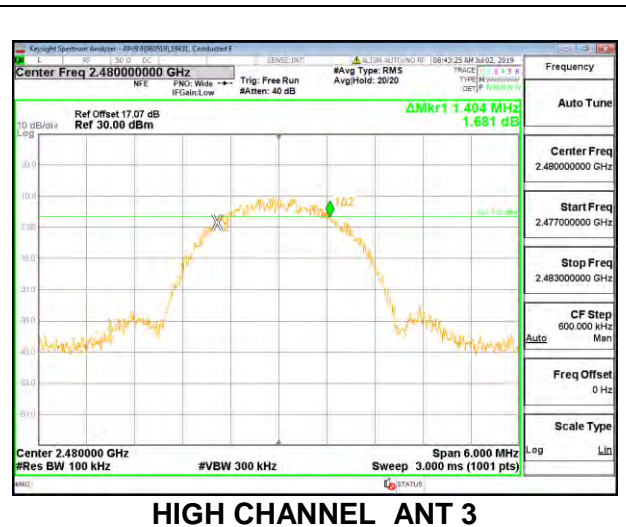
MID CHANNEL ANT 4



MID CHANNEL ANT 3



HIGH CHANNEL ANT 4



HIGH CHANNEL ANT 3

8.10 BEAMFORMING OUTPUT POWER

8.10.1 HIGH POWER BLE (1Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Output Power Antenna 4 (dBm) | Output Power Antenna 3 (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|------------------------------------|------------------------------------|----------------------|----------------|----------------|
| Low | 2402 | 17.18 | 17.22 | 20.21 | 30 | -9.79 |
| Middle | 2440 | 17.24 | 17.16 | 20.21 | 30 | -9.79 |
| High | 2480 | 17.20 | 17.12 | 20.17 | 30 | -9.83 |

8.10.2 HIGH POWER BLE (2Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Output Power Antenna 4 (dBm) | Output Power Antenna 3 (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|------------------------------------|------------------------------------|----------------------|----------------|----------------|
| Low | 2402 | 17.21 | 17.18 | 20.21 | 30 | -9.79 |
| Middle | 2440 | 17.11 | 17.17 | 20.15 | 30 | -9.85 |
| High | 2480 | 17.22 | 17.25 | 20.25 | 30 | -9.75 |

Note: Test procedures and setting are same as BLE normal mode.

8.10.3 LOW POWER BLE (1Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Output Power Antenna 4 (dBm) | Output Power Antenna 3 (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|------------------------------------|------------------------------------|----------------------|----------------|----------------|
| Low | 2402 | 12.65 | 12.66 | 15.67 | 30 | -14.33 |
| Middle | 2440 | 12.58 | 12.64 | 15.62 | 30 | -14.38 |
| High | 2480 | 12.71 | 12.72 | 15.73 | 30 | -14.27 |

8.10.4 LOW POWER BLE (2Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Output Power Antenna 4 (dBm) | Output Power Antenna 3 (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|------------------------------------|------------------------------------|----------------------|----------------|----------------|
| Low | 2402 | 12.64 | 12.65 | 15.66 | 30 | -14.34 |
| Middle | 2440 | 12.57 | 12.61 | 15.60 | 30 | -14.40 |
| High | 2480 | 12.77 | 12.63 | 15.71 | 30 | -14.29 |

Note: Test procedures and setting are same as BLE normal mode.

8.11 BEAMFORMING AVERAGE POWER

8.11.1 HIGH POWER BLE (1Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Average Power Antenna 4 (dBm) | Average Power Antenna 3 (dBm) | Total Power (dBm) |
|---------|--------------------|-------------------------------------|-------------------------------------|----------------------|
| Low | 2402 | 16.89 | 16.87 | 19.89 |
| Middle | 2440 | 16.95 | 16.82 | 19.90 |
| High | 2480 | 16.92 | 16.91 | 19.93 |

8.11.2 HIGH POWER BLE (2Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Average Power Antenna 4 (dBm) | Average Power Antenna 3 (dBm) | Total Power (dBm) |
|---------|--------------------|-------------------------------------|-------------------------------------|----------------------|
| Low | 2402 | 16.88 | 16.89 | 19.90 |
| Middle | 2440 | 16.92 | 16.95 | 19.95 |
| High | 2480 | 16.94 | 16.91 | 19.94 |

8.11.3 LOW POWER BLE (1Mbps)

2TX Antenna 4 + Antenna 3, TxBF Mode

| | |
|------------|-----------|
| Tested By: | 12492 |
| Date: | 7/24/2019 |

| Channel | Frequency (MHz) | Average Power Antenna 4 (dBm) | Average Power Antenna 3 (dBm) | Total Power (dBm) |
|---------|--------------------|-------------------------------------|-------------------------------------|----------------------|
| Low | 2402 | 12.42 | 12.39 | 15.42 |
| Middle | 2440 | 12.40 | 12.44 | 15.43 |
| High | 2480 | 12.41 | 12.43 | 15.43 |

8.11.4 LOW POWER BLE (2Mbps)

2TX Antenna 4 + Antenna 3 TxBF Mode

| | |
|------------|---------|
| Tested By: | 12492 |
| Date: | 7/24/19 |

| Channel | Frequency (MHz) | Average Power Antenna 4 (dBm) | Average Power Antenna 3 (dBm) | Total Power (dBm) |
|---------|--------------------|-------------------------------------|-------------------------------------|----------------------|
| Low | 2402 | 12.45 | 12.46 | 15.47 |
| Middle | 2440 | 12.44 | 12.39 | 15.43 |
| High | 2480 | 12.43 | 12.40 | 15.43 |

8.12 BEAMFORMING, POWER SPECTRAL DENSITY

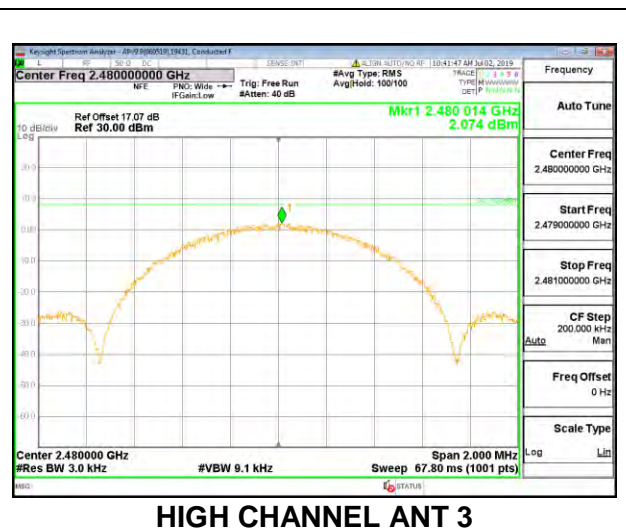
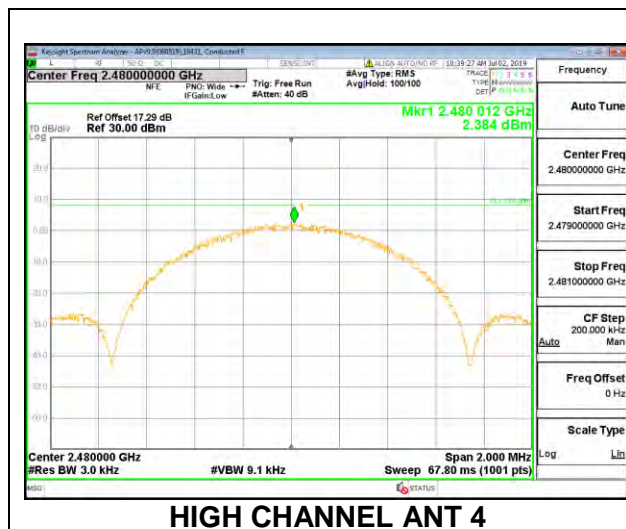
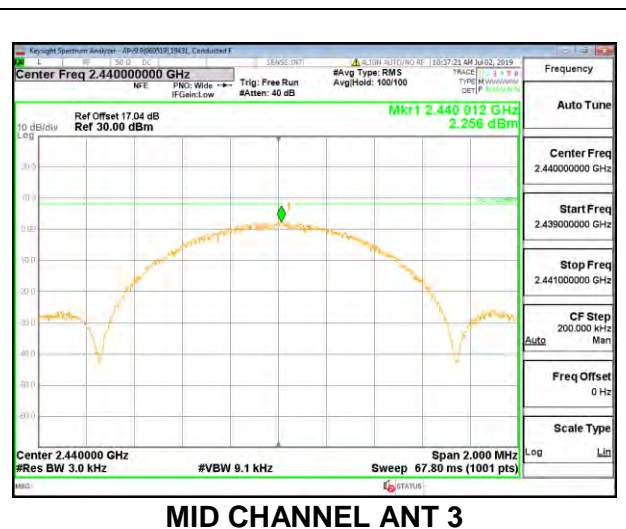
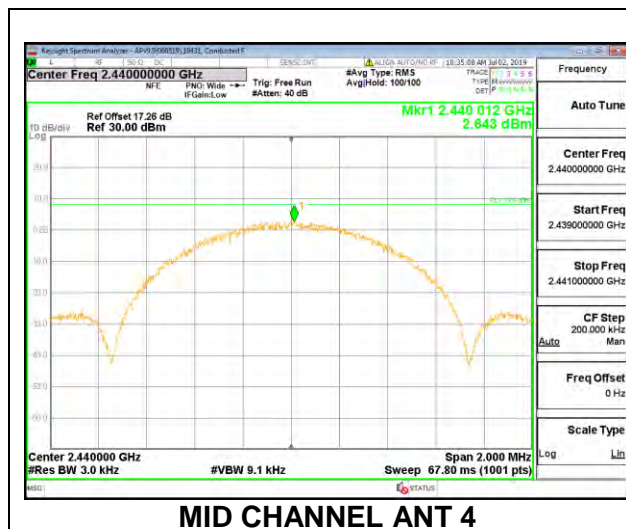
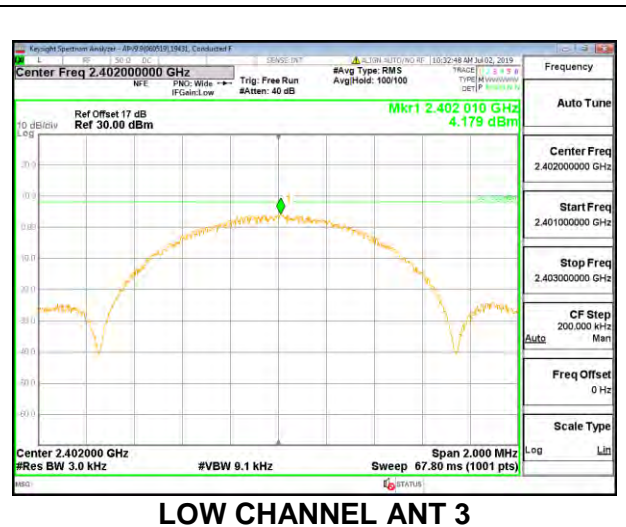
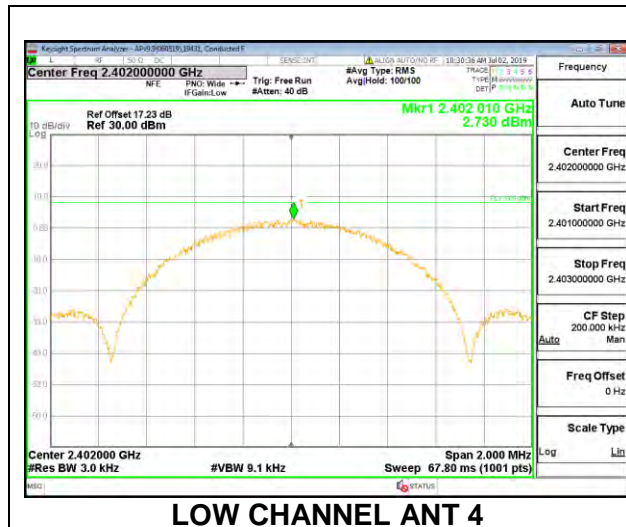
8.12.1 HIGH POWER BLE (1Mbps)

| | | |
|--------------------|--|--|
| Duty Cycle CF (dB) | | Included in Calculations of Corr'd PSD |
|--------------------|--|--|

PSD Results

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---------|--------------------|---------------------------------|---------------------------------|--|-------------------------|----------------|
| Low | 2402 | 2.730 | 4.179 | 6.525 | 8.0 | -1.475 |
| Mid | 2440 | 2.643 | 2.256 | 5.464 | 8.0 | -2.536 |
| High | 2480 | 2.384 | 2.074 | 5.242 | 8.0 | -2.758 |

Note: Test procedures and setting are same as BLE normal mode.

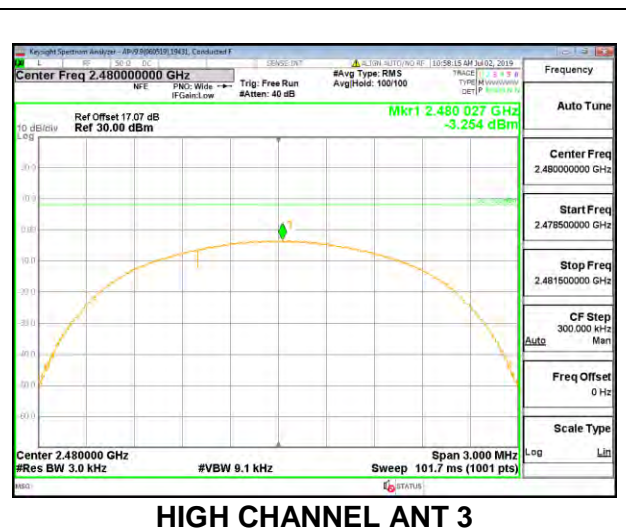
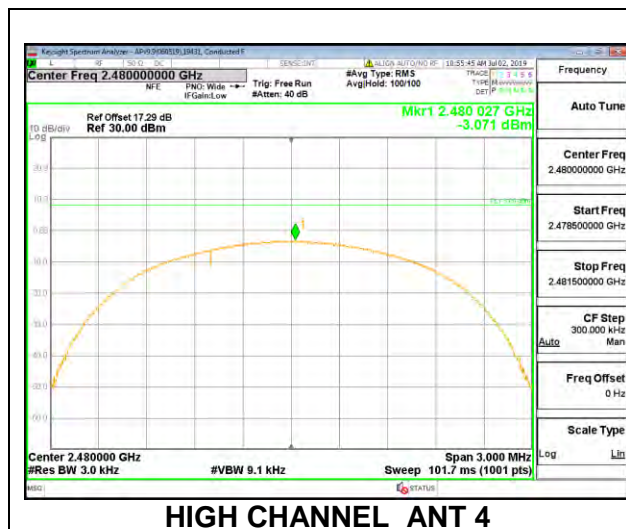
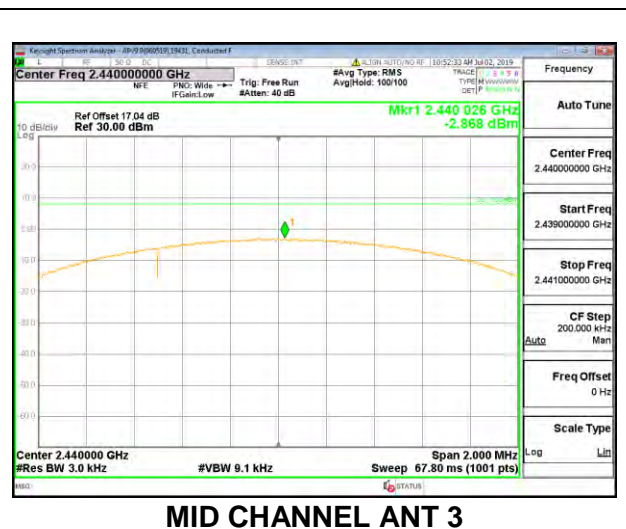
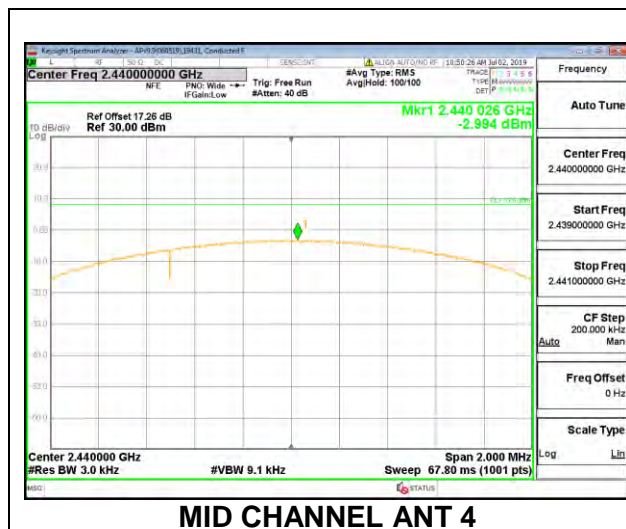
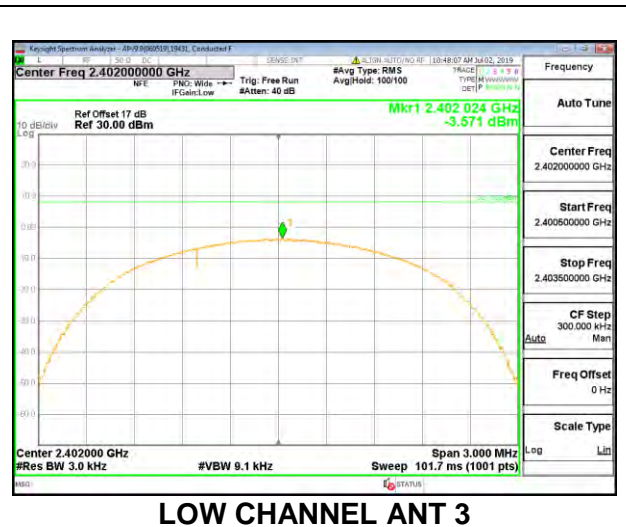
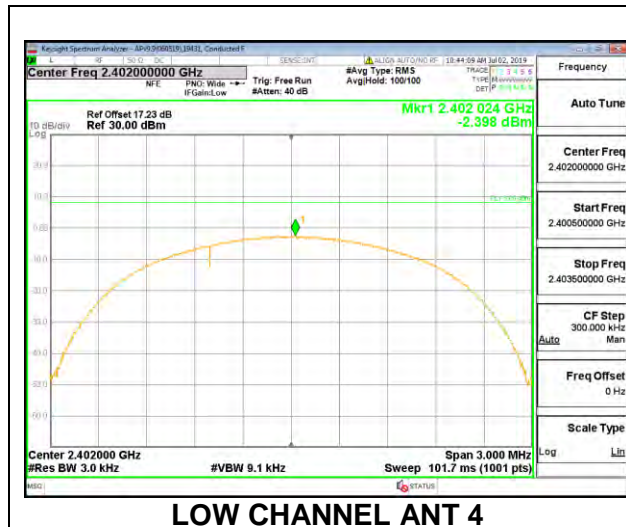


8.12.2 HIGH POWER BLE (2Mbps)

| | | |
|--------------------|--|--|
| Duty Cycle CF (dB) | | Included in Calculations of Corr'd PSD |
|--------------------|--|--|

PSD Results

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---------|--------------------|---------------------------------|---------------------------------|--|-------------------------|----------------|
| Low | 2402 | -2.398 | -3.571 | 0.065 | 8.0 | -7.935 |
| Mid | 2440 | -2.994 | -2.868 | 0.080 | 8.0 | -7.920 |
| High | 2480 | -3.071 | -3.254 | -0.151 | 8.0 | -8.151 |

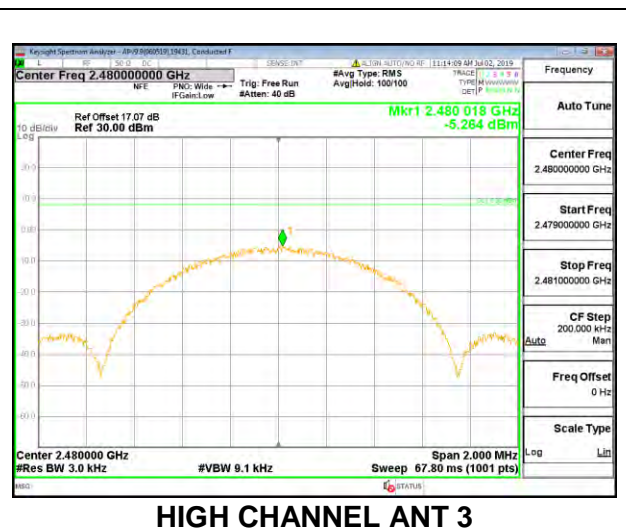
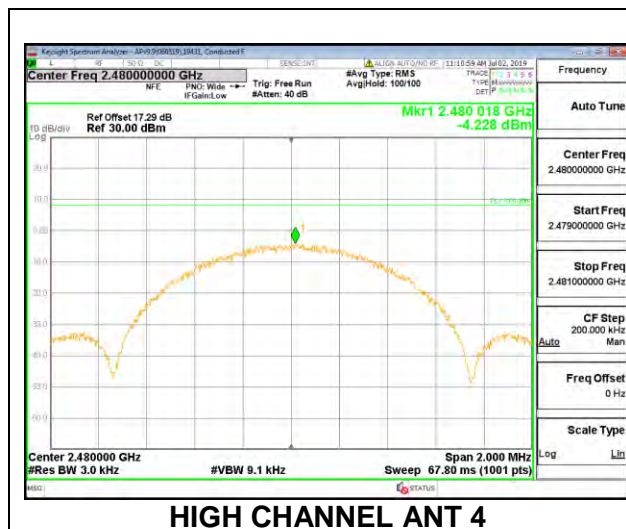
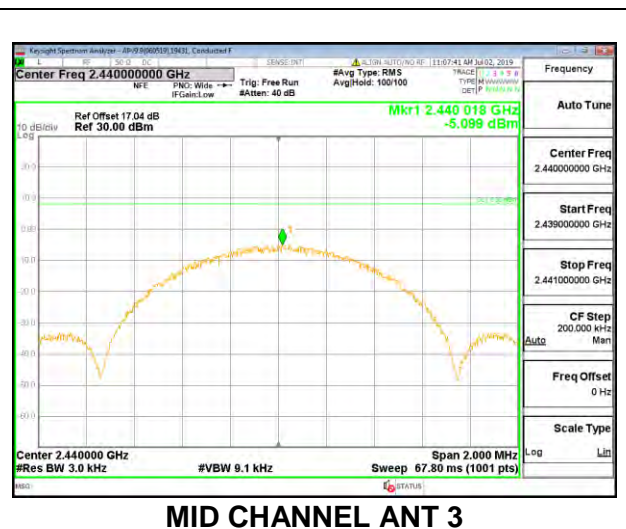
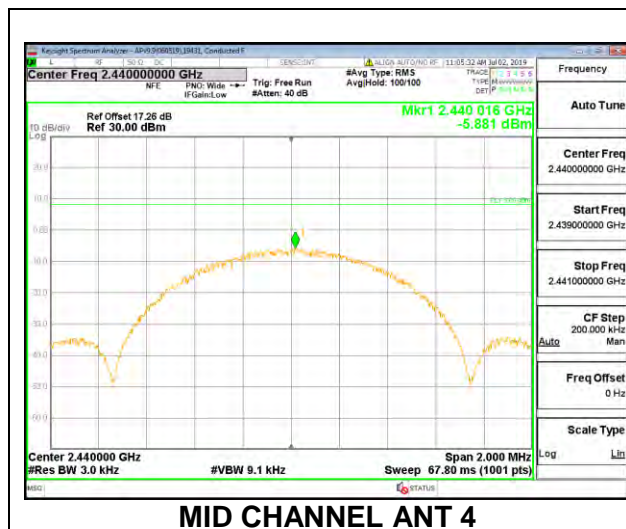
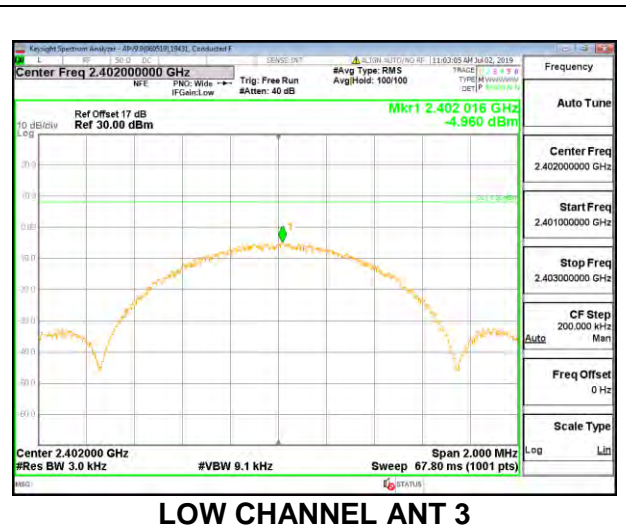
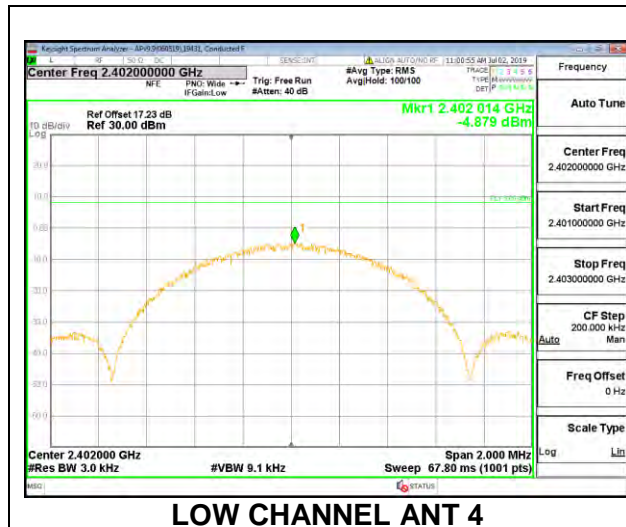


8.12.3 LOW POWER BLE (1Mbps)

| | | |
|--------------------|--|--|
| Duty Cycle CF (dB) | | Included in Calculations of Corr'd PSD |
|--------------------|--|--|

PSD Results

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---------|--------------------|---------------------------------|---------------------------------|--|-------------------------|----------------|
| Low | 2402 | -4.879 | -4.960 | -1.909 | 8.0 | -9.909 |
| Mid | 2440 | -5.881 | -5.099 | -2.462 | 8.0 | -10.462 |
| High | 2480 | -4.228 | -5.264 | -1.705 | 8.0 | -9.705 |



8.12.4 LOW POWER BLE (2Mbps)

| | | |
|--------------------|--|--|
| Duty Cycle CF (dB) | | Included in Calculations of Corr'd PSD |
|--------------------|--|--|

PSD Results

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---------|--------------------|---------------------------------|---------------------------------|--|-------------------------|----------------|
| Low | 2402 | -10.540 | -10.327 | -7.42 | 8.0 | -15.4 |
| Mid | 2440 | -9.416 | -10.842 | -7.06 | 8.0 | -15.1 |
| Hjigh | 2480 | -9.886 | -10.830 | -7.32 | 8.0 | -15.3 |

