# FCC 47CFR part 15C
# Test Report
## For
## Jongo T2
## Jongo T240

Reference Standard: FCC 47CFR part 15C
Manufacturer: PURE
For type of equipment and serial number, refer to section 3
Report Number: 06-6939-7-13 Issue 01
Report Produced by: -

***R.N. Electronics Ltd.***
1 Arnolds Court
Arnolds Farm Lane
Mountnessing
Essex
CM13 1UT
U.K.

www.RNelectronics.com

Telephone +44 (0) 1277 352219
Email sales@RNelectronics.com

Copy No. pdf

Arnolds Court, Arnolds Farm Lane, Mountnessing, Brentwood Essex, CM13 1UT

# Certificate of Test 6939-7

The unit noted below has been tested by **R.N. Electronics Limited** and, where appropriate, conforms to the relevant subpart of FCC 47CFR Part 15. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

| | |
|---|---|
| Equipment: | Jongo T2 |
| Model Number:<br>Proposed FCC ID: | Jongo T240<br>X280070 |
| Unique Serial Numbers: | ES2-17 (Rad TX), ES2-15 (Cond TX) |
| Manufacturer: | PURE<br>Imagination Technologies<br>Home Park Industrial Estate<br>Kings Langley<br>Hertfordshire<br>WD4 8LZ |
| Full measurement results are detailed in<br>Report Number: | 06-6939-7-13 Issue 01 |
| Test Standards: | FCC 47CFR Part 15.247<br>effective date **October 1st, 2012**<br>Class DTS Intentional Radiator |

NOTE:
Certain tests were not performed based upon manufacturer's declarations. For details refer to section 3 of this report.

DEVIATIONS:
Deviations from the standards have been applied. For details refer to section 4.2 of this report.

This certificate relates only to the unit tested as identified by a unique serial number and in the condition at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Directive, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to one or more national authorities within the EU and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Date of Test: June 20th to June 24th , 2013

Test Engineer: Digitally signed by: Daniel Sims
DN: CN = Daniel Sims C = GB O = RN Electronics
Date: 2013.08.02 10:55:04 Z

Approved By:
Managing Director

Customer Representative:

# 1 Contents

# 2 Summary of test results

The **Jongo T2** was tested to the following standards: -

**FCC 47CFR Part 15.247 (effective date October 1st, 2012);**
**Class DTS Intentional Radiator**

Any compliance statements are made reliant on the modes of operation as instructed to us by the Manufacturer based on their specific knowledge of the application and functionality of the equipment tested. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard, particularly under different conditions to those during testing.

| Title | Reference | Results |
|---|---|---|
| 1. AC power line conducted emissions | FCC Part 15C §15.207 | PASSED |
| 2. Radiated emissions | FCC Part 15C §15.205, §15.209 and §15.247(d) | PASSED |
| 3. Occupied bandwidth | FCC Part 15C §15.215(c), §15.247(a)(2) | PASSED |
| 4. Maximum peak conducted output power | FCC Part 15C §15.247(b) | PASSED |
| 5. Frequency tolerance | FCC Part 15C §15.215(c) | NOT APPLICABLE[1] |
| 6. Duty cycle | FCC Part 15C §15.35(c) | NOT APPLICABLE[2] |
| 7. Power spectral density | FCC Part 15C §15.247(e) | PASSED |
| 8. Band edge compliance | FCC Part 15C §15.205, §15.209 and §15.247 | PASSED |
| 9. FHSS parameters | FCC Part 15C §15.247(a)(1)<br>Dwell time and Number of hopping channels<br>Frequency separation | <br>NOT APPLICABLE[3]<br>NOT APPLICABLE[3] |

[1]No limits apply, however the requirement to contain the designated bandwidth of the emission within the specified frequency band includes the frequency stability of the transmitter over expected variations in temperature and supply voltage.
[2] No limits apply.
[3] EUT does not employ FHSS technology.

# 3 Equipment Under Test (EUT)

## 3.1 Equipment specification

| | |
|---|---|
| Applicant | PURE<br>Imagination Technologies<br>Home Park Industrial Estate<br>Kings Langley<br>Hertfordshire<br>WD4 8LZ |
| | |
| Manufacturer of EUT | PURE |
| Brand name of EUT | Jongo T2 |
| Model Number of EUT | Jongo T240 |
| Serial Numbers of EUT's | ES2-17 (Rad TX), ES2-15 (Cond TX) |
| Date when equipment was received by RN Electronics | June 14th, 2013 |
| Date of test: | June 20th to June 24th , 2013 |
| | |
| Visual description of EUT: | Small plastic enclosure with two speakers located on the front behind a speaker grille. On the left hand side are 4 push buttons, volume up, volume down, Mute and standby. On the rear are 3 ports, a DC port, a USB port and an auxiliary audio input port. Also located on the rear are a Wi-Fi sync button and a mounting thread. |
| Main function of the EUT: | A wireless audio speaker which stream via Wi-Fi or Bluetooth. n.b. Bluetooth is not under test here. |
| Height | 145mm |
| Width | 250mm |
| Depth | 120mm |
| Weight | 2kg |
| | |
| EUT supplied PSU: | |
| Manufacturer | Phihong |
| Model number | PSAA30R-150 |
| Serial number | Not available |
| Voltage input | 100-240VAC |
| Current required from above voltage source | 0.8A |
| Output | 15V dc, 2.0A |

## 3.2 EUT Configurations for testing

| **General parameters** | |
|---|---|
| EUT Normal use position | Desktop / mobile. |
| Choice of model(s) for type tests | Single variant |
| Antenna details | Wi-Fi inverted F PCB antenna |
| Antenna port | Integral antenna |
| Data port (yes/no)? | Yes |
| Highest Signal generated in EUT | 2462MHz (Wi-Fi TX channel 11) |
| Lowest Signal generated in EUT | 12MHz (USB clock) |
| **TX Parameters** | |
| Alignment range – transmitter | 2.412 - 2.462 GHz |
| EUT Declared Modulation | DSSS: DBPSK; DQPSK; CCK (802.11b) |

| | |
|---|---|
| Parameters | OFDM: BPSK; QPSK; 16QAM; 64QAM (802.11g) |
| EUT Declared Power level | +16dBm |
| EUT Declared Signal Bandwidths | 20MHz |
| EUT Declared Channel Spacing's | 5MHz |
| Declared frequency stability | +/-20ppm |
| **RX Parameters** | |
| Alignment range – receiver | 2412 - 2462 MHz |
| EUT Declared RX Signal Bandwidth | 20MHz |

## 3.3 Functional description

The Jongo T2 is a wireless speaker which has the ability to stream audio media via the use of a Wi-Fi network or via Bluetooth. The media can be streamed via a smartphone, table or a PC. The device can be used via Apps on the iOS and android systems. The unit also has the ability to directly play audio by connecting an audio device to its auxiliary input port by means of a 3.5mm jack audio cable.
N.b. Bluetooth operation (using integral pre-approved Bluetooth module, is not under test in this report).

## 3.4 EUT modes

| Mode Reference | Description | Used for testing |
|---|---|---|
| TX channel 1 | EUT constantly transmitting with mod @2412MHz and 1MBPS | Yes |
| TX channel 6 | EUT constantly transmitting with mod @2437MHz and 1MBPS | Yes |
| TX channel 11 | EUT constantly transmitting with mod @2462MHz and 1MBPS | Yes |
| TX normal | Wi-Fi or Bluetooth packet transmission of audio data | No |

All Transmit modes were 100% duty cycle, modulated (except where stated otherwise), and left on the default max power setting.

The Transmit modes referred to above were checked in combination with the following table of modulation/ data rate schemes to fulfil the test requirements:-

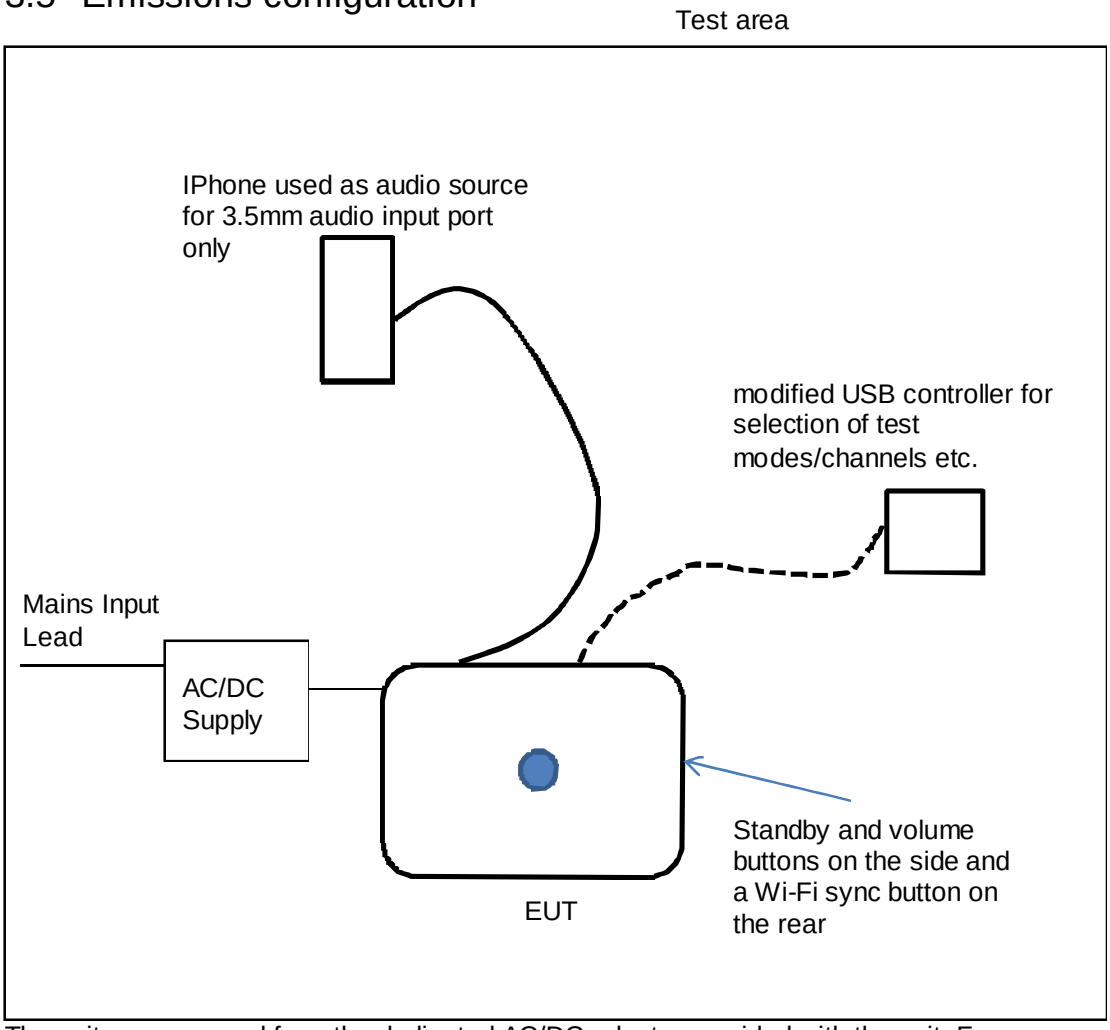
| Mode | Rate |
|---|---|
| 802.11B | 1 Mbps |
| 802.11B | 2 Mbps |
| 802.11B | 5.5 Mbps |
| 802.11B | 11 Mbps |
| | |
| 802.11G | 6 Mbps |
| 802.11G | 9 Mbps |
| 802.11G | 12 Mbps |
| 802.11G | 18 Mbps |
| 802.11G | 24 Mbps |
| 802.11G | 36 Mbps |
| 802.11G | 48 Mbps |
| 802.11G | 54 Mbps |

Description of ancillary equipment connected to the equipment under test, for the purpose of tests, can be found in Section 10.

Any modifications made to the EUT, whilst under test, can be found in Section 11.

This report was printed on: 02 August 2013

## 3.5 Emissions configuration




The unit was powered from the dedicated AC/DC adapter provided with the unit. For conducted RF tests a second unit was provided with the internal antenna unsoldered and an SMA connector fitted in its place.
The units were configured with engineering menus in software which were accessed via a specially modified USB device which allowed permanent transmit and receive modes of the device on the top, middle and bottom channels as stated within section 3.4 of this report. The transmit mode was 100% continuous with modulation and the power settings for each channel were left at the default settings (level 20) in the software.

For radiated and conducted emissions tests the unit was populated with typical peripherals. The audio input port had a 3.5mm audio lead inserted which was connected to the audio out of an IPhone (3.5mm socket) the USB port was populated with the Special USB device for control of the test modes required for tests.
2 identical units were provided for test, these were: - S/n ES2-17 for all radiated RF TX tests (and Conducted AC emissions) and S/n ES2-15 for all Conducted RF TX tests.
The AC/DC adapter was also placed on to the test table along with the main enclosure of the EUT.
A pre-approved Bluetooth USB dongle was permanently fitted inside the EUT enclosure and was powered/in operation during the course of the testing. The Bluetooth dongle was labelled FCC ID: **VHVBTVD1100.**

# 4 Specifications

## 4.1 Relevant standards

The tests were performed by RN Electronics Engineer Daniel Sims who set up the tests, the test equipment, and operated it in accordance with the ***R.N. Electronics Ltd*** procedures manual and the basic standards listed below.

R.N. Electronics Ltd sites M and OATS are listed with the FCC. Registration Number 293246

| Reference | Standard Number | Year | Description |
|---|---|---|---|
| 4.1.1 | FCC 47CFR15 | 2012 | Electromagnetic compatibility and radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements |
| 4.1.2 | ANSI C63.10 | 2009 | American National Standard for Testing Unlicensed Wireless Devices |
| 4.1.3 | ANSI C63.4 | 2003 | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| 4.1.4 | KDB558074 | 2012 | Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 |

## 4.2 Deviations

ANSI C63-10-2009 deviations:
The reference standard ANSI C63.4-2003 was used, not the latest ANSI C63.4-2009

FCC Part 15 deviations:
None.

## 4.3 Tests at Extremes of Temperature & Voltage

Not Required.

N.b. for certain tests referenced to antenna port:

☒ A temporary internal RF port was used for testing.
☐ A test fixture was used for testing.
☐ A temporary RF port was created for testing.
☐ The equipment internal Antenna was used for testing.

## 4.4 Measurement uncertainties

| Parameter | Uncertainty |
|---|---|
| Transmitter Tests | |
| Conducted RF power | <± 1.0 dB |
| Occupied bandwidth | ± 1.9 % |
| Radiated RF power | ± 3.5 dB |
| Radiated spurious emissions | 30MHz - 1000MHz ±5.1dB<br>1000MHz - 2000MHz ±4.5dB<br>1 – 18 GHz ±3.5dB<br>18 – 26.5 GHz ±3.9dB |
| AC power line conducted emissions | (For LISN) 150kHz to 30MHz ±3.6dB |

# 5 Tests, Methods and Results

## 5.1 AC power line conducted emissions

### 5.1.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.207)
Test Method: ANSI C63.10, Reference (6.2.)

### 5.1.2 Configuration of EUT

The EUT and its AC/DC adapter were placed on a wooden table 0.8m above the ground plane and the adapter was connected to a LISN via a 1m mains cable.

Details of the Peripheral and Ancillary Equipment connected for this test is listed in section 11.

The EUT was operated in **TX low channel**, **TX mid channel** and **TX high channel** modes.

### 5.1.3 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted in the 'Test Equipment' Section. Measurements were made on the live and neutral conductors using both average and quasi-peak detection.
At least 6 signals within 20dB and/or all signals within 10dB of the limit were investigated.

Tests were performed in Test Site F.

### 5.1.4 Test Equipment used

E150, E035, E533, E534, E535, E465

See Section 10 for more details.

### 5.1.5 Test results

Ambient conditions.
Temperature: 22 °C Relative humidity: 55 %

No discernible difference was noted in emissions between channels (exploratory measurements); therefore the final measurements are presented for **TX mid channel** mode only.

Analyser plots showing Peak values as applicable can be found in Section 6.1 of this report.

**Table of signals measured.**

Quasi-Peak and Average Live (Mid channel TX)

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP - Lim1 (dB) | AV Amp (dBuV) | AV - Lim1 (dB) |
|---|---|---|---|---|---|---|
| 1 | 0.178 | 46.9 | 43.8 | -20.8 | 31.6 | -23.0 |
| 2 | 0.239 | 41.8 | 36.0 | -26.1 | 23.1 | -29.0 |
| 3 | 0.300 | 37.7 | 35.9 | -24.3 | 26.0 | -24.2 |
| 4 | 0.385 | 39.1 | 37.4 | -20.8 | 25.7 | -22.5 |
| 5 | 0.429 | 39.7 | 38.6 | -18.7 | 27.0 | -20.3 |
| 6 | 0.714 | 32.6 | 30.3 | -25.7 | 19.1 | -26.9 |

## Table of signals measured.

Quasi-Peak and Average Neutral (Mid channel TX)

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP - Lim1 (dB) | AV Amp (dBuV) | AV - Lim1 (dB) |
|---|---|---|---|---|---|---|
| 1 | 0.180 | 51.0 | 46.1 | -18.4 | 35.3 | -19.2 |
| 2 | 0.239 | 38.6 | 38.7 | -23.4 | 25.9 | -26.2 |
| 3 | 0.239 | 42.4 | 38.0 | -24.1 | 25.9 | -26.2 |
| 4 | 0.304 | 41.8 | 38.5 | -21.6 | 29.0 | -21.1 |
| 5 | 0.380 | 42.9 | 40.4 | -17.9 | 29.0 | -19.3 |
| 6 | 0.442 | 43.0 | 40.7 | -16.3 | 28.7 | -18.3 |

These results show that the **EUT** has **PASSED** this test.

# 5.2 Radiated emissions

## 5.2.1 Test Methods

Test Requirements: FCC Part 15C, Reference (15.209)
Test Method: ANSI C63.4, Reference (8.)

## 5.2.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was measured in 3 orthogonal planes.

The EUT was operated in **TX low channel**, **TX mid channel** and **TX high channel** modes.

## 5.2.3 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Below 30MHz, measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment and the antenna were rotated 360° to record the worst case emissions.

30MHz - 1GHz, measurements were made on a site listed with the FCC. The equipment was rotated 360° and the antenna scanned 1 – 4 metres in both horizontal and vertical polarisations to record the worst case emissions.

Above 1GHz, measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. Horn antennas were used at heights where the whole of the EUT was contained within the main beam. The EUT was rotated through 360° to record the worst case emissions.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using Test Site M**.**

## 5.2.4 Test Equipment used

E268, E410, E411, E412, E429, E533, E534, E535, TMS78, TMS79, TMS81, TMS82, TMS933, N240**.**

See Section 10 for more details

## 5.2.5 Test results

Ambient conditions
Temperature: 18-22 °C Relative humidity: 46-57 %

Analyser plots showing Peak values can be found in Section 6.2 of this report.

Note: EUT tested in a continuous transmit mode for ease of test.

No discernible difference was noted in emissions between channel settings in the test ranges 150k-30MHz and 30-1000MHz (exploratory measurements); therefore final measurements are presented for **TX mid channel** mode only for these test ranges.

The 1Mbps data rate was found to yield the highest emission amplitudes and has been used for final measurements.

### 5.2.5.1 Below 30MHz.

Plot references for Low Frequency Radiated emissions measurements (9kHz to 30MHz)

| Channel | Parallel Plots | Perpendicular Plots |
|---|---|---|
| Mid channel | 6939-7 TX MID CHANNEL 150KHz to 30MHz Parallel | 6939-7 TX MID CHANNEL 150KHz to 30MHz Perpendicular |

### 5.2.5.2 30MHz - 1GHz.

Plot references for Radiated emissions measurements (30-1000MHz)

| Frequency Range | Antenna Polarisation | Plot reference |
|---|---|---|
| 30 – 300 MHz | Horizontal | 6879-6 Rad 1 VHF Horiz |
| 30 – 300 MHz | Vertical | 6879-6 Rad 1 VHF Vert |
| 300 – 1000 MHz | Horizontal | 6879-6 Rad 1 UHF Horiz |
| 300 – 1000 MHz | Vertical | 6879-6 Rad 1 UHF Vert |

**Table of signals measured (TX mid channel)**

Horizontal

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP - Lim1 (dB) |
|---|---|---|---|---|
| 1 | 114.700 | 30.8 | 29.2 | -14.3 |
| 2 | 120.000 | 35.8 | 34.0 | -9.5 |
| 3 | 240.000 | 36.6 | 35.0 | -11.0 |
| 4 | 258.075 | 35.6 | 34.1 | -11.9 |
| 5 | 399.408 | 37.1 | 31.8 | -14.2 |
| 6 | 596.878 | 40.6 | 34.4 | -11.6 |

Vertical

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP - Lim1 (dB) |
|---|---|---|---|---|
| 1 | 33.786 | 34.6 | 30.5 | -9.5 |
| 2 | 34.369 | 35.0 | 30.6 | -9.4 |
| 3 | 50.759 | 33.5 | 29.8 | -10.2 |
| 4 | 120.000 | 32.8 | 30.2 | -13.3 |
| 5 | 125.348 | 27.0 | 22.6 | -20.9 |
| 6 | 125.352 | 27.9 | 24.8 | -18.7 |
| 7 | 135.182 | 28.5 | 26.2 | -17.3 |
| 8 | 402.119 | 32.1 | 25.8 | -20.2 |

### 5.2.5.3 Above 1GHz.

Radio Parameters 1

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Bottom channel** | 2412 MHz |

Results relating to Radio Parameters 1

| Spurious Frequency (MHz) | Measured Peak Level (dBµV/m) | Difference to Peak Limit (dB) | Measured Average Level (dBµV/m) | Difference to Average Limit (dB) | Antenna Polarisation | EUT Polarisation |
|---|---|---|---|---|---|---|
| 4824 | 53.1 | -20.9 | 48.3 | -5.7 | Vertical | normal use |
| 4824 | 53.9 | -20.1 | 48.2 | -5.8 | Horizontal | Flat on back |

Radio Parameters 2

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Middle channel 1** | 2437 MHz |

Results relating to Radio Parameters 2

| Spurious Frequency (MHz) | Measured Peak Level (dBµV/m) | Difference to Peak Limit (dB) | Measured Average Level (dBµV/m) | Difference to Average Limit (dB) | Antenna Polarisation | EUT Polarisation |
|---|---|---|---|---|---|---|
| 6498 | 45.1 | -14.9 | 38.9 | -11.1 | Horizontal | normal use |
| 6498 | 43.2 | -16.8 | 34.7 | -15.3 | Vertical | normal use |
| 4874 | 52.6 | -21.4 | 44.6 | -9.4 | Vertical | Flat on back |
| 4874 | 53.6 | -20.4 | 48.2 | -5.8 | Horizontal | Flat on back |

Radio Parameters 3

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 3

| Spurious Frequency (MHz) | Measured Peak Level (dBµV/m) | Difference to Peak Limit (dB) | Measured Average Level (dBµV/m) | Difference to Average Limit (dB) | Antenna Polarisation | EUT Polarisation |
|---|---|---|---|---|---|---|
| 6565 | 43.7 | -30.3 | 36.4 | -17.6 | Vertical | normal use |
| 6565 | 43.6 | -30.4 | 36.2 | -17.8 | Horizontal | normal use |
| 4924 | 56.5 | -17.5 | 53.2 | -0.8 | Vertical | Flat on back |
| 4924 | 56.1 | -17.9 | 52.9 | -1.1 | Horizontal | Flat on back |

Plot Table

| Frequency Range | Antenna Polarisation | Plot reference |
|---|---|---|
| 1-2GHz | Horizontal | J6939-7 1 - 2GHz Horizontal plot Mid channel |
| 1-2GHz | Vertical | J6939-7 1 - 2GHz Vertical plot Mid channel |
| 2-2.7GHz | Horizontal | J6939-7 2 – 2.7GHz Horizontal plot Mid channel |
| 2-2.7GHz | Vertical | J6939-7 2 – 2.7GHz Vertical plot Mid channel |
| 2.7GHz-5GHz | Horizontal | J6939-7 2.7 - 5GHz Horizontal plot Mid channel |

| | | |
|---|---|---|
| 2.7GHz-5GHz | Vertical | J6939-7 2.7 - 5GHz Vertical plot Mid channel |
| 5-6GHz | Horizontal | J6939-7 5 - 6GHz Horizontal plot Mid channel |
| 5-6GHz | Vertical | J6939-7 5 - 6GHz Vertical plot Mid channel |
| 6-7.8GHz | Horizontal | J6939-7 6 – 7.8GHz Horizontal plot Mid channel |
| 6-7.8GHz | Vertical | J6939-7 6 – 7.8GHz Vertical plot Mid channel |
| 7.8-10GHz | Horizontal | J6939-7 7.8 - 10GHz Horizontal plot Mid channel |
| 7.8-10GHz | Vertical | J6939-7 7.8 - 10GHz Vertical plot Mid channel |
| 10-12.5GHz | Horizontal | J6939-7 10 – 12.5GHz Horizontal plot Mid channel |
| 10-12.5GHz | Vertical | J6939-7 10 – 12.5GHz Vertical plot Mid channel |
| 12-15GHz | Horizontal | J6939-7 12 - 15GHz Horizontal plot Mid channel |
| 12-15GHz | Vertical | J6939-7 12 - 15GHz Vertical plot Mid channel |
| 15-18GHz | Horizontal | J6939-7 15 - 18GHz Horizontal plot Mid channel |
| 15-18GHz | Vertical | J6939-7 15 - 18GHz Vertical plot Mid channel |
| 18-21.5GHz | Horizontal | J6939-7 18 – 21.5GHz Horizontal plot Mid channel |
| 18-21.5GHz | Vertical | J6939-7 18 – 21.5GHz Vertical plot Mid channel |
| 21.5-25GHz | Horizontal | J6939-7 21.5 - 5GHz Horizontal plot Mid channel |
| 21.5-25GHz | Vertical | J6939-7 21.5 - 5GHz Vertical plot Mid channel |

Note: Whilst Low, Mid and High channels were tested, plots are for illustrative purposes only and only **Mid channel** plots are shown in this report.

LIMITS:
15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.
15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20dB from the level of the fundamental / meet the general limits of 15.209.

N.b. the general limits of 15.209 are as drawn on the respective plots.

These show that the **EUT** has **PASSED** this test.

# 5.3 Occupied bandwidth

## 5.3.1 Test Methods

Test Requirements**:** FCC Part 15C, Reference (15.215)
Test Method: ANSI C63.10, Reference (6.9)

## 5.3.2 Configuration of EUT

The EUT was tested on a bench. Measurements were made at the temporary internal RF port. The EUT was operated in **TX low channel** and **TX mid channel** and **TX high channel** modes.

## 5.3.3 Test Procedure

Tests were performed using Test Site A.
Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. A 100kHz RBW, ≥ 3x VBW, auto sweep time and max hold settings were used for the 6dB bandwidth.

## 5.3.4 Test Equipment used

E252, E533, E534, E535, E256,

See Section 10 for more details.

## 5.3.5 Test results

Ambient conditions.
Temperature: 18-21 °C Relative humidity: 42-50 % Pressure: 101 mbar

Analyser plots for the 6dB bandwidth can be found in Section 6.4 of this report.

Radio Parameter 1

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 1

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 10.045 | 10.005 | 9.474 |
| **Plot reference** | J6939-7, Plot 0001 | J6939-7, Plot 0013 | J6939-7, Plot 0025 |

Radio Parameter 2

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 2 MBPS |

| | |
|---|---|
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 2

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 10.115 | 10.065 | 10.075 |
| **Plot reference** | J6939-7, Plot 0002 | J6939-7, Plot 0014 | J6939-7, Plot 0026 |

Radio Parameter 3

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 5.5 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 3

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 10.035 | 9.574 | 10.035 |
| **Plot reference** | J6939-7, Plot 0003 | J6939-7, Plot 0015 | J6939-7, Plot 0027 |

Radio Parameter 4

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 11 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 4

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 10.075 | 10.055 | 9.755 |
| **Plot reference** | J6939-7, Plot 0004 | J6939-7, Plot 0016 | J6939-7, Plot 0028 |

Radio Parameter 5

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 6 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 5

| | Low | Mid | High |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **6dB BW (MHz)** | 15.137 | 15.118 | 15.148 |
| **Plot reference** | J6939-7, Plot 0005 | J6939-7, Plot 0017 | J6939-7, Plot 0029 |

Radio Parameter 6

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 9 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 6

| | **Low** | **Mid** | **High** |
|---|---|---|---|
| **6dB BW (MHz)** | 15.117 | 15.128 | 15.138 |
| **Plot reference** | J6939-7, Plot 0006 | J6939-7, Plot 0018 | J6939-7, Plot 0030 |

Radio Parameter 7

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 12 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 7

| | **Low** | **Mid** | **High** |
|---|---|---|---|
| **6dB BW (MHz)** | 15.127 | 15.128 | 15.218 |
| **Plot reference** | J6939-7, Plot 0007 | J6939-7, Plot 0019 | J6939-7, Plot 0031 |

Radio Parameter 8

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 18 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 8

| | **Low** | **Mid** | **High** |
|---|---|---|---|
| **6dB BW (MHz)** | 15.418 | 15.418 | 15.408 |
| **Plot reference** | J6939-7, Plot 0008 | J6939-7, Plot 0020 | J6939-7, Plot 0032 |

Radio Parameter 9

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |

| | |
|---|---|
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 24 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 9

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 15.138 | 15.138 | 15.138 |
| **Plot reference** | J6939-7, Plot 0009 | J6939-7, Plot 0021 | J6939-7, Plot 0033 |

Radio Parameter 10

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 36 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 10

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 15.748 | 15.748 | 15.748 |
| **Plot reference** | J6939-7, Plot 0010 | J6939-7, Plot 0022 | J6939-7, Plot 0034 |

Radio Parameter 11

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 48 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 11

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 15.328 | 15.138 | 15.328 |
| **Plot reference** | J6939-7, Plot 0011 | J6939-7, Plot 0023 | J6939-7, Plot 0035 |

Radio Parameter 12

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 54 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 12

| | Low | Mid | High |
|---|---|---|---|
| **6dB BW (MHz)** | 15.138 | 15.138 | 15.138 |
| **Plot reference** | J6939-7, Plot 0012 | J6939-7, Plot 0024 | J6939-7, Plot 0036 |

**LIMITS:**

15.247(a)(2) The minimum 6dB bandwidth shall be at least 500kHz.

These results show that the EUT has **PASSED** this test.

# 5.4 Maximum peak conducted output power

## 5.4.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.247)
Test Method: ANSI C63.10, Reference (6.10.2.1 b))

## 5.4.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the temporary internal RF port.

The EUT was operated in **TX low channel** and **TX mid channel** and **TX high channel** modes for this test.

The EUT was set to each mode and test signal in turn (see section 3.4) and highest power levels recorded.

## 5.4.3 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. Peak stated reading is maximum power observed using a spectrum analyser channel power function over the 6dB bandwidth + 1MHz using a 1MHz RBW, per ANSI C63.10.

Measurements were made on a test bench in site A.

## 5.4.4 Test Equipment used

E533, E534, E535, E252, E256

See Section 10 for more details

## 5.4.5 Test results

Ambient conditions.
Temperature: 20 °C Relative humidity: 52 % Pressure: 102 mbar

Radio Parameter1

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 1

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 63.1 | 56.2 | 51.3 |
| **Maximum TX Power observed (mW)** | | 63.1 | | |

Radio Parameter2

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 2 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 2

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 64.6 | 57.5 | 50.1 |
| **Maximum TX Power observed (mW)** | | 64.6 | | |

Radio Parameter3

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 5.5 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 3

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 69.2 | 61.7 | 55.0 |
| **Maximum TX Power observed (mW)** | | 69.2 | | |

Radio Parameter4

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 11 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 4

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 77.6 | 70.8 | 60.3 |
| **Maximum TX Power observed (mW)** | | 77.6 | | |

Radio Parameter5

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |

| | |
|---|---|
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 6 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 5

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 56.2 | 63.1 | 56.2 |
| **Maximum TX Power observed (mW)** | | 63.1 | | |

Radio Parameter6

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 9 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 6

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 61.7 | 67.6 | 58.9 |
| **Maximum TX Power observed (mW)** | | 67.6 | | |

Radio Parameter7

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 12 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 7

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 52.5 | 57.5 | 50.1 |
| **Maximum TX Power observed (mW)** | | 57.5 | | |

Radio Parameter8

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 18 MBPS |
| **Low channel** | 2412 MHz |

| | |
|---|---|
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 8

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 51.3 | 55.0 | 47.9 |
| **Maximum TX Power observed (mW)** | | 55.0 | | |

Radio Parameter9

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 24 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 9

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 55.0 | 58.9 | 51.3 |
| **Maximum TX Power observed (mW)** | | 58.9 | | |

Radio Parameter10

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 36 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 10

| **Test conditions** | | **Carrier Power (mW)** | | |
|---|---|---|---|---|
| | | **Low** | **Mid** | **High** |
| **Temp Ambient** | **Volts Nominal** | 57.5 | 61.7 | 53.7 |
| **Maximum TX Power observed (mW)** | | 61.7 | | |

Radio Parameter11

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 48 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 11

| Test conditions | | Carrier Power (mW) | | |
|---|---|---|---|---|
| | | Low | Mid | High |
| Temp Ambient | Volts Nominal | 36.3 | 47.9 | 38.9 |
| Maximum TX Power observed (mW) | | 47.9 | | |

Radio Parameter12

| | |
|---|---|
| Band | 2400-2483.5 MHz |
| Power level | 16 dBm |
| Channel spacing | 5 MHz |
| Mod scheme | 54 MBPS |
| Low channel | 2412 MHz |
| Mid channel | 2437 MHz |
| Top channel | 2462 MHz |

Results relating to Radio Parameters 12

| Test conditions | | Carrier Power (mW) | | |
|---|---|---|---|---|
| | | Low | Mid | High |
| Temp Ambient | Volts Nominal | 35.5 | 49.0 | 38.0 |
| Maximum TX Power observed (mW) | | 49.0 | | |

LIMITS:
15.247(b)(3)
For systems using digital modulation in the 902-928, 2400-2483.5 or 5725-5850 MHz bands 1 Watt.

These results show that the EUT has **PASSED** this test.

## 5.5 Frequency tolerance

NOT APPLICABLE: No limits apply, however the requirement to contain the designated bandwidth of the emission within the specified frequency band includes the frequency stability of the transmitter over expected variations in temperature and supply voltage

## 5.6 Duty cycle

NOT APPLICABLE: There is no limit defined in the standard. It was, however, confirmed by observation that the continuous test mode provided was 100% duty.

# 5.7 Maximum Power Spectral Density

## 5.7.1 Test Methods

Test Requirements**:** FCC Part 15C, Reference (15.247)
Test Method: KDB558074, PSD Option 1

## 5.7.2 Configuration of EUT

The EUT was configured as for the peak conducted power test. The EUT was operated in **TX low channel** and **TX mid channel** and **TX high channel** modes for this test.

## 5.7.3 Test Procedure

Tests were performed using Test Site A**.**
Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking any plots. PEP was recorded in the required span and bandwidth. Measurements/plots were taken with the span set to 1.5 times the measured DTS bandwidth for each modulation scheme setting.

## 5.7.4 Test Equipment used

E256, E252, E410, E411, E412

See Section 10 for more details.

## 5.7.5 Test results

Ambient conditions.
Temperature: 18°C Relative humidity: 57% Pressure: 102mbar

Radio Parameter 1

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 1

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -11.000 | -11.910 | -12.500 |
| **Plot reference** | J6939-7 plot0200 | J6939-7 plot0212 | J6939-7 plot0224 |

Radio Parameter 2

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |

| | |
|---|---|
| **Mod scheme** | 2 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 2

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -8.950 | -9.740 | -10.650 |
| **Plot reference** | J6939-7 plot0201 | J6939-7 plot0213 | J6939-7 plot0225 |

Radio Parameter 3

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 5.5 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 3

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -10.500 | -11.320 | -12.060 |
| **Plot reference** | J6939-7 plot0202 | J6939-7 plot0214 | J6939-7 plot0226 |

Radio Parameter 4

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 11 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 4

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -10.100 | -10.420 | -11.440 |
| **Plot reference** | J6939-7 plot0203 | J6939-7 plot0215 | J6939-7 plot0227 |

Radio Parameter 5

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |

| | |
|---|---|
| **Mod scheme** | 6 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 5

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -11.300 | -11.440 | -12.150 |
| **Plot reference** | J6939-7 plot0204 | J6939-7 plot0216 | J6939-7 plot0228 |

Radio Parameter 6

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 9 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 6

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -10.650 | -10.820 | -11.530 |
| **Plot reference** | J6939-7 plot0205 | J6939-7 plot0217 | J6939-7 plot0229 |

Radio Parameter 7

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 12 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 7

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -10.230 | -10.290 | -11.050 |
| **Plot reference** | J6939-7 plot0206 | J6939-7 plot0218 | J6939-7 plot0230 |

Radio Parameter 8

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |

| | |
|---|---|
| **Mod scheme** | 18 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 8

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -10.060 | -11.270 | -10.550 |
| **Plot reference** | J6939-7 plot0207 | J6939-7 plot0219 | J6939-7 plot0231 |

Radio Parameter 9

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 24 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 9

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -9.860 | -9.500 | -10.160 |
| **Plot reference** | J6939-7 plot0208 | J6939-7 plot0220 | J6939-7 plot0232 |

Radio Parameter 10

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 36 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 10

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -7.630 | -7.370 | -7.930 |
| **Plot reference** | J6939-7 plot0209 | J6939-7 plot0221 | J6939-7 plot0233 |

Radio Parameter 11

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |

| | |
|---|---|
| **Mod scheme** | 48 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 11

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -8.480 | -7.320 | -8.490 |
| **Plot reference** | J6939-7 plot0210 | J6939-7 plot0222 | J6939-7 plot0234 |

Radio Parameter 12

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 54 MBPS |
| **Low channel** | 2412 MHz |
| **Mid channel** | 2437 MHz |
| **Top channel** | 2462 MHz |

Results relating to Radio Parameters 12

| | Low | Mid | High |
|---|---|---|---|
| **Antenna Gain (dB)** | 0.5 | 1 | -0.5 |
| **Duty Cycle (%)** | 100 | 100 | 100 |
| **dBm per 3kHz** | -9.700 | -8.520 | -9.550 |
| **Plot reference** | J6939-7 plot0211 | J6939-7 plot0223 | J6939-7 plot0235 |

**LIMITS:**
15.247(e) +8dBm/3kHz.

Any Analyser plots can be found in Section 6.5 of this report.

These results show that the EUT has **PASSED** this test.

# 5.8 Band Edge Compliance

## 5.8.1 Test Methods

Test Requirements: FCC Part 15C, Reference (15.215 and 15.247)
Test Method: ANSI C63.10-2009, Reference clause 6.9.3

## 5.8.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres.

The EUT was operated in **TX low channel** and **TX high channel** modes.

## 5.8.3 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking the plots.

Tests were performed using Test Site **M**.

## 5.8.4 Test Equipment used

E268, E410, E411, E412, E533, E534, E535, TMS82, E252, N240

See Section 10 for more details.

## 5.8.5 Test results

Ambient conditions.
Temperature: 17-21 °C Relative humidity: 46-51 % Pressure: 101 mbar

Analyser plots for the Band Edge Compliance can be found in Section 6.4 of this report. These show the 20dBc requirement of 15.247(d) are met at the band edges of 2400 and 2483.5 MHz. Restricted band edge plots are also shown in section 6.4.

The following tables list the field strengths observed in the adjacent restricted bands, which are required to meet the tighter 15.209 limits:

Radio Parameter 1

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 1 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 1

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 62.6 | 62 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 1MBPS | J6939-7, Band edge PK (1MRBW) High chan 1MBPS |
| **Average Level** | 53.5 | 47.7 |

| | | |
|---|---|---|
| **(dBµV/m)** | | |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 1MBPS | J6939-7, Band edge AV (1MRBW) High chan 1MBPS |

Band Edge Results relating to Radio Parameters 1

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 1MBPS | J6939-7, Band edge PK (100kRBW) High chan 1MBPS |

Radio Parameter 2

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 2 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 2

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 61.9 | 62.4 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 2MBPS | J6939-7, Band edge PK (1MRBW) High chan 2MBPS |
| **Average Level (dBµV/m)** | 53.5 | 47.2 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 2MBPS | J6939-7, Band edge AV (1MRBW) High chan 2MBPS |

Band Edge Results relating to Radio Parameters 2

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 2MBPS | J6939-7, Band edge PK (100kRBW) High chan 2MBPS |

Radio Parameter 3

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 5.5 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 3

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 62.8 | 61 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 5.5MBPS | J6939-7, Band edge PK (1MRBW) High chan 5.5MBPS |
| **Average Level (dBµV/m)** | 52.8 | 47.3 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 5.5MBPS | J6939-7, Band edge AV (1MRBW) High chan 5.5MBPS |

Band Edge Results relating to Radio Parameters 3

| | **Low** | **High** |
|---|---|---|

| | | |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 5.5MBPS | J6939-7, Band edge PK (100kRBW) High chan 5.5MBPS |

Radio Parameter 4

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 11 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 4

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 61.7 | 61.6 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 11MBPS | J6939-7, Band edge PK (1MRBW) High chan 11MBPS |
| **Average Level (dBµV/m)** | 52.9 | 47.4 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 11MBPS | J6939-7, Band edge AV (1MRBW) High chan 11MBPS |

Band Edge Results relating to Radio Parameters 4

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 11MBPS | J6939-7, Band edge PK (100kRBW) High chan 11MBPS |

Radio Parameter 5

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 6 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 5

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 67.3 | 61.1 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 6MBPS | J6939-7, Band edge PK (1MRBW) High chan 6MBPS |
| **Average Level (dBµV/m)** | 53.4 | 46.9 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 6MBPS | J6939-7, Band edge AV (1MRBW) High chan 6MBPS |

Band Edge Results relating to Radio Parameters 5

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 6MBPS | J6939-7, Band edge PK (100kRBW) High chan 6MBPS |

Radio Parameter 6

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |

| | |
|---|---|
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 9 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 6

| | Low | High |
|---|---|---|
| **Peak Level (dBµV/m)** | 63.7 | 62.4 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 9MBPS | J6939-7, Band edge PK (1MRBW) High chan 9MBPS |
| **Average Level (dBµV/m)** | 53.4 | 47.1 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 9MBPS | J6939-7, Band edge AV (1MRBW) High chan 9MBPS |

Band Edge Results relating to Radio Parameters 6

| | Low | High |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 9MBPS | J6939-7, Band edge PK (100kRBW) High chan 9MBPS |

Radio Parameter 7

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 12 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 7

| | Low | High |
|---|---|---|
| **Peak Level (dBµV/m)** | 64.5 | 61.1 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 12MBPS | J6939-7, Band edge PK (1MRBW) High chan 12MBPS |
| **Average Level (dBµV/m)** | 52.6 | 46.8 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 12MBPS | J6939-7, Band edge AV (1MRBW) High chan 12MBPS |

Band Edge Results relating to Radio Parameters 7

| | Low | High |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 12MBPS | J6939-7, Band edge PK (100kRBW) High chan 12MBPS |

Radio Parameter 8

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 18 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 8

| | Low | High |
|---|---|---|
| **Peak Level (dBµV/m)** | 63.1 | 61 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 18MBPS | J6939-7, Band edge PK (1MRBW) High chan 18MBPS |
| **Average Level (dBµV/m)** | 52.3 | 46.5 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 18MBPS | J6939-7, Band edge AV (1MRBW) High chan 18MBPS |

Band Edge Results relating to Radio Parameters 8

| | Low | High |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 18MBPS | J6939-7, Band edge PK (100kRBW) High chan 18MBPS |

Radio Parameter 9

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 24 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 9

| | Low | High |
|---|---|---|
| **Peak Level (dBµV/m)** | 64.9 | 61.6 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 24MBPS | J6939-7, Band edge PK (1MRBW) High chan 24MBPS |
| **Average Level (dBµV/m)** | 52.8 | 46.2 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 24MBPS | J6939-7, Band edge AV (1MRBW) High chan 24MBPS |

Band Edge Results relating to Radio Parameters 9

| | Low | High |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 24MBPS | J6939-7, Band edge PK (100kRBW) High chan 24MBPS |

Radio Parameter 10

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 36 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 10

| | Low | High |
|---|---|---|
| **Peak Level (dBµV/m)** | 63.5 | 62.7 |

| | | |
|---|---|---|
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 36MBPS | J6939-7, Band edge PK (1MRBW) High chan 36MBPS |
| **Average Level (dBµV/m)** | 53.1 | 46.7 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 36MBPS | J6939-7, Band edge AV (1MRBW) High chan 36MBPS |

Band Edge Results relating to Radio Parameters 10

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 36MBPS | J6939-7, Band edge PK (100kRBW) High chan 36MBPS |

Radio Parameter 11

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 48 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 11

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 62.6 | 60.7 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 48MBPS | J6939-7, Band edge PK (1MRBW) High chan 48MBPS |
| **Average Level (dBµV/m)** | 48.7 | 44.1 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 48MBPS | J6939-7, Band edge AV (1MRBW) High chan 48MBPS |

Band Edge Results relating to Radio Parameters 11

| | **Low** | **High** |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 48MBPS | J6939-7, Band edge PK (100kRBW) High chan 48MBPS |

Radio Parameter 12

| | |
|---|---|
| **Band** | 2400-2483.5 MHz |
| **Power level** | 16 dBm |
| **Channel spacing** | 5 MHz |
| **Mod scheme** | 54 MBPS |
| **Low channel** | 2412 MHz |
| **Top channel** | 2462 MHz |

Restricted Band Edge Results relating to Radio Parameters 12

| | **Low** | **High** |
|---|---|---|
| **Peak Level (dBµV/m)** | 61.3 | 61.8 |
| **Peak Plot reference** | J6939-7, Band edge PK (1MRBW) Low chan 54MBPS | J6939-7, Band edge PK (1MRBW) High chan 54MBPS |
| **Average Level (dBµV/m)** | 49 | 44 |
| **Average Plot reference** | J6939-7, Band edge AV (1MRBW) Low chan 54MBPS | J6939-7, Band edge AV (1MRBW) High chan 54MBPS |

Band Edge Results relating to Radio Parameters 12

| | Low | High |
|---|---|---|
| **Plot reference** | J6939-7, Band edge PK (100kRBW) Low chan 54MBPS | J6939-7, Band edge PK (100kRBW) High chan 54MBPS |

The band edge readings were performed with a peak detector (max held plot) and with the EUT set in a constant 100% transmit state.

Limits: AV = 54dBuV/m at band edges
PK = 74dBuV/m at band edges

The restricted band edges closest to the EUT frequency of 2400-2483.5MHz are 2390 & 2483.5MHz.

Further wider span plots have been taken to show the fact that there are no spurious emissions above the restricted limits of 15.209.

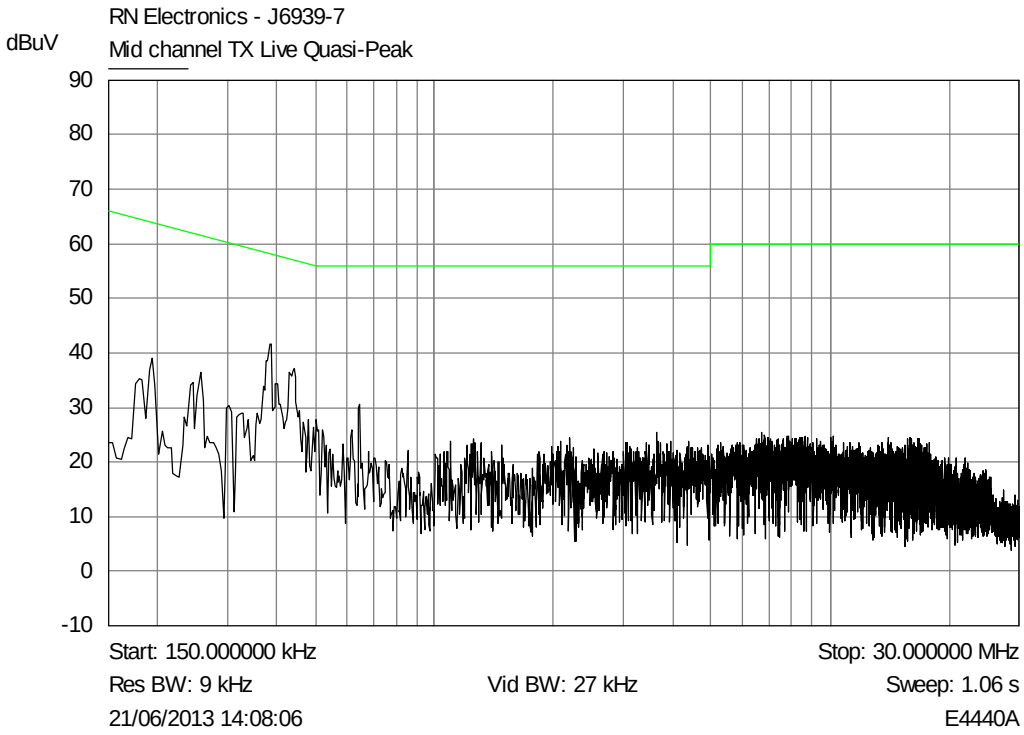
These results show that the **EUT** has **PASSED** this test.

## 5.9 FHSS Parameters

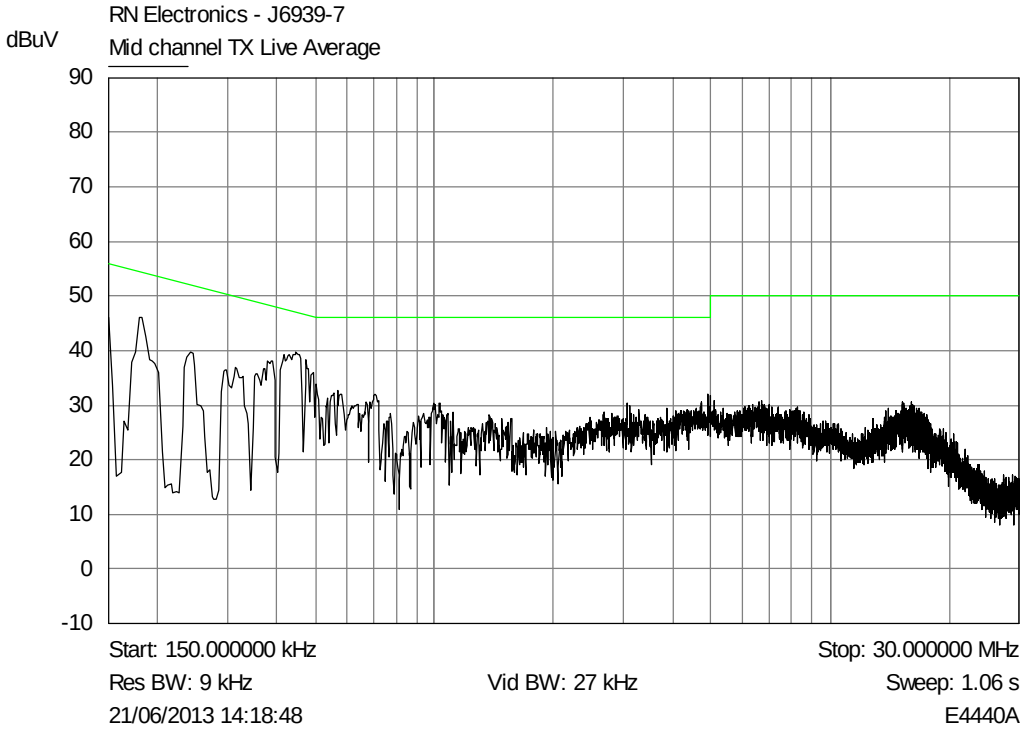
Not Applicable. EUT does not employ FHSS technology.

# 6 Plots and Results

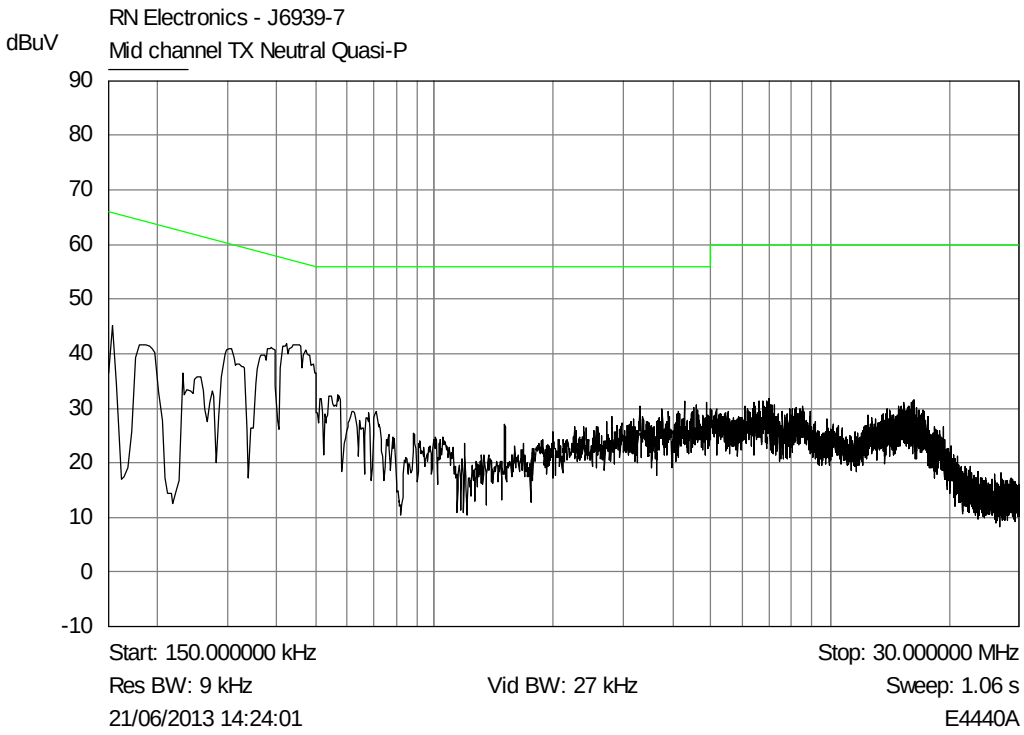
## 6.1 AC power line conducted emissions plots



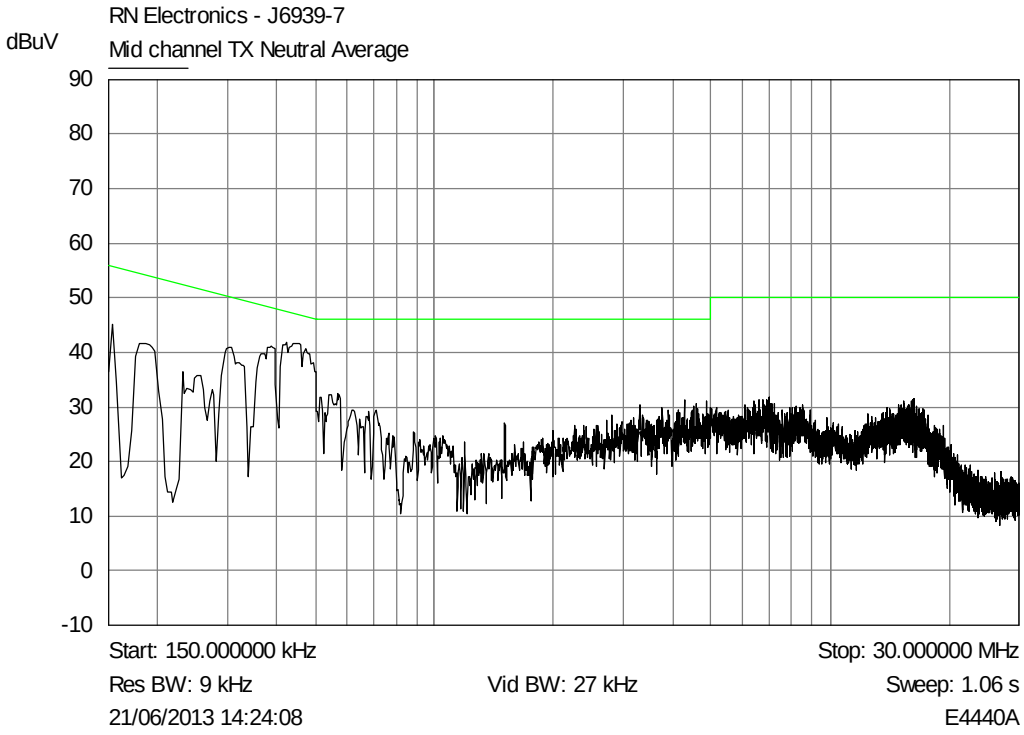

**Plot of peak emissions 150kHz - 30MHz on the Mid channel TX live terminal against the quasi-peak limit line.**




**Plot of peak emissions 150kHz - 30MHz on the Mid channel TX live terminal against the average limit line.**



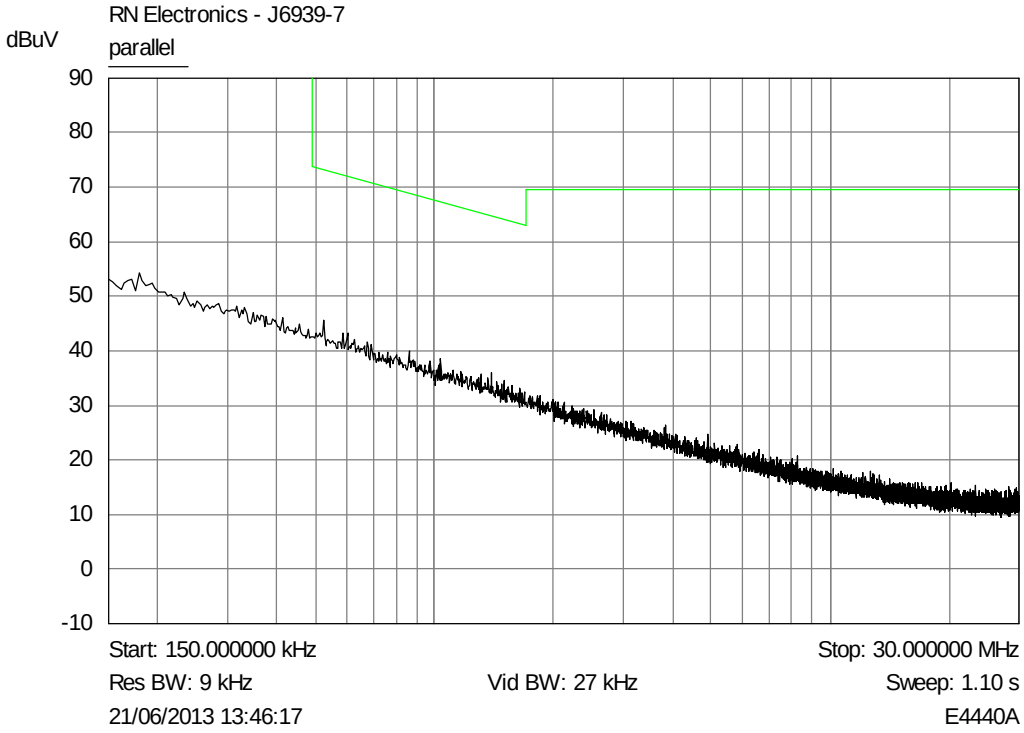

**Plot of peak emissions 150kHz - 30MHz on the Mid channel TX neutral terminal against the quasi-peak limit line.**



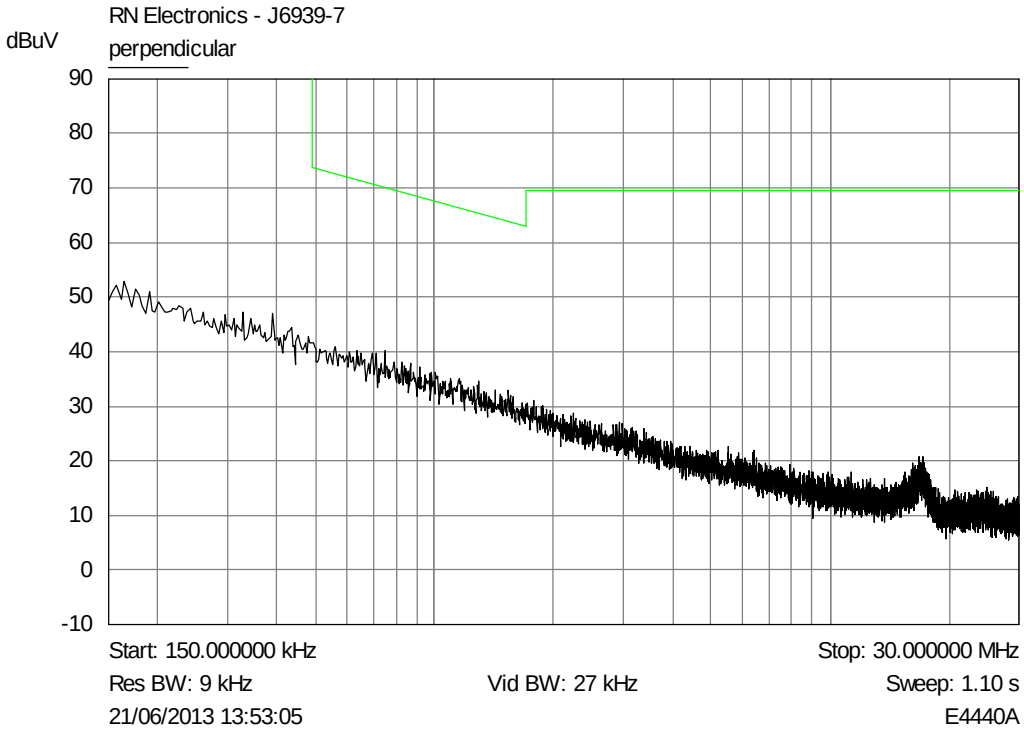

**Plot of peak emissions 150kHz - 30MHz on the Mid channel TX neutral terminal against the average limit line.**

# 6.2 Radiated emissions plots

## 6.2.1 Low frequency radiated emissions plots

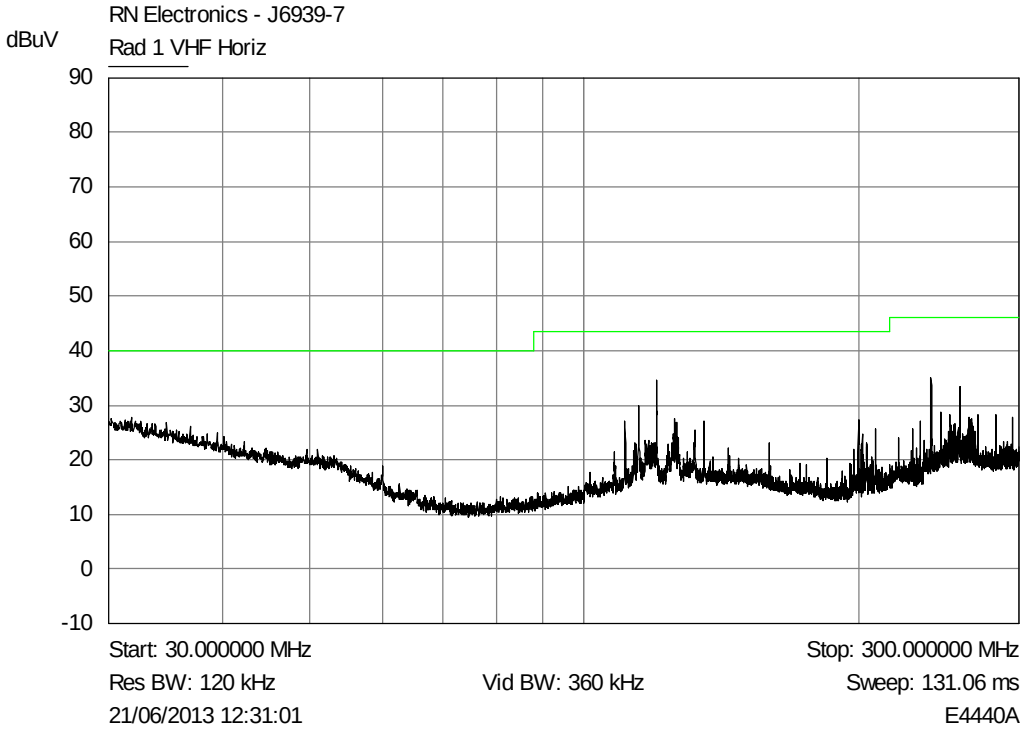



**Mid channel - Parallel Plot**

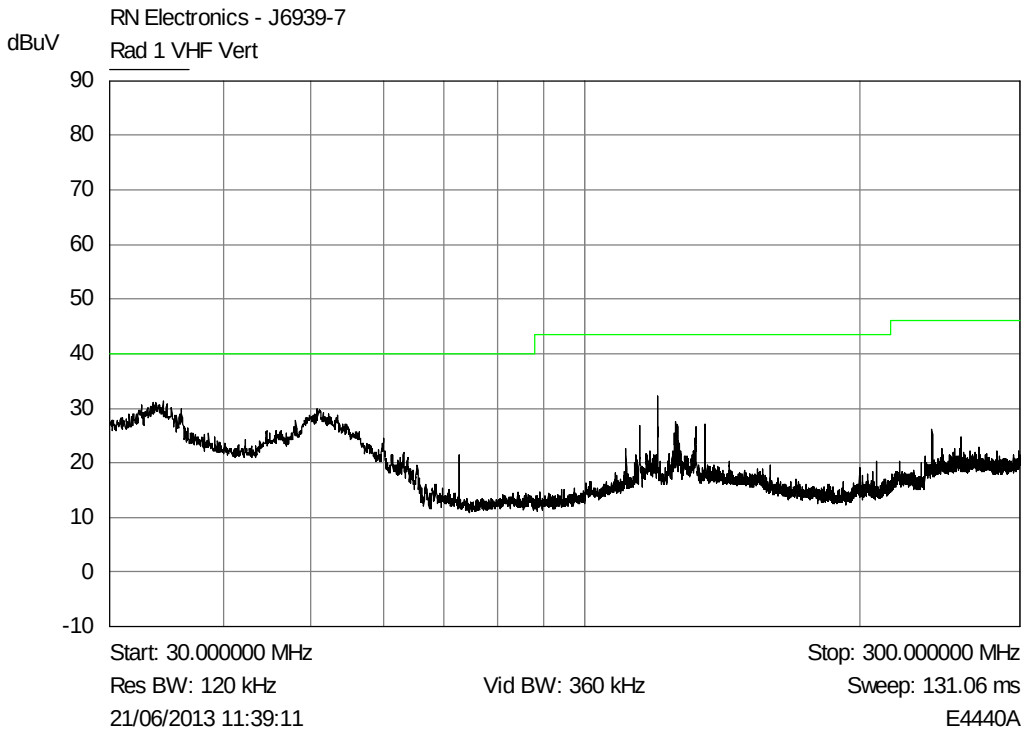



**Mid channel - Perpendicular Plot**

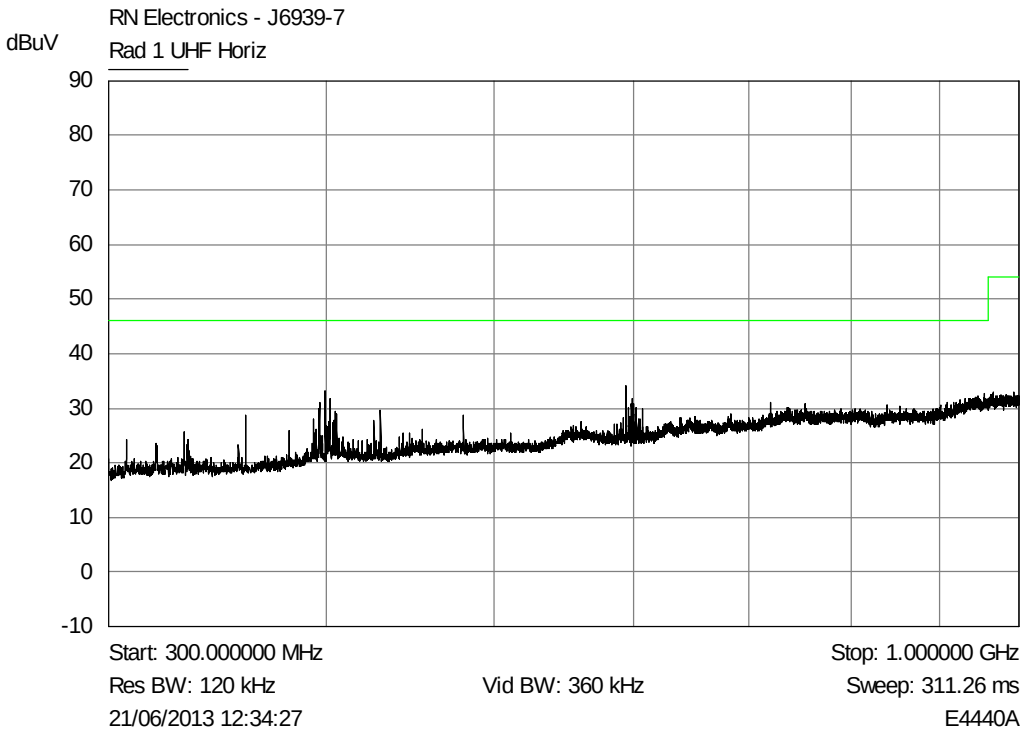
### 6.2.2 Radiated emissions - 30MHz - 1GHz



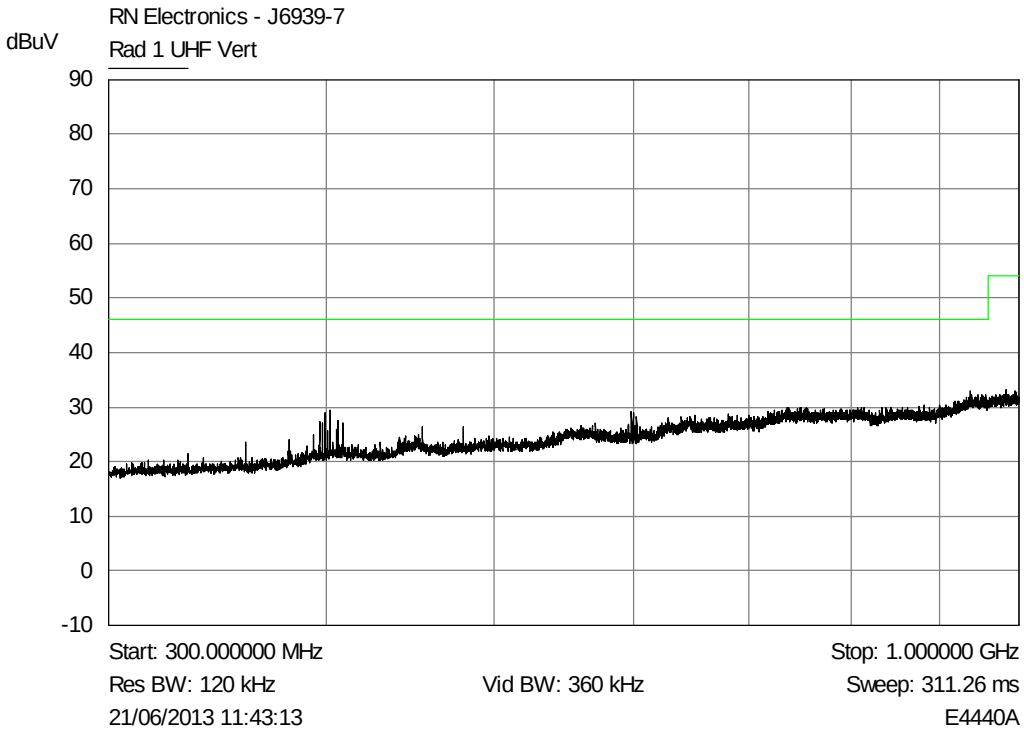

**TX mid channel: Plot of peak horizontal emissions 30MHz - 300MHz against the quasi-peak limit line.**




**TX mid channel: Plot of peak vertical emissions 30MHz - 300MHz against the quasi-peak limit line.**

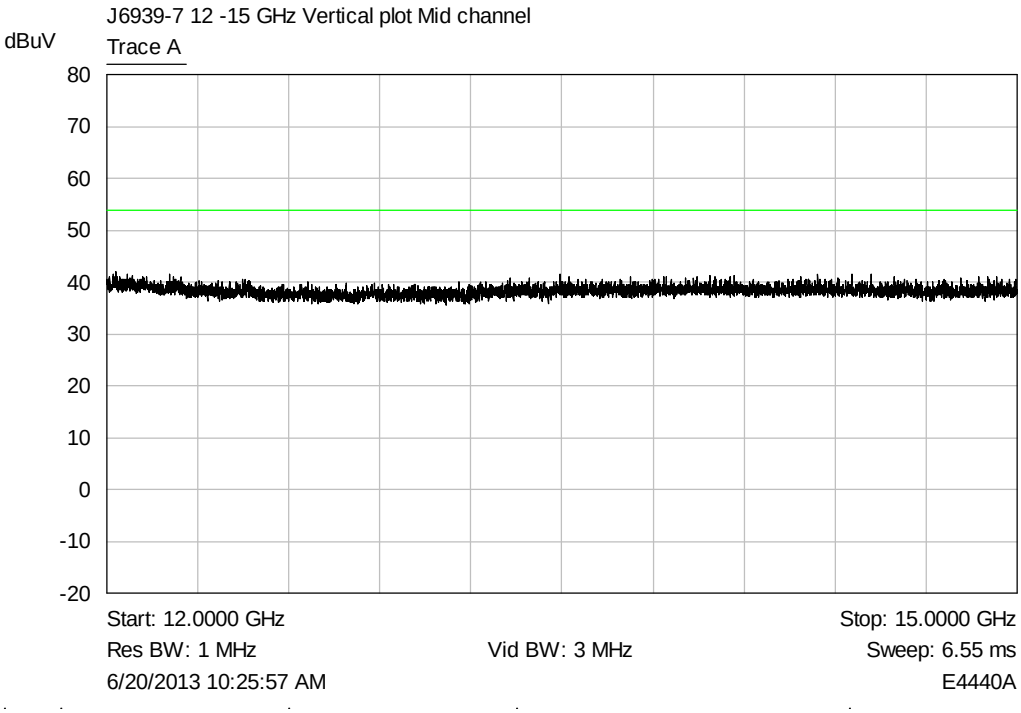



**TX mid channel: Plot of peak horizontal emissions 300MHz - 1GHz against the quasi-peak limit line.**

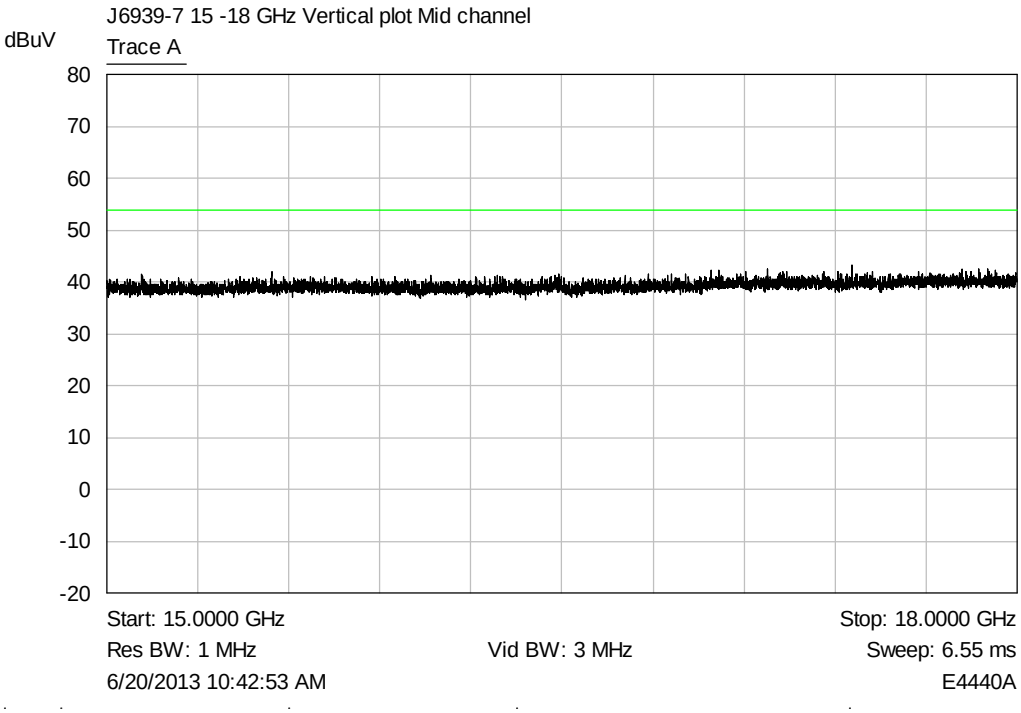



**TX mid channel: Plot of peak vertical emissions 300MHz - 1GHz against the quasi-peak limit line.**

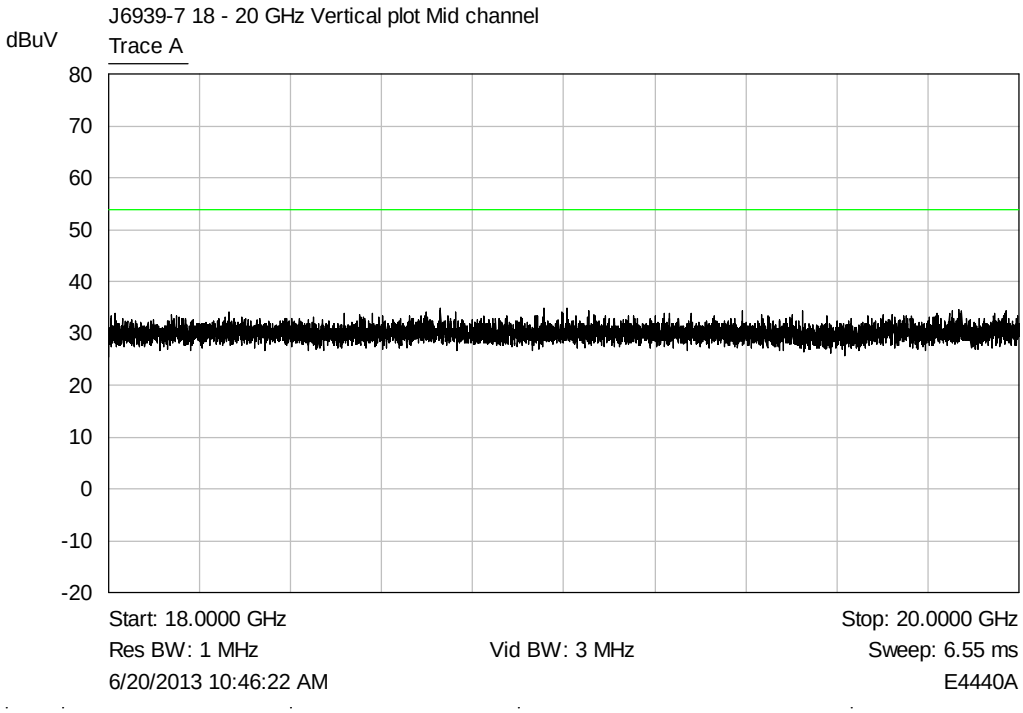
### 6.2.3 Radiated emissions Plots above 1GHz



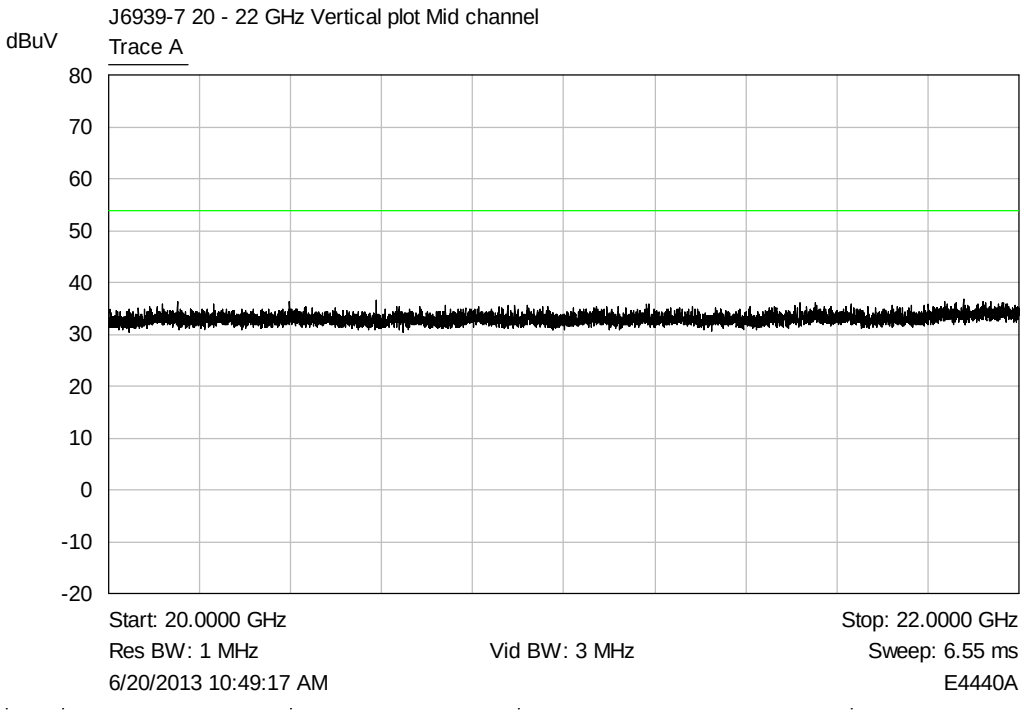

**Middle channel 1 (2437 MHz) - 12-15GHz - Vert**



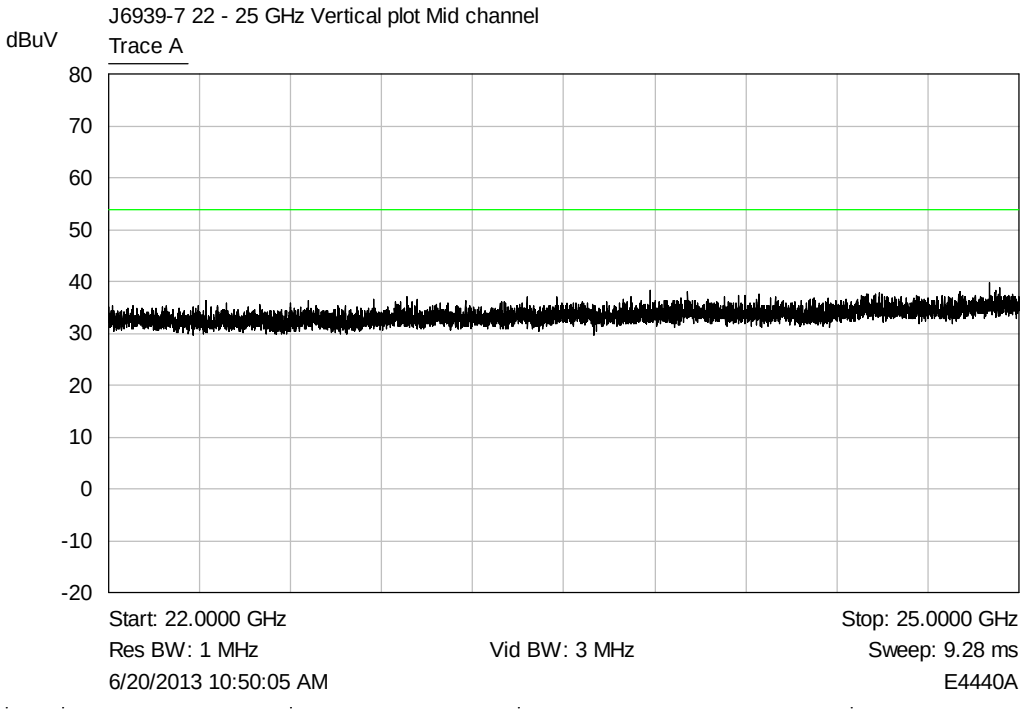

**Middle channel 1 (2437 MHz) - 15-18GHz - Vert**



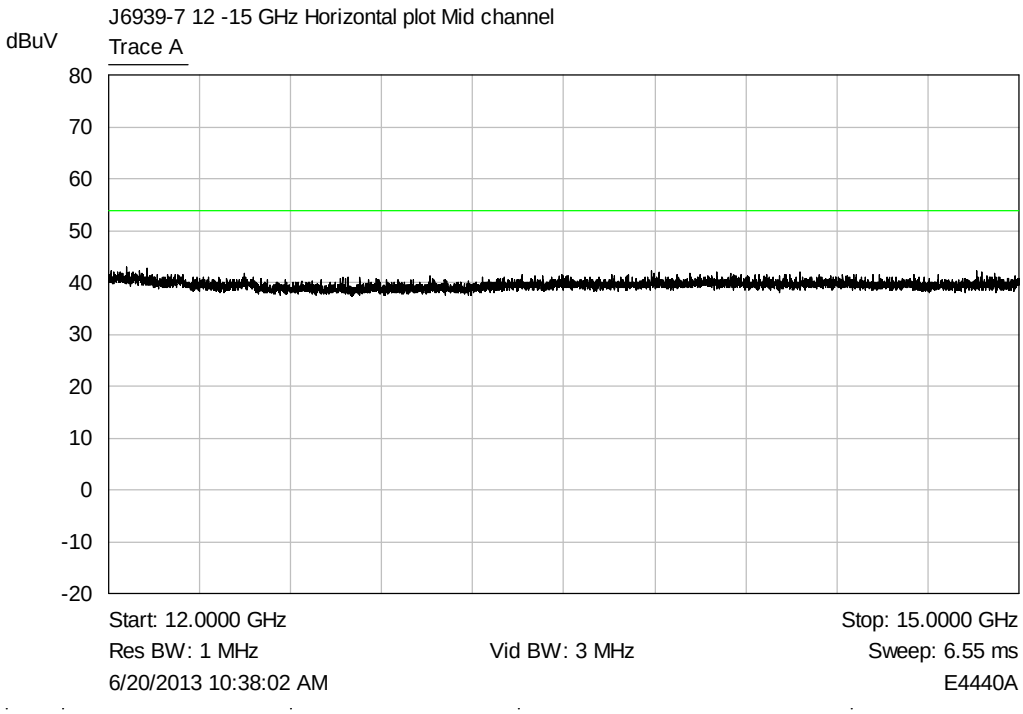

**Middle channel 1 (2437 MHz) - 18-20GHz - Vert**



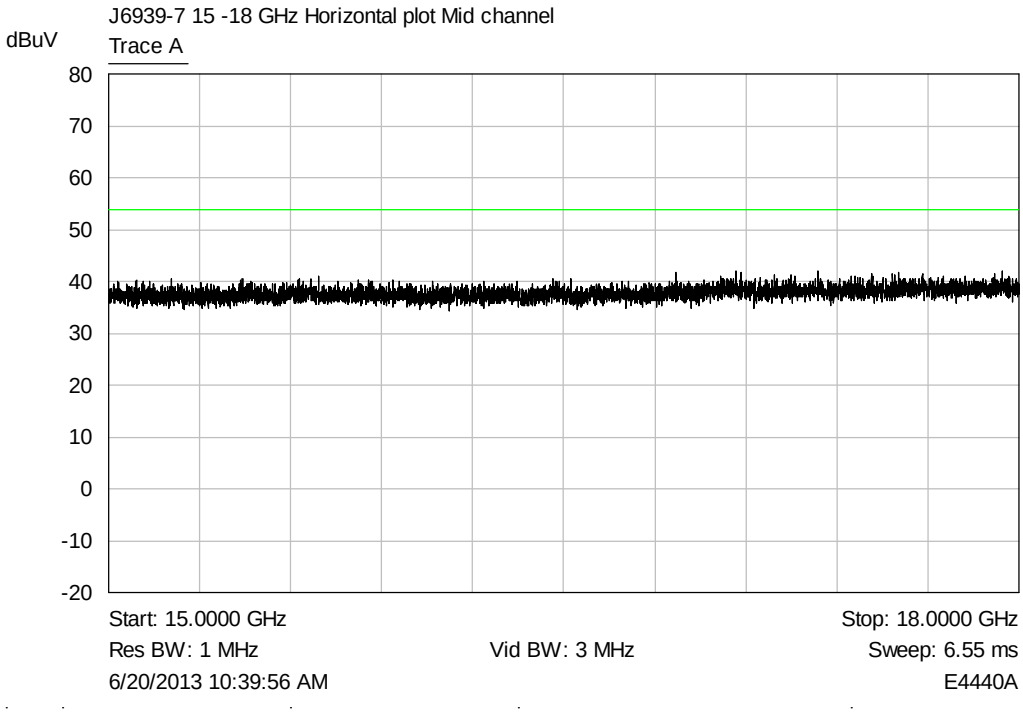

**Middle channel 1 (2437 MHz) - 20-22GHz - Vert**



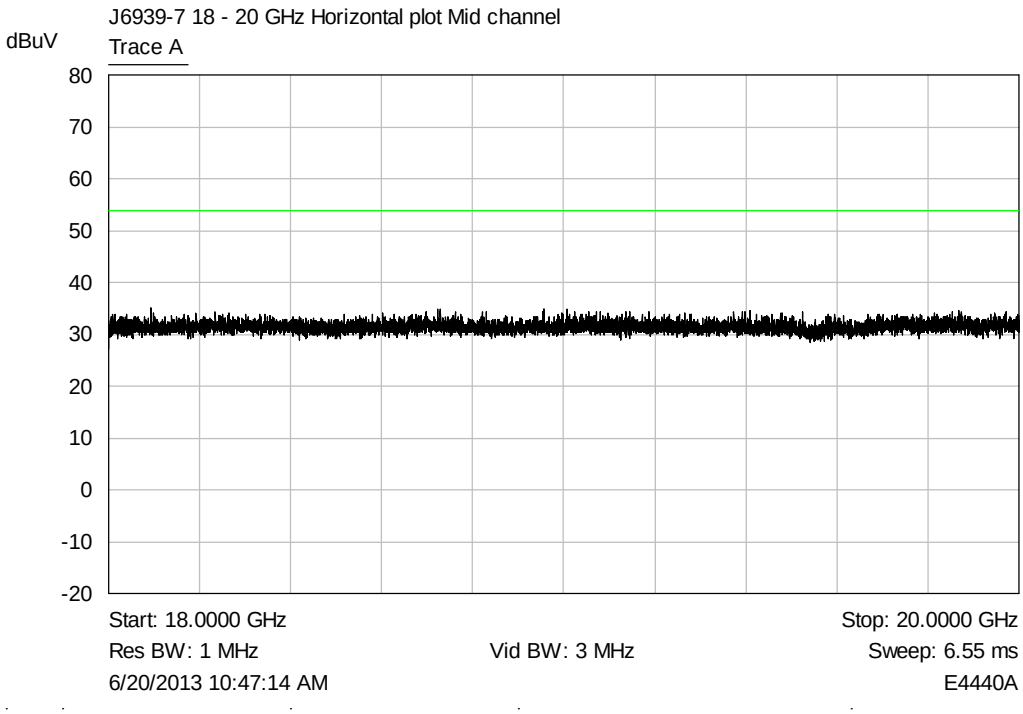

**Middle channel 1 (2437 MHz) - 22-25GHz - Vert**



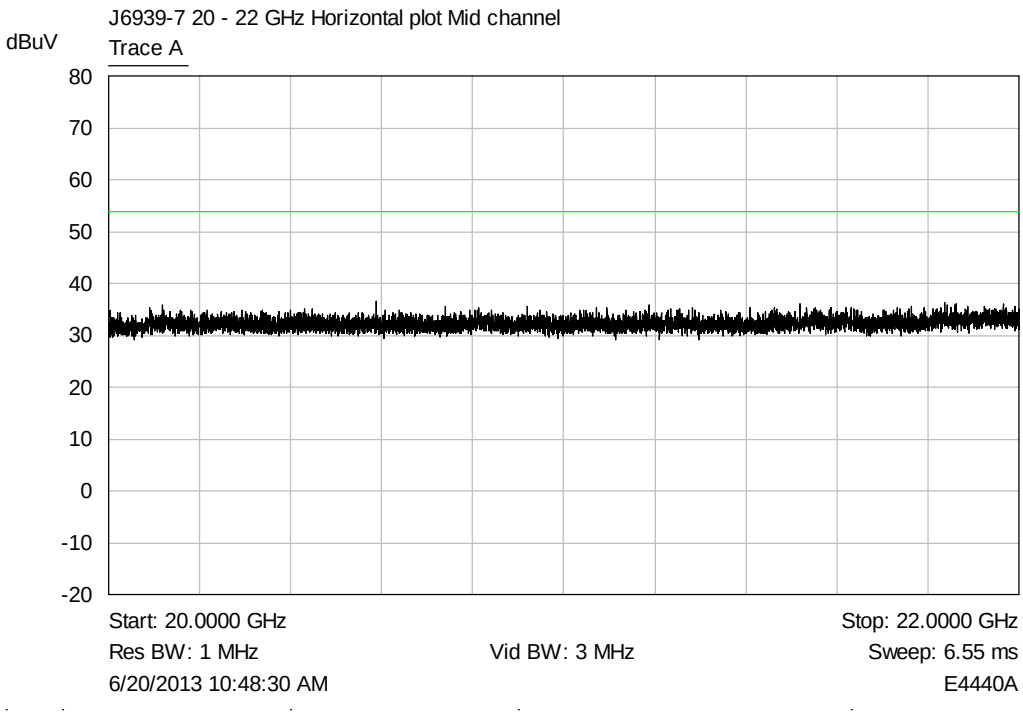

**Middle channel 1 (2437 MHz) - 12-15GHz - Horiz**



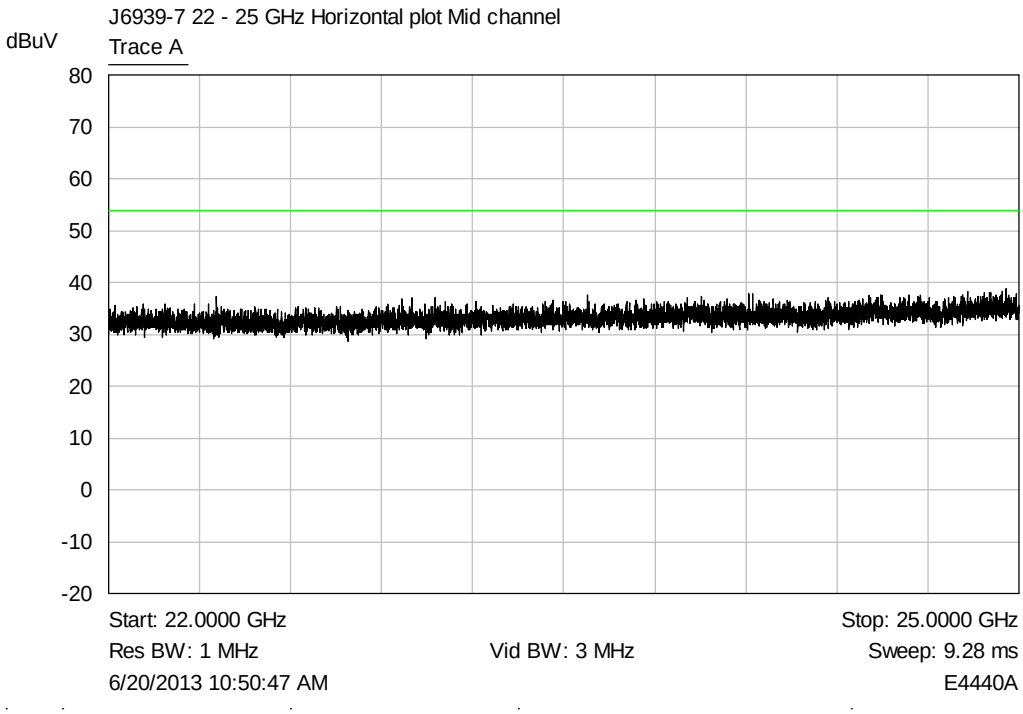

**Middle channel 1 (2437 MHz) - 15-18GHz - Horiz**




**Middle channel 1 (2437 MHz) - 18-20GHz - Horiz**



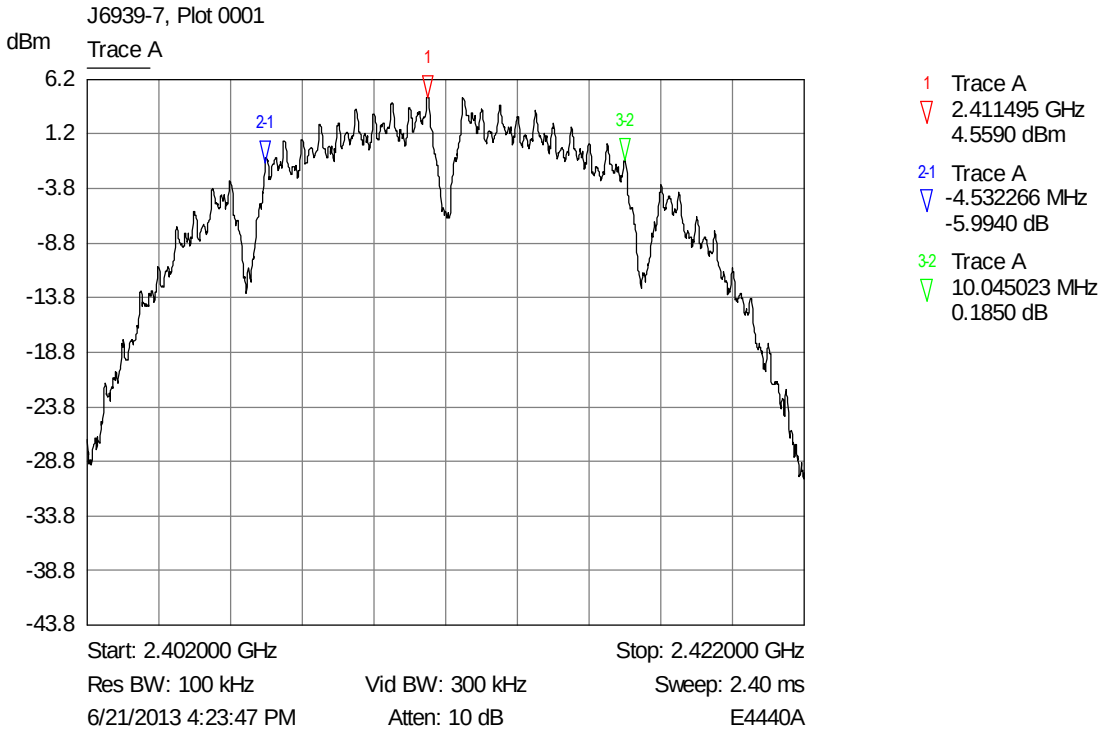

**Middle channel 1 (2437 MHz) - 20-22GHz - Horiz**



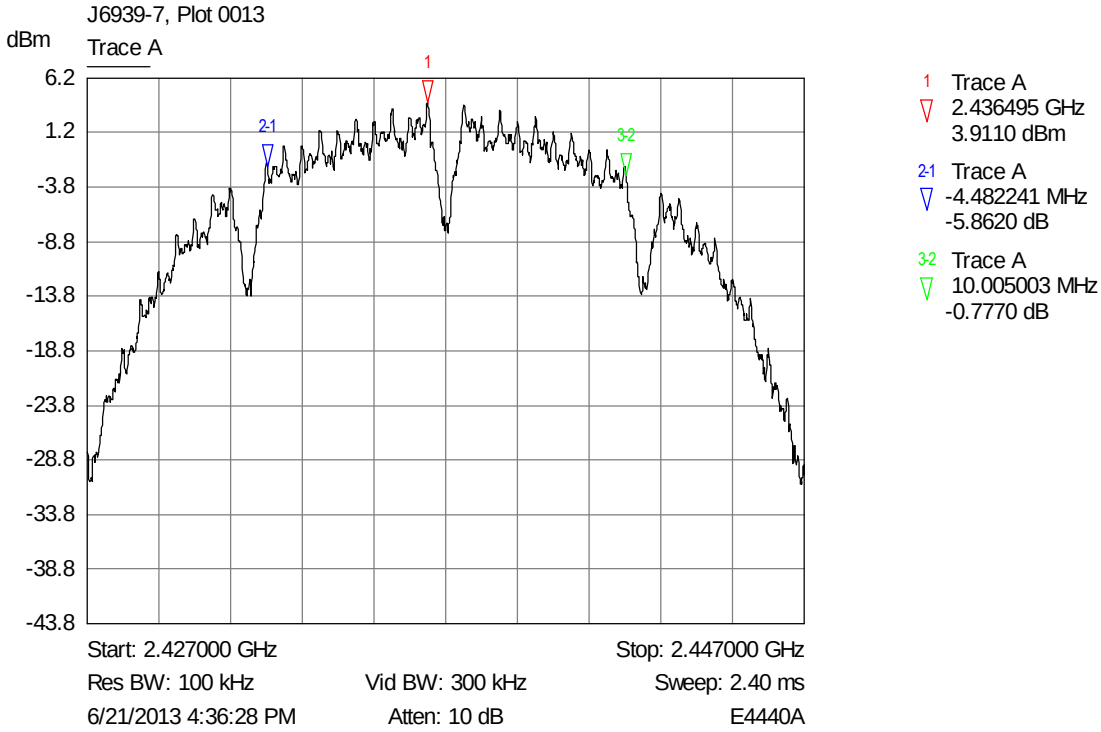

**Middle channel 1 (2437 MHz) - 22-25GHz - Horiz**

# 6.3 6dB bandwidth plots

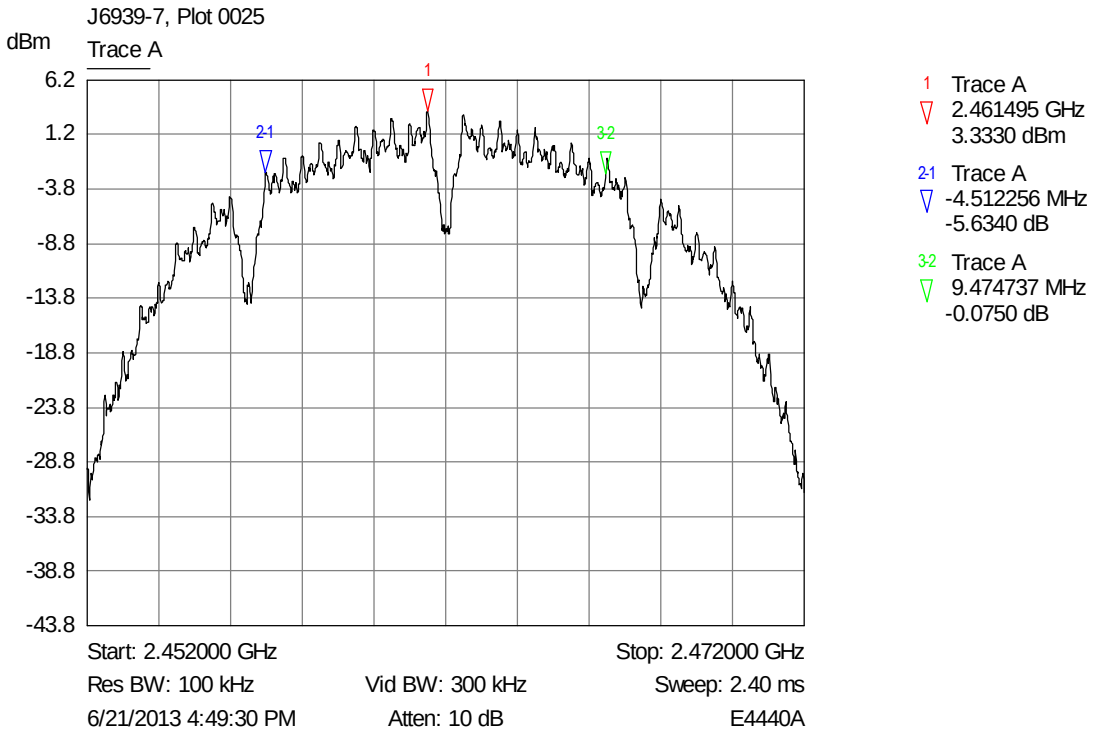
## 6.3.1 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 1 MBPS




**Low channel**

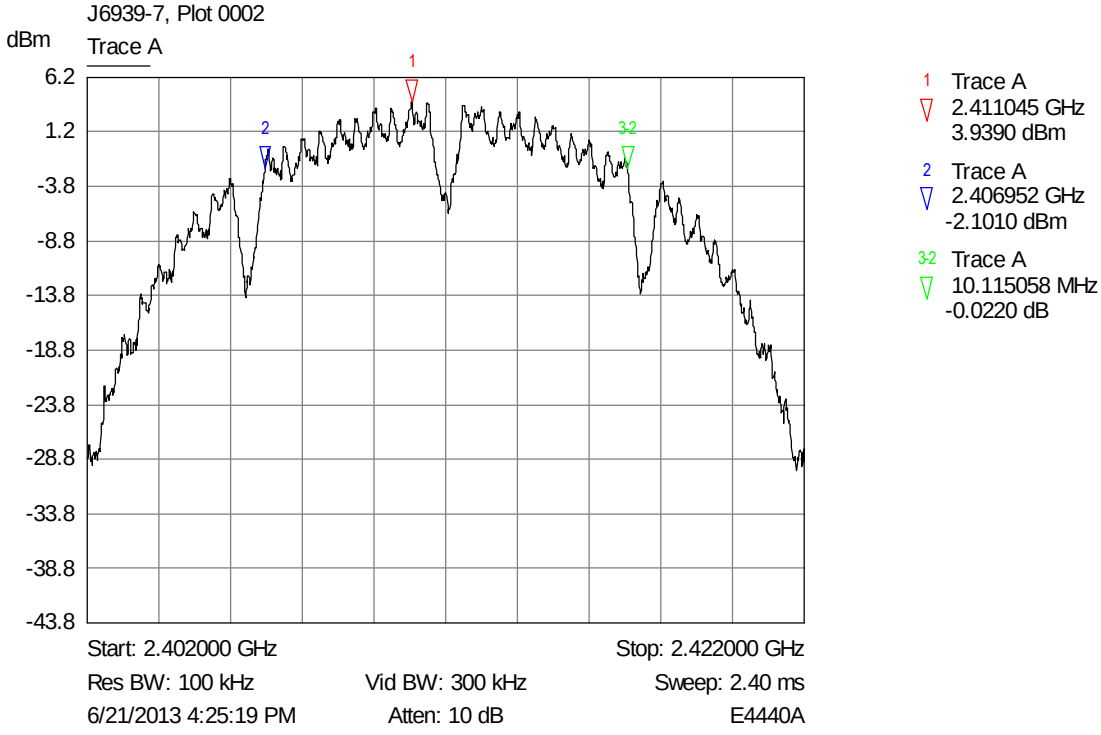


## Mid channel

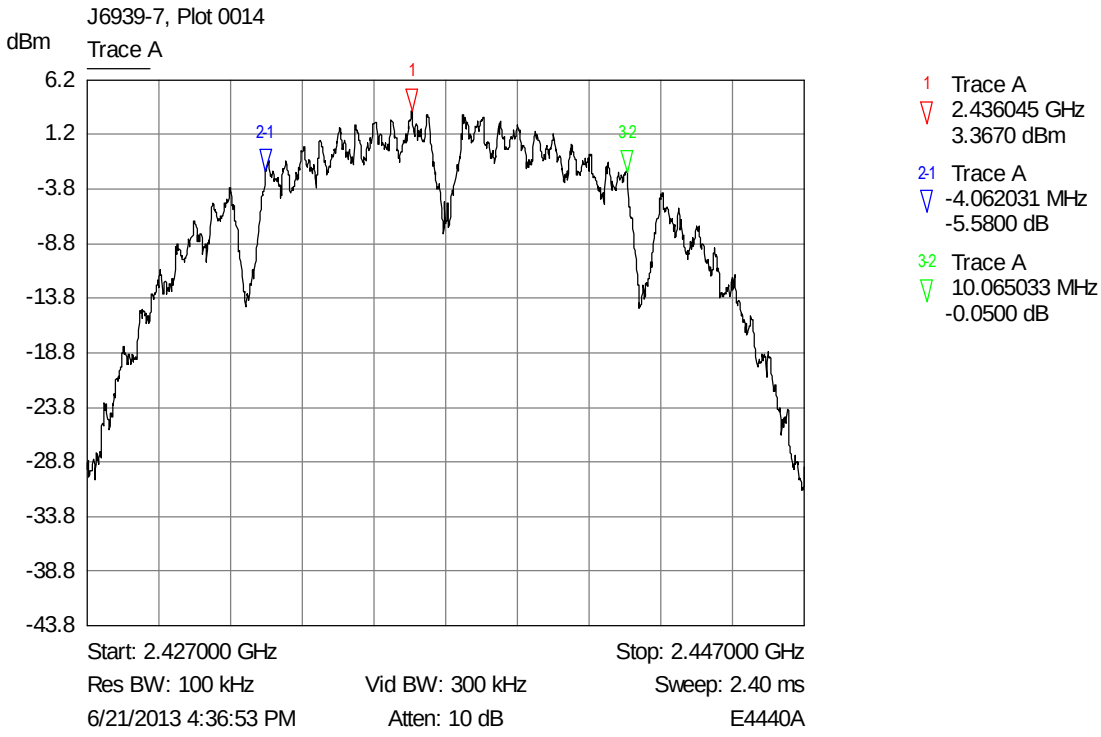



## High channel

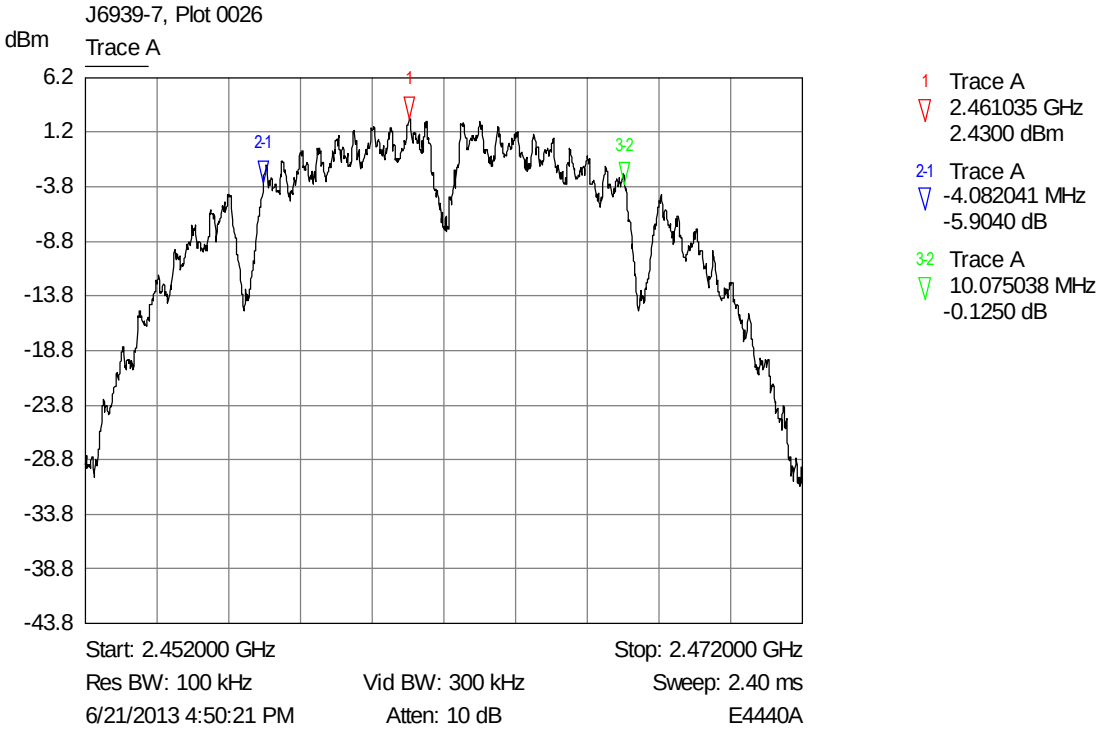
### 6.3.2 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 2 MBPS



## Low channel

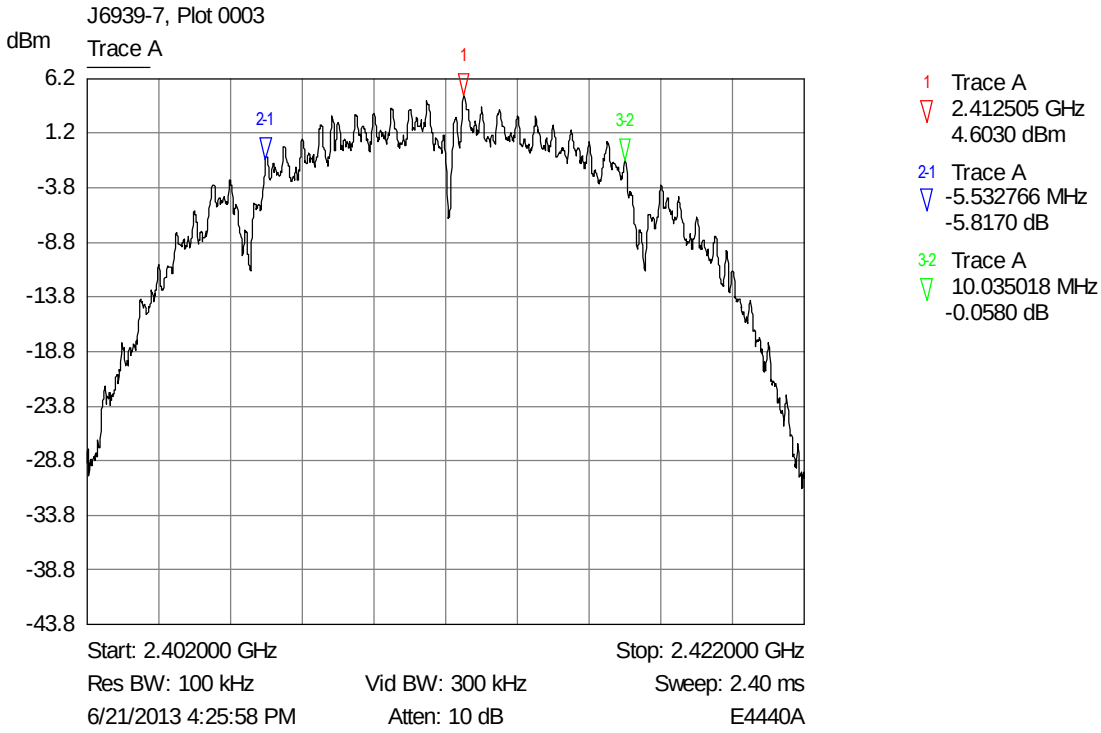



## Mid channel

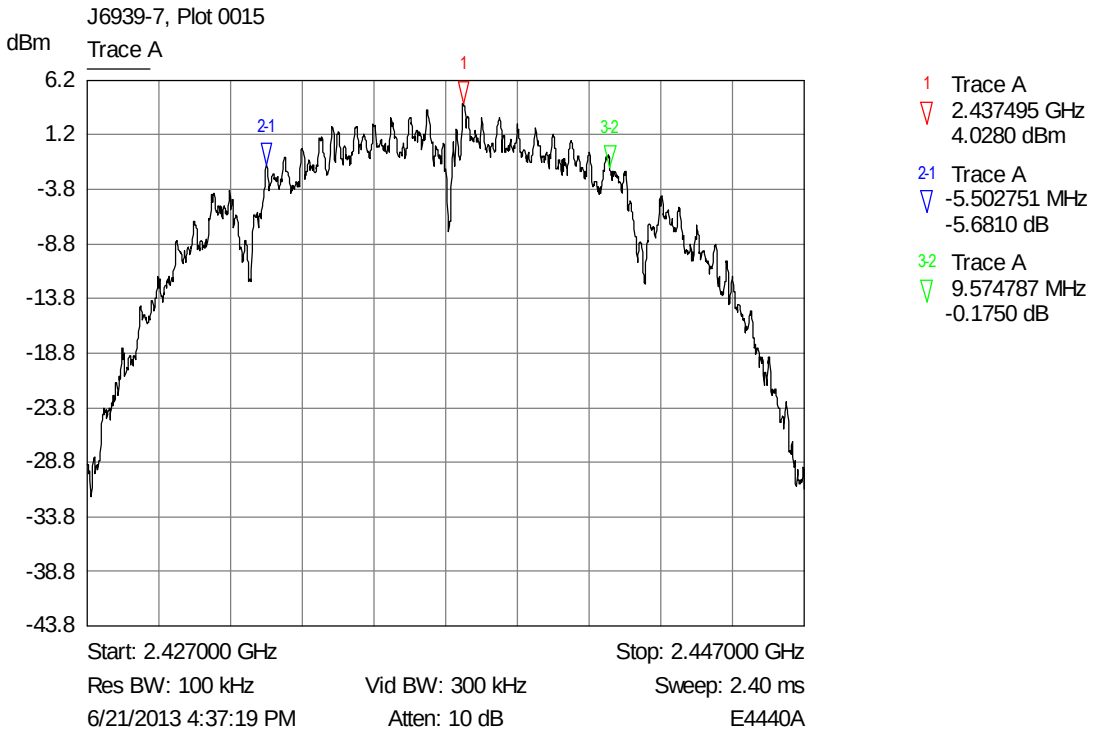



## High channel

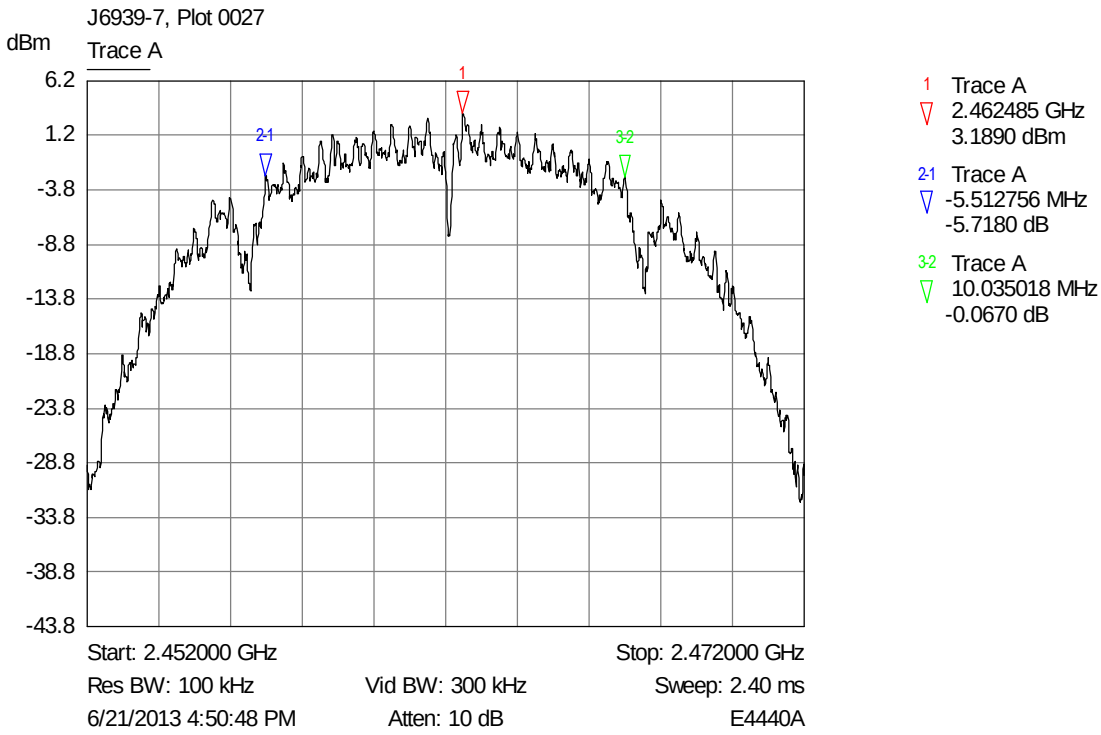
### 6.3.3 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 5.5 MBPS




**Low channel**

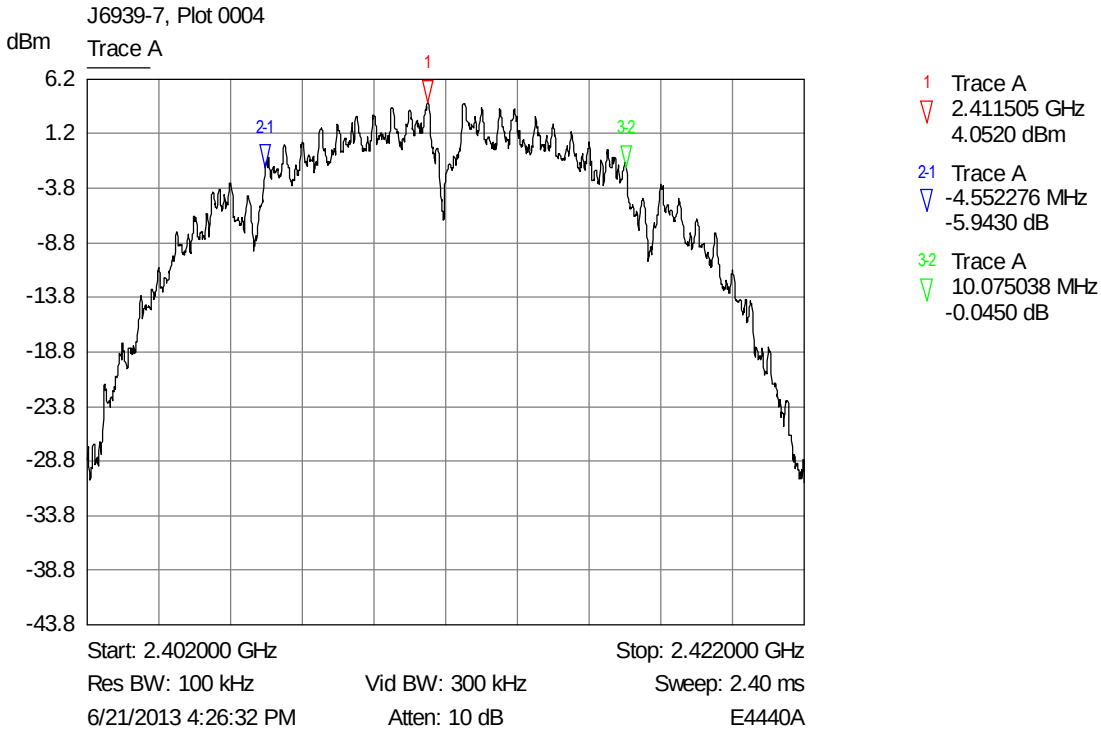



**Mid channel**

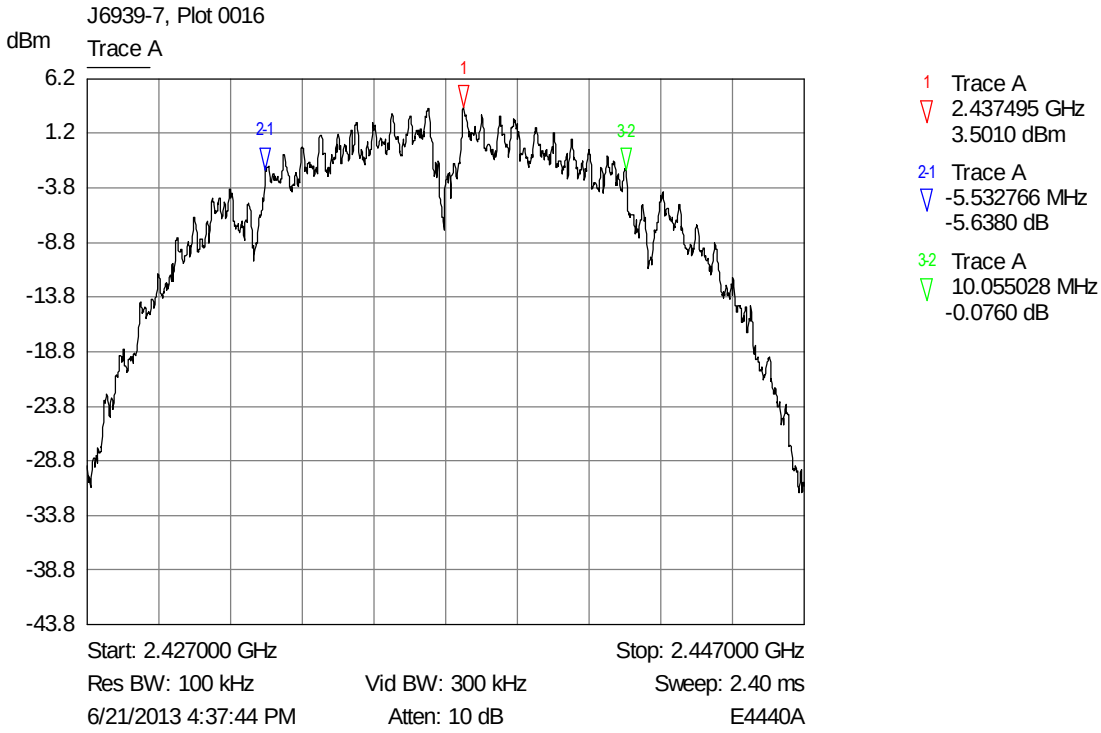



**High channel**

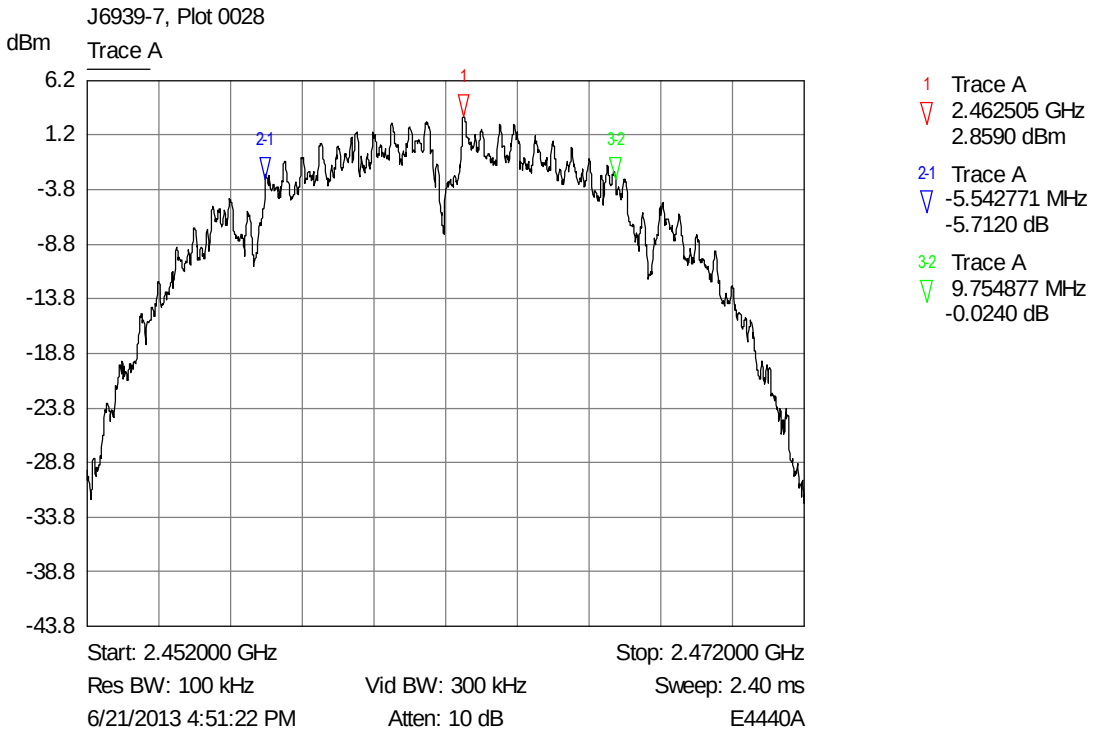
### 6.3.4 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 11 MBPS




**Low channel**

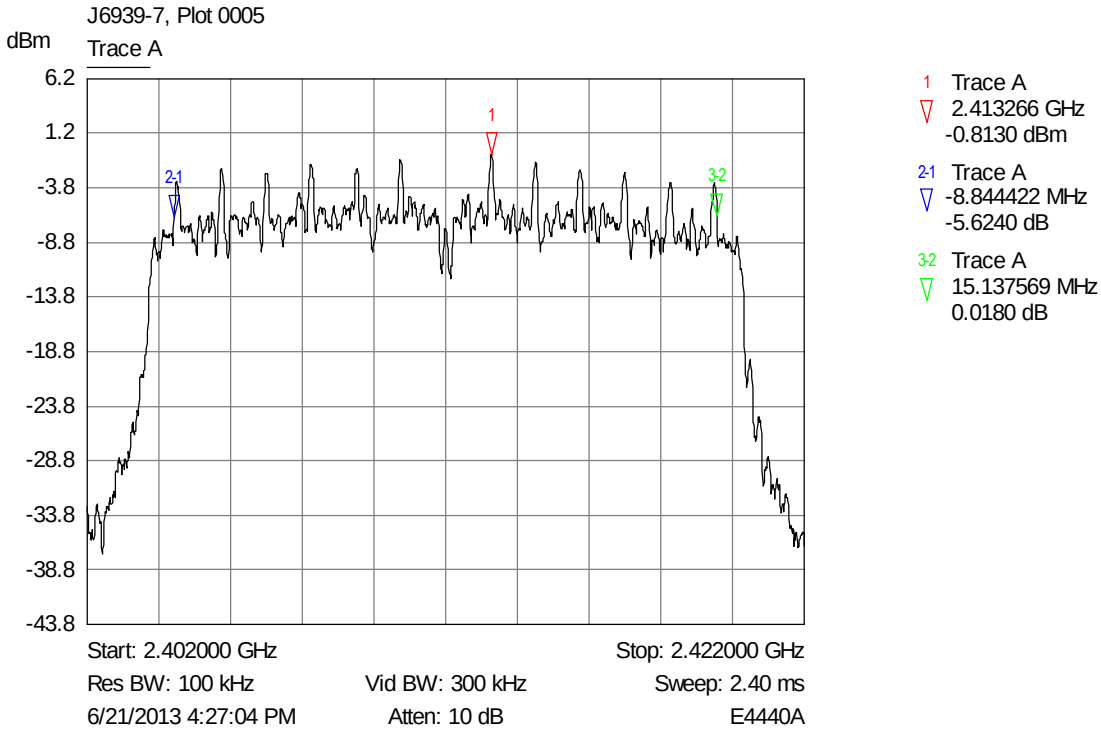



**Mid channel**

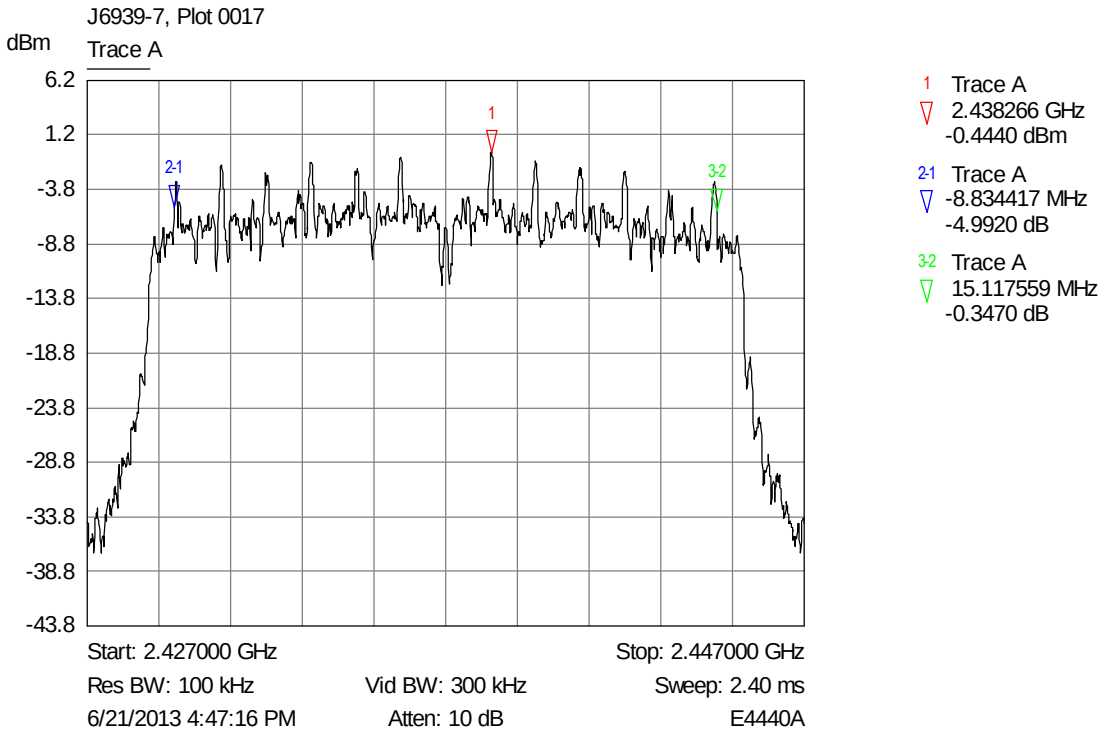



**High channel**

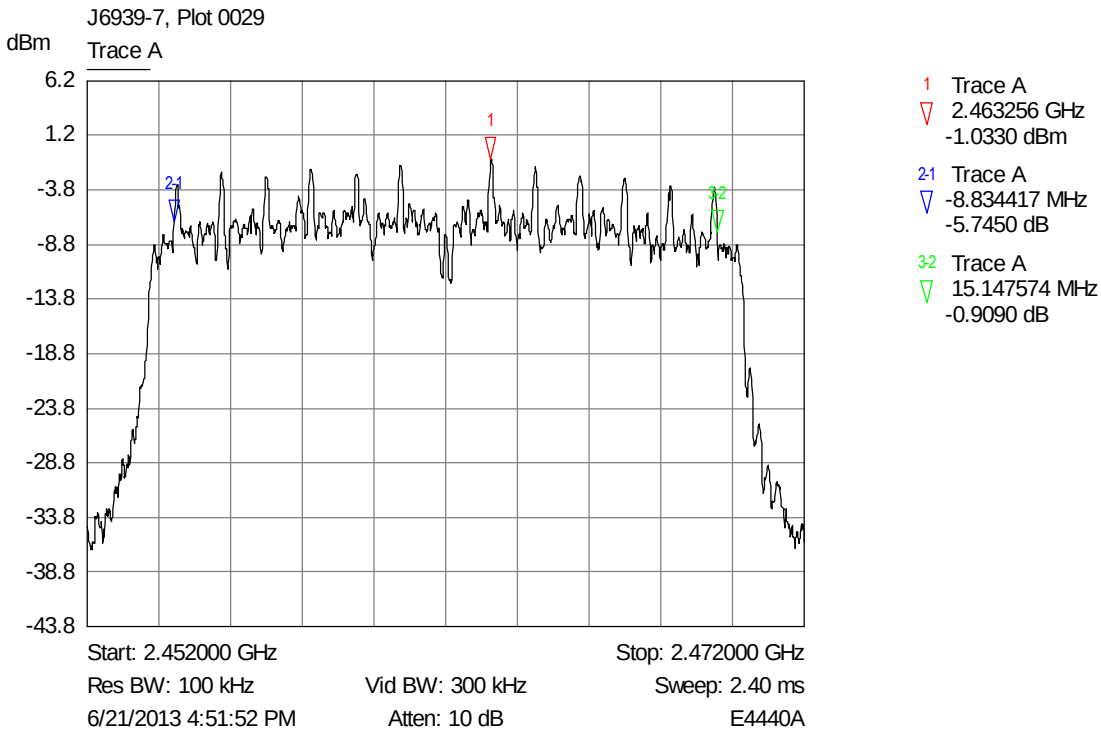
### 6.3.5 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 6 MBPS




**Low channel**

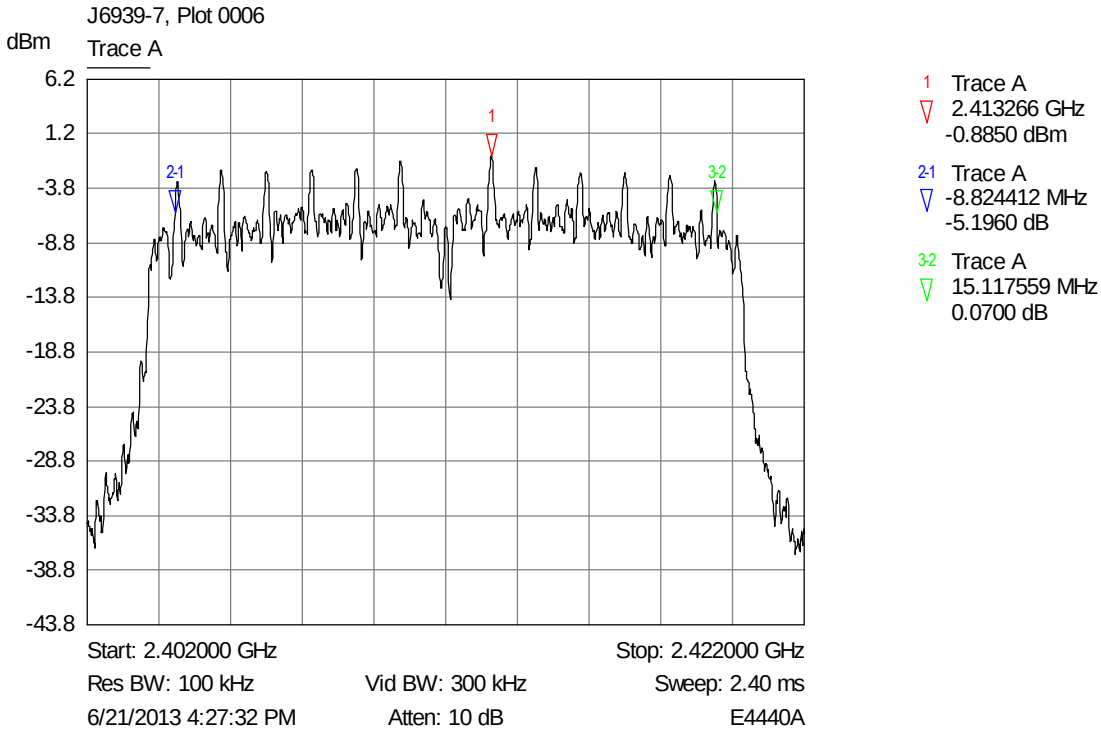



**Mid channel**

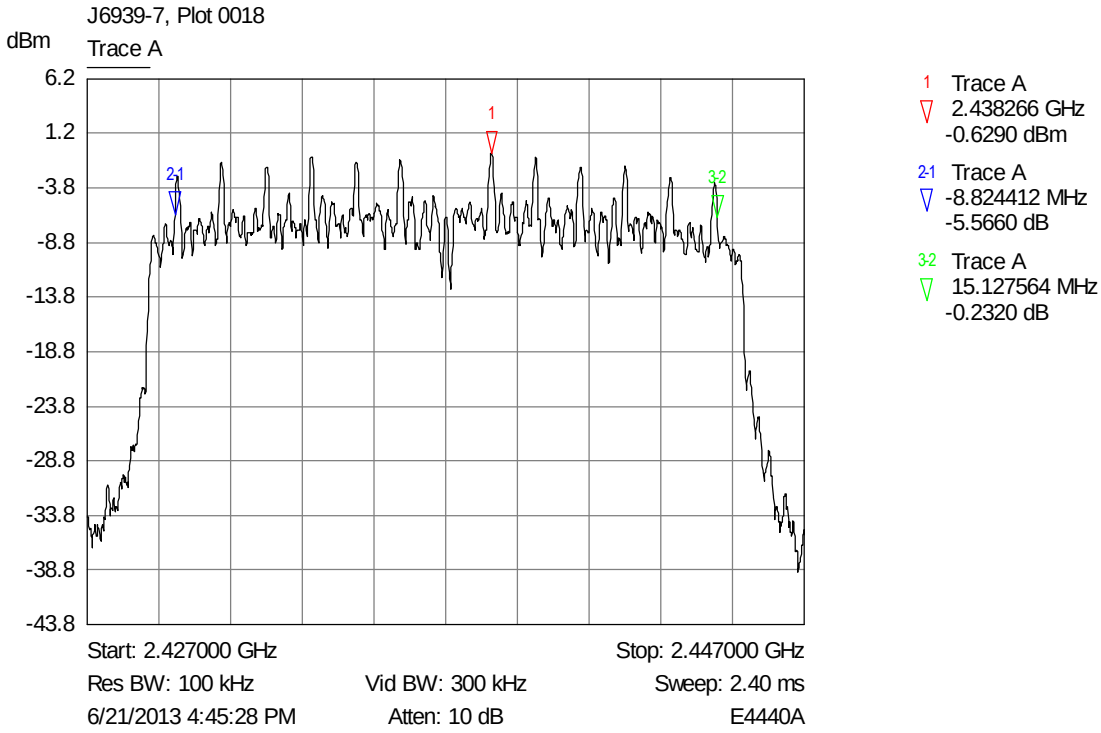



**High channel**

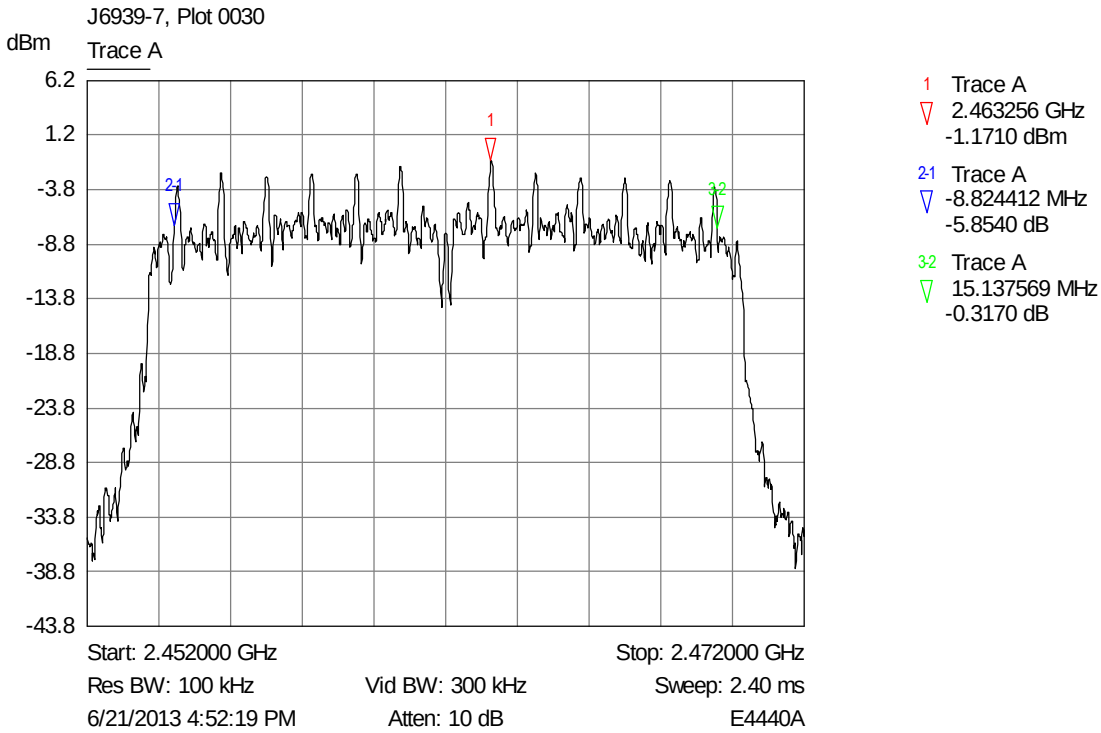
### 6.3.6 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 9 MBPS




**Low channel**

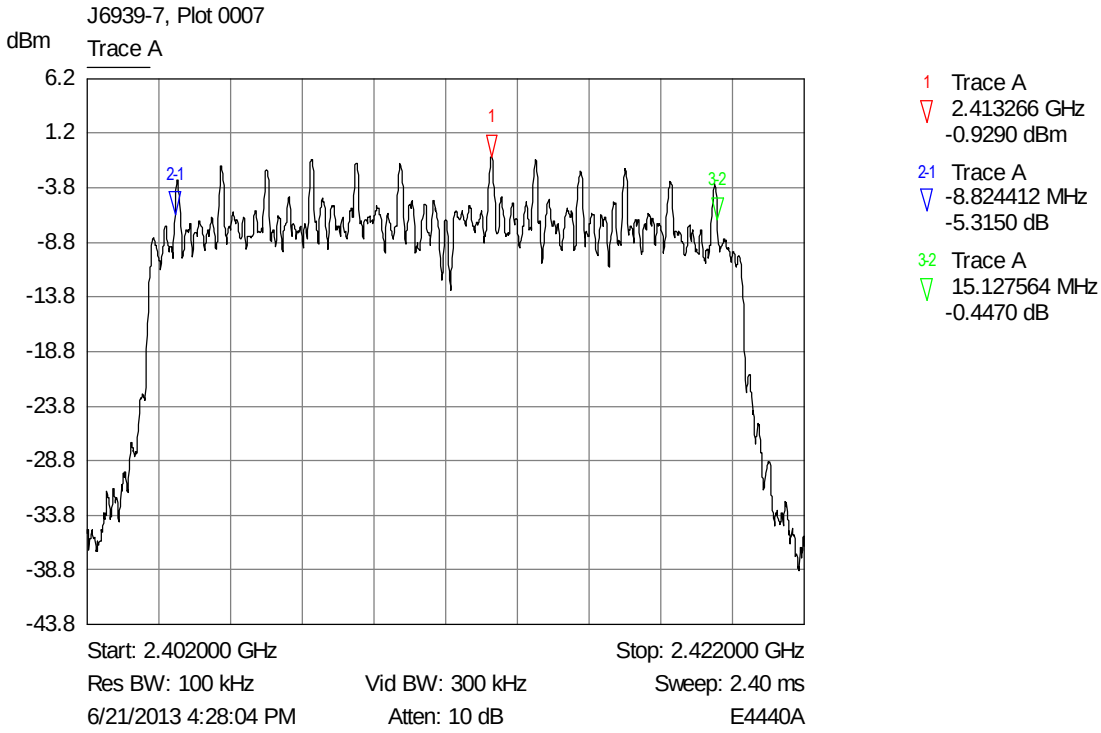



**Mid channel**

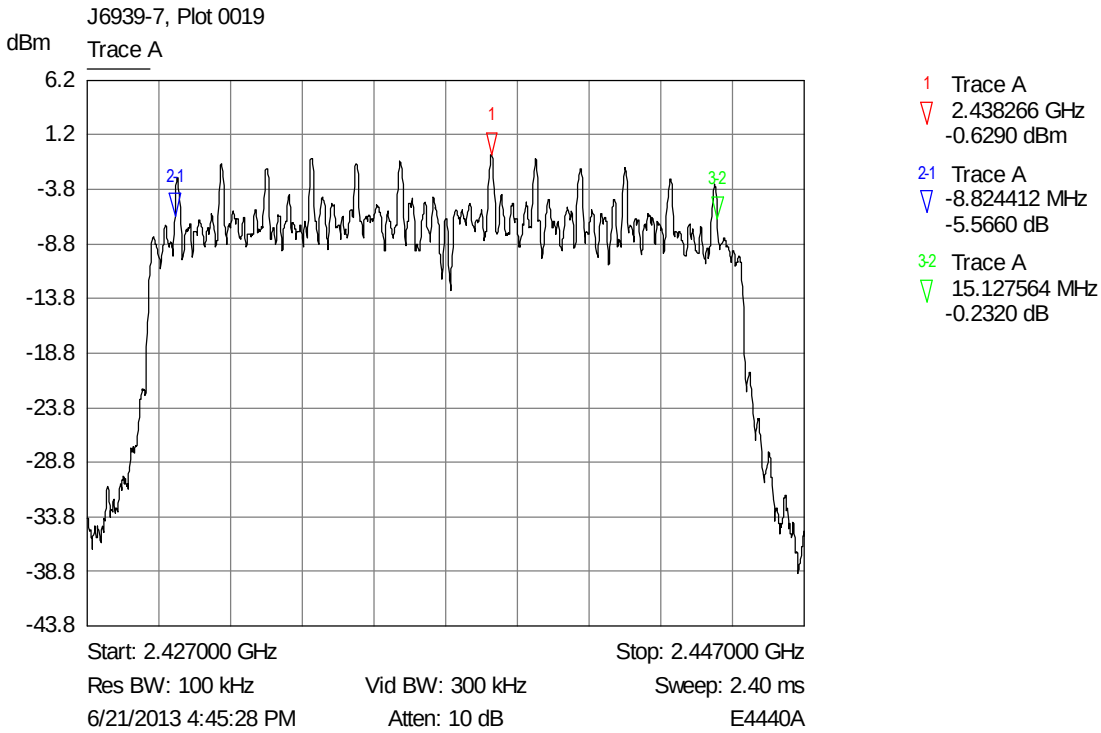



**High channel**

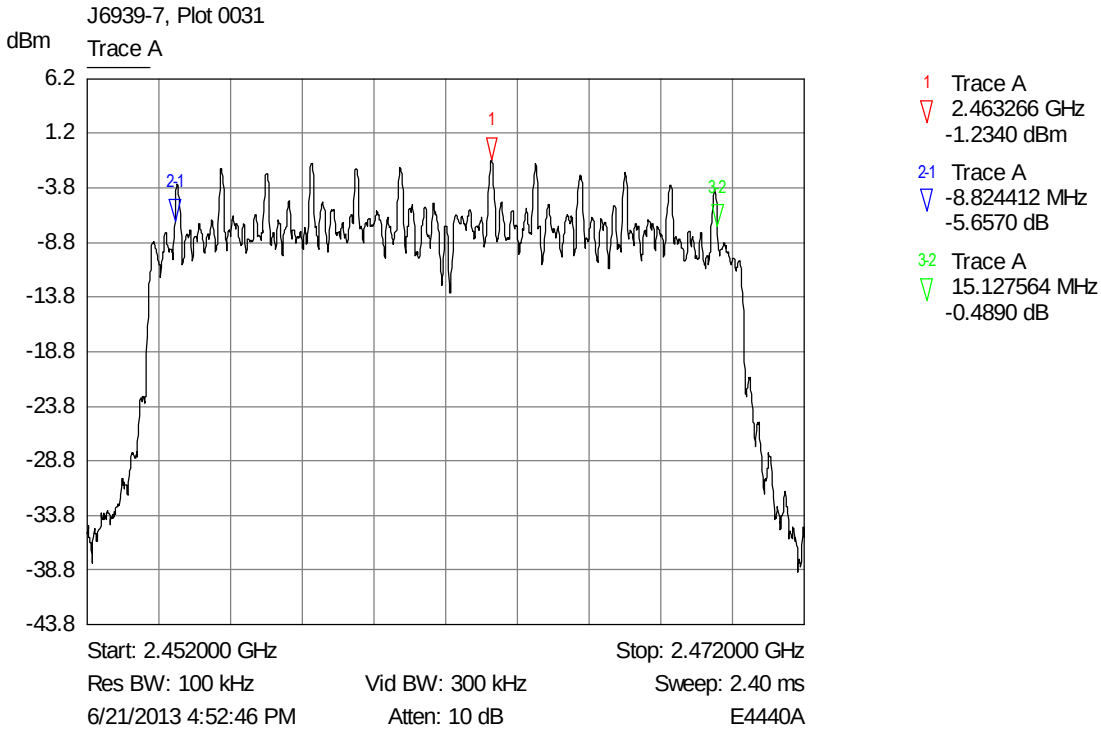
### 6.3.7 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 12 MBPS




**Low channel**

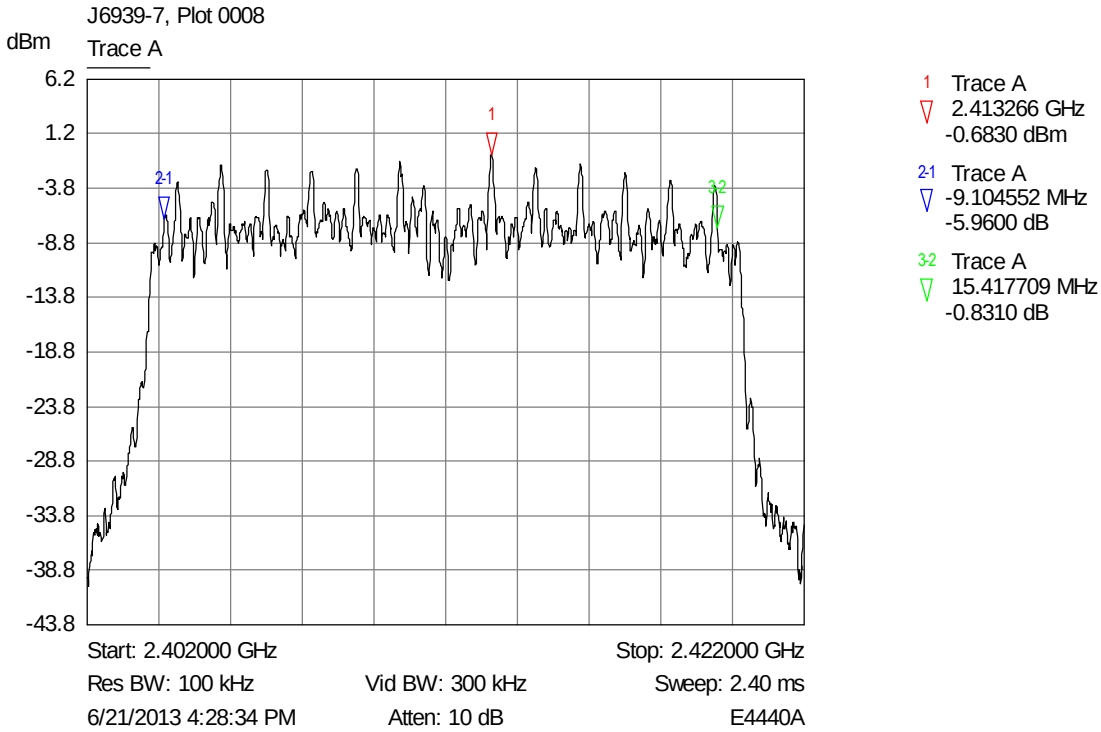



**Mid channel**

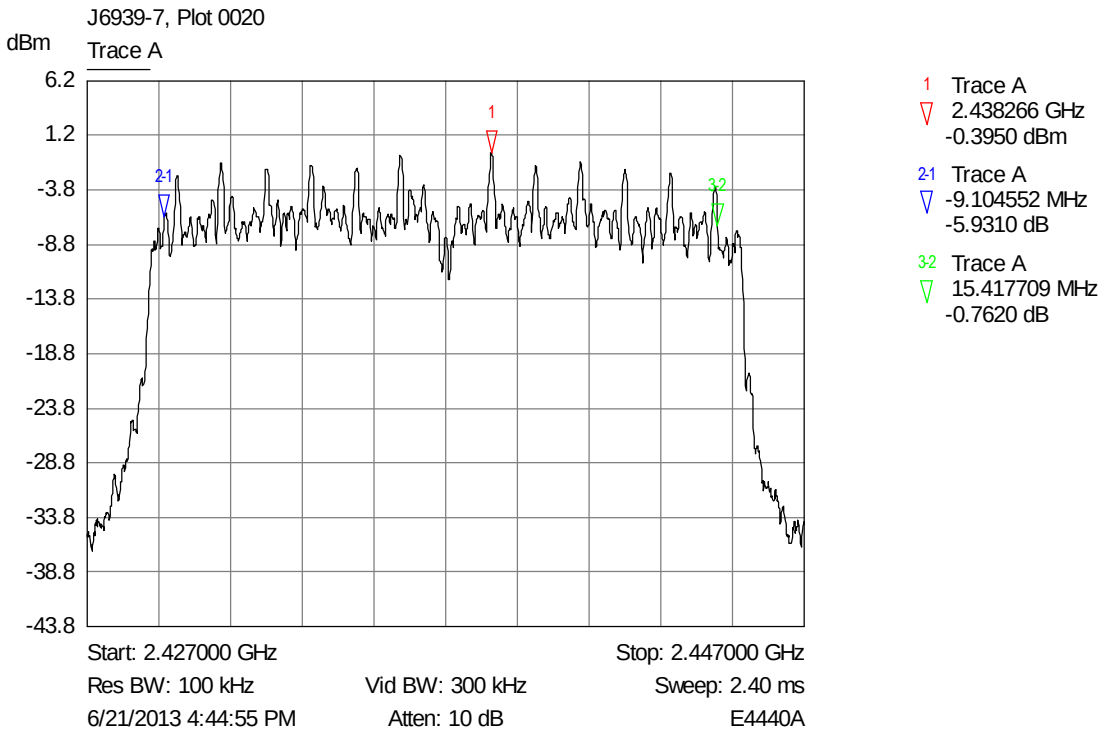



**High channel**

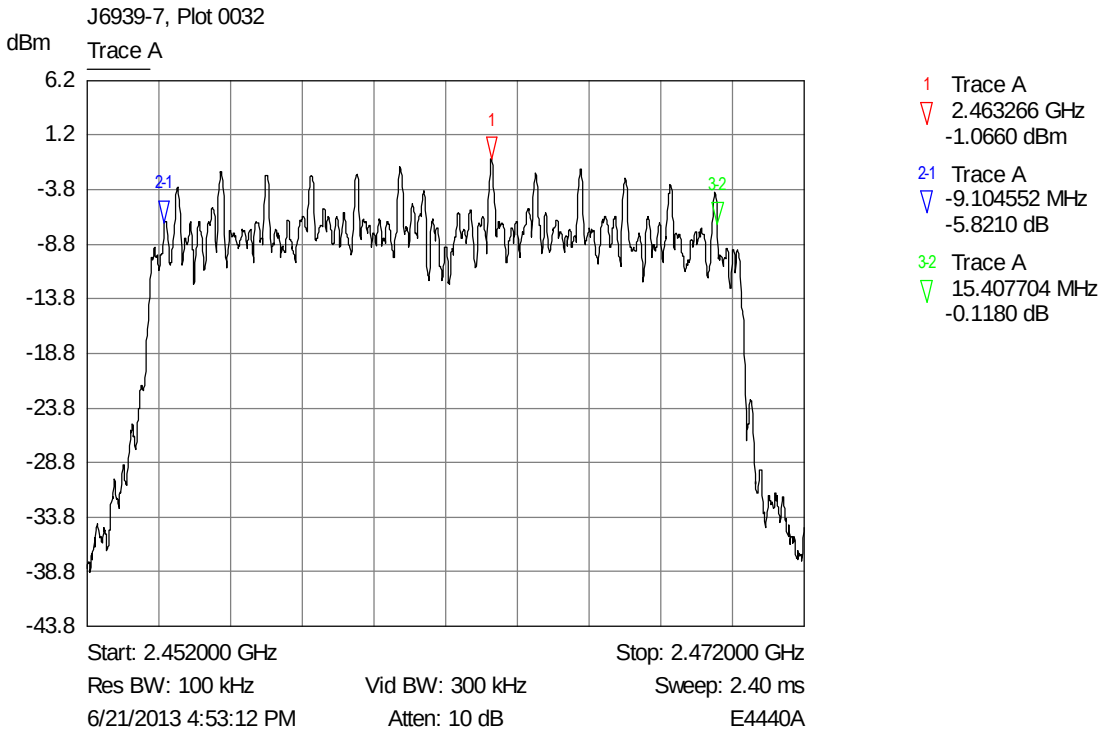
### 6.3.8 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 18 MBPS




**Low channel**

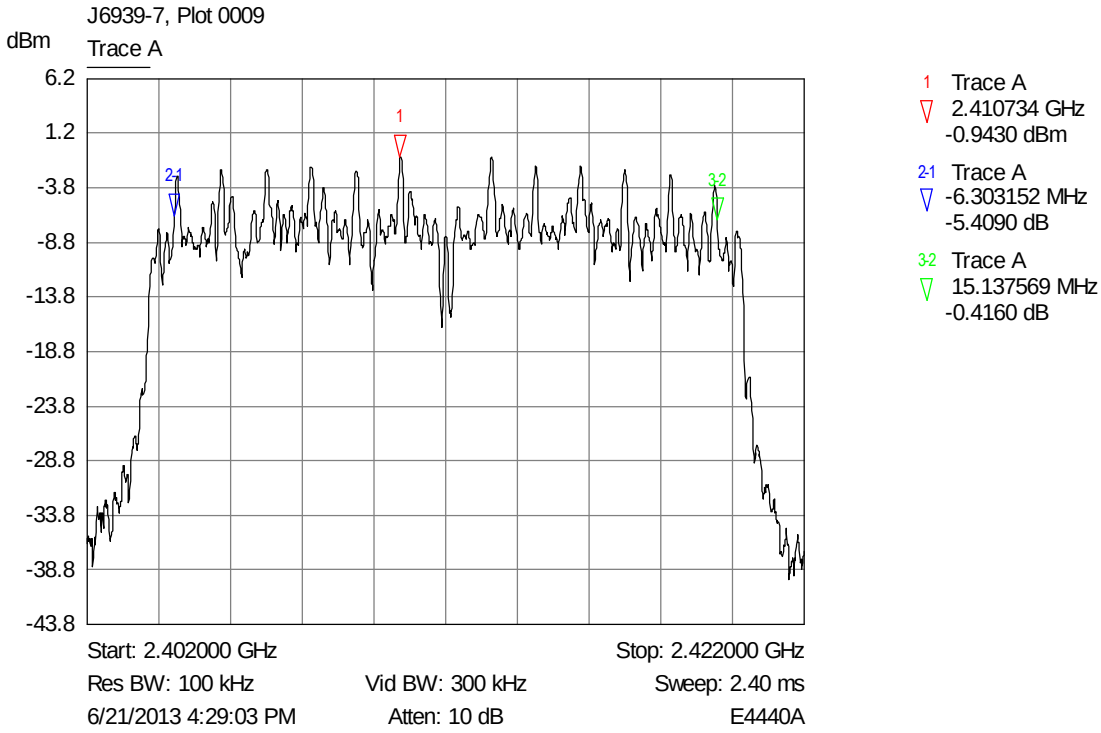



**Mid channel**

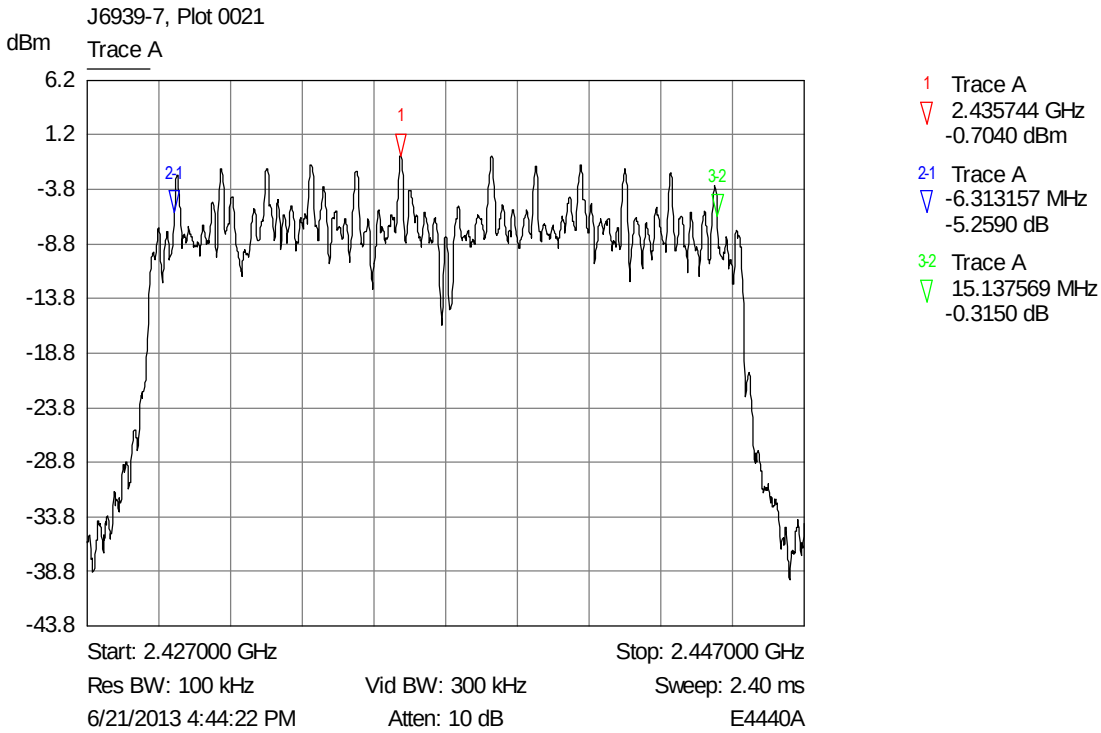



**High channel**

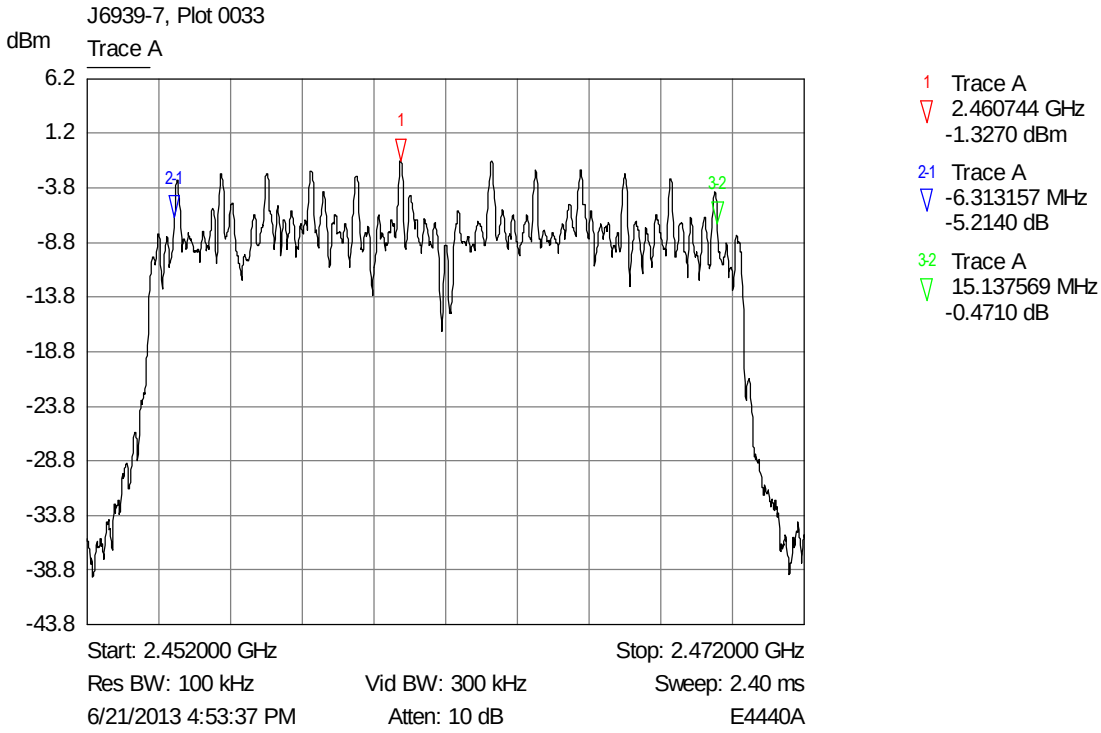
### 6.3.9 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 24 MBPS




**Low channel**

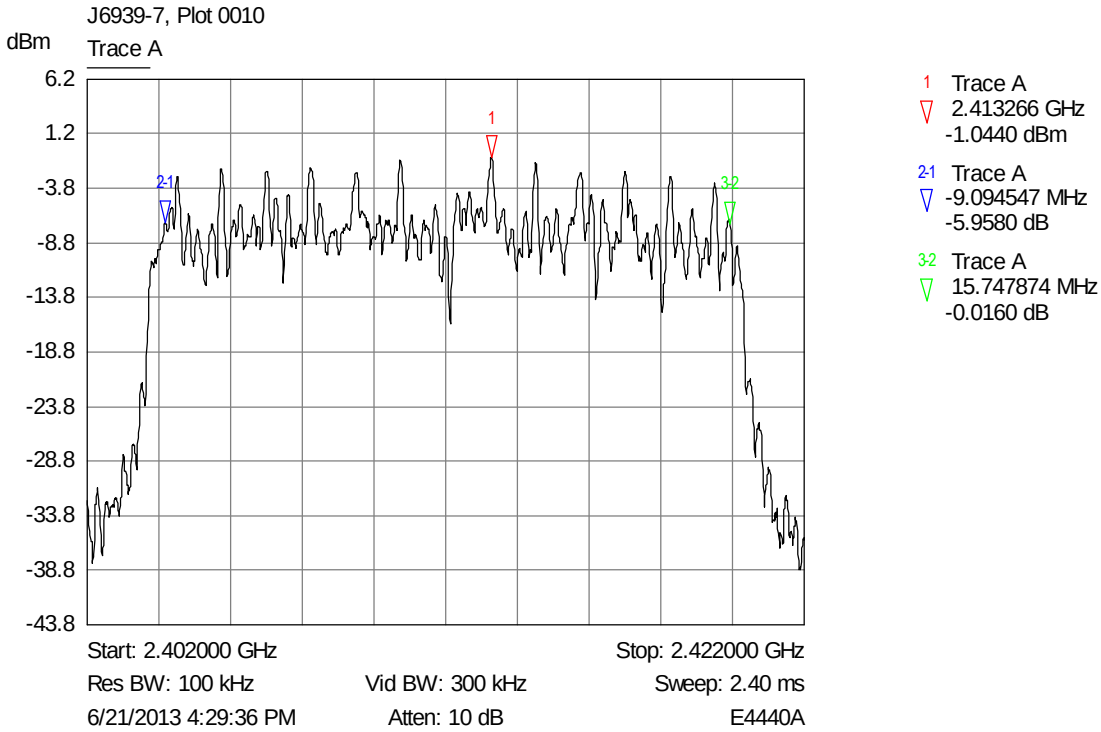



**Mid channel**

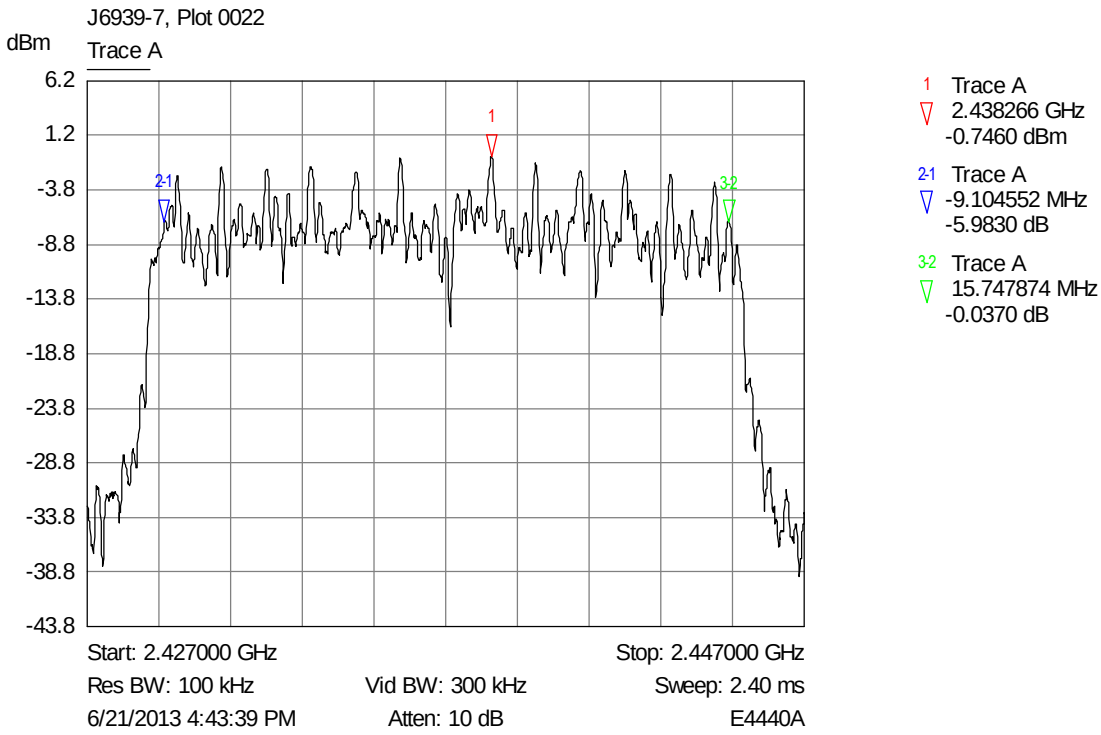



**High channel**

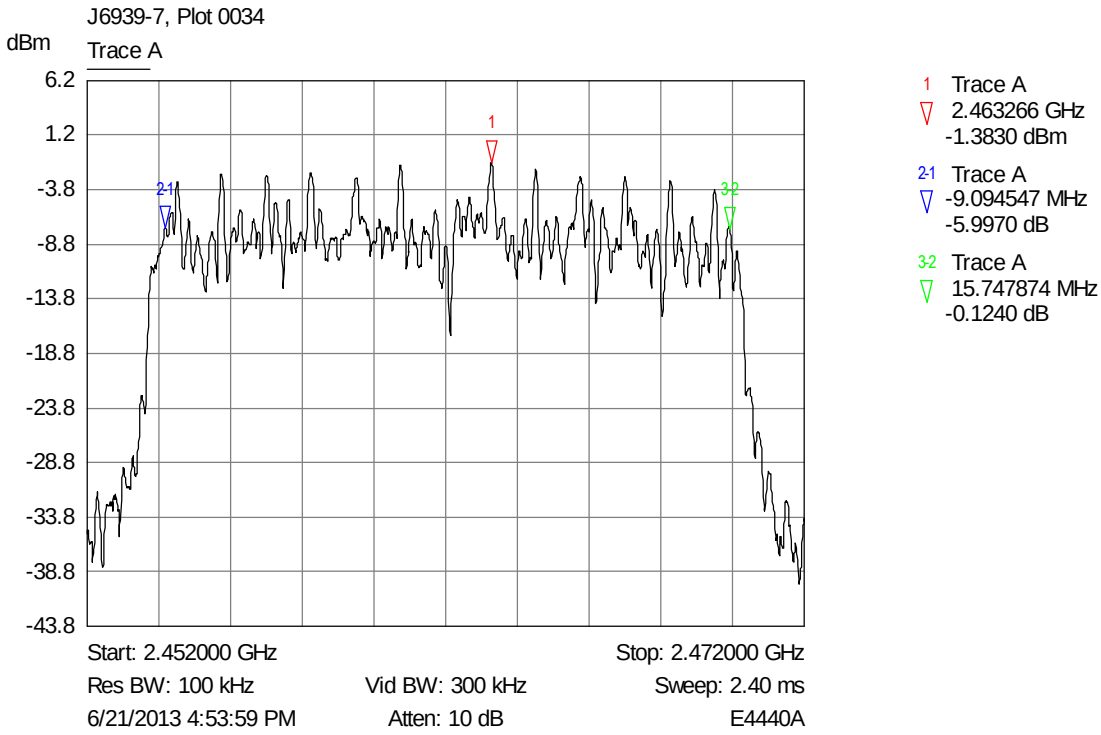
### 6.3.10 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 36 MBPS




**Low channel**

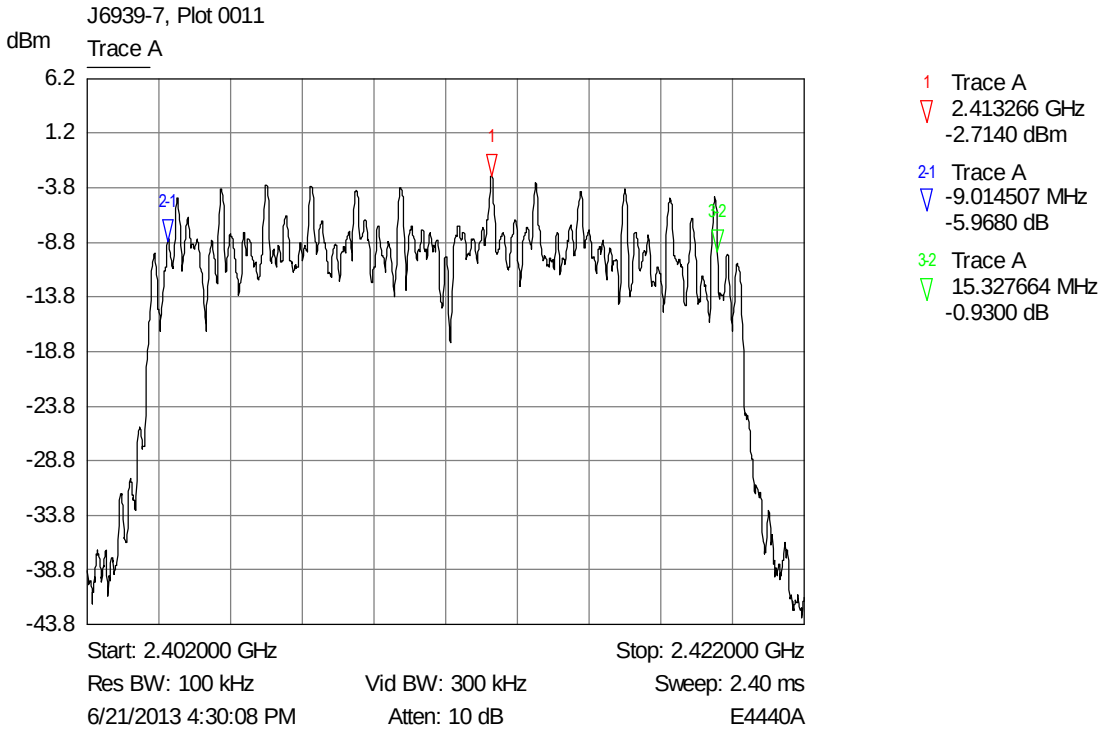



**Mid channel**

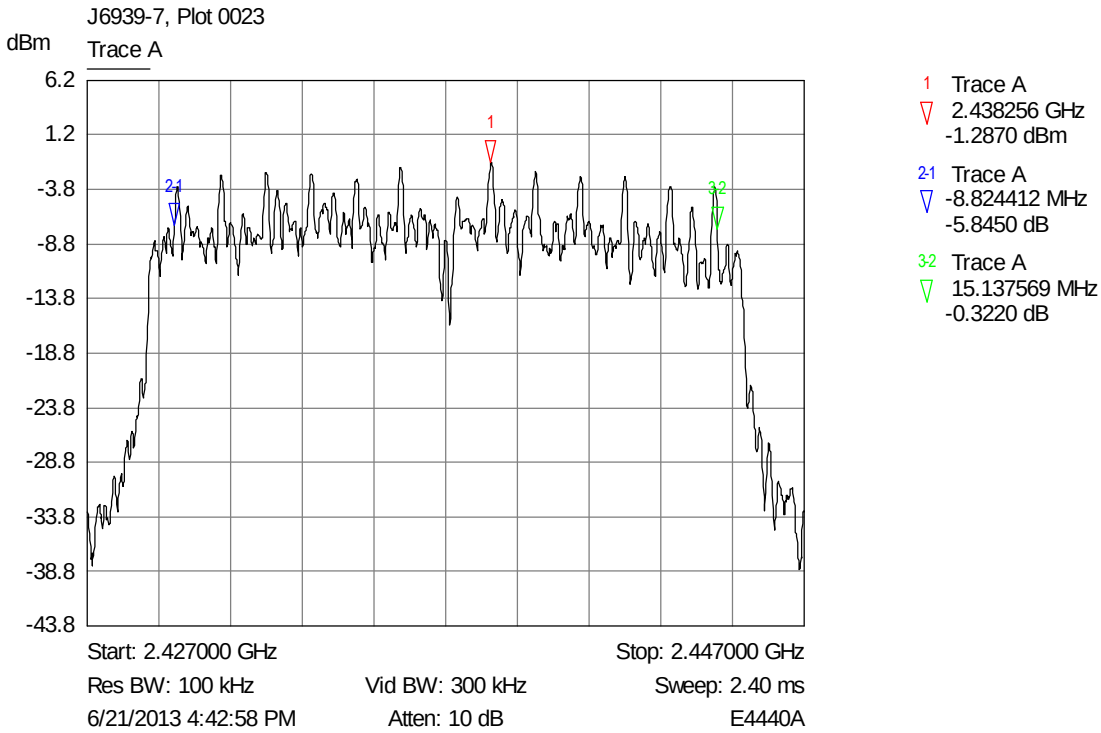



**High channel**

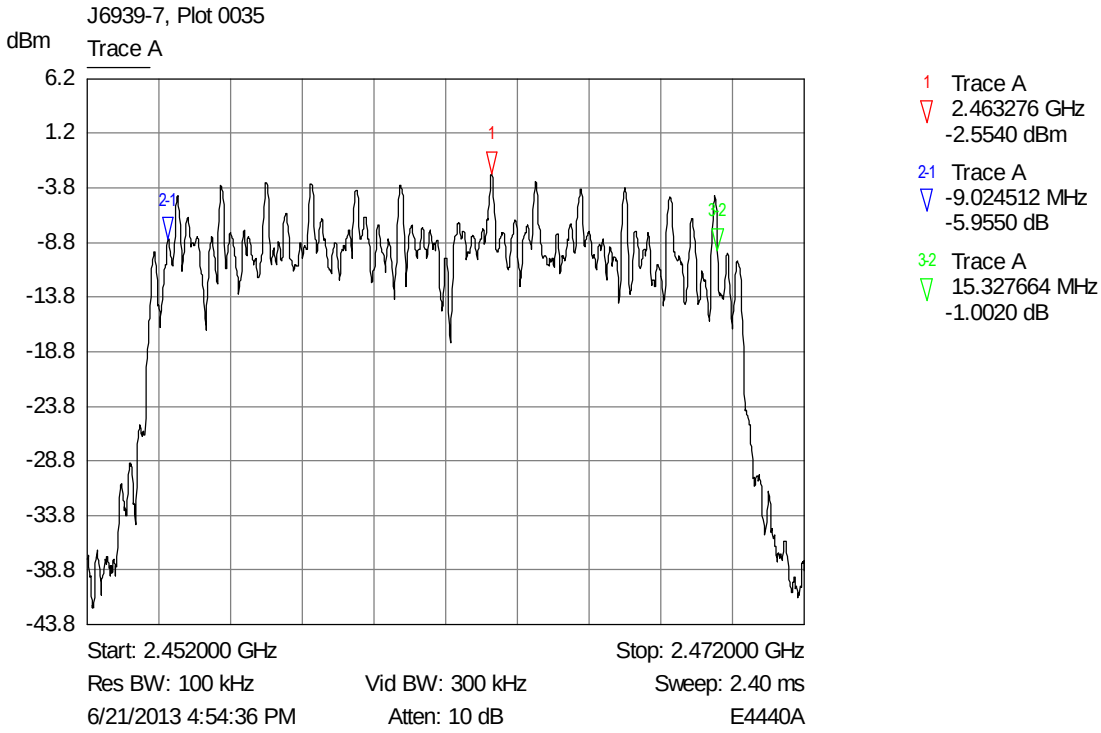
### 6.3.11 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 48 MBPS




**Low channel**

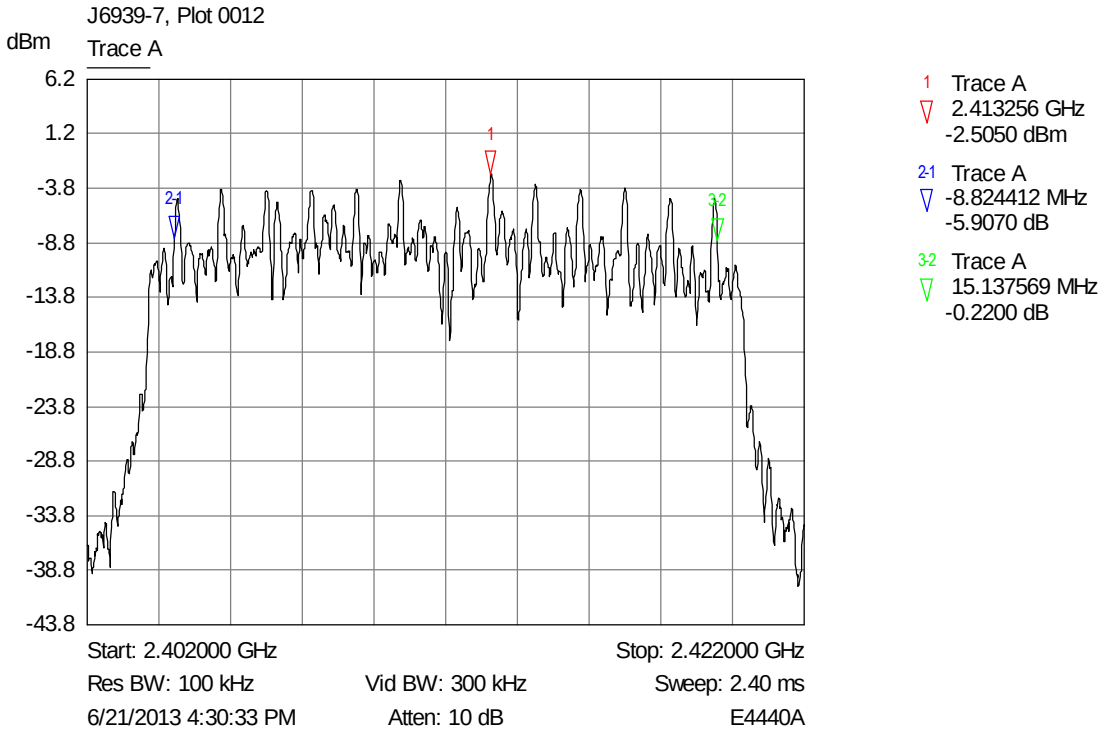



**Mid channel**

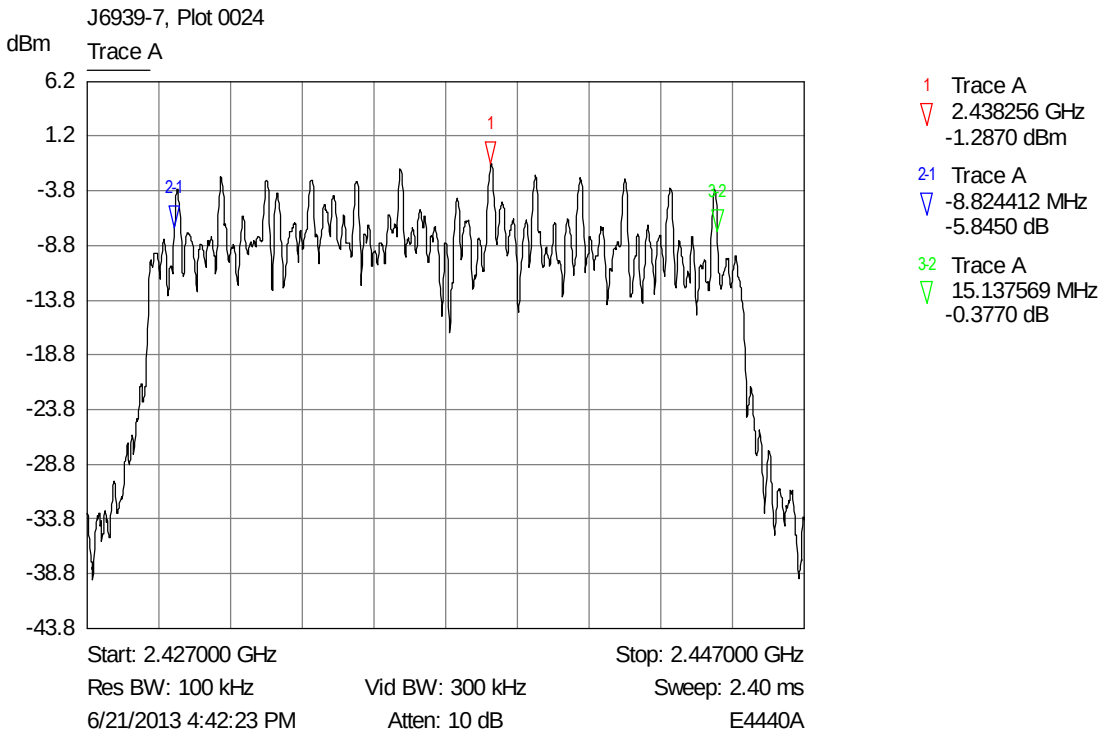



**High channel**

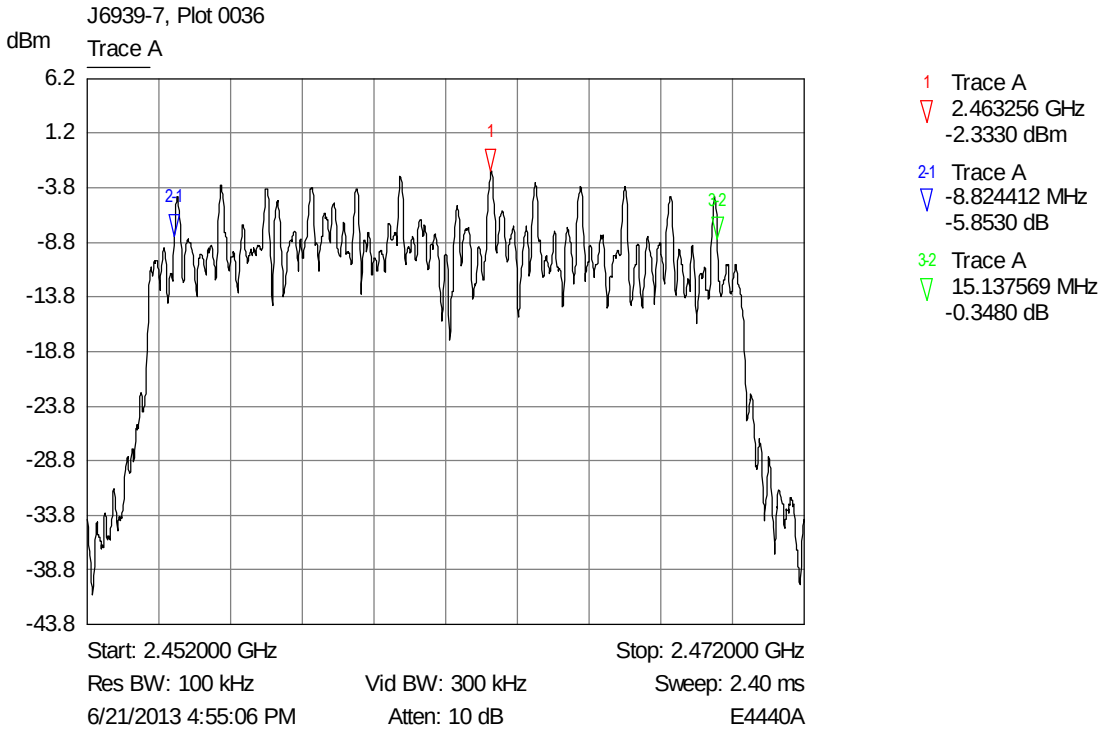
### 6.3.12 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 54 MBPS




**Low channel**



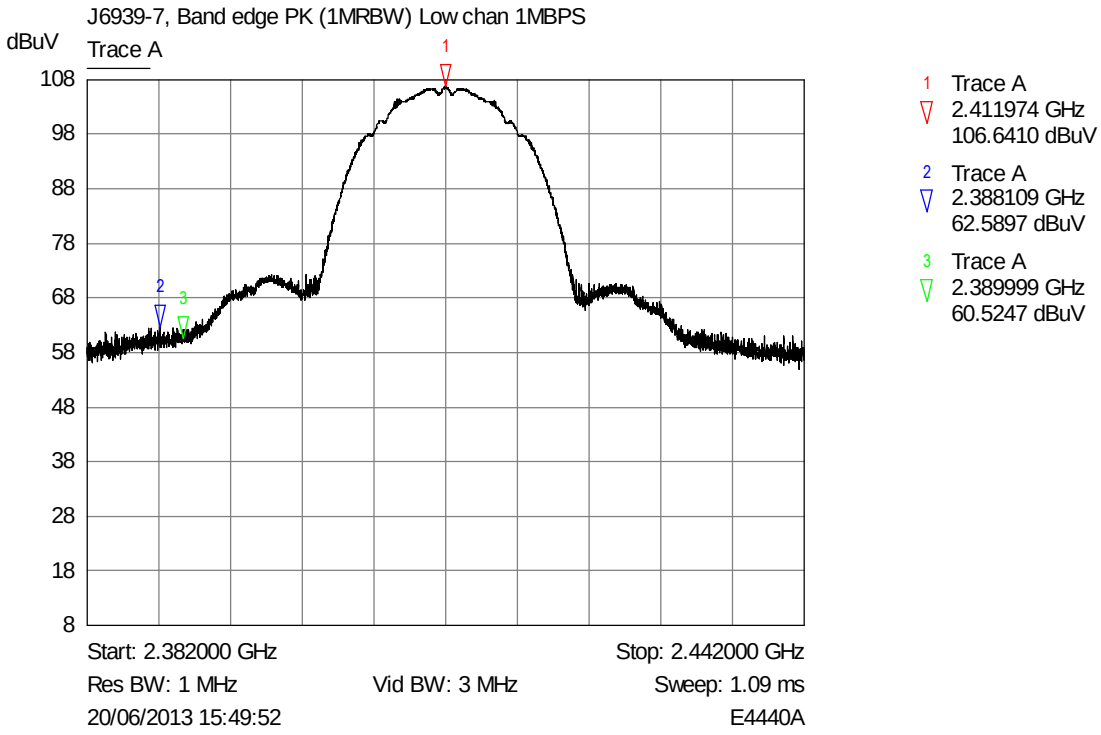

**Mid channel**



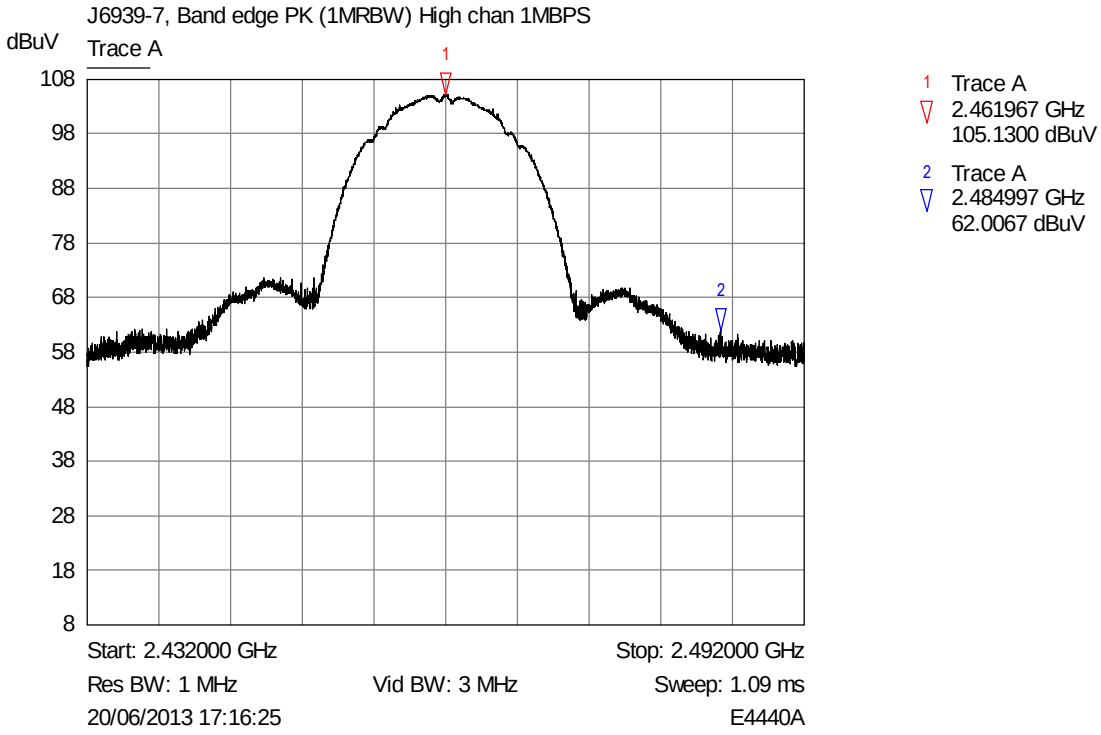

**High channel**

## 6.4 Band edge compliance plots

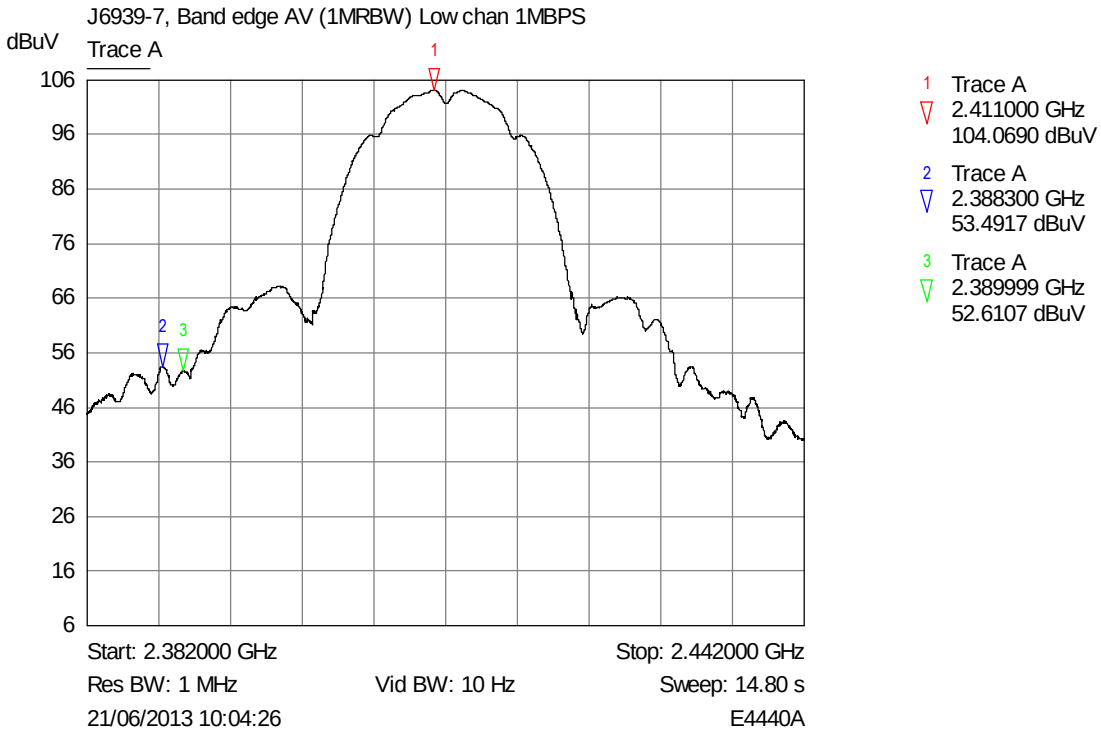
### 6.4.1 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 1 MBPS



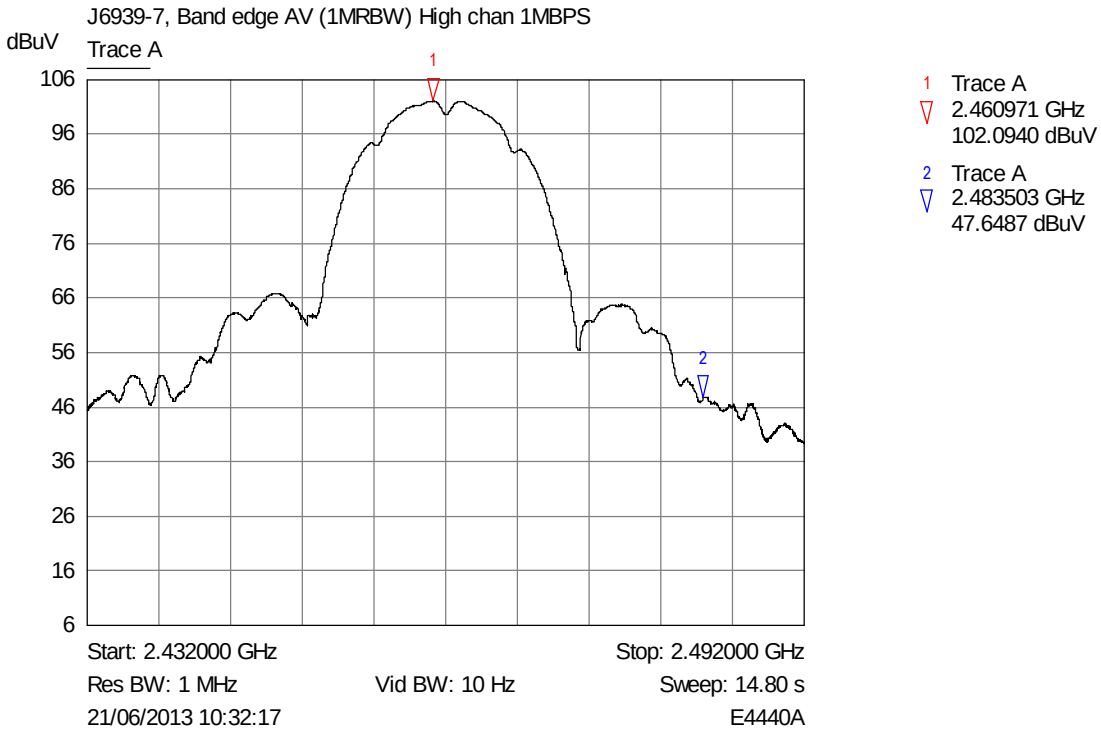

**Restricted Band: Low channel Peak Plot**



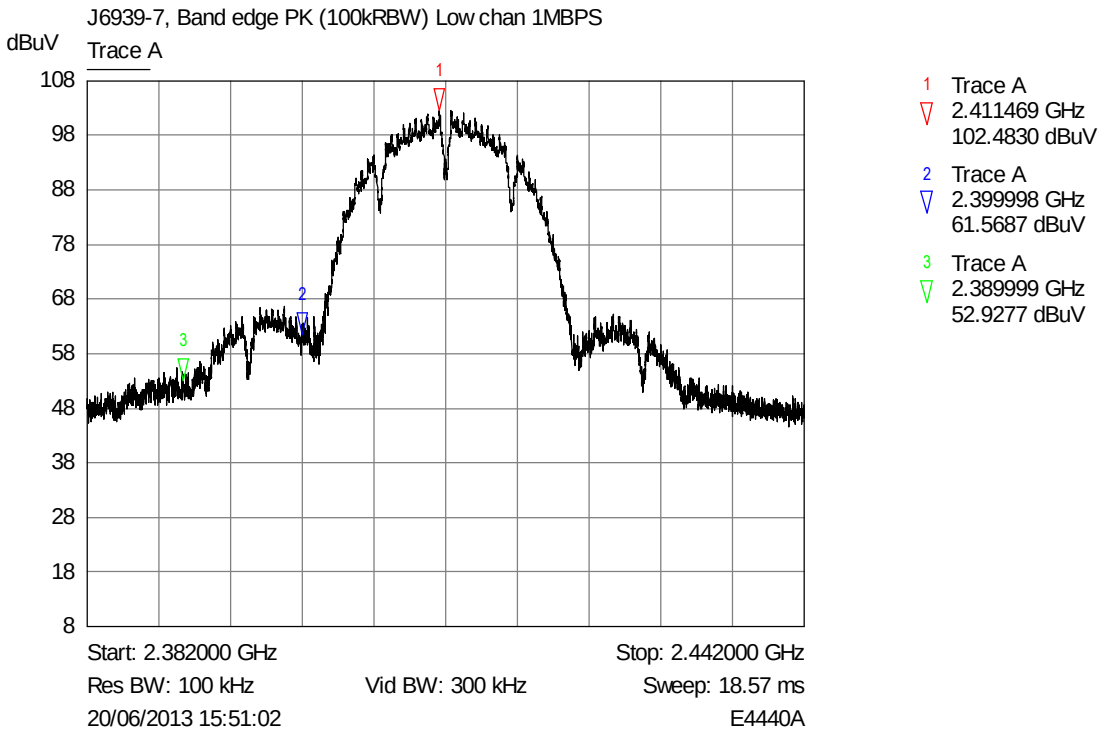
## Restricted Band: High channel Peak Plot



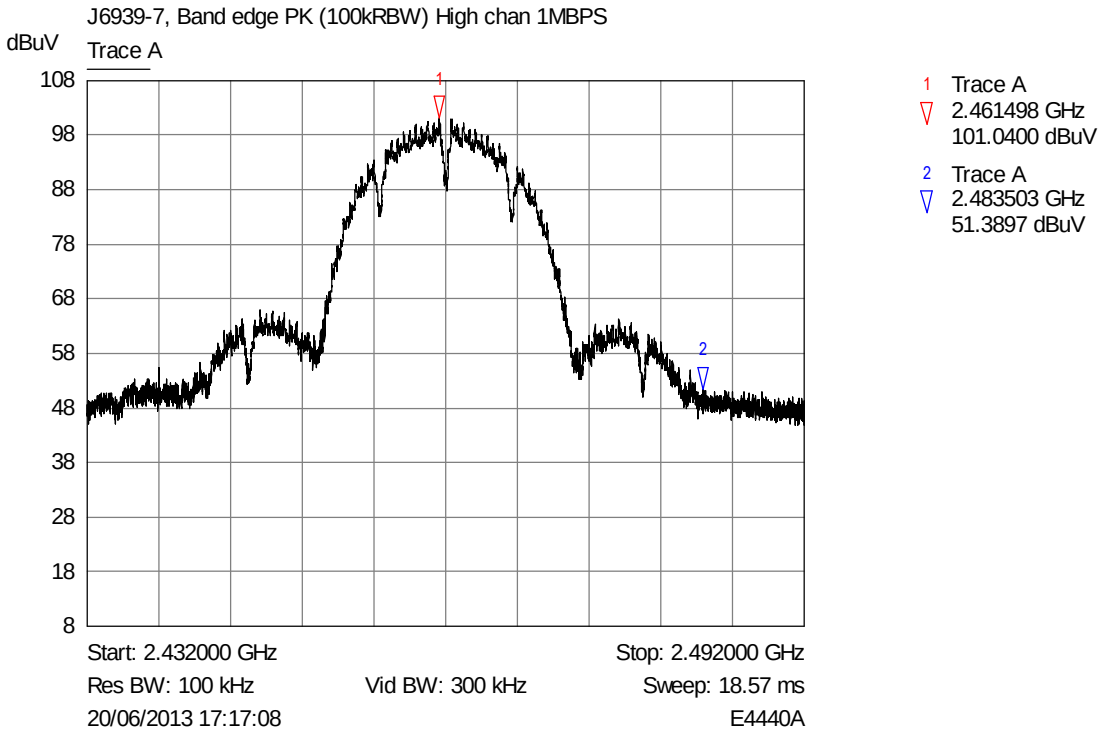

## Restricted Band: Low channel Average Plot




## Restricted Band: High channel Average Plot

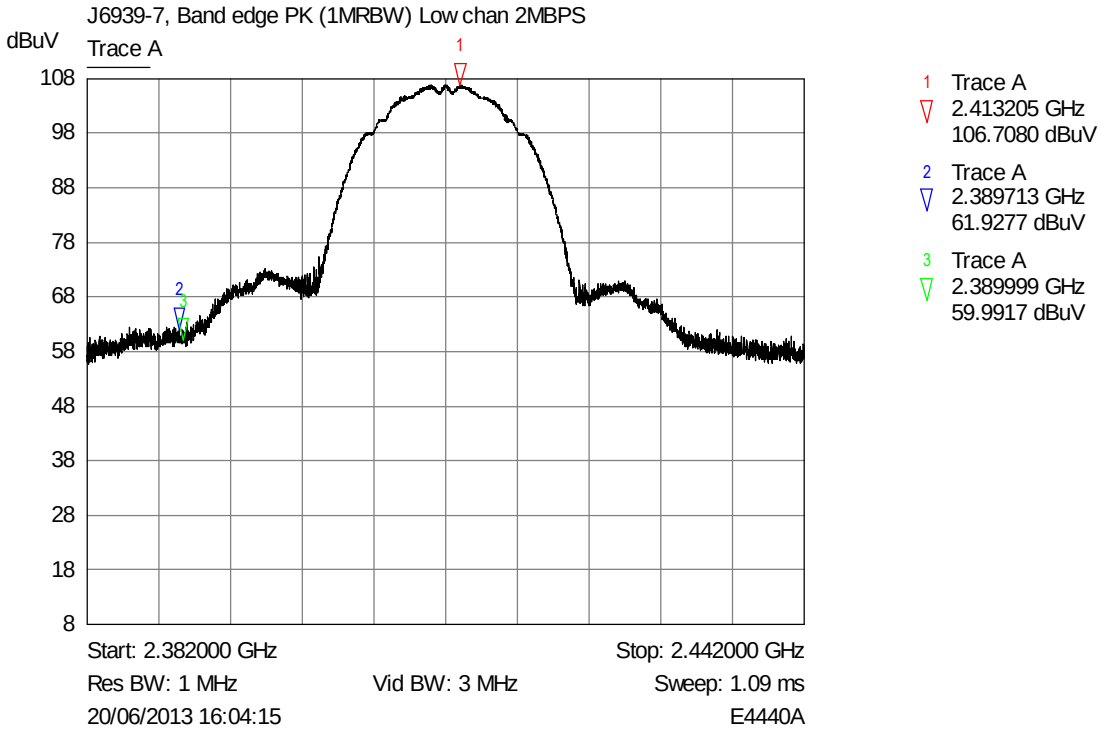



## Band Edge: Low channel

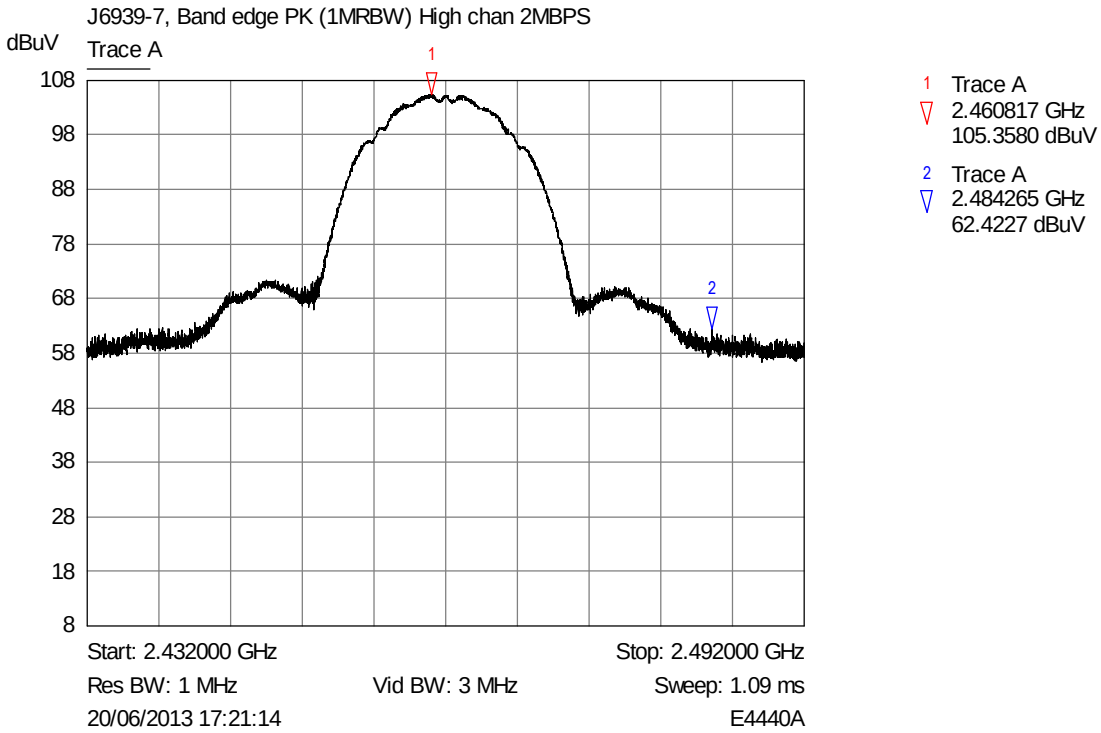



## Band Edge: High channel

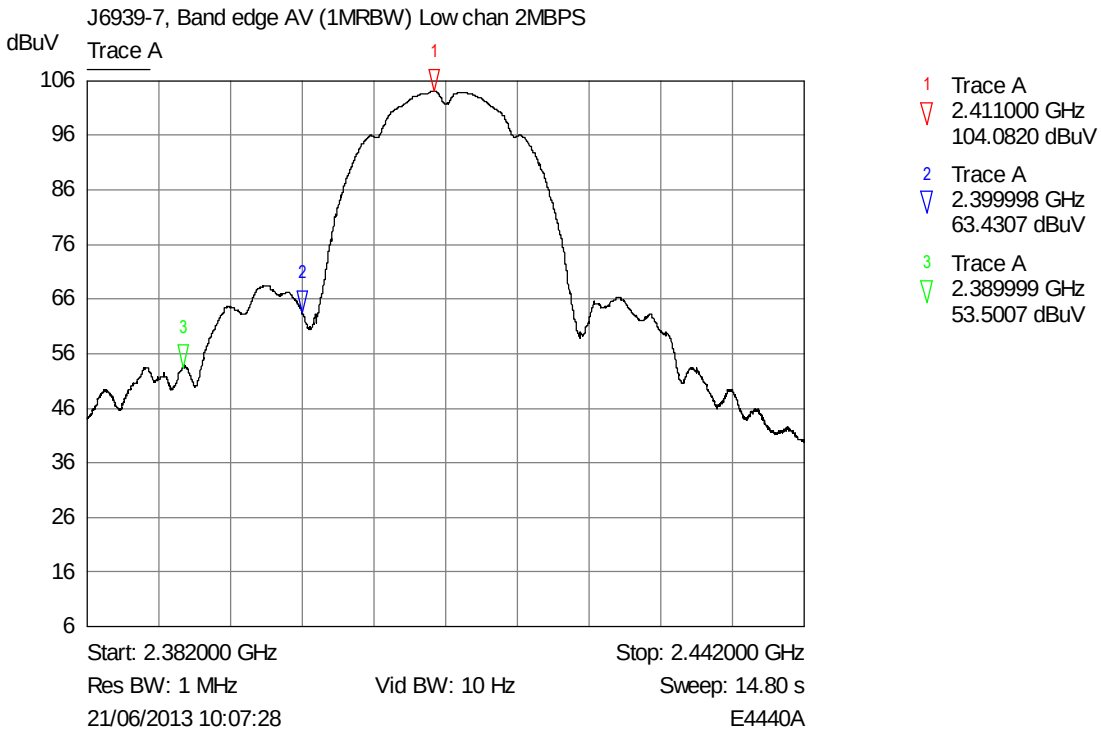
## 6.4.2 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 2 MBPS



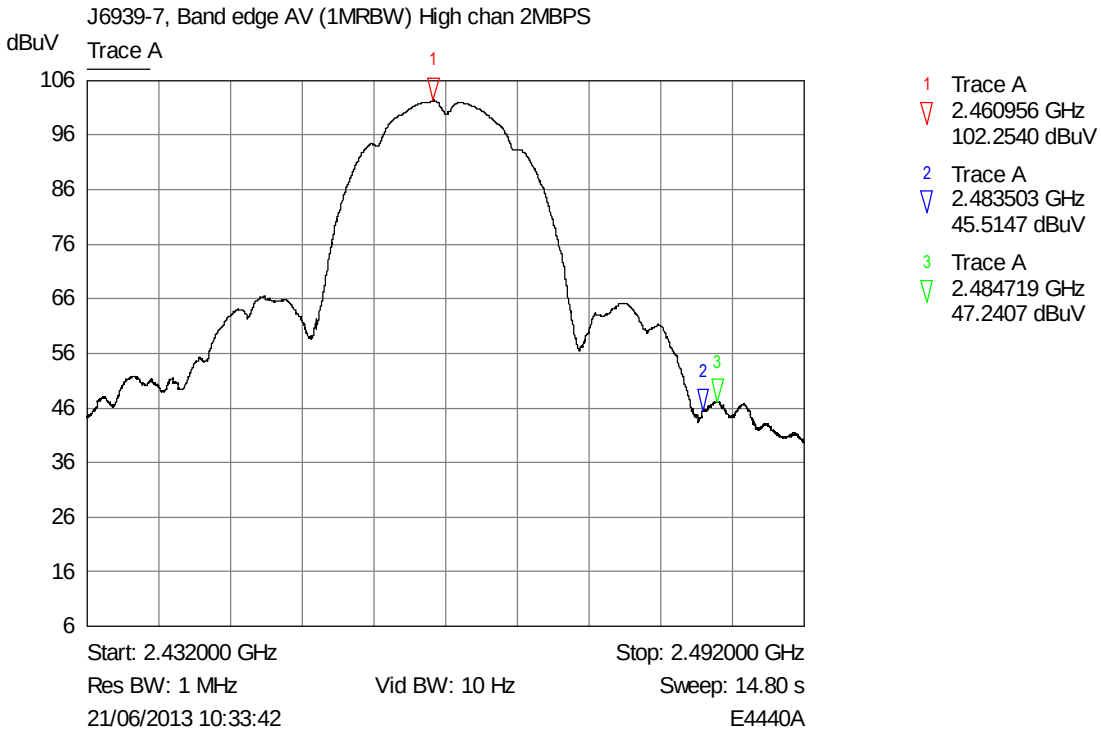

**Restricted Band: Low channel Peak plot**



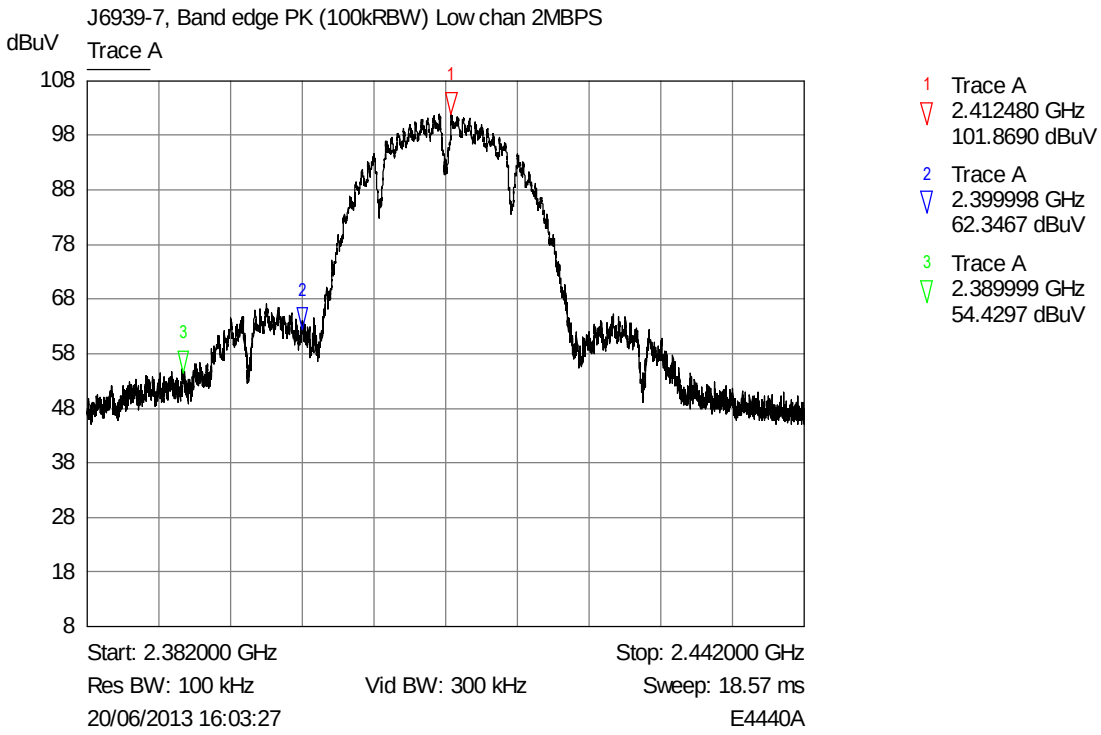

**Restricted Band: High channel Peak plot**



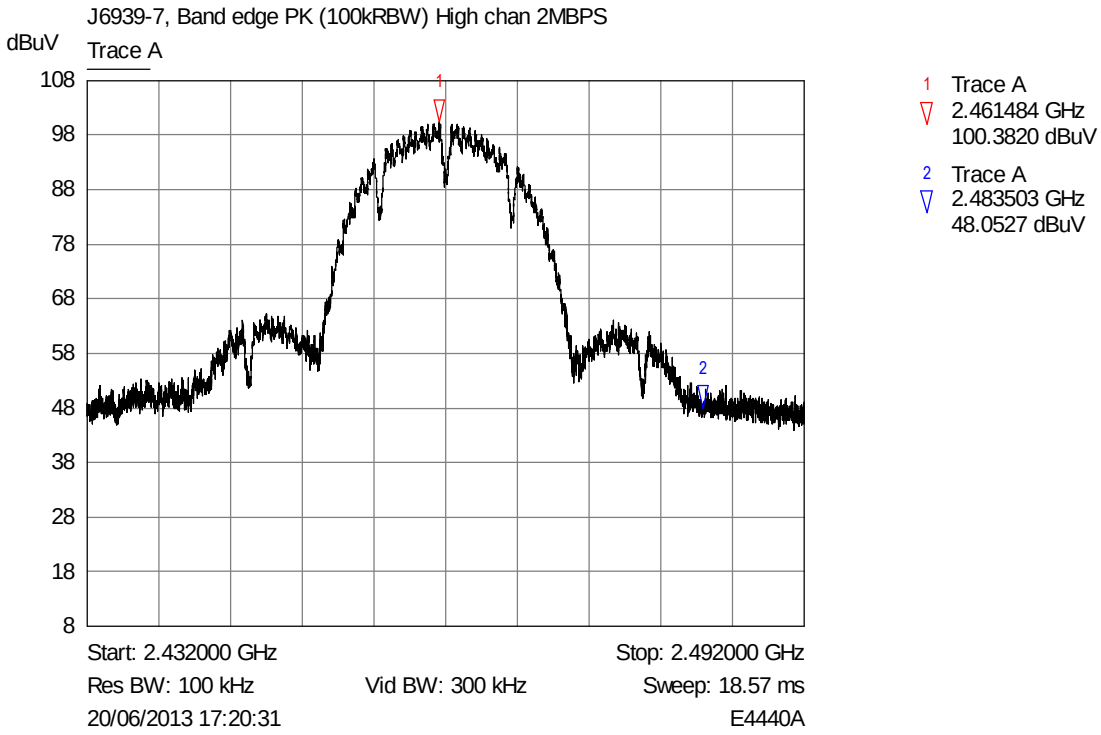

**Restricted Band: Low channel Average plot**




**Restricted Band: High channel Average plot**

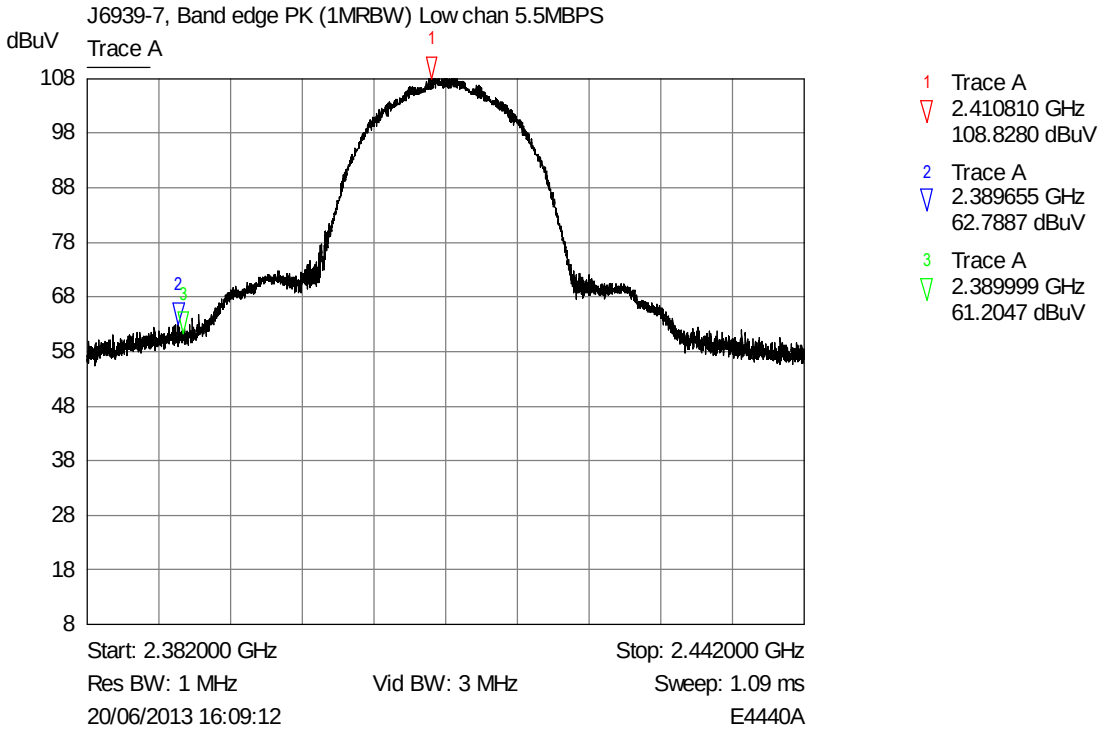



## Band Edge: Low channel

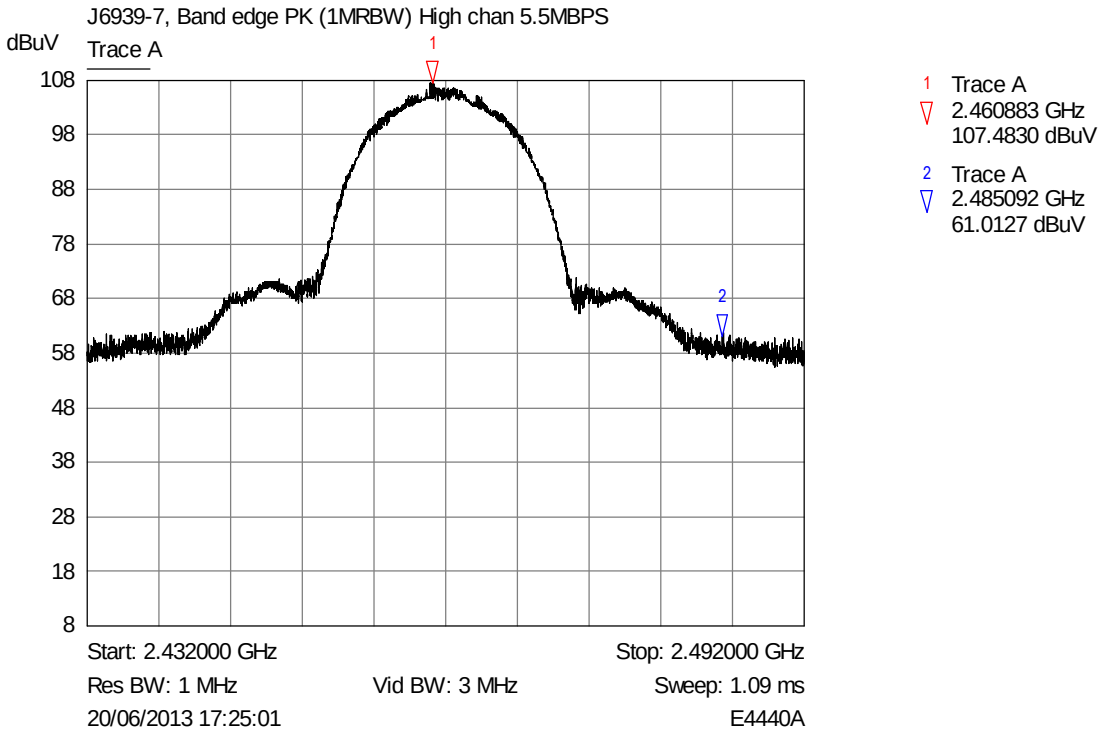



## Band Edge: High channel

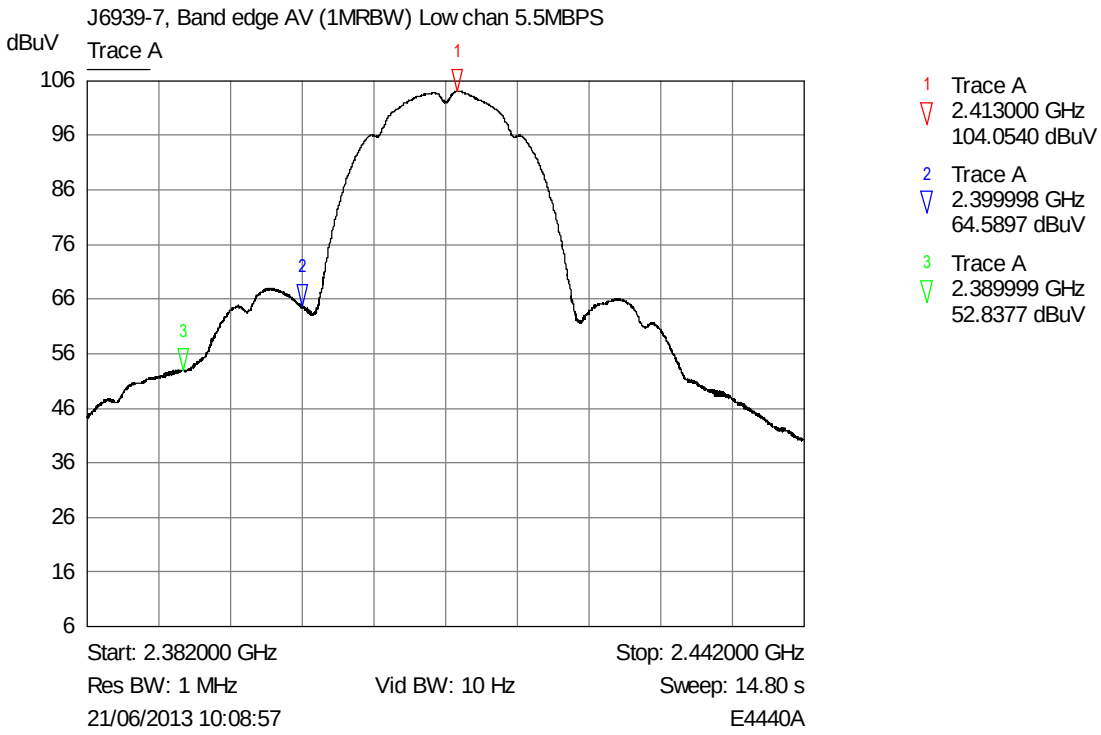
### 6.4.3 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 5.5 MBPS



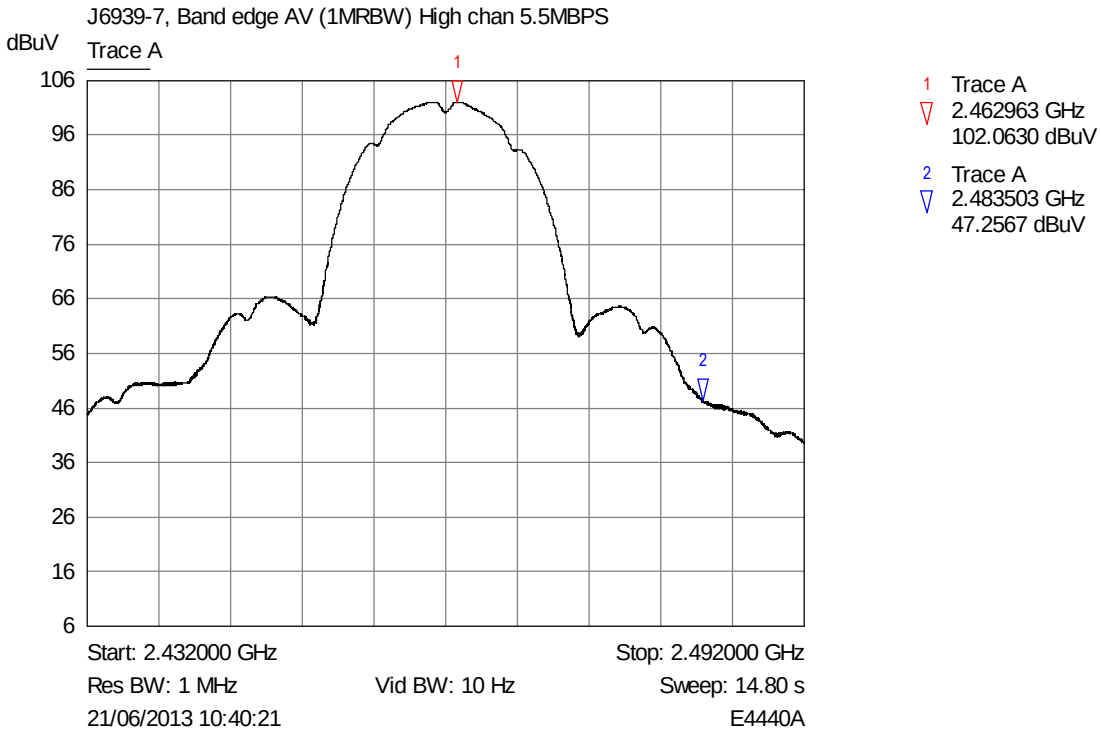

**Restricted Band: Low channel Peak plot**



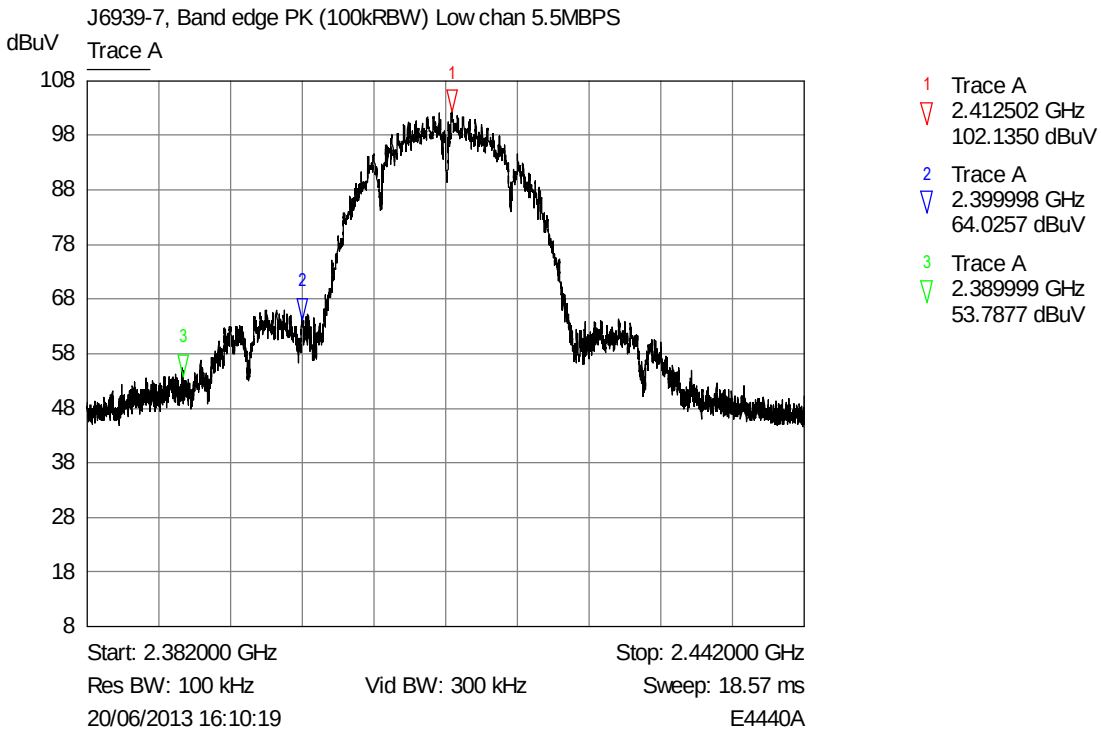

**Restricted Band: High channel Peak plot**



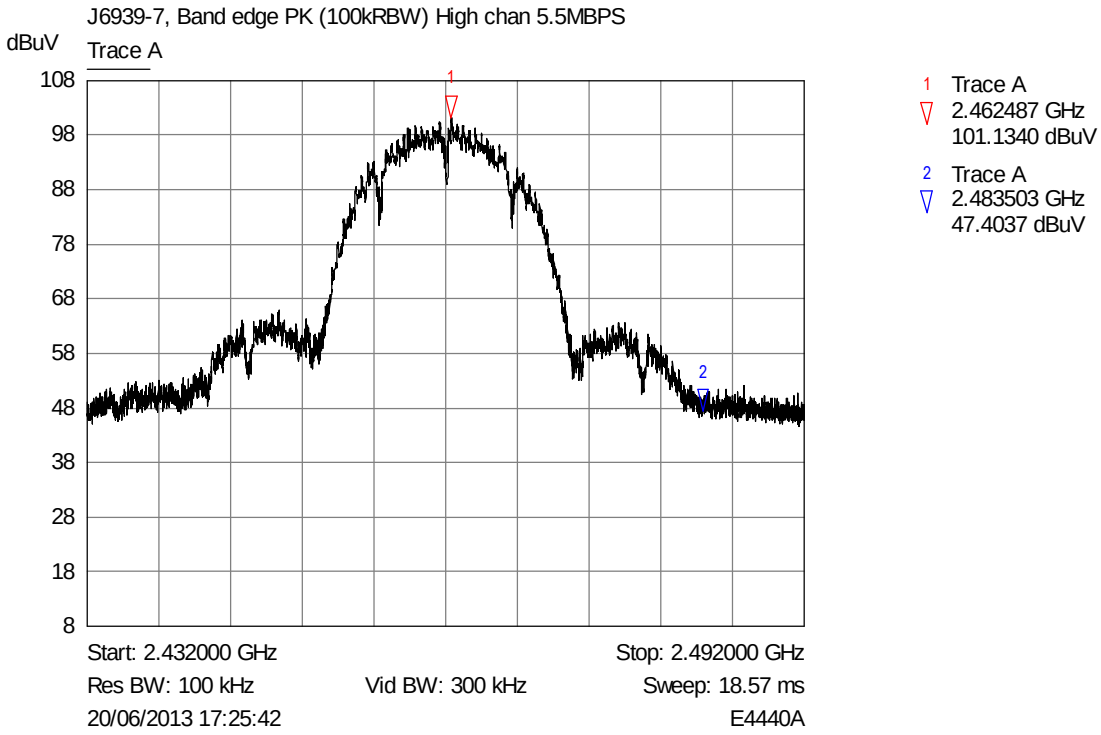

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

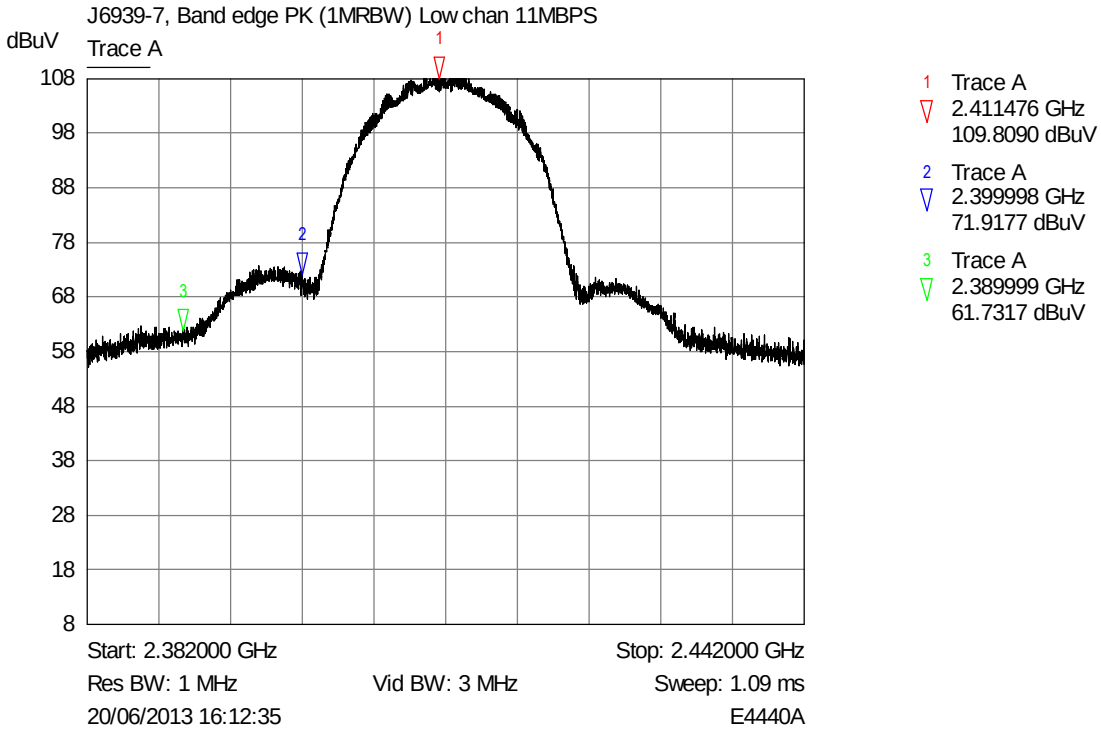



## Band Edge: Low channel

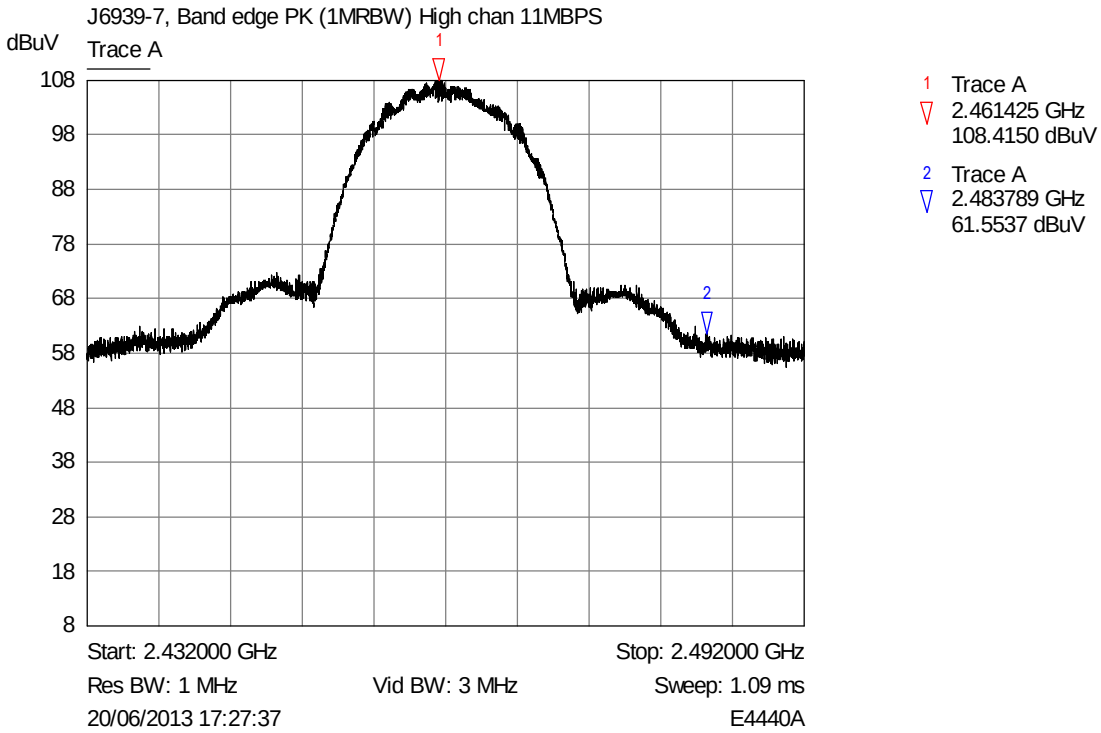



## Band Edge: High channel

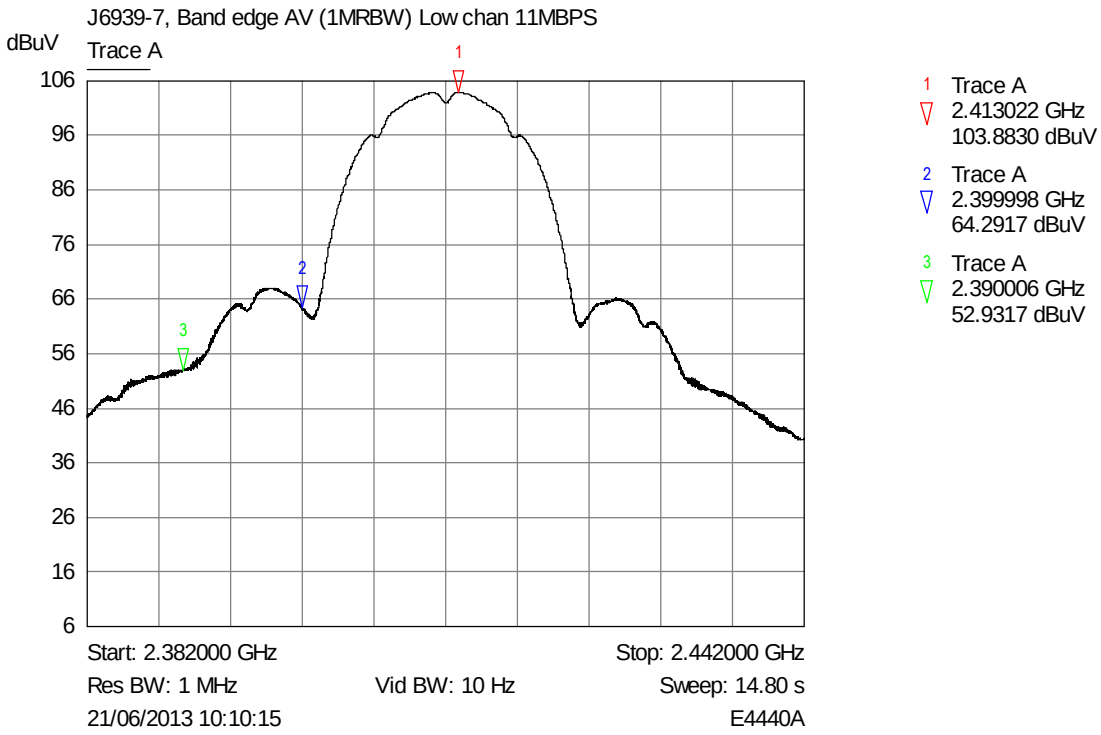
### 6.4.4 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 11 MBPS



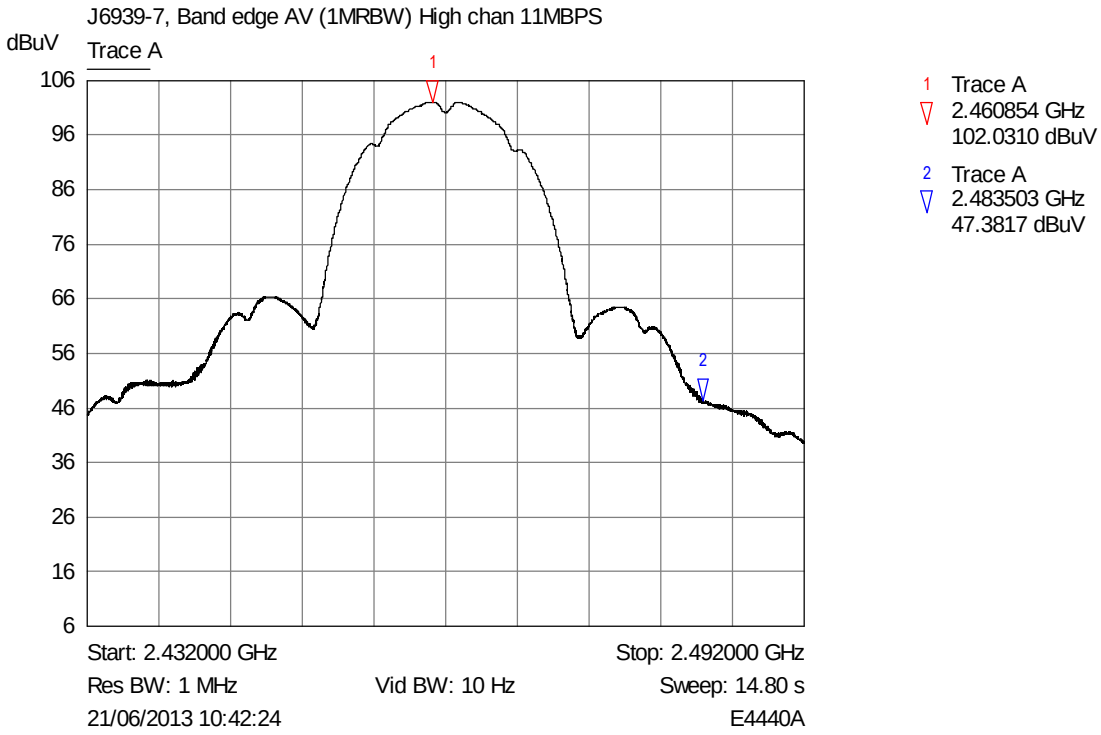

**Restricted Band: Low channel Peak plot**



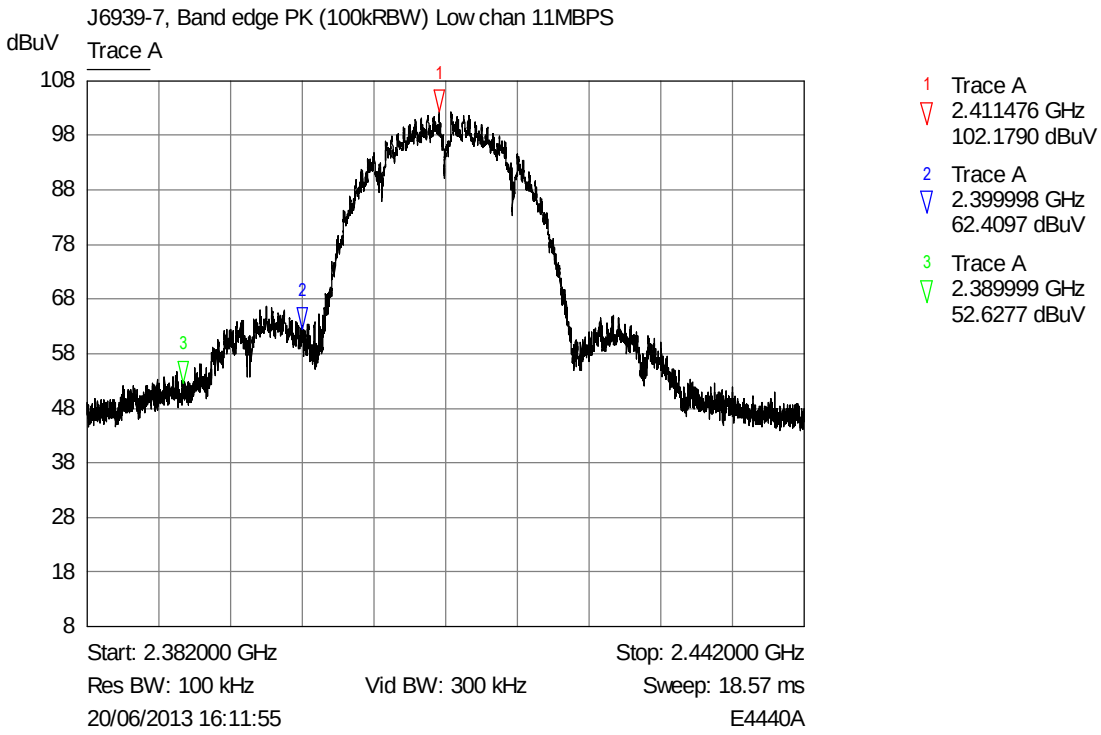

**Restricted Band: High channel Peak plot**



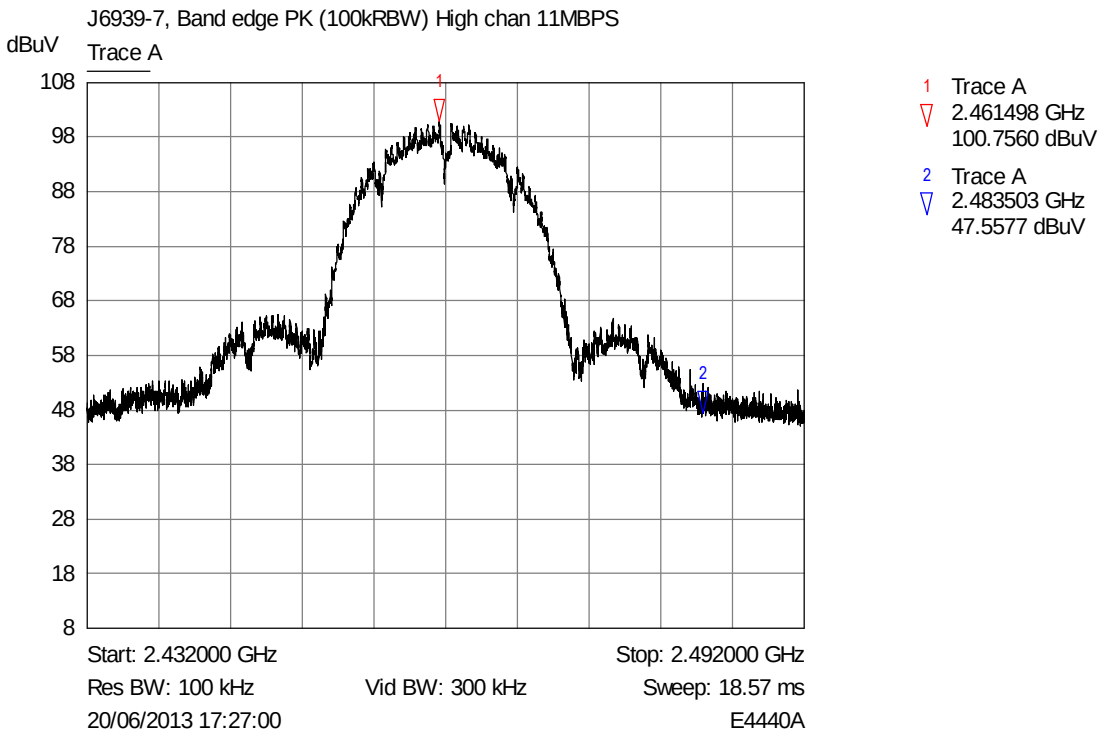

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

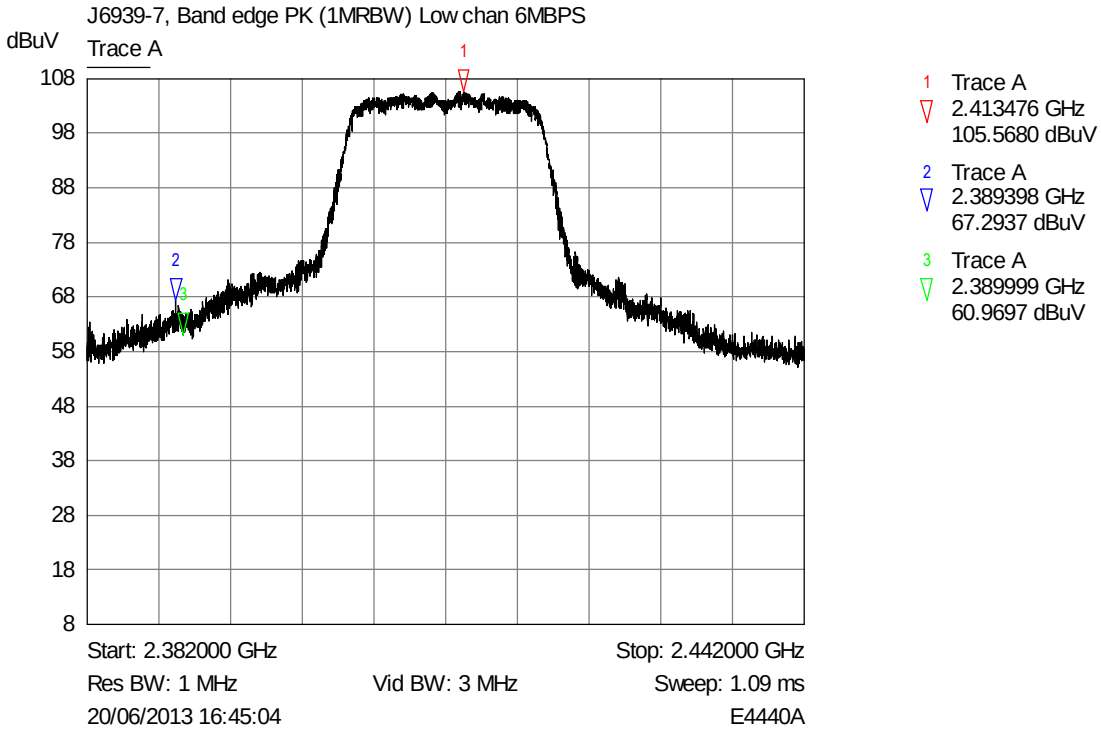



## Band Edge: Low channel

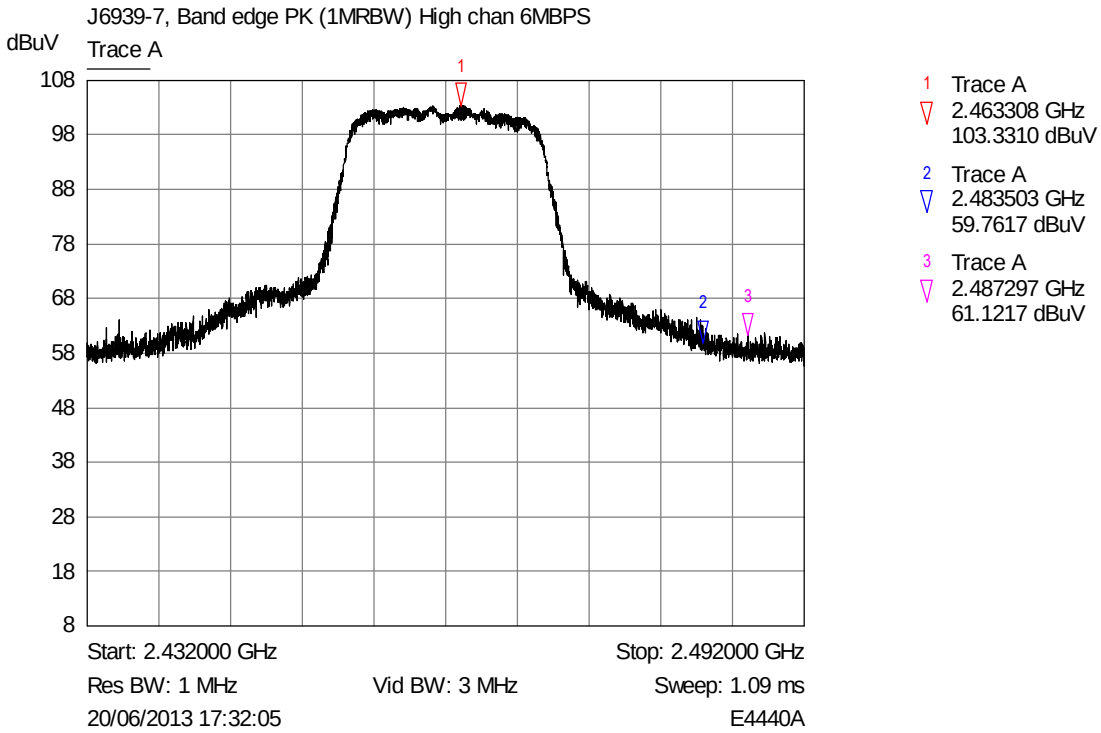



## Band Edge: High channel

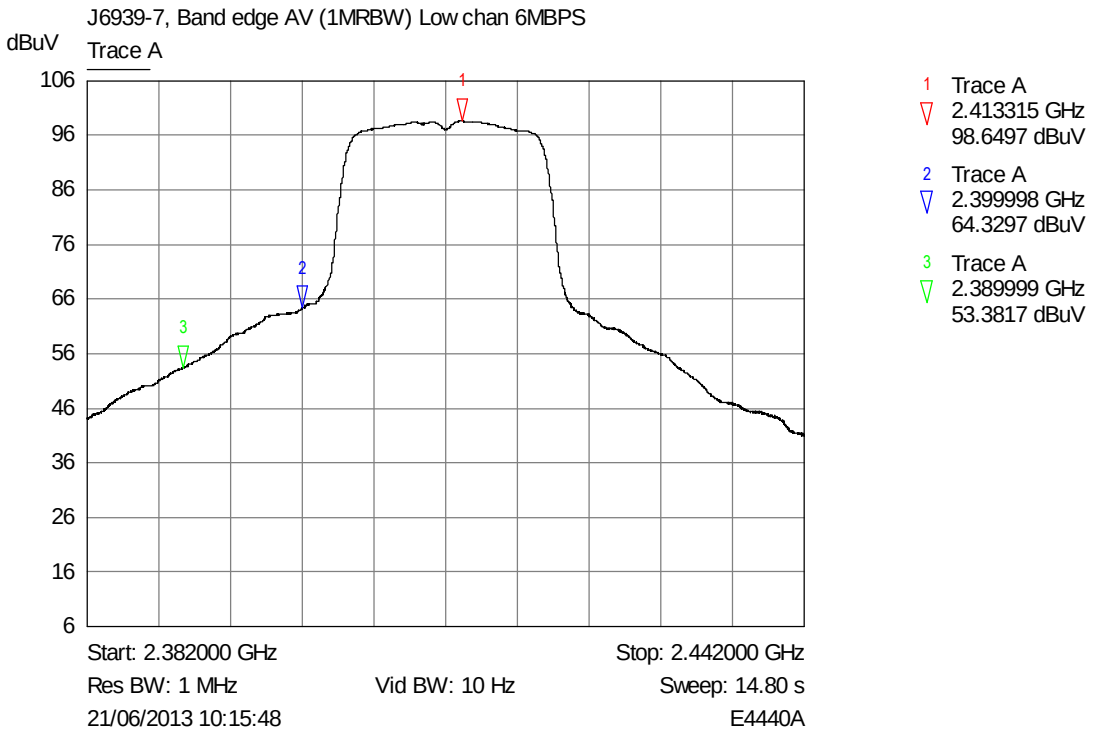
### 6.4.5 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 6 MBPS



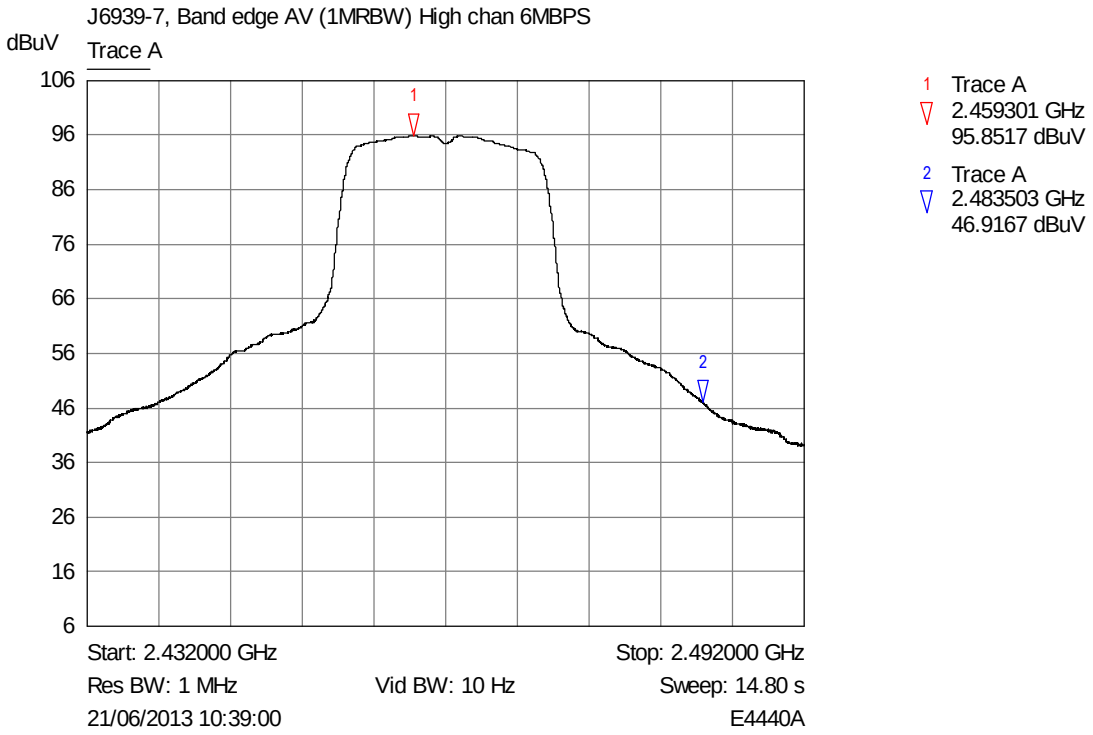

**Restricted Band: Low channel Peak plot**



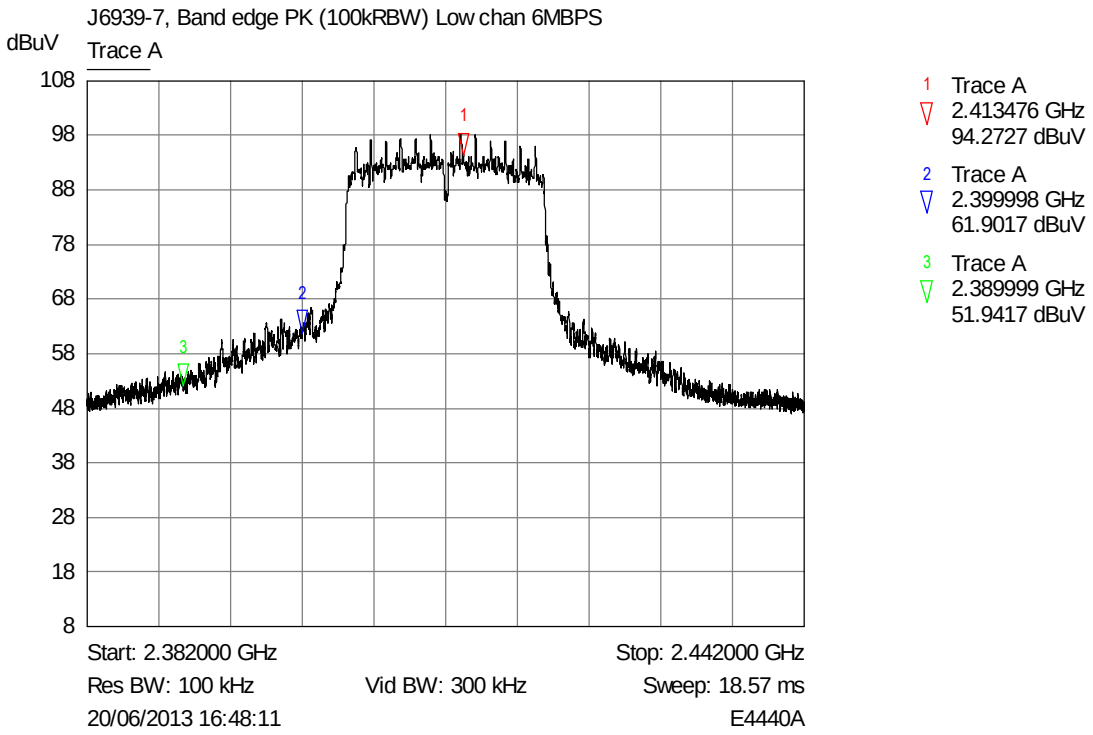

**Restricted Band: High channel Peak plot**



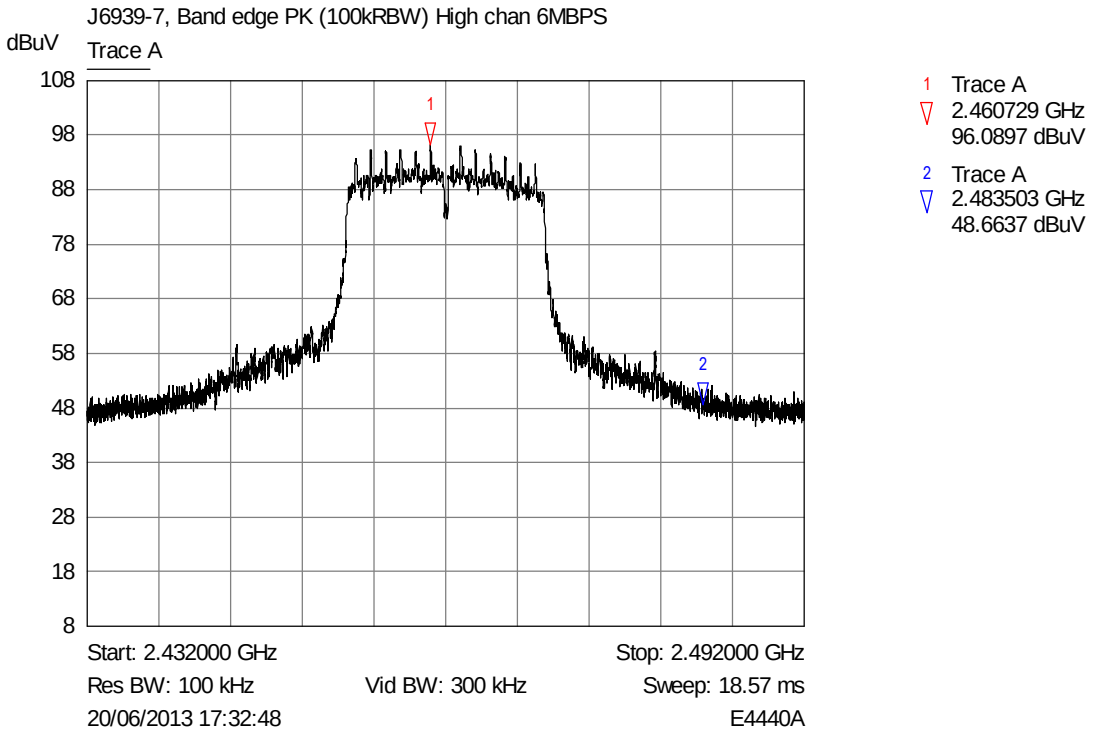

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

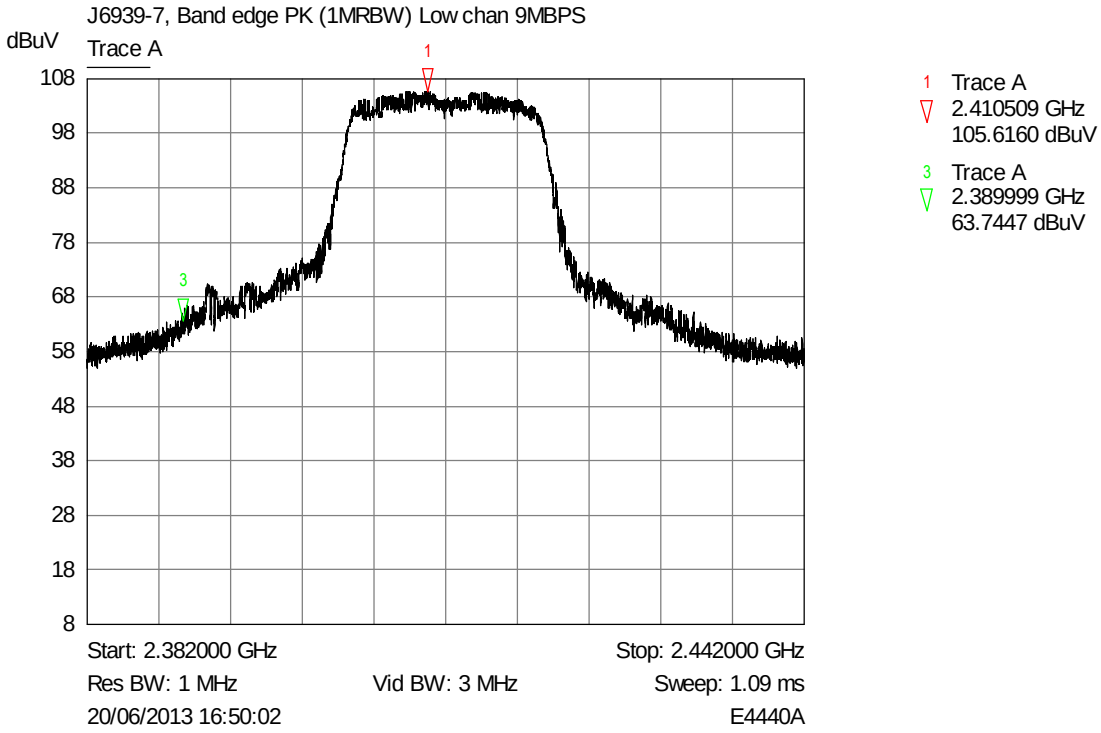



## Band Edge: Low channel

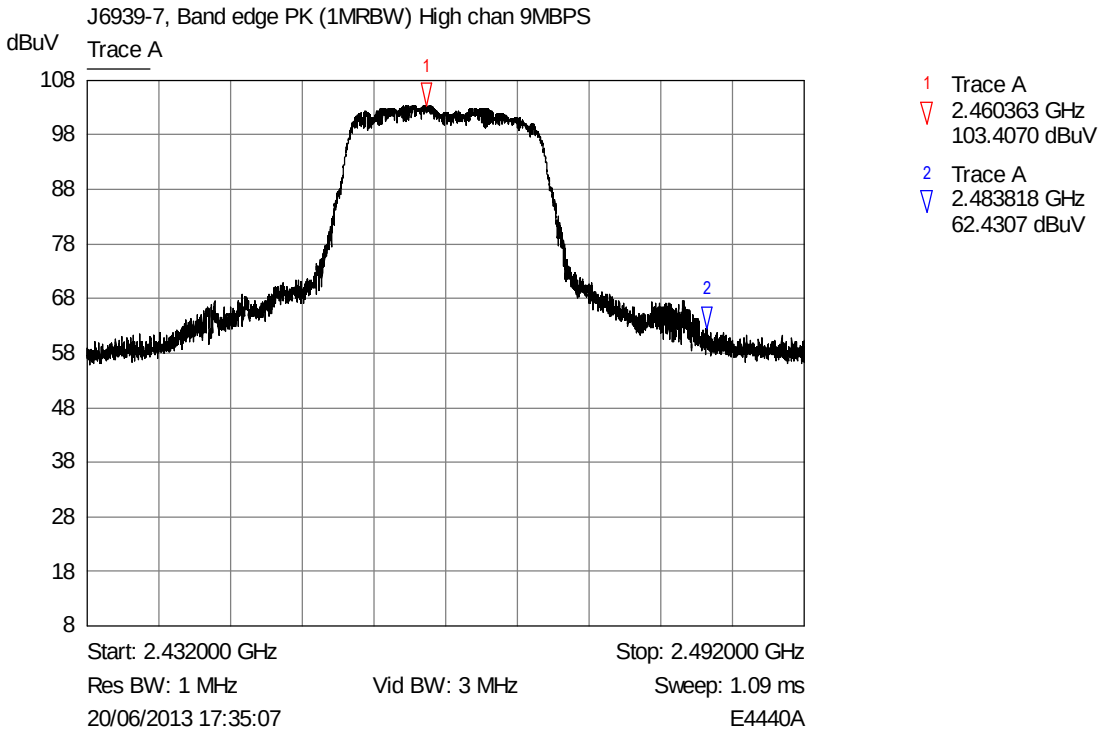



## Band Edge: High channel

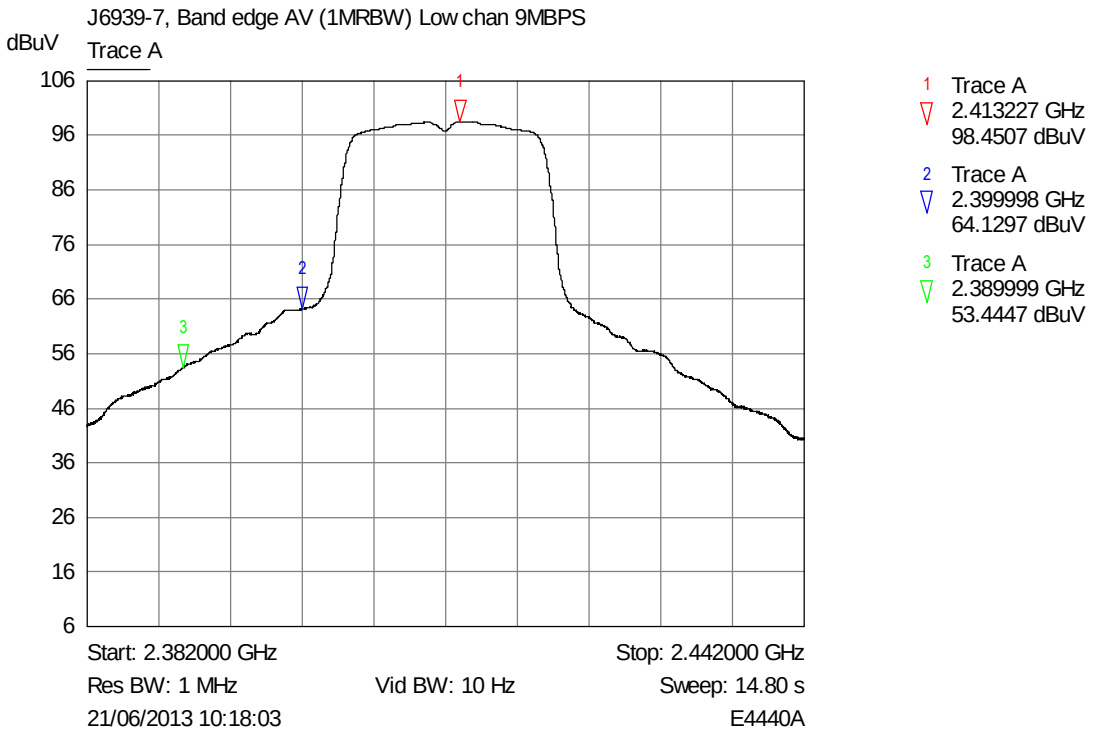
### 6.4.6 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 9 MBPS



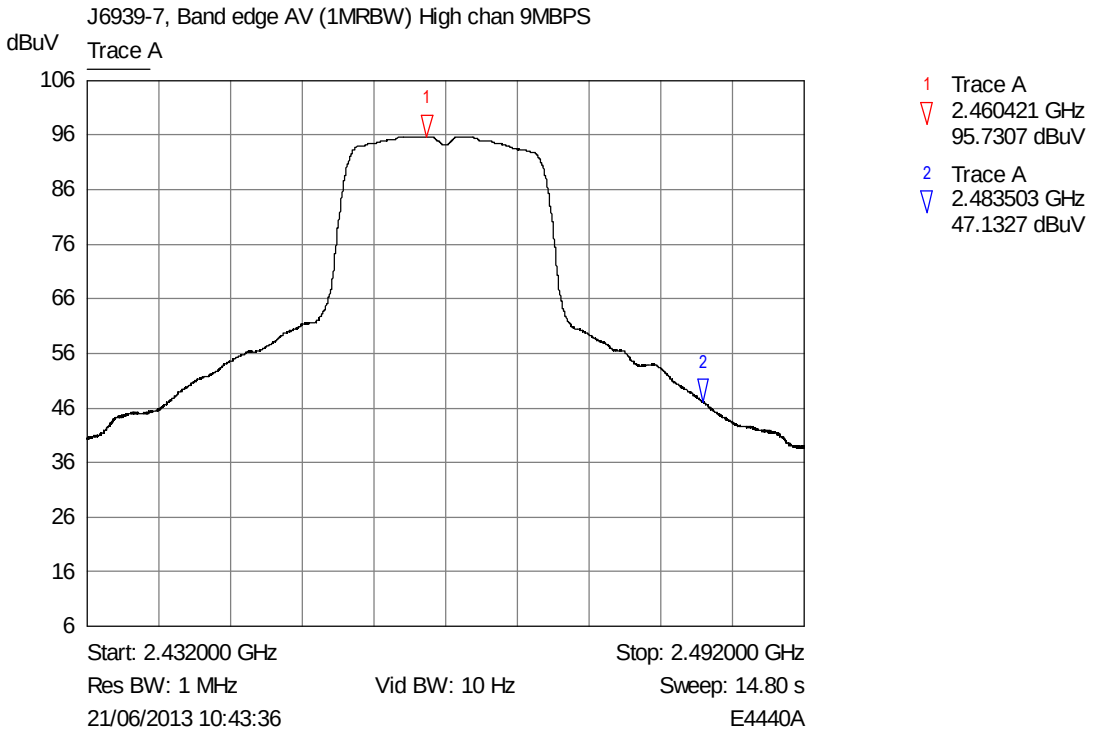

**Restricted Band: Low channel Peak plot**



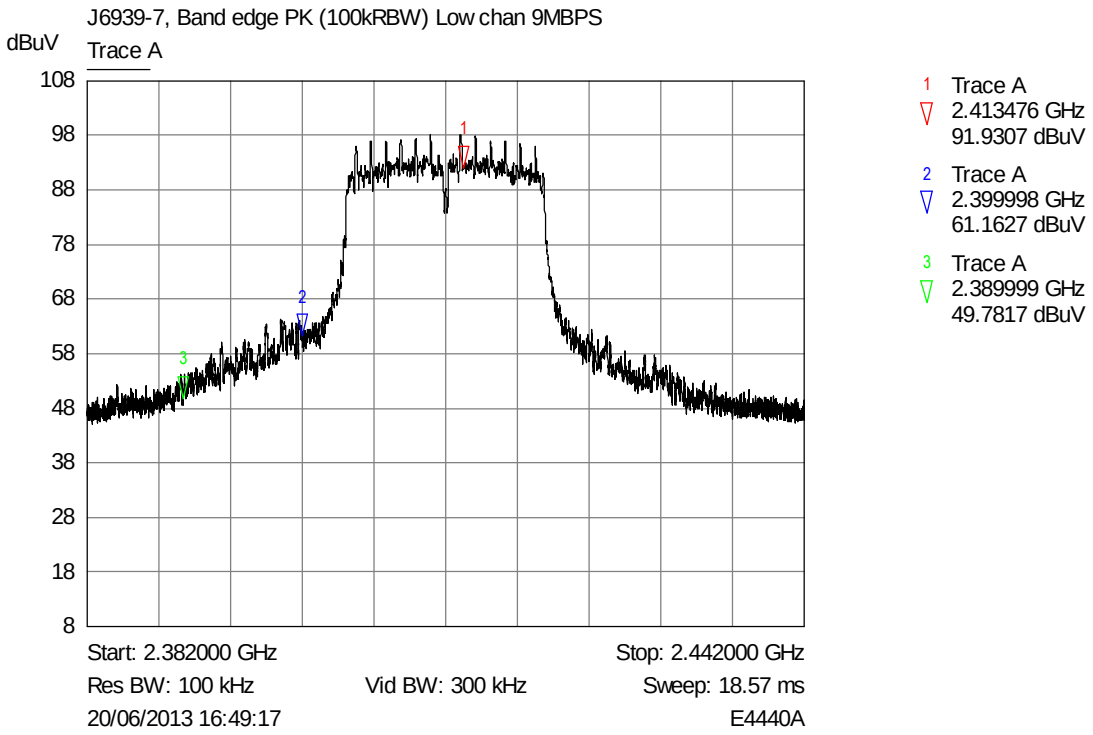

**Restricted Band: High channel Peak plot**



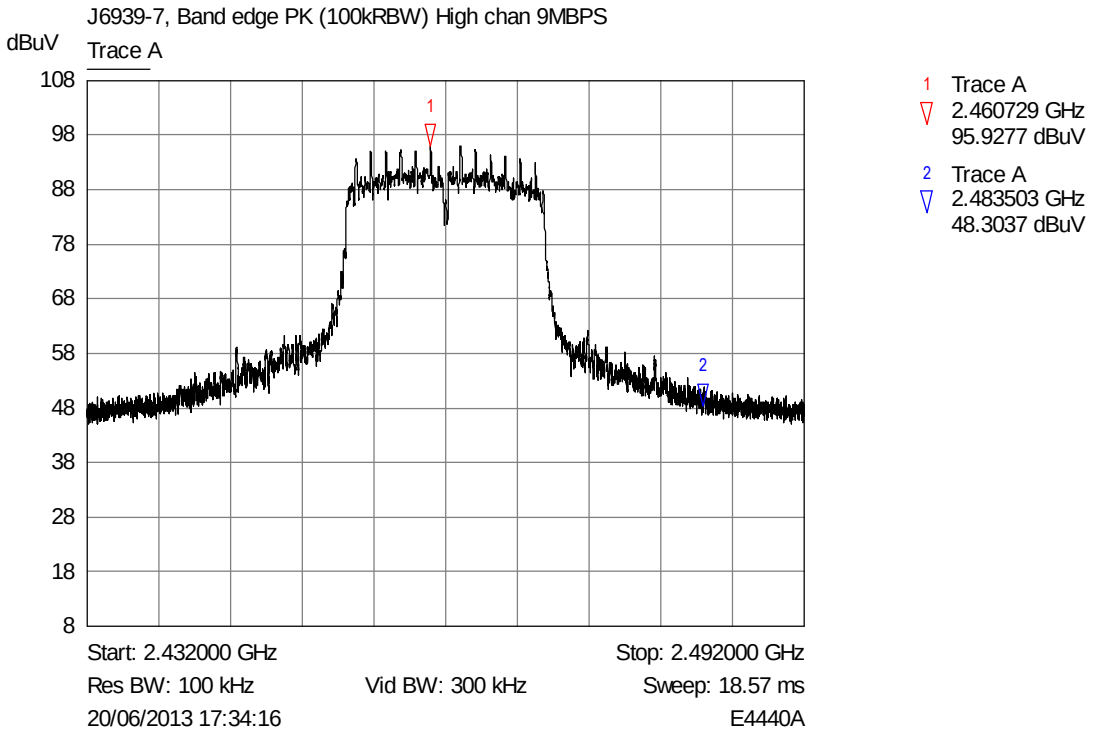

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

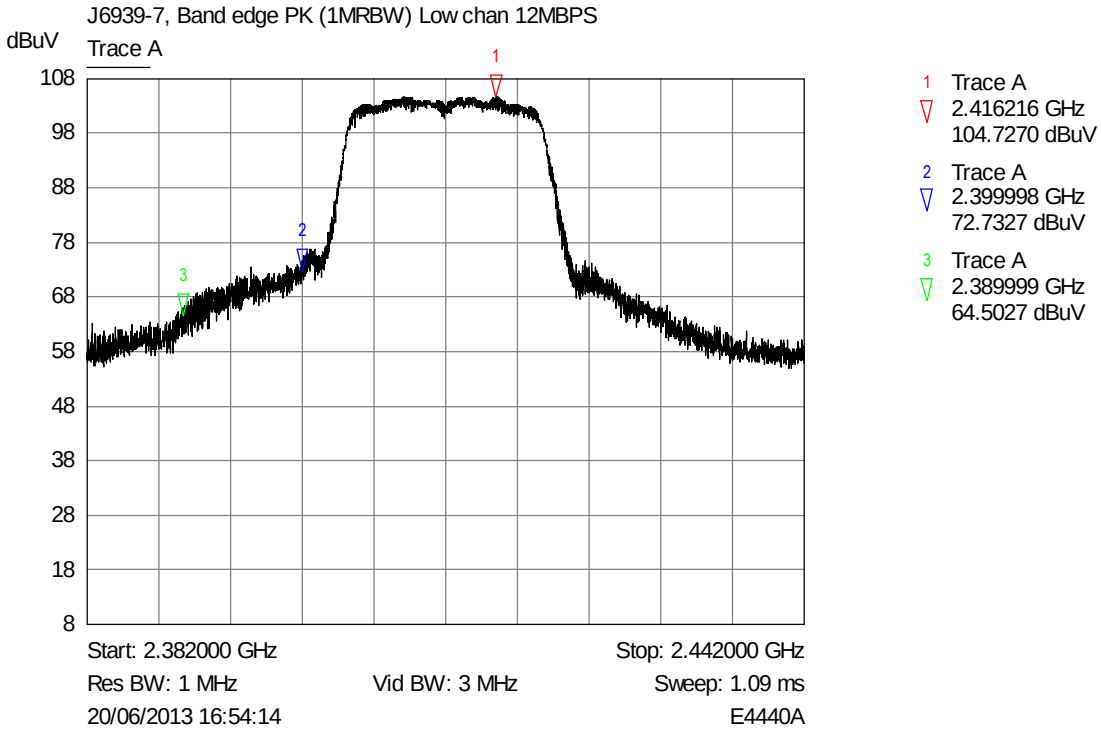



## Band Edge: Low channel

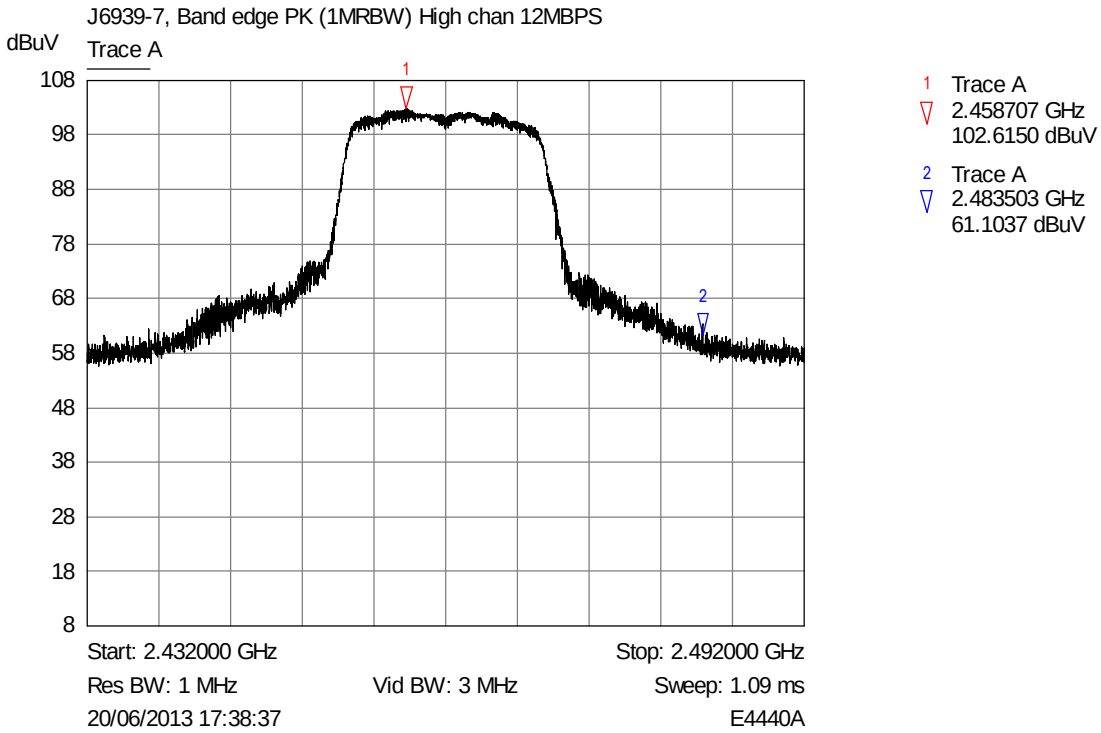



## Band Edge: High channel

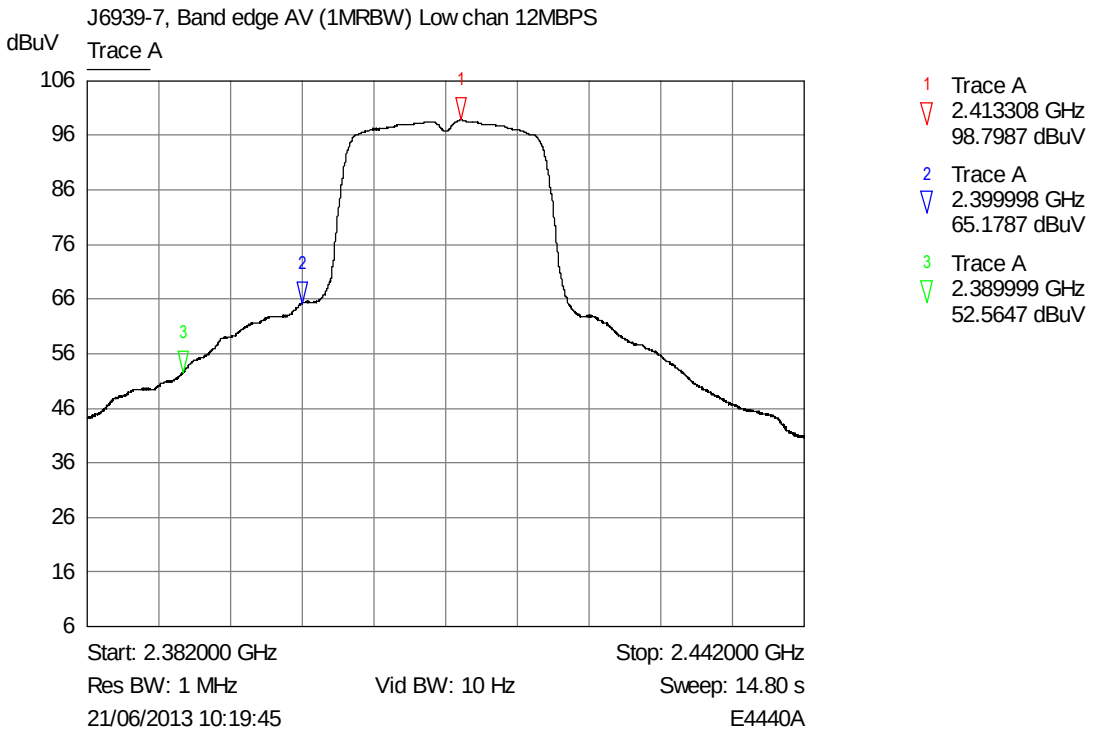
### 6.4.7 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 12 MBPS



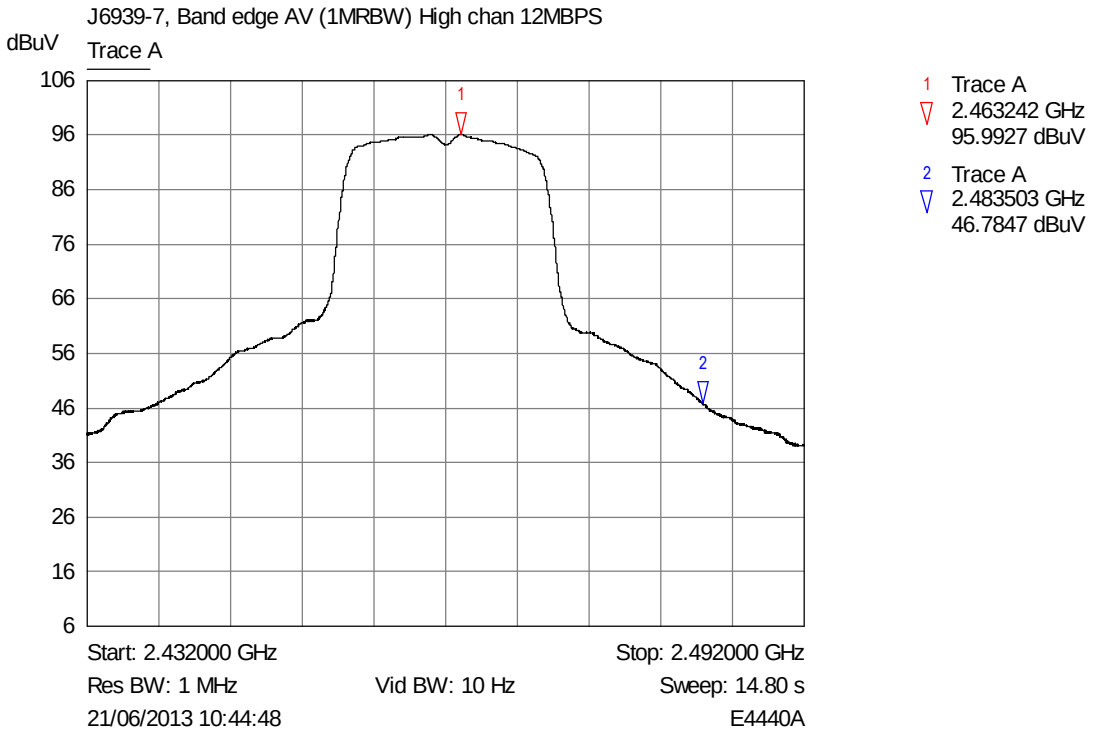

**Restricted Band: Low channel Peak plot**



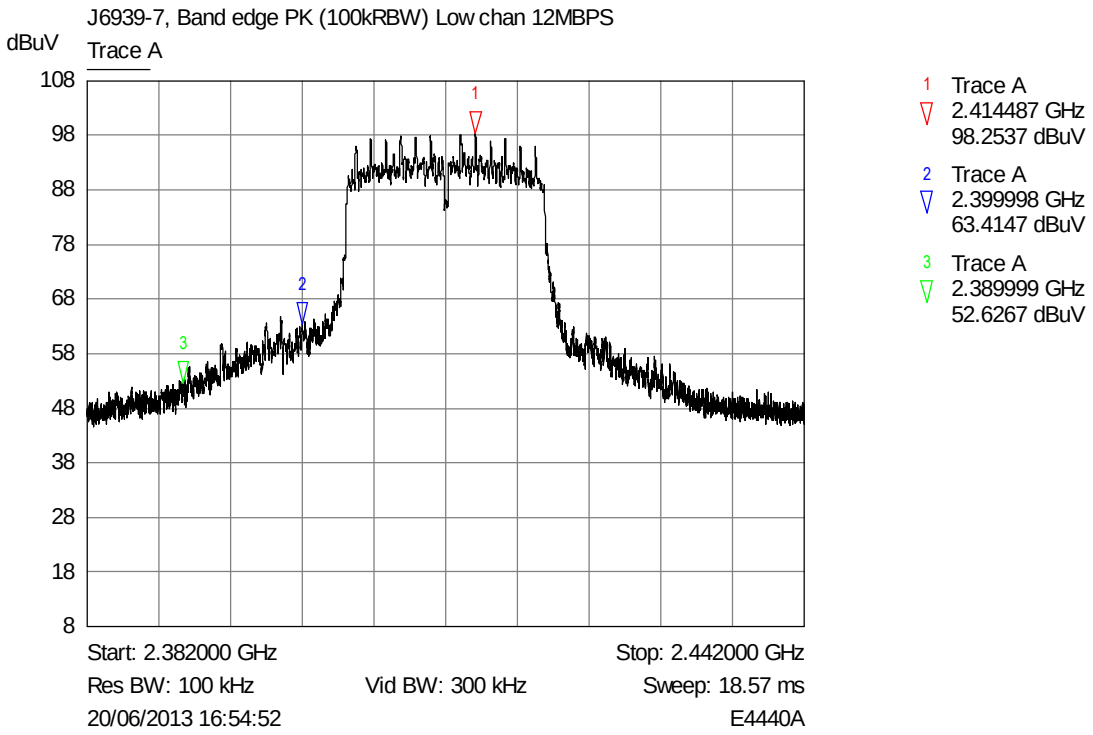

**Restricted Band: High channel Peak plot**



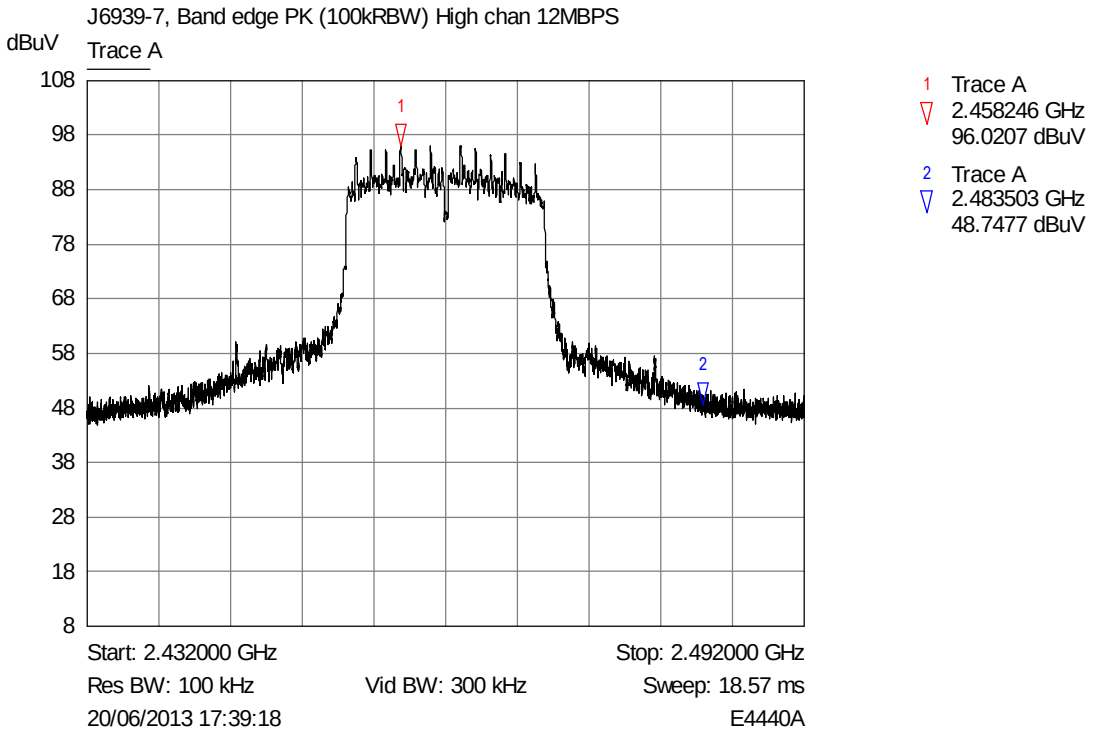

**Restricted Band: Low channel Average plot**




**Restricted Band: High channel Average plot**

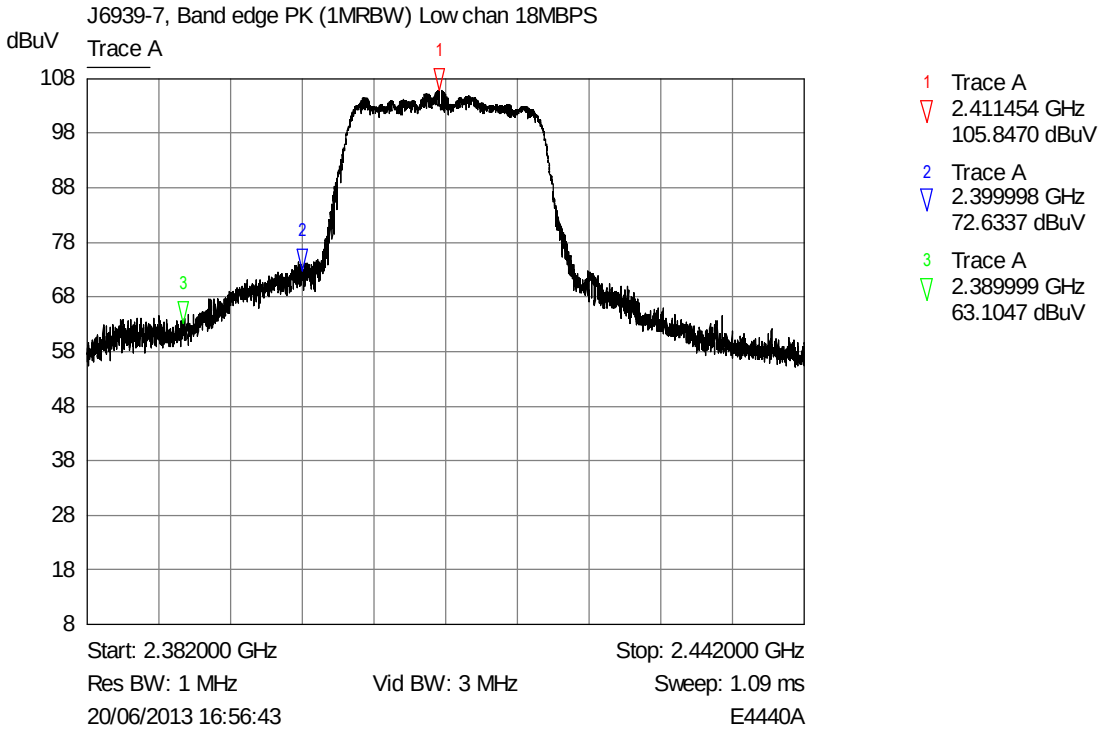



## Band Edge: Low channel

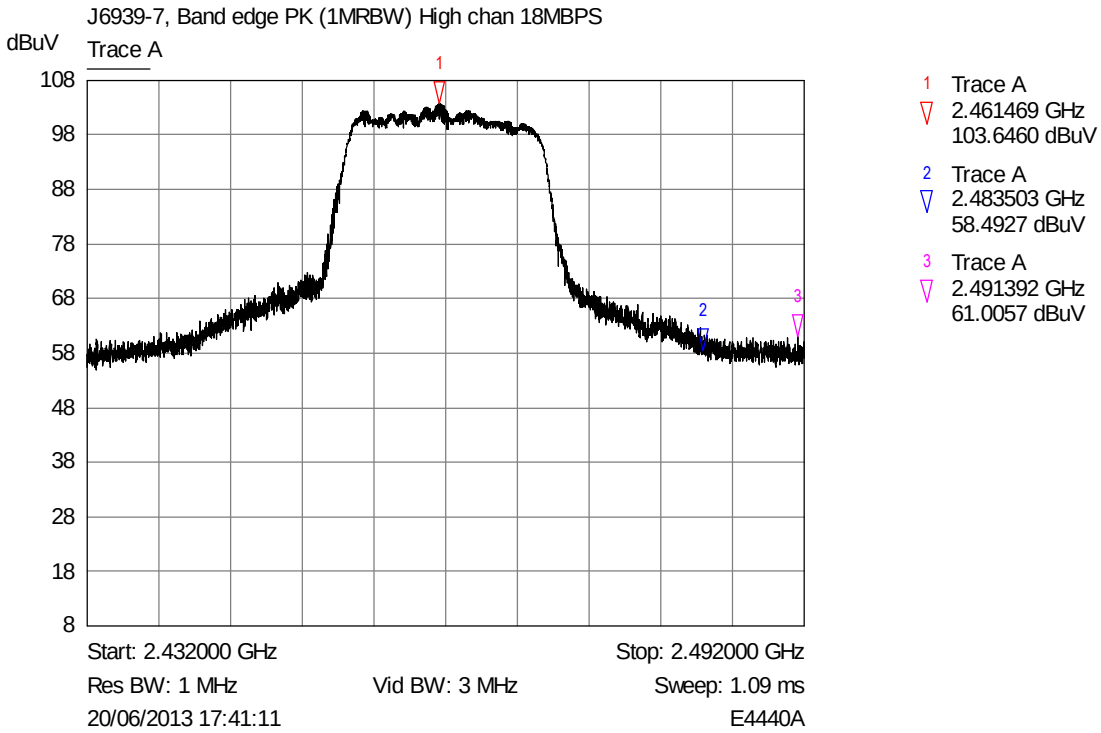



## Band Edge: High channel

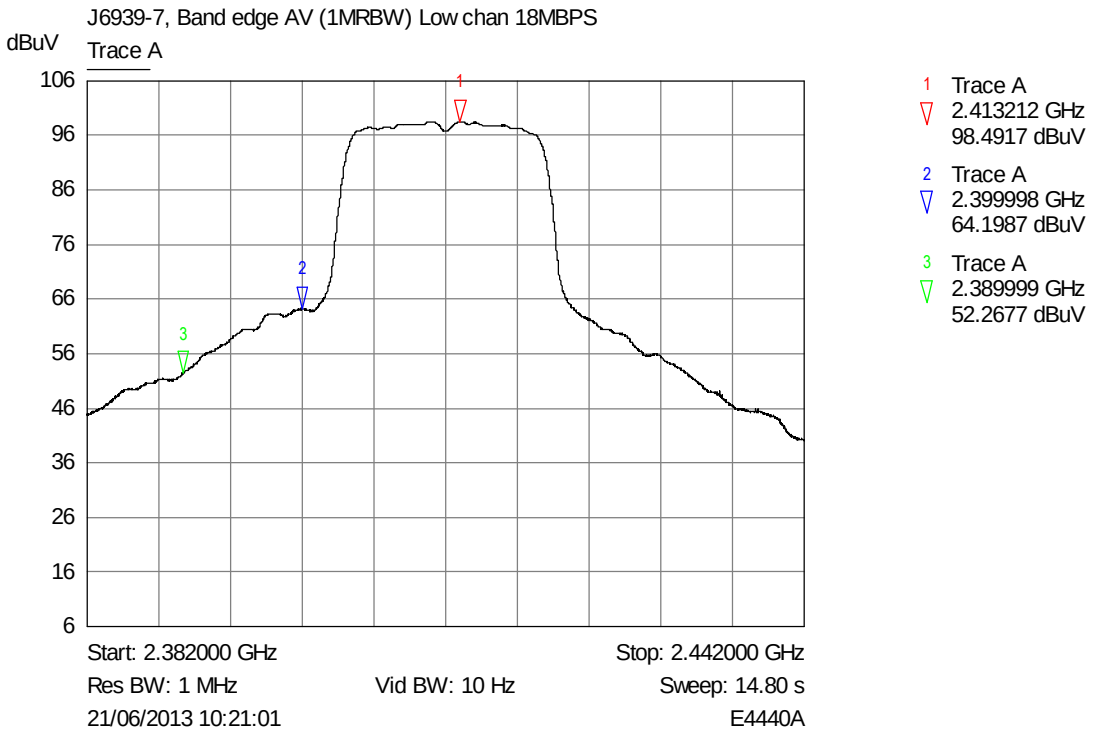
### 6.4.8 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 18 MBPS



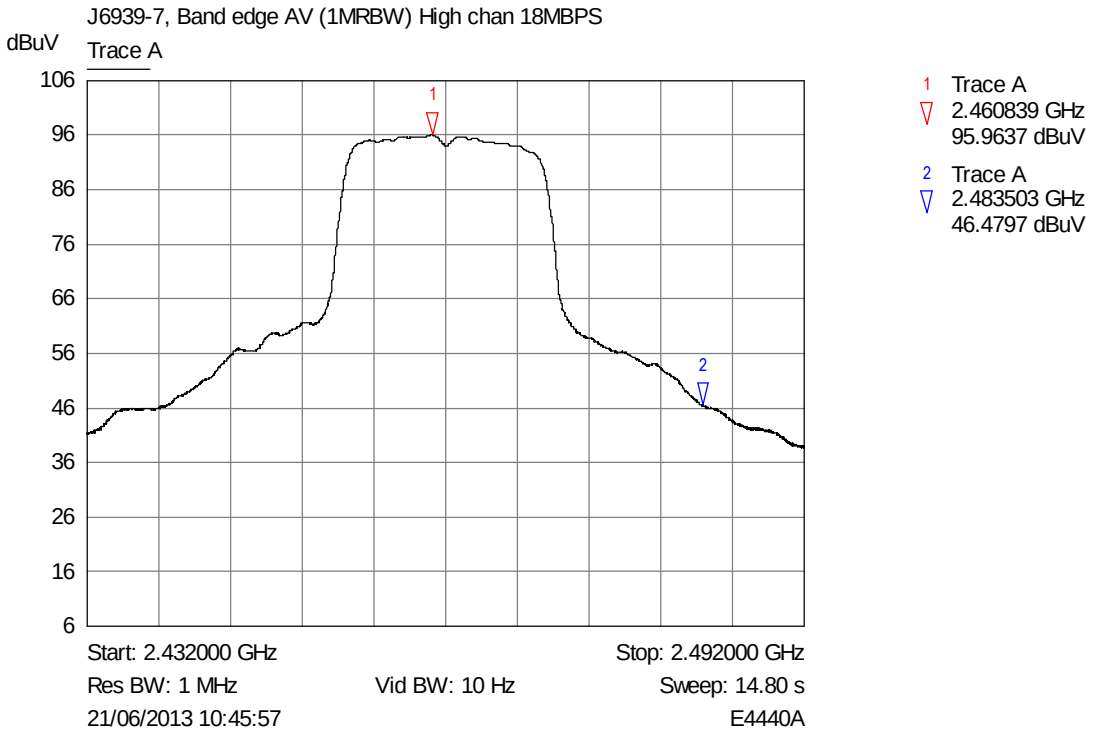

**Restricted Band: Low channel Peak plot**



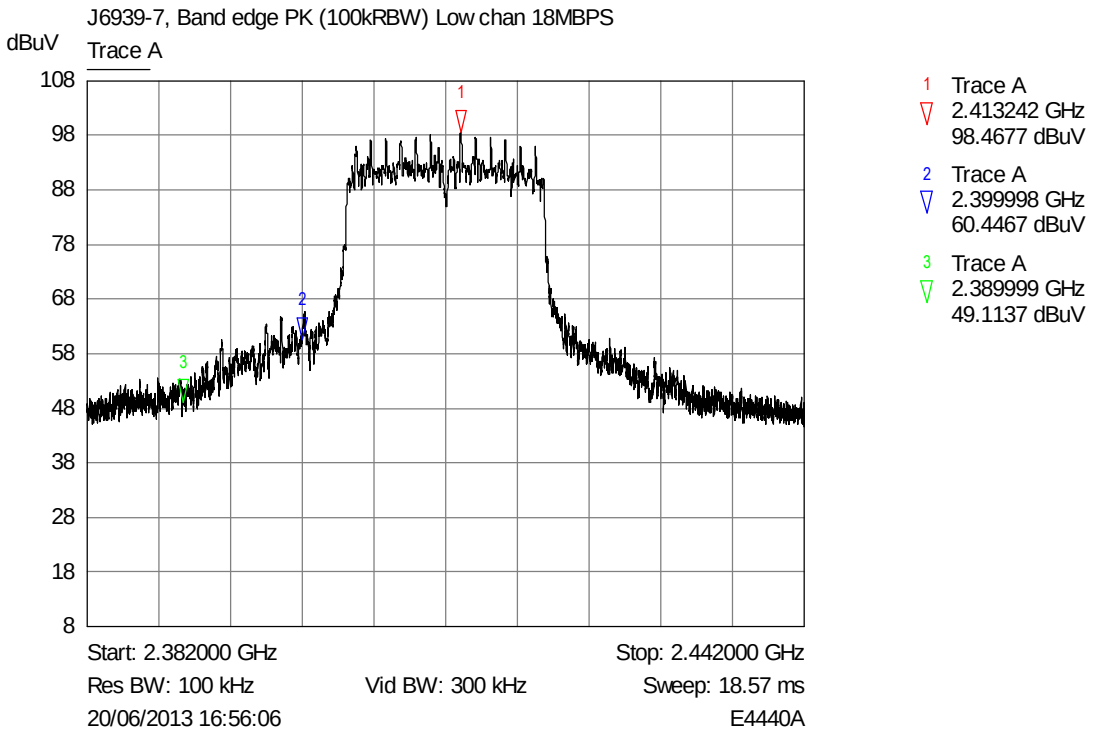

**Restricted Band: High channel Peak plot**



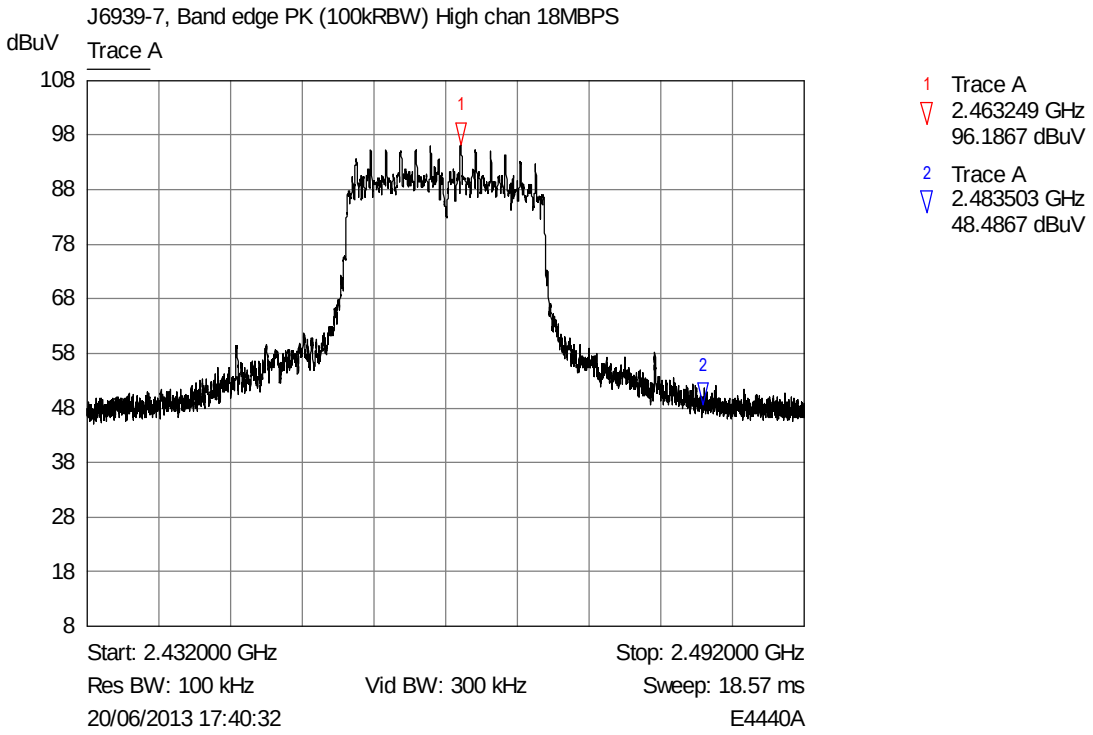

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

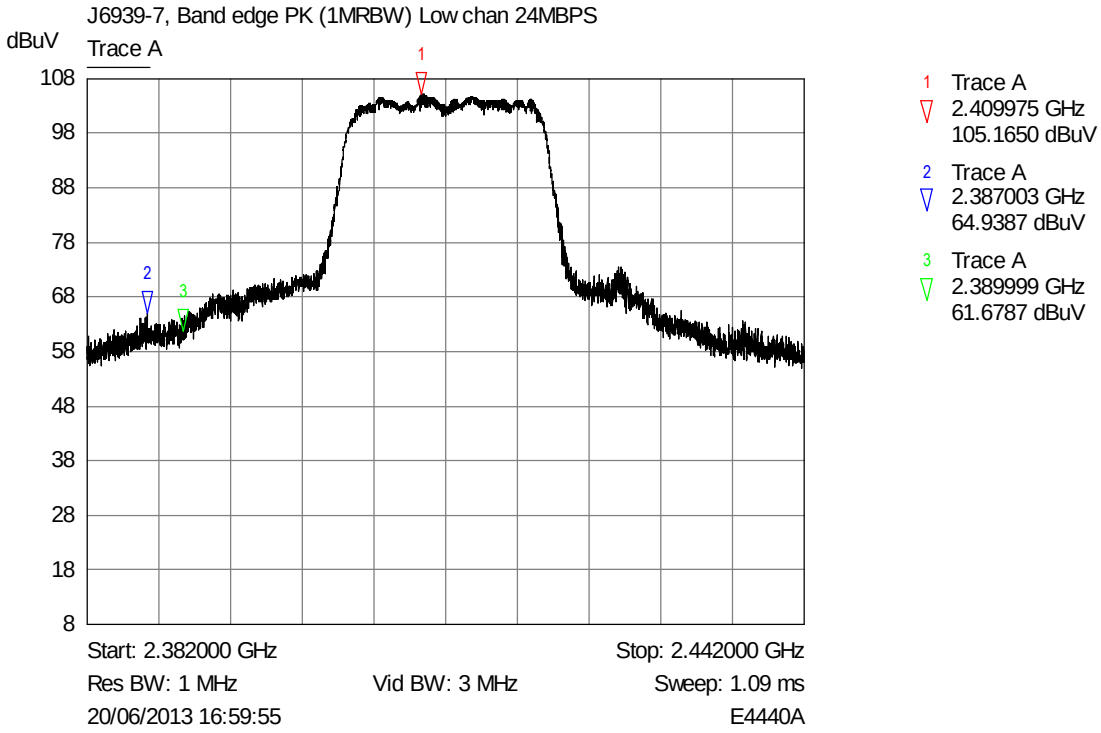



## Band Edge: Low channel

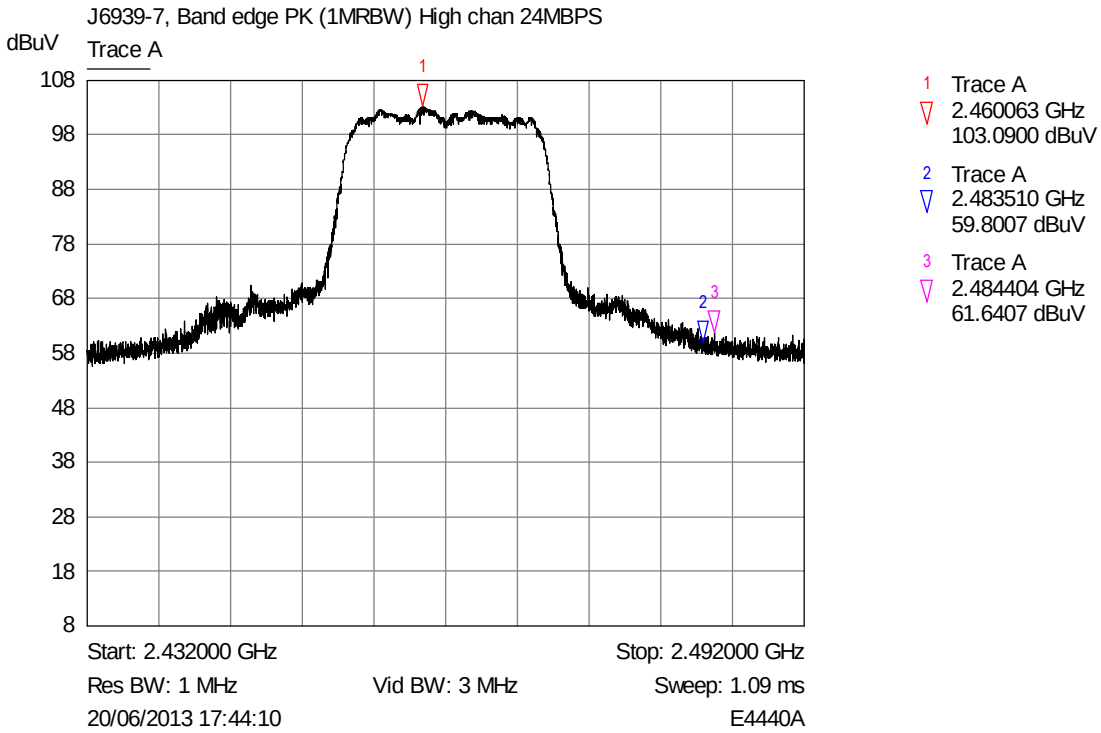



## Band Edge: High channel

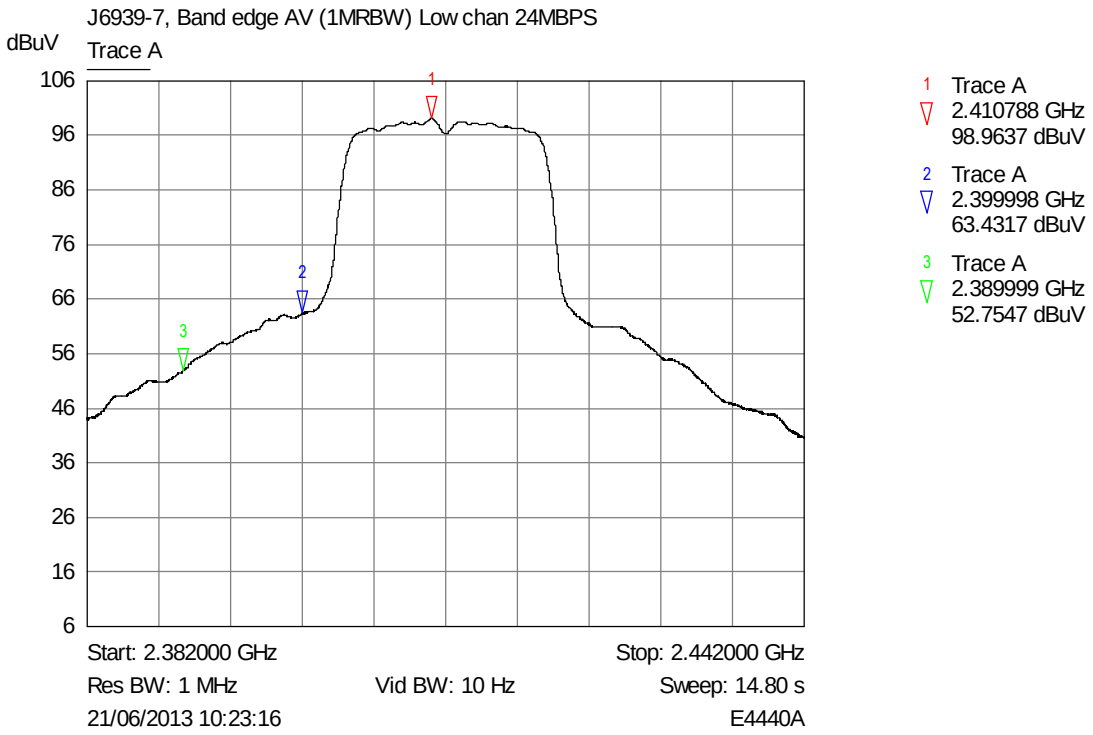
### 6.4.9 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 24 MBPS



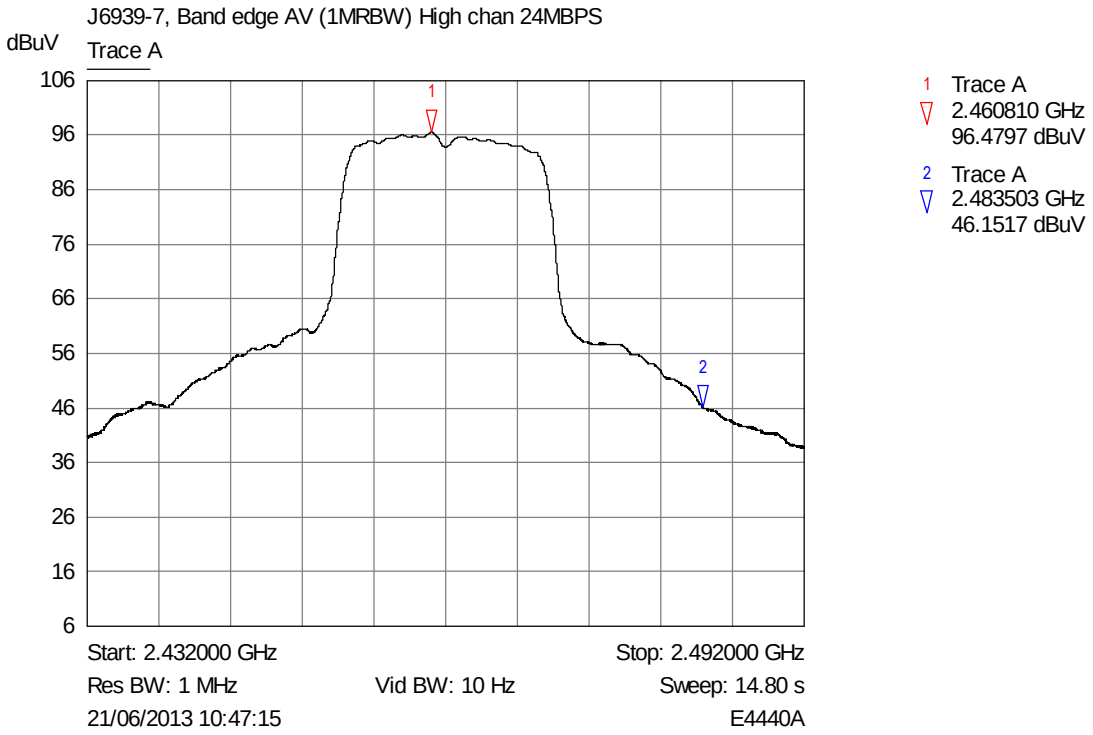

**Restricted Band: Low channel Peak plot**



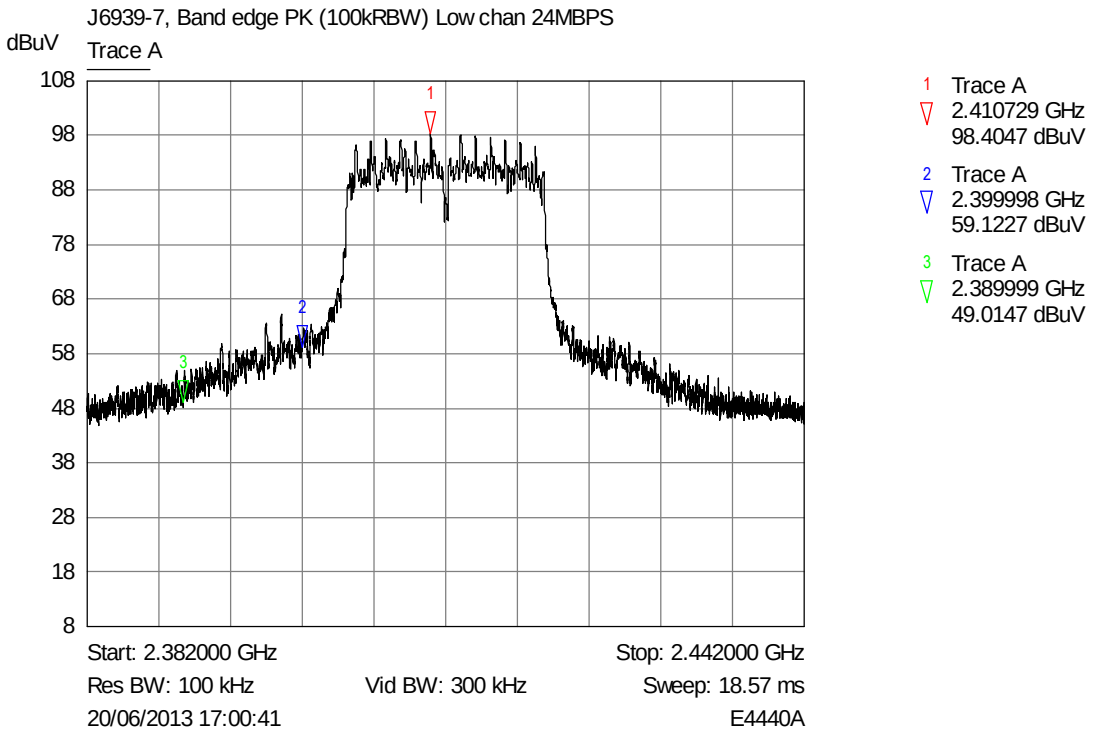

**Restricted Band: High channel Peak plot**



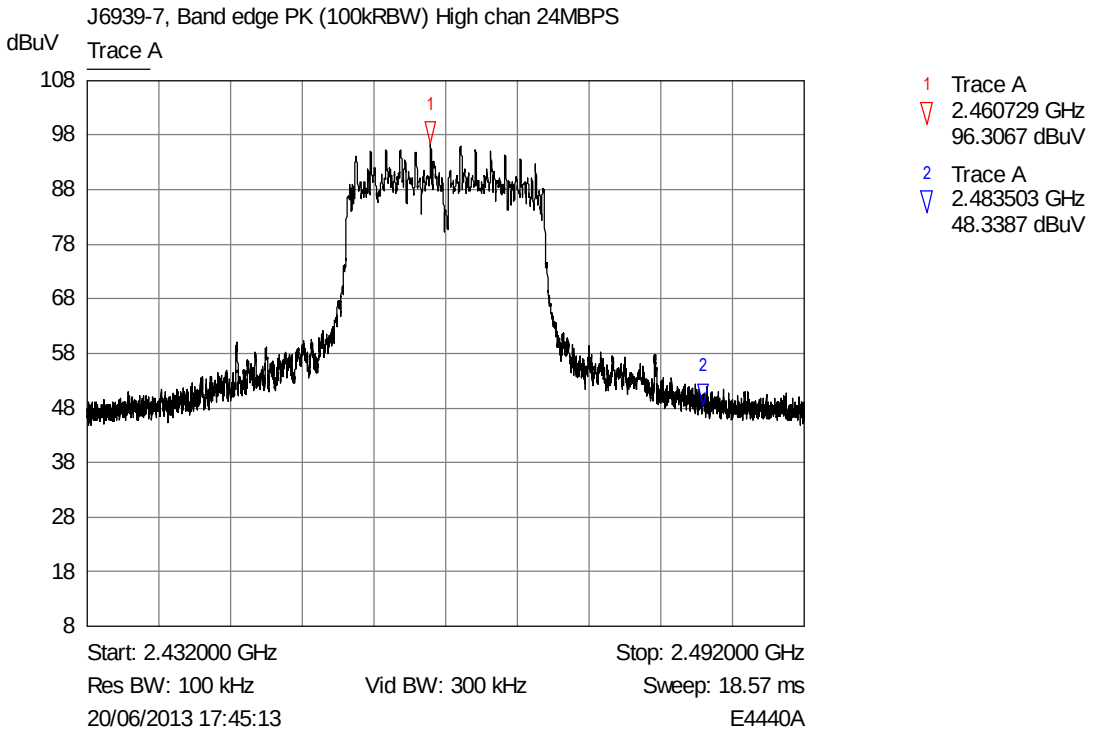

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

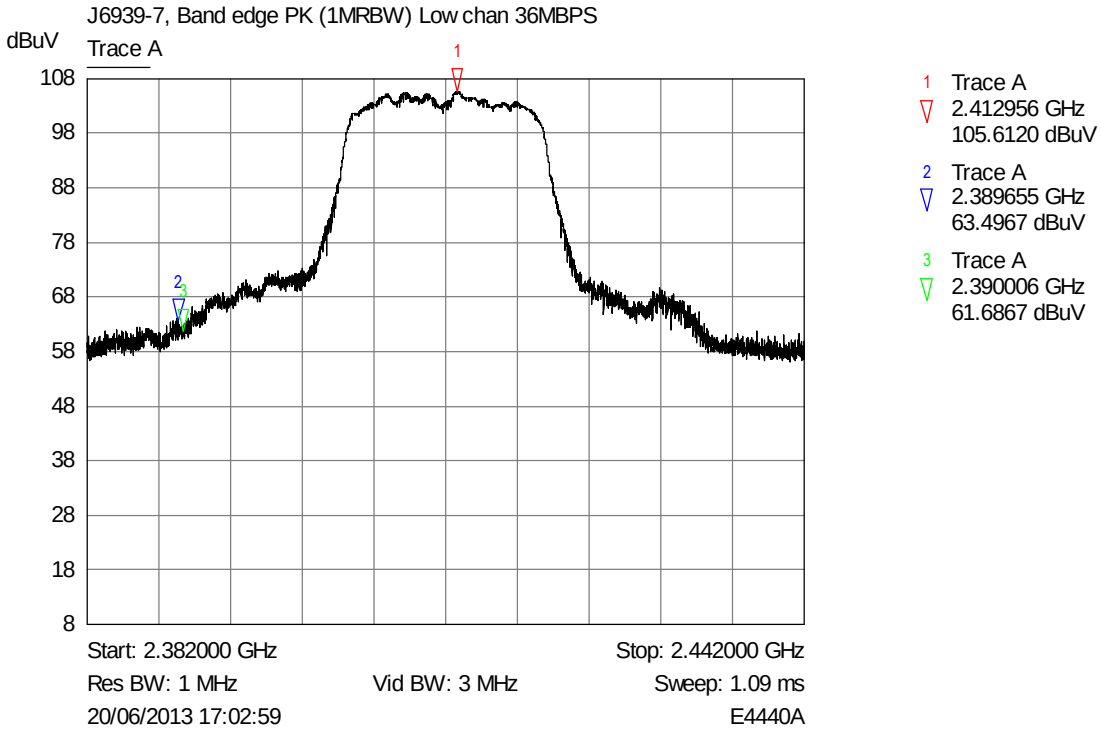



## Band Edge: Low channel

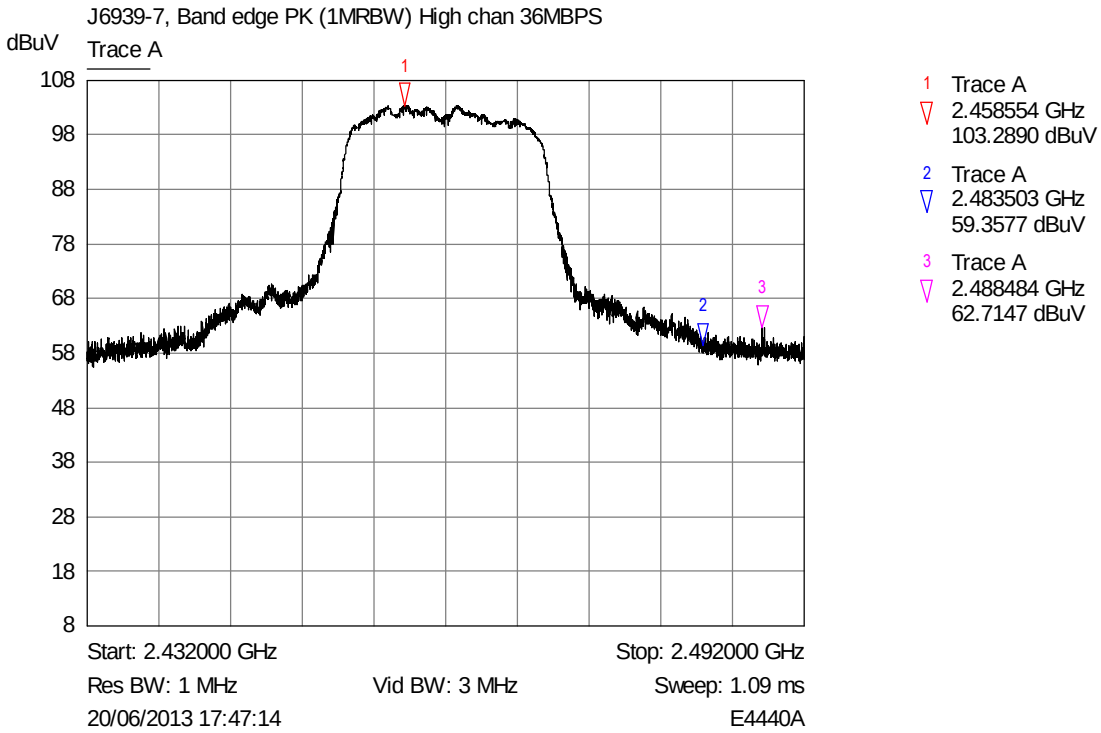



## Band Edge: High channel

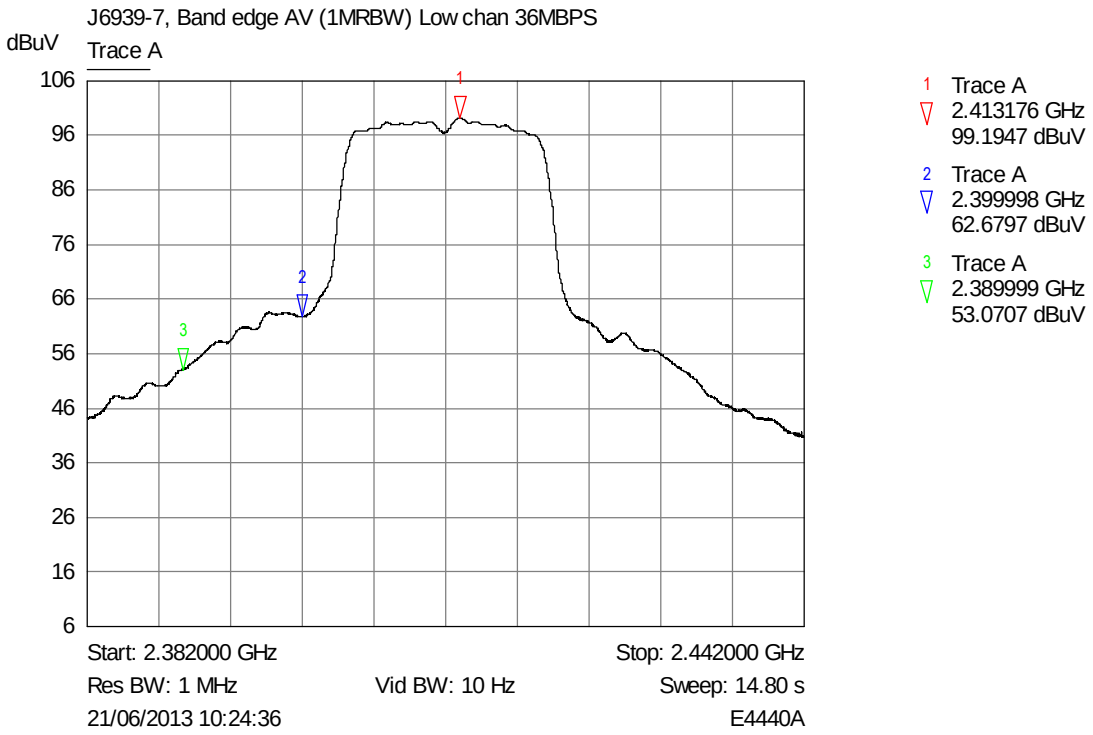
## 6.4.10 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 36 MBPS



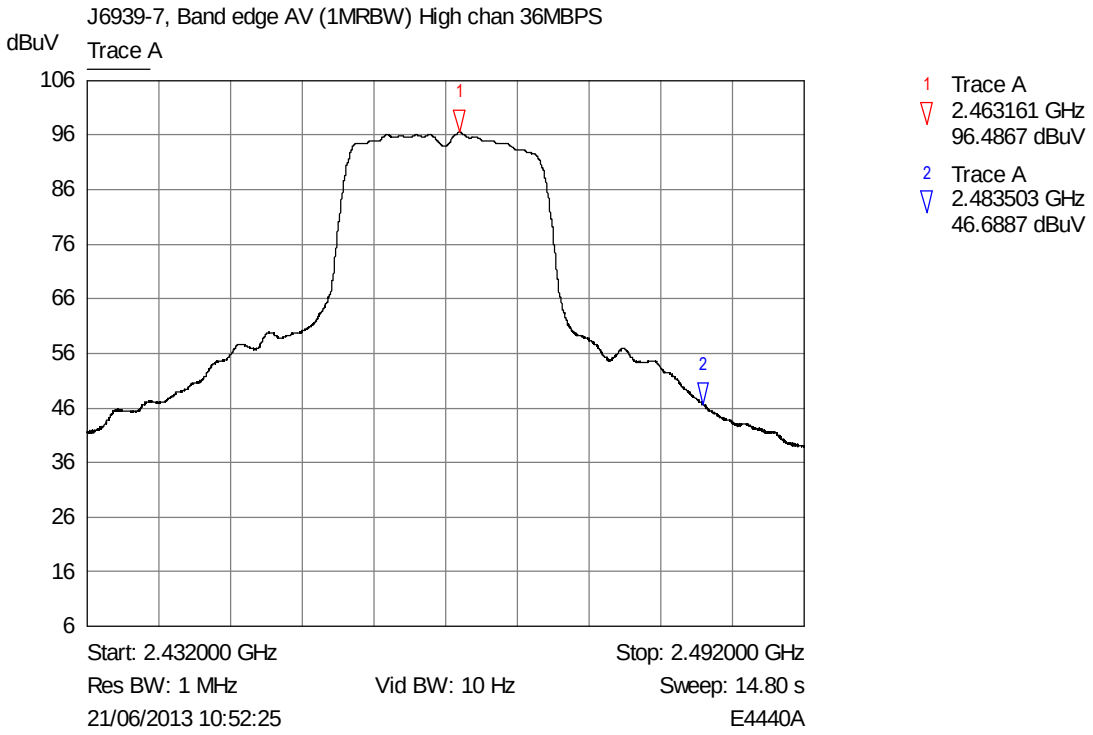

**Restricted Band: Low channel Peak plot**



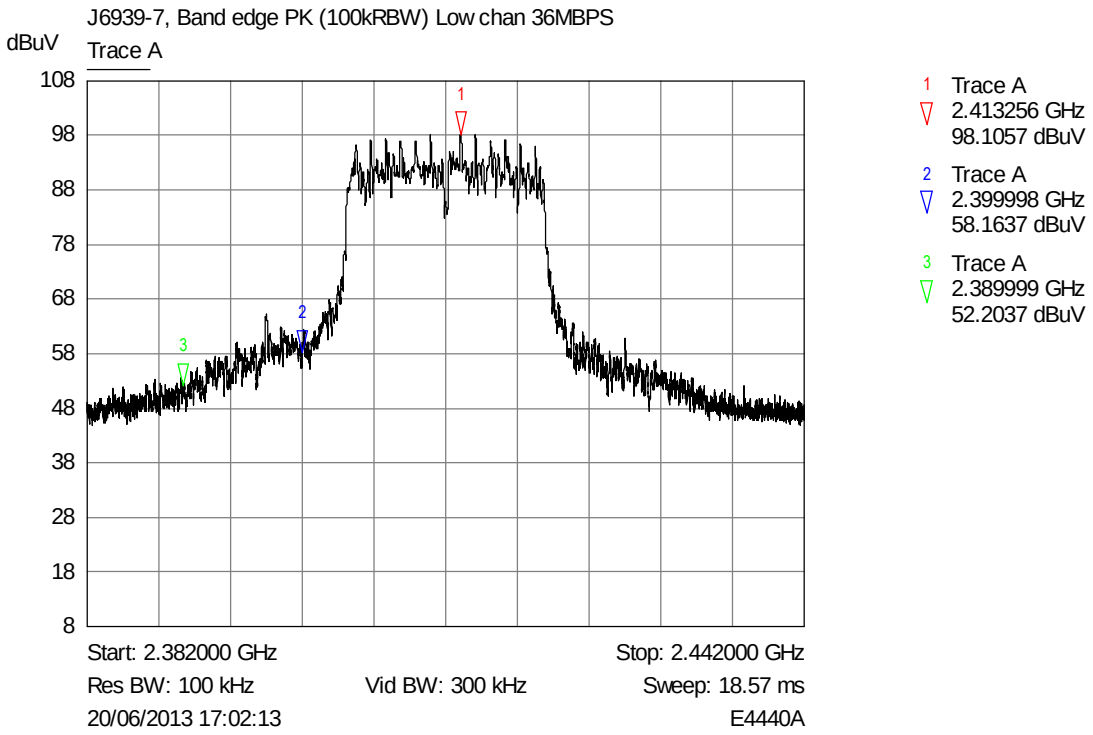

**Restricted Band: High channel Peak plot**



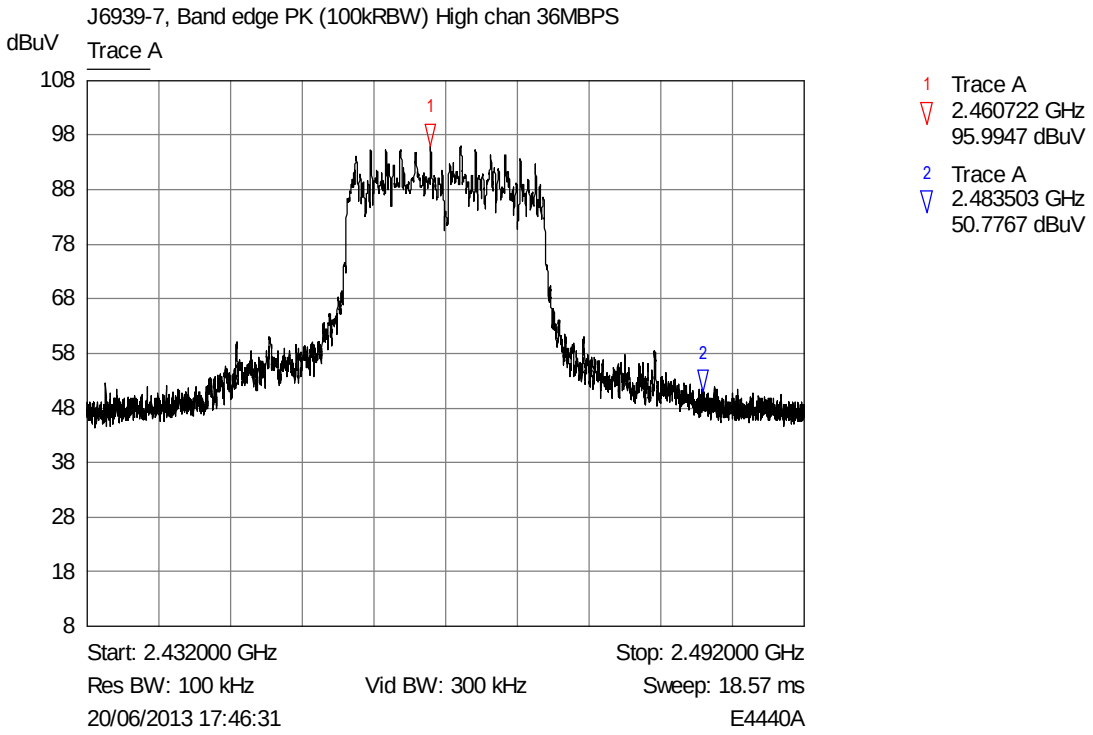

**Restricted Band: Low channel Average plot**




**Restricted Band: High channel Average plot**

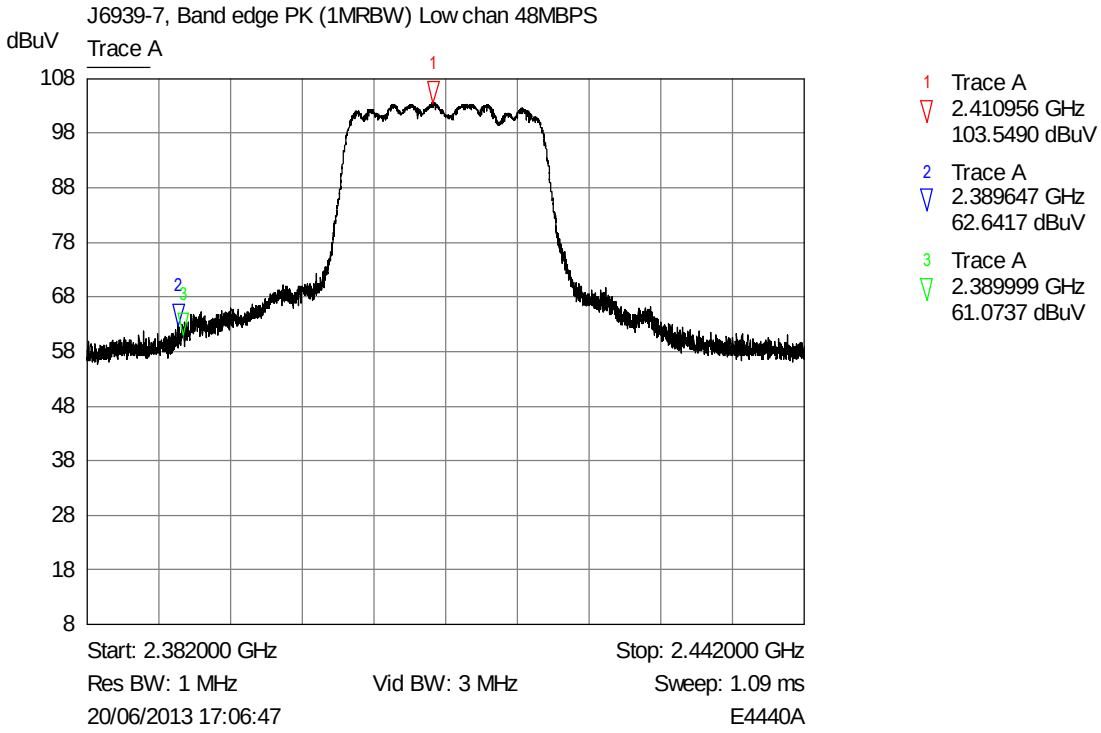



## Band Edge: Low channel

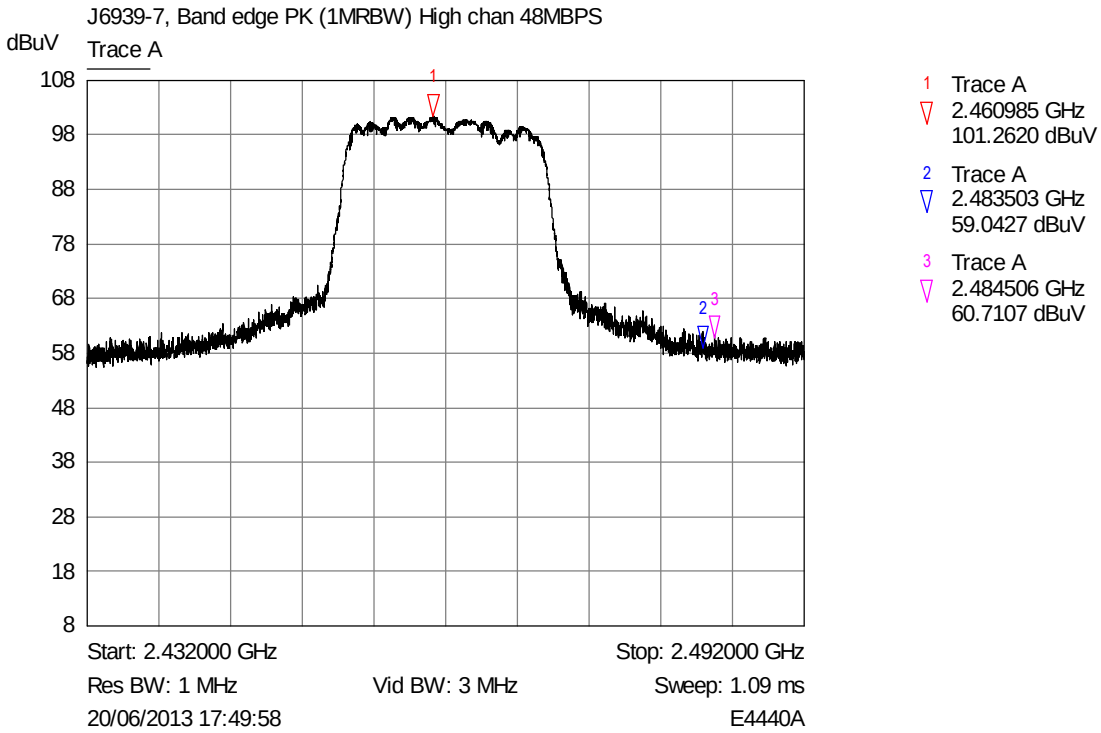



## Band Edge: High channel

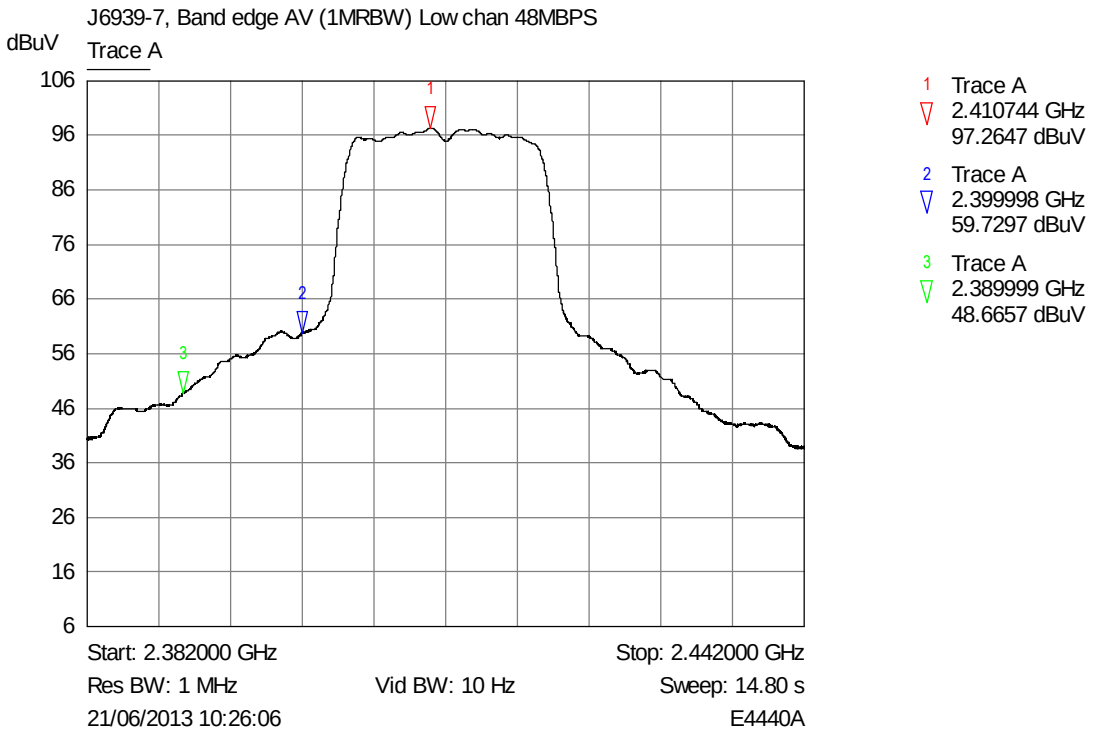
### 6.4.11 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 48 MBPS



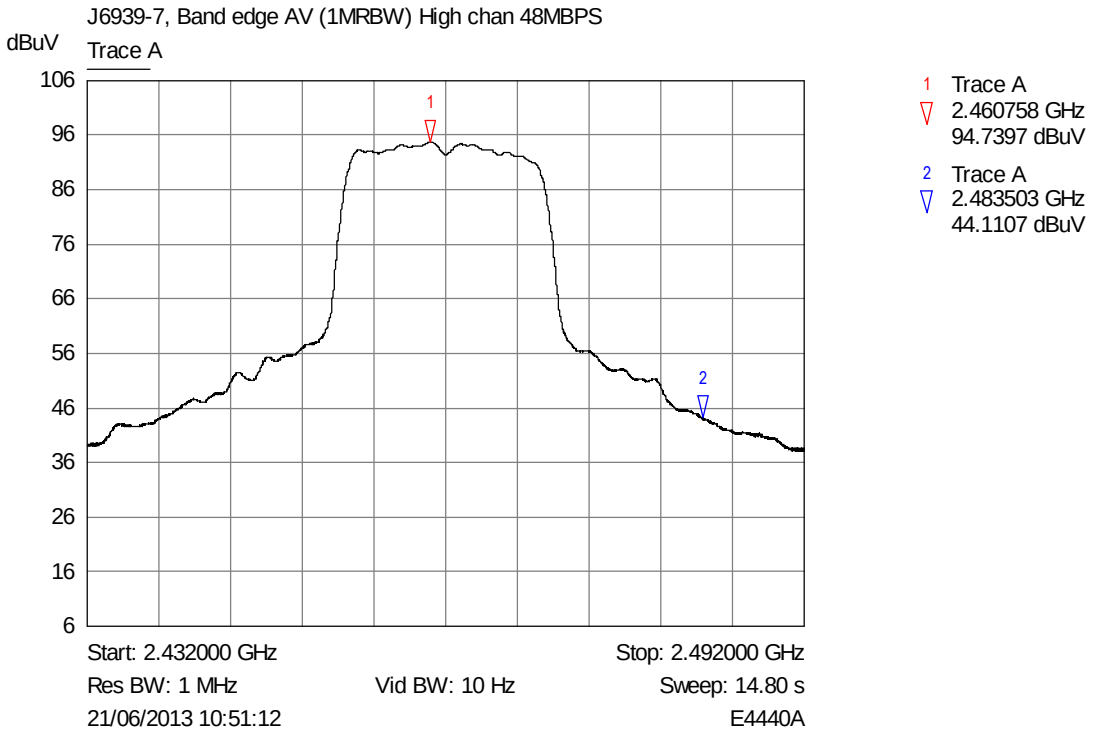

**Restricted Band: Low channel Peak plot**



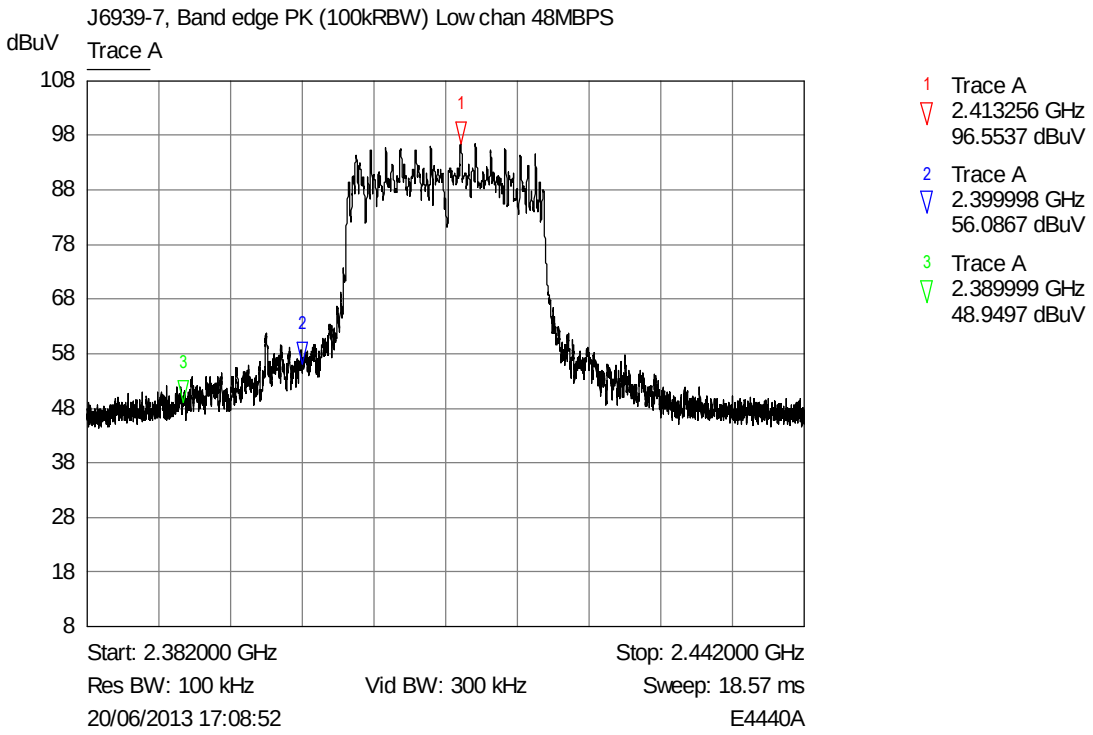

**Restricted Band: High channel Peak plot**



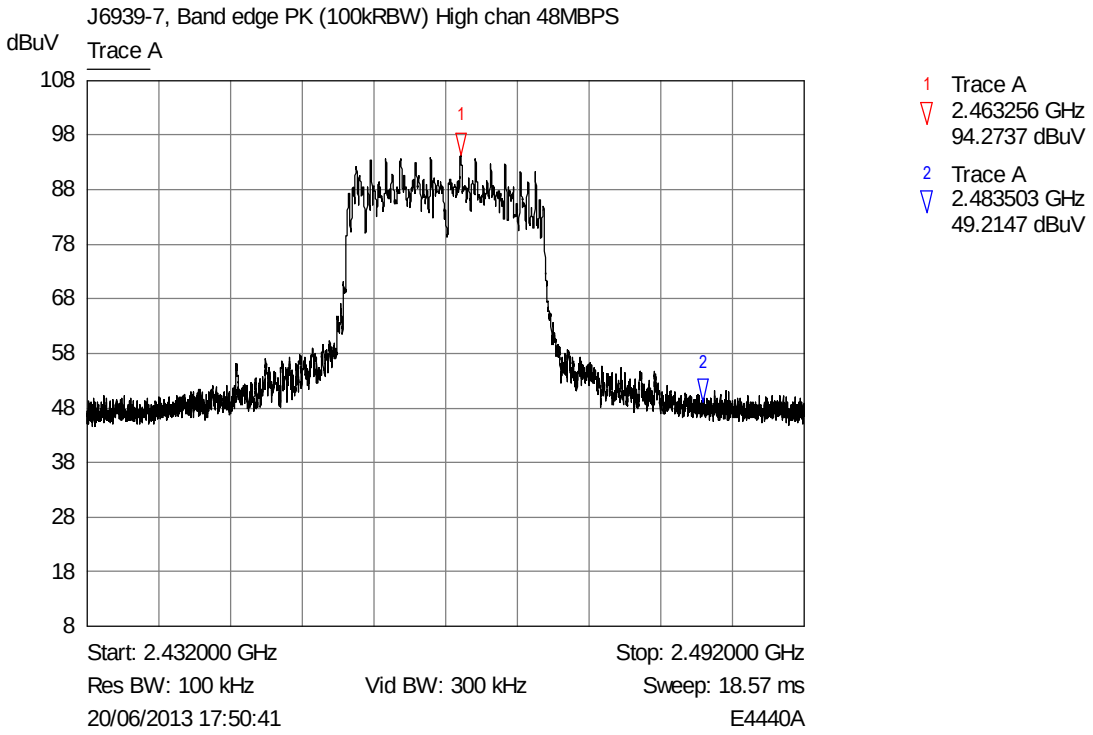

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot

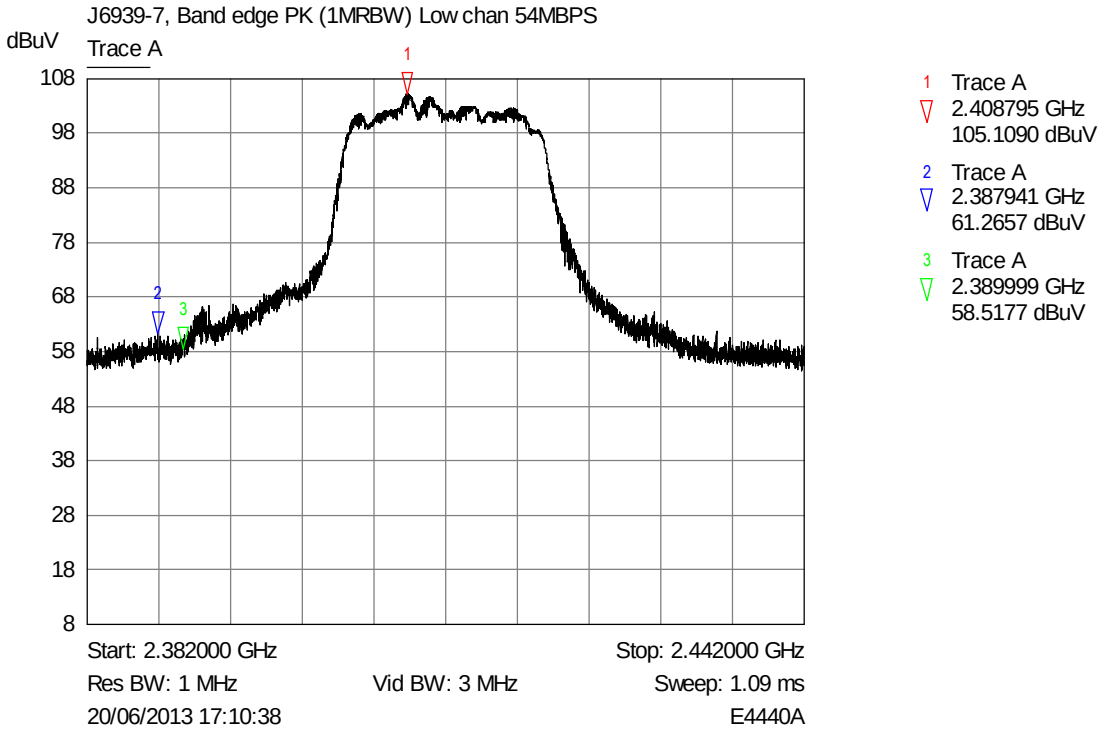



## Band Edge: Low channel

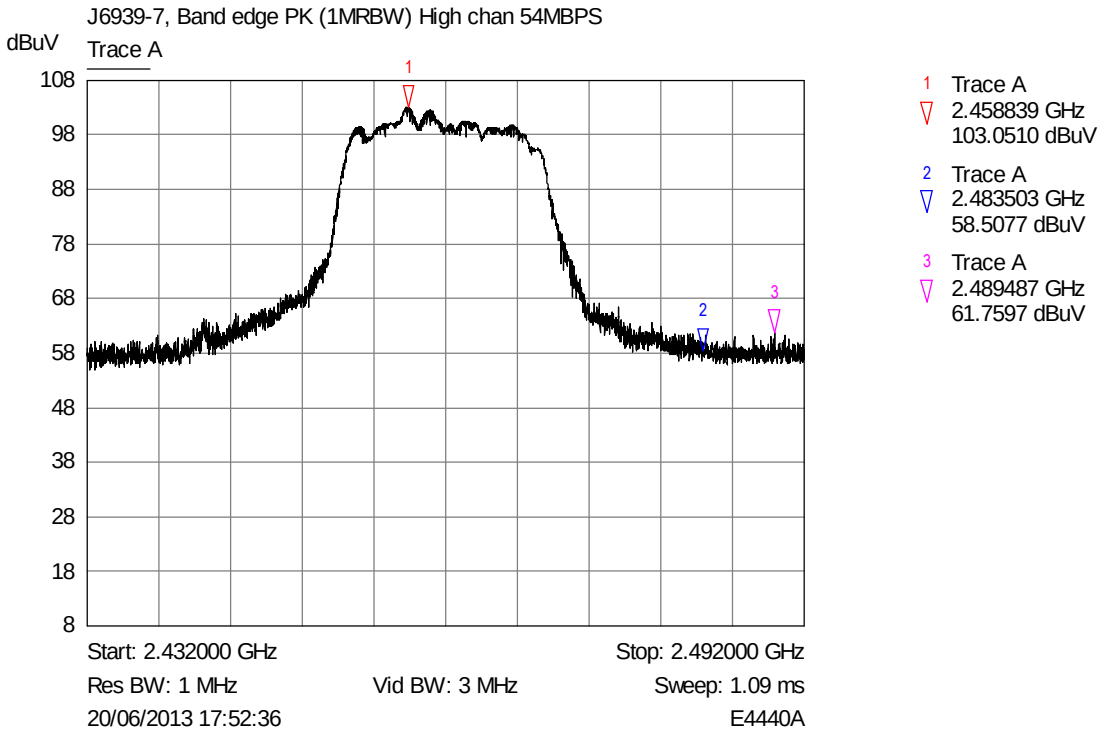



## Band Edge: High channel

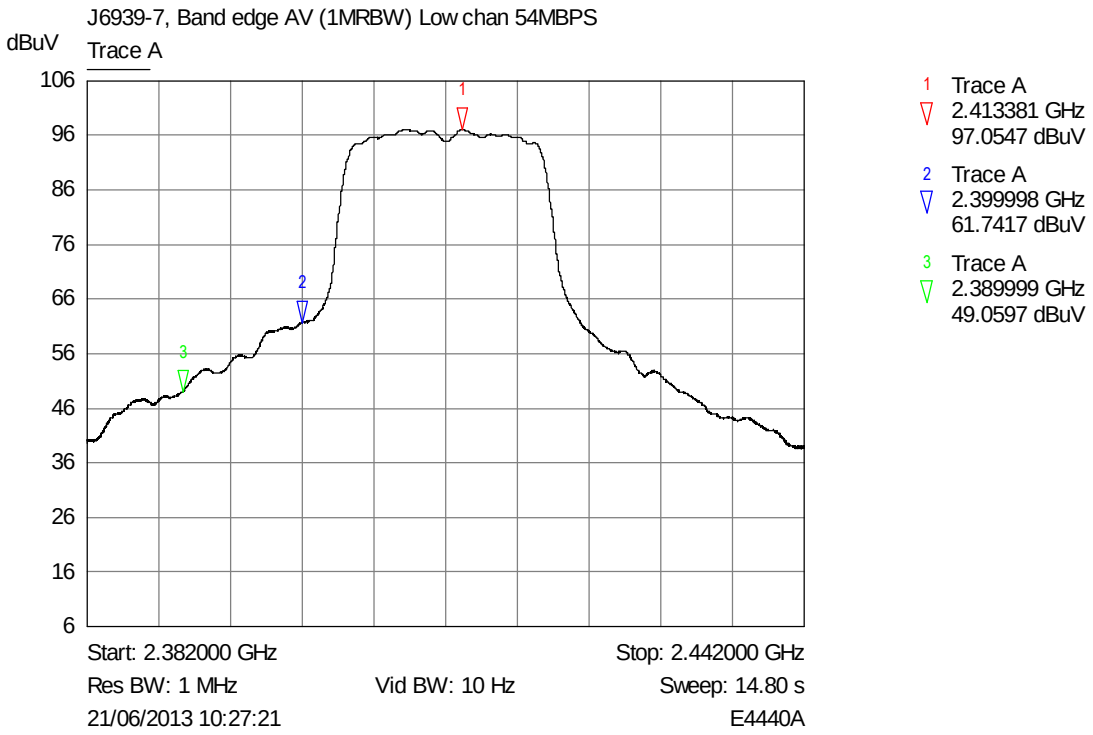
## 6.4.12 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 54 MBPS



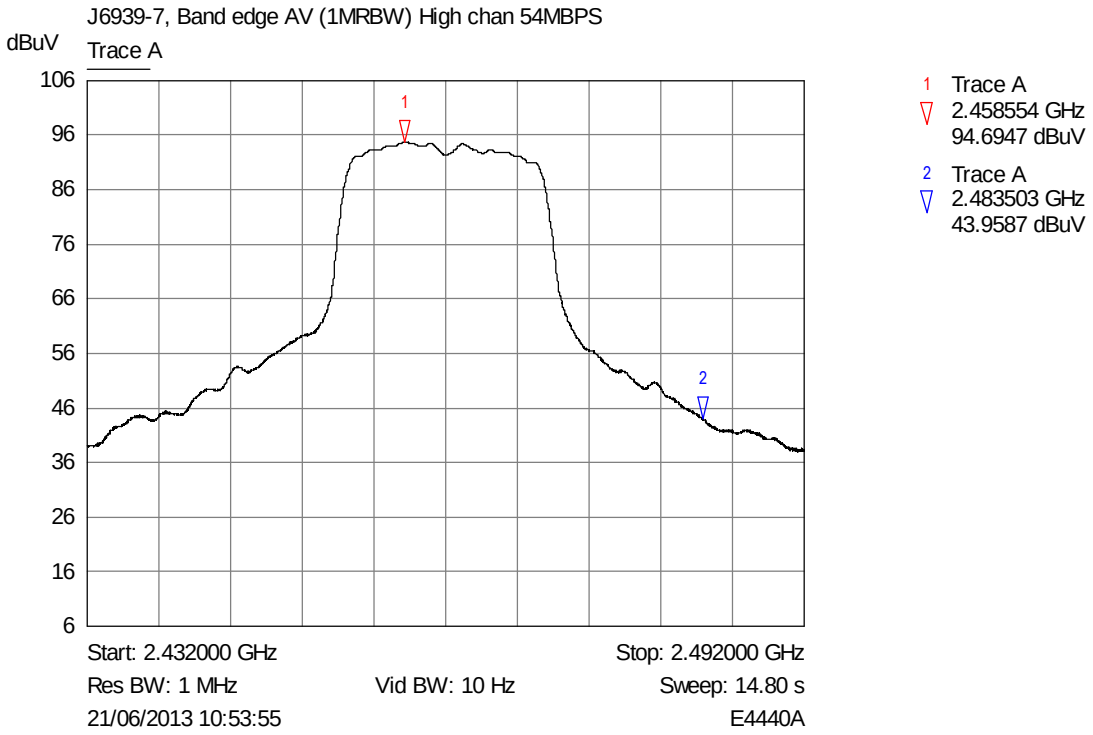

**Restricted Band: Low channel Peak plot**



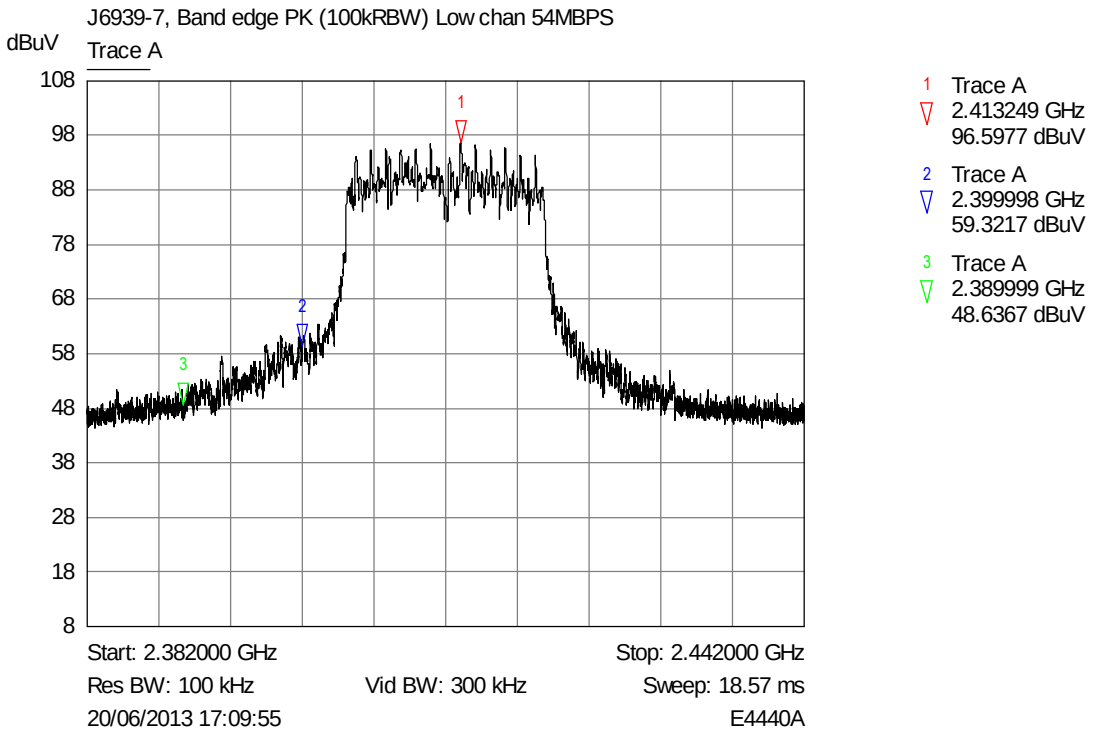

**Restricted Band: High channel Peak plot**



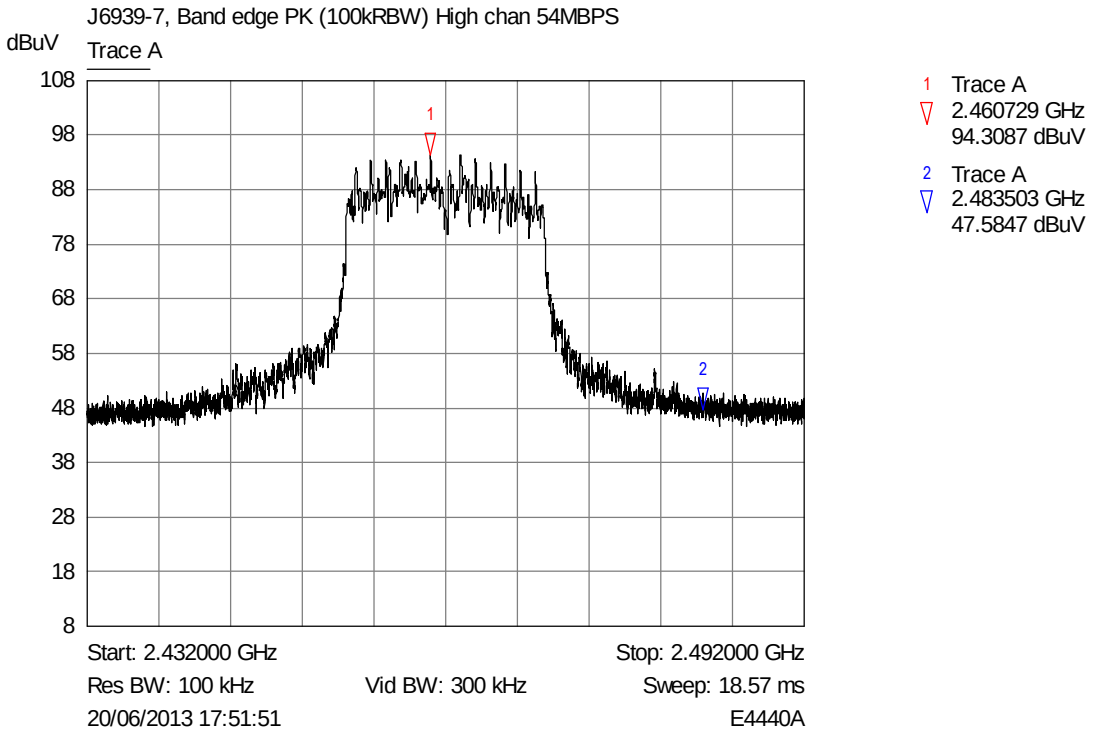

## Restricted Band: Low channel Average plot




## Restricted Band: High channel Average plot



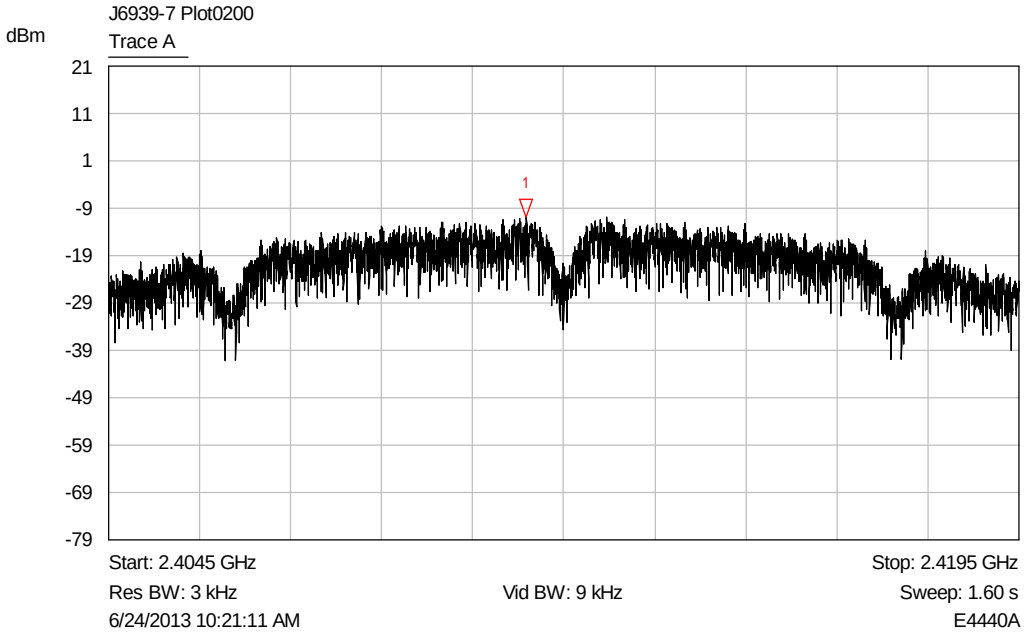

## Band Edge: Low channel




## Band Edge: High channel

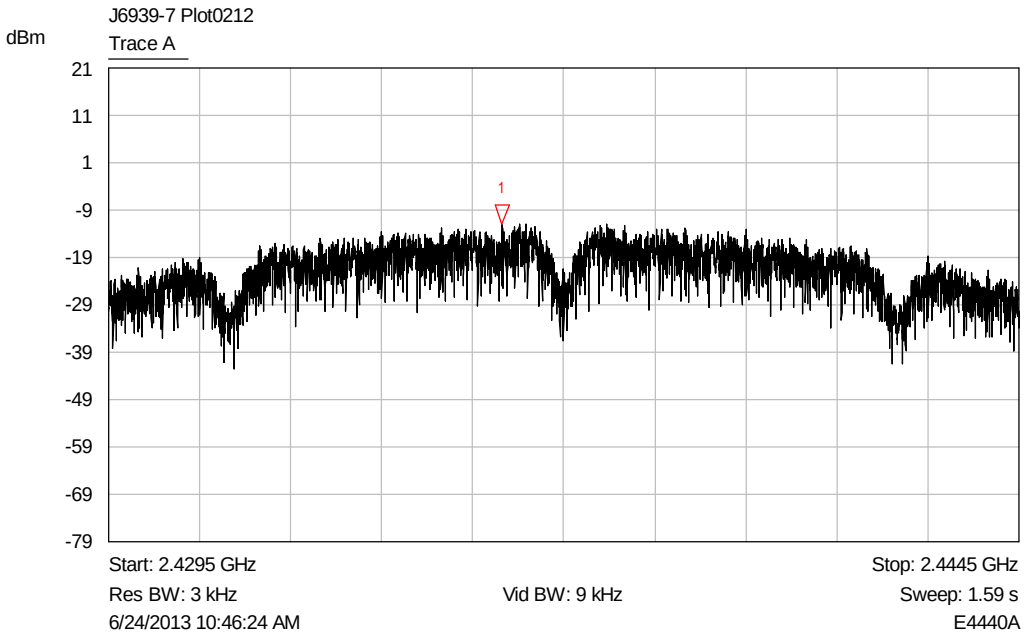
# 6.5 Power spectral density plots

## 6.5.1 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 1 MBPS



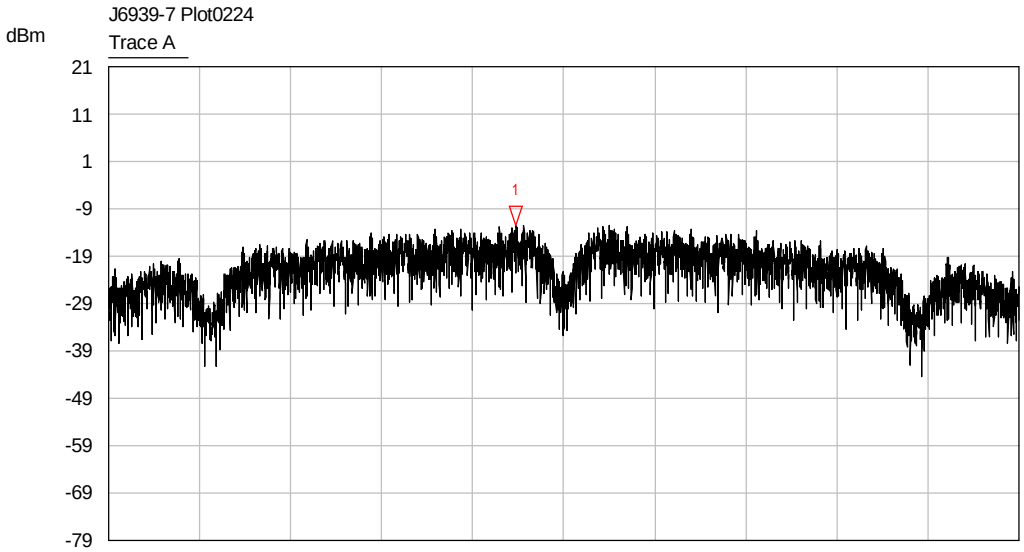

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4114 GHz | -11.03 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4360 GHz | -11.91 dBm | |

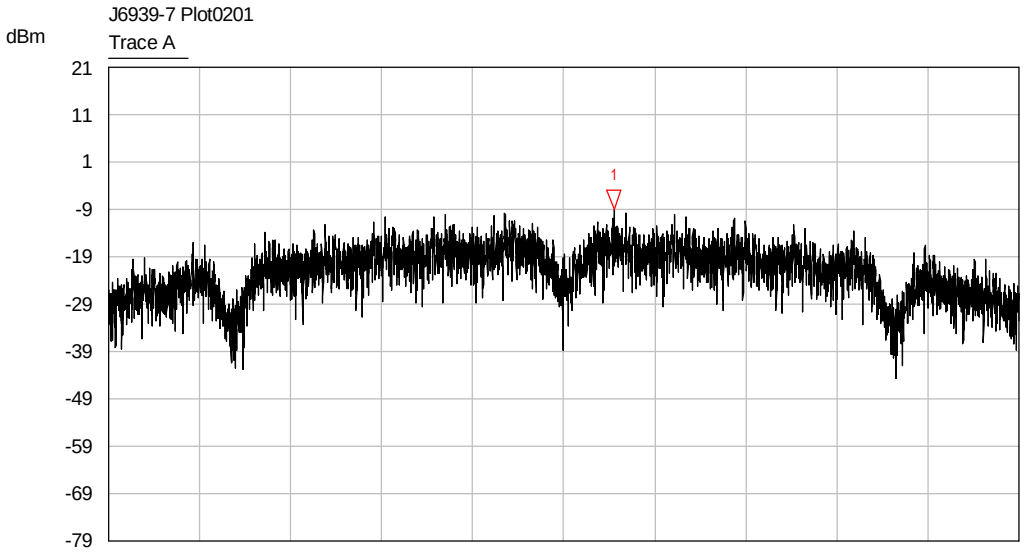
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4613 GHz | -12.50 dBm | |

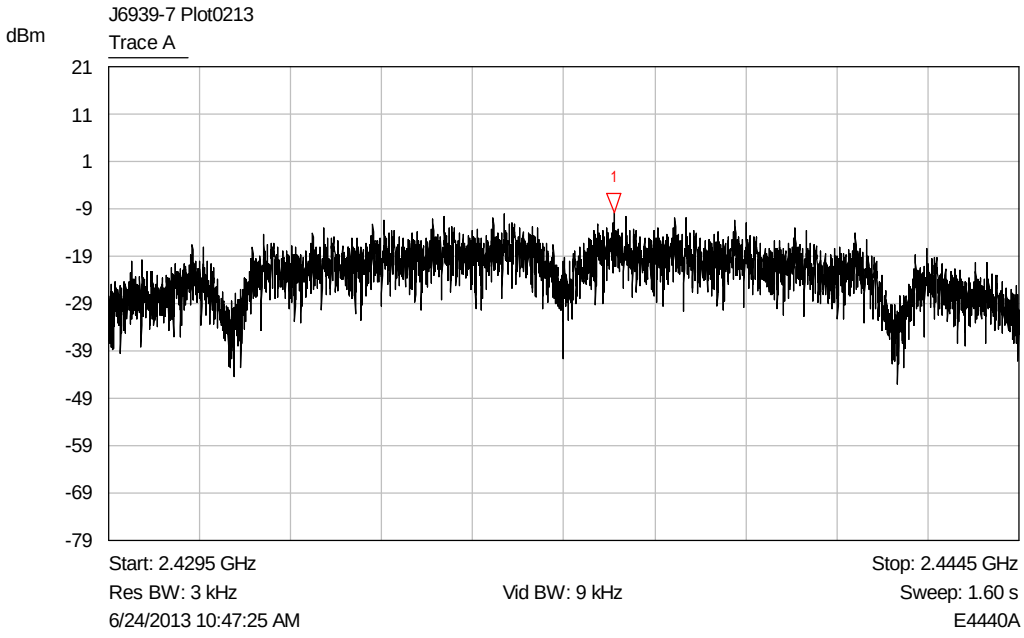
## High channel

### 6.5.2 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 2 MBPS



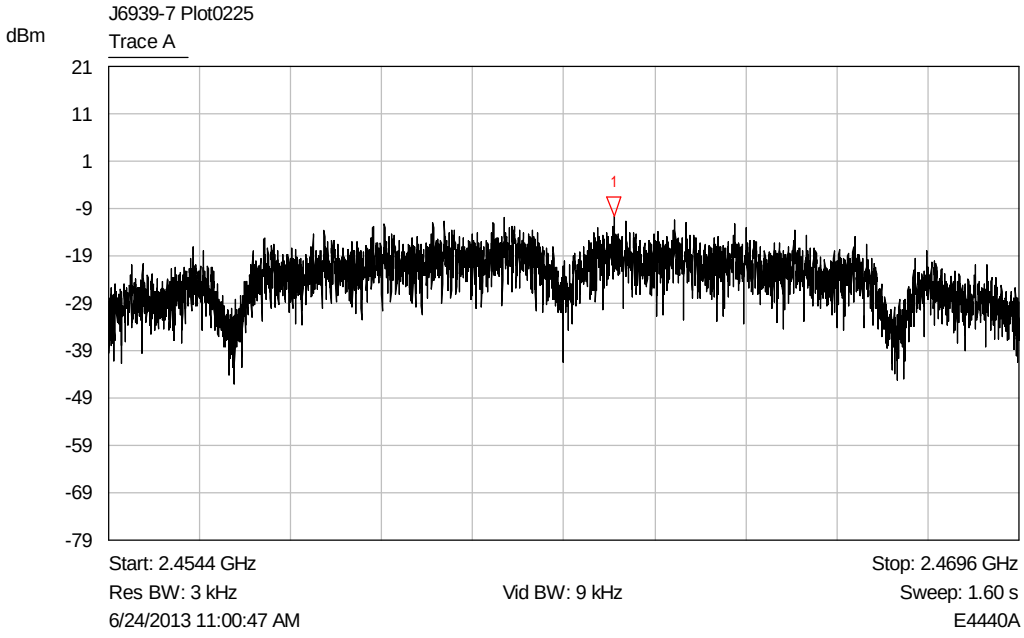

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4128 GHz | -8.95 dBm | |

## Low channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4378 GHz | -9.74 dBm | |

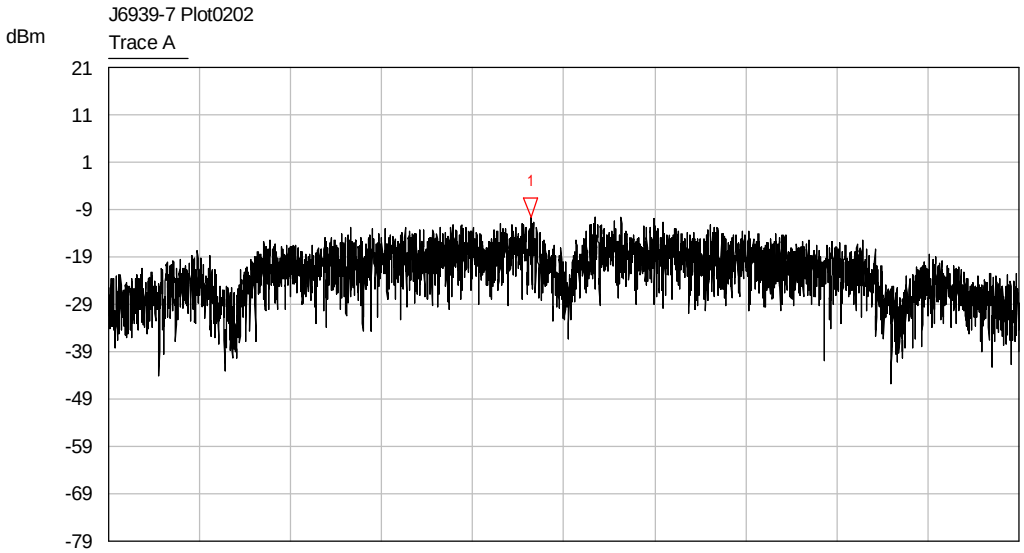
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4628 GHz | -10.65 dBm | |

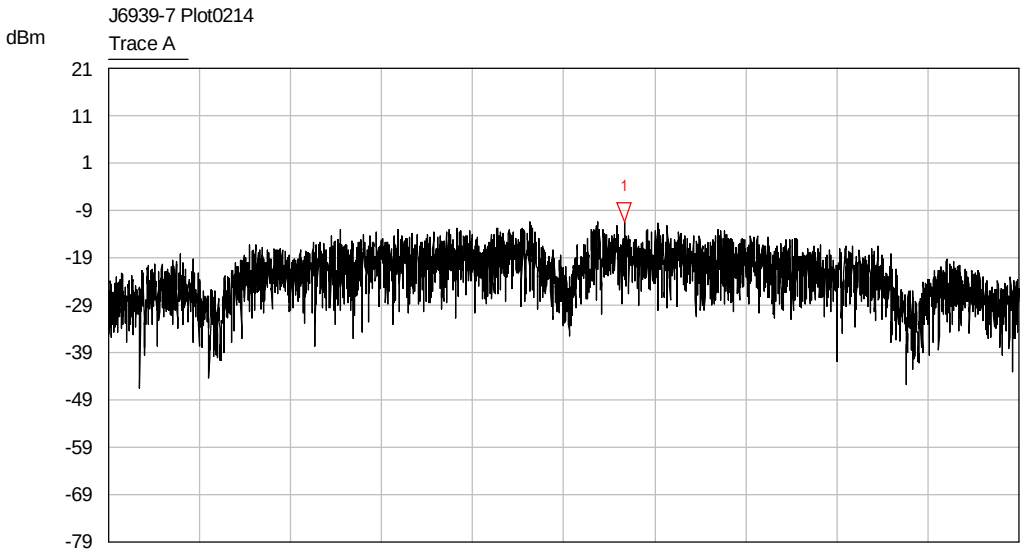
## High channel

### 6.5.3 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 5.5 MBPS



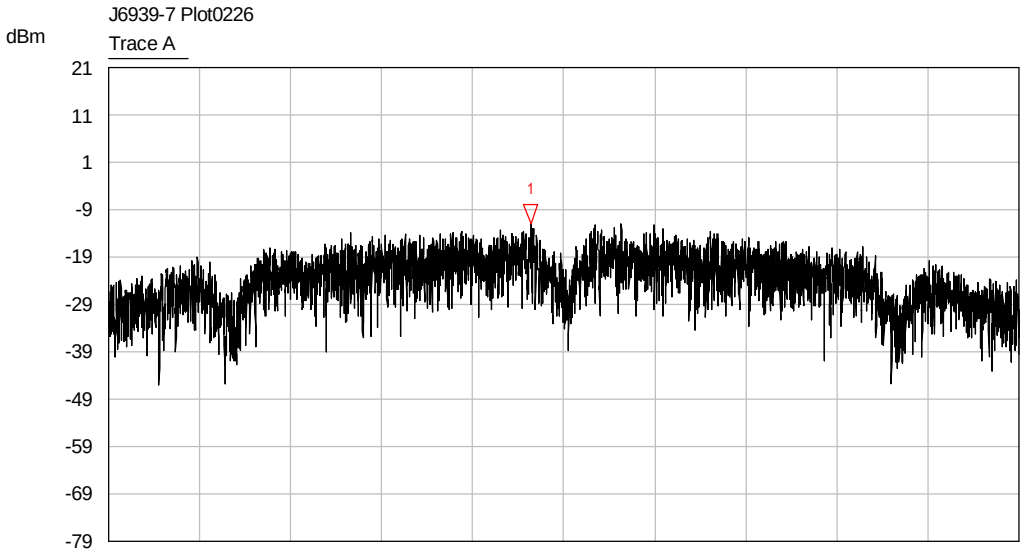

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4115 GHz | -10.46 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4379 GHz | -11.32 dBm | |

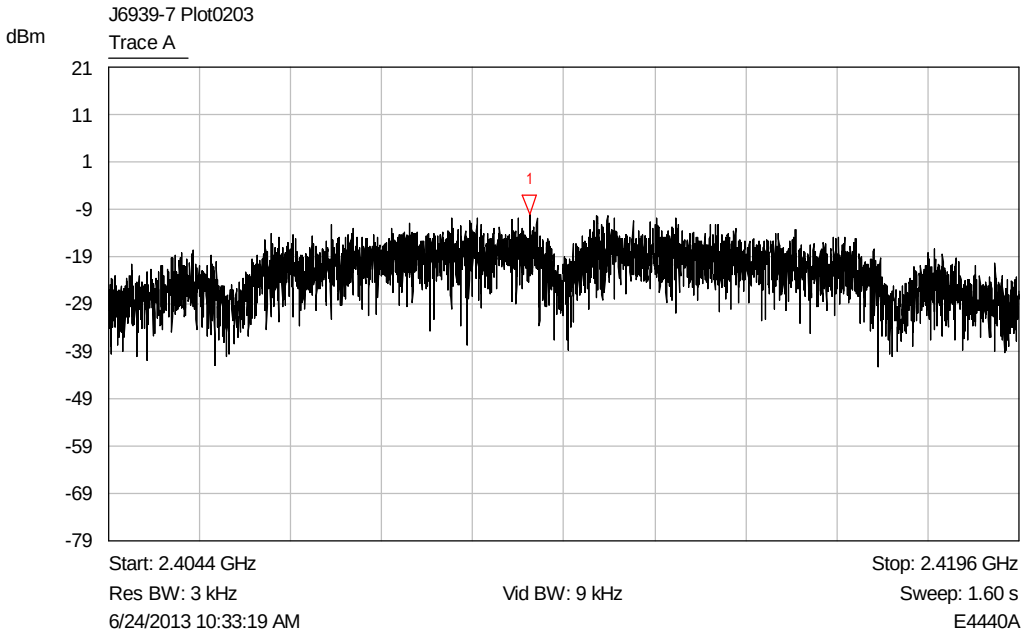
**Mid channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4615 GHz | -12.06 dBm | |

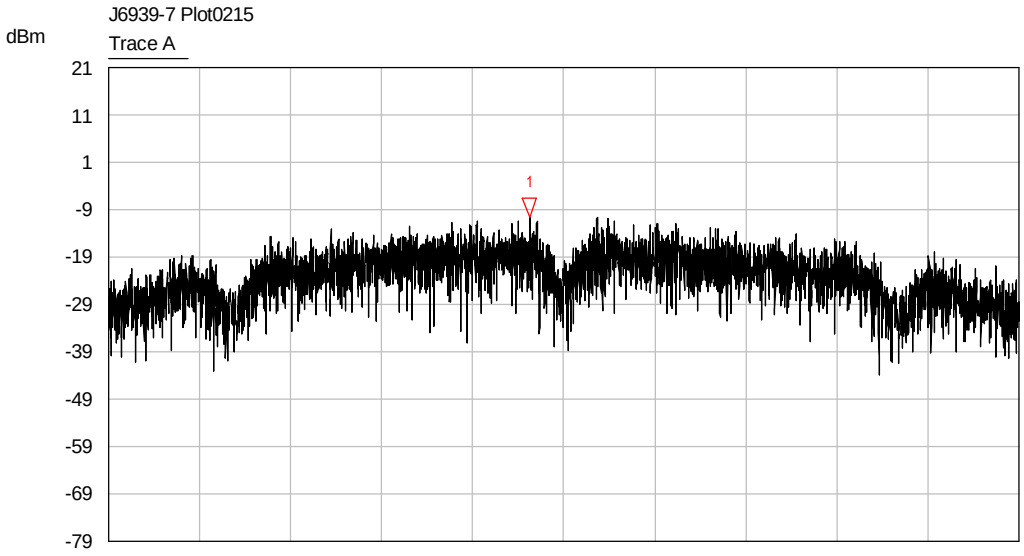
**High channel**

### 6.5.4 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 11 MBPS



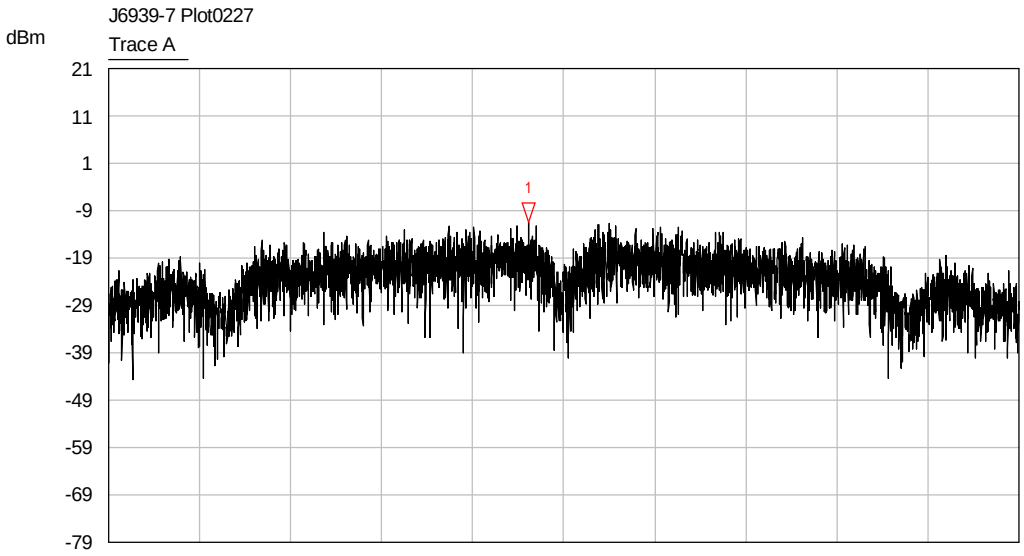

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4114 GHz | -10.06 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4364 GHz | -10.42 dBm | |

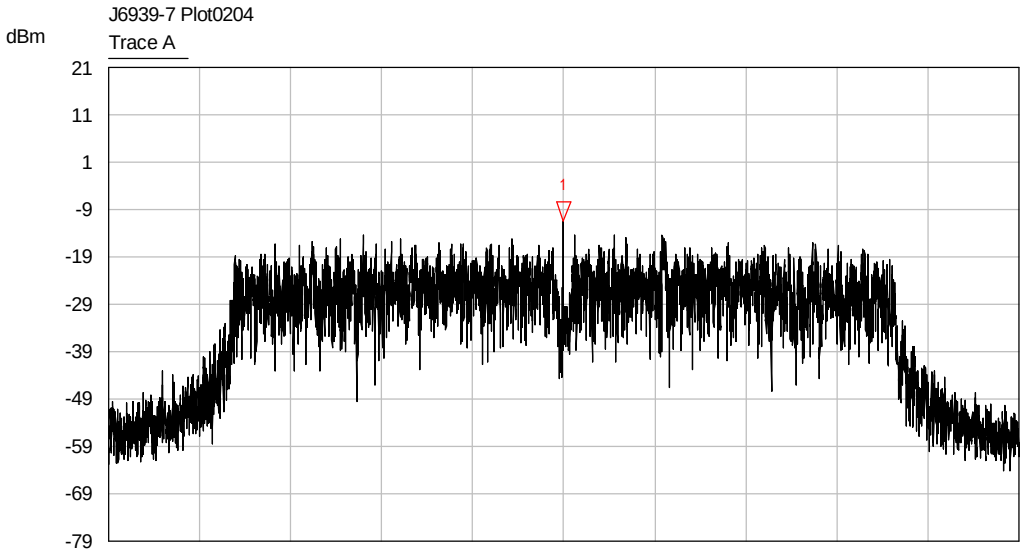
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4614 GHz | -11.44 dBm | |

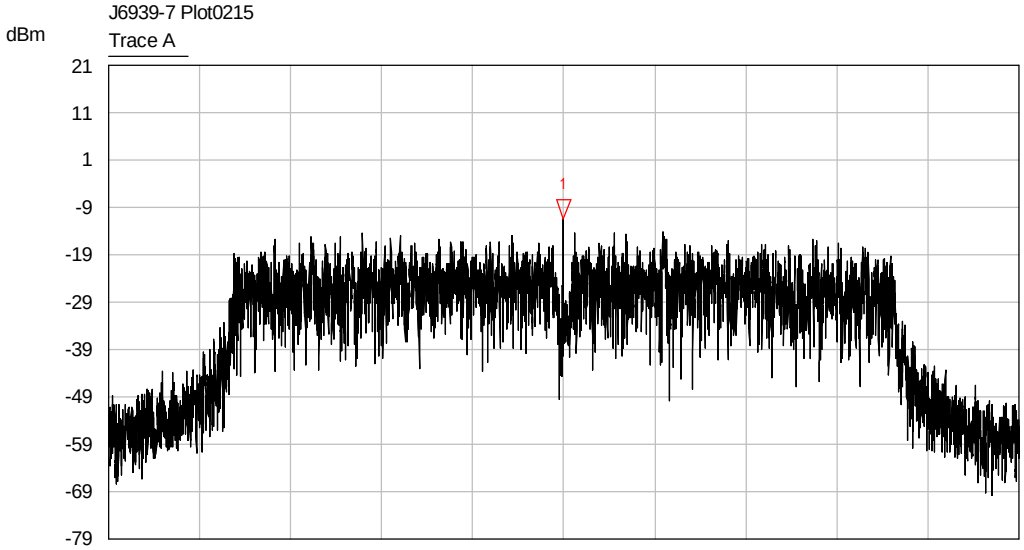
## High channel

### 6.5.5 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 6 MBPS



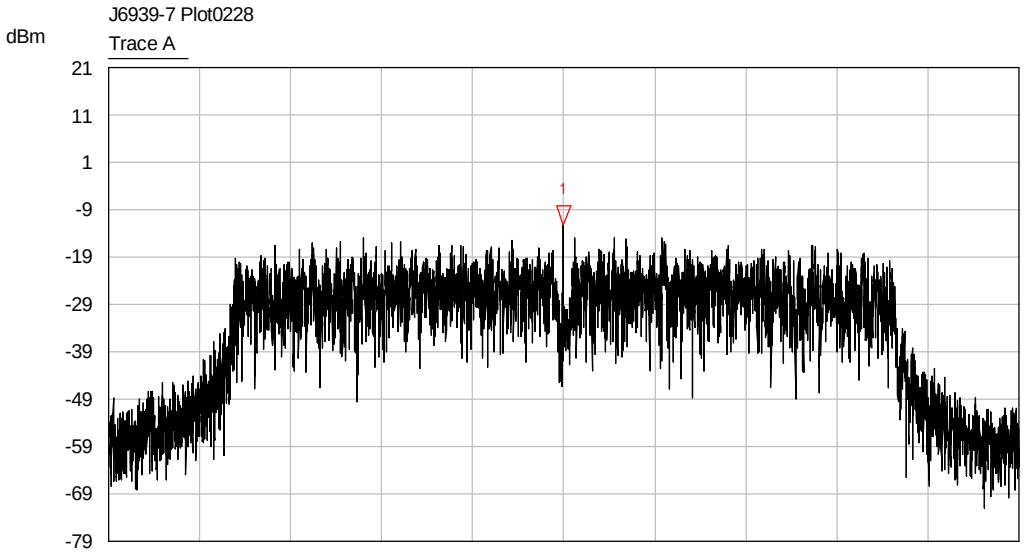

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4120 GHz | -11.32 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4370 GHz | -11.44 dBm | |

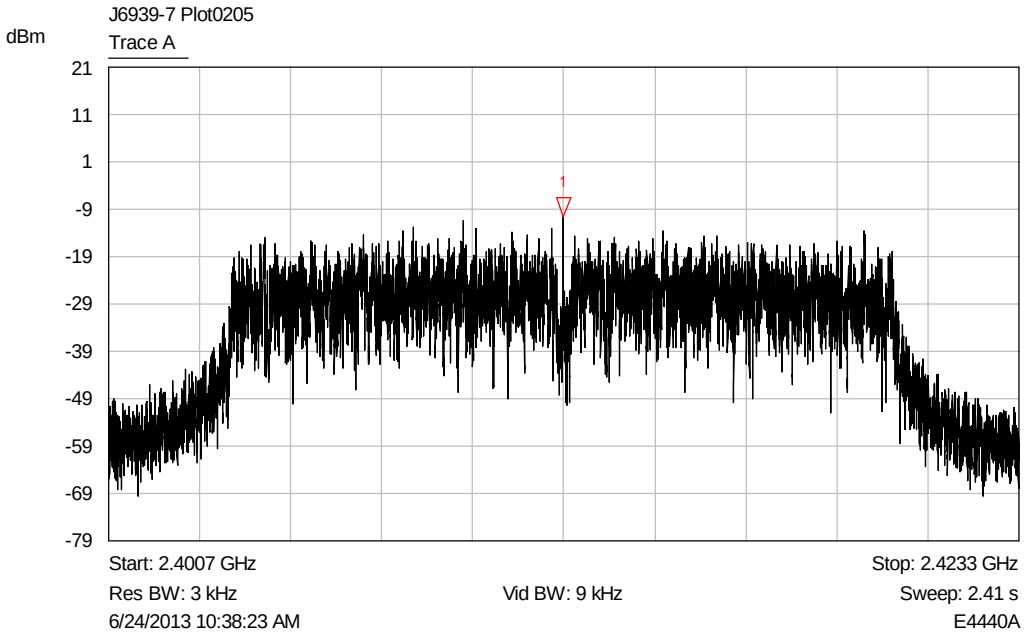
**Mid channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4620 GHz | -12.15 dBm | |

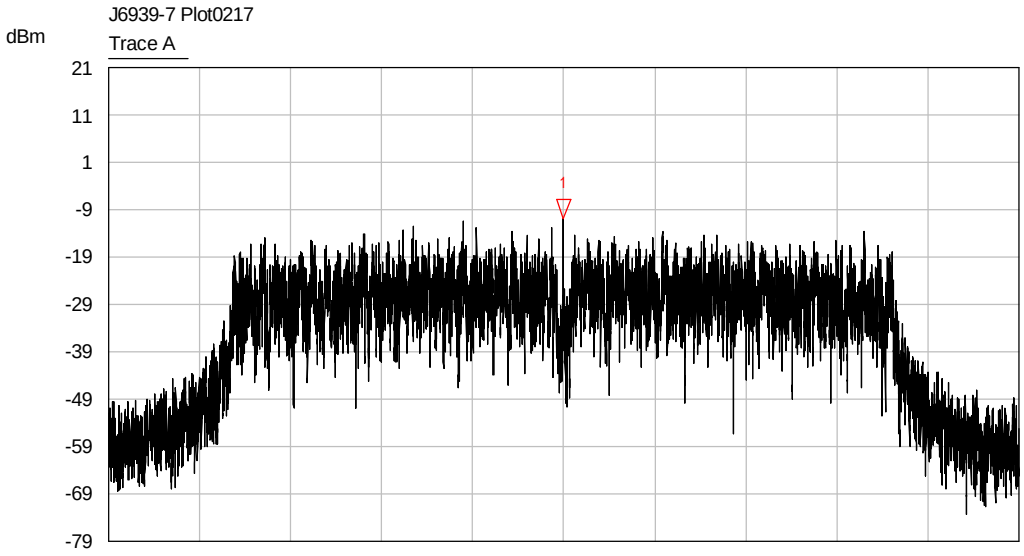
**High channel**

### 6.5.6 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 9 MBPS



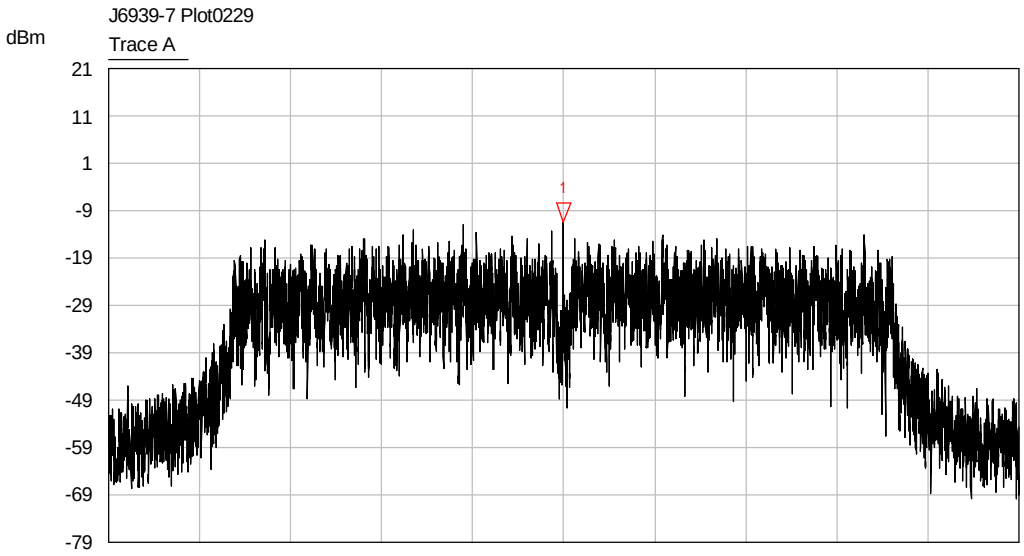

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4120 GHz | -10.65 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4370 GHz | -10.82 dBm | |

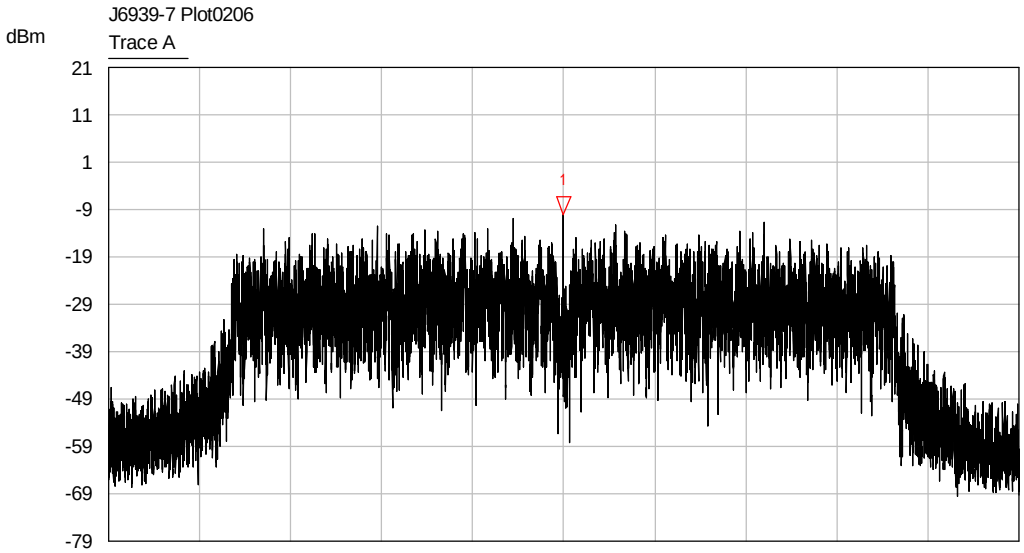
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4620 GHz | -11.53 dBm | |

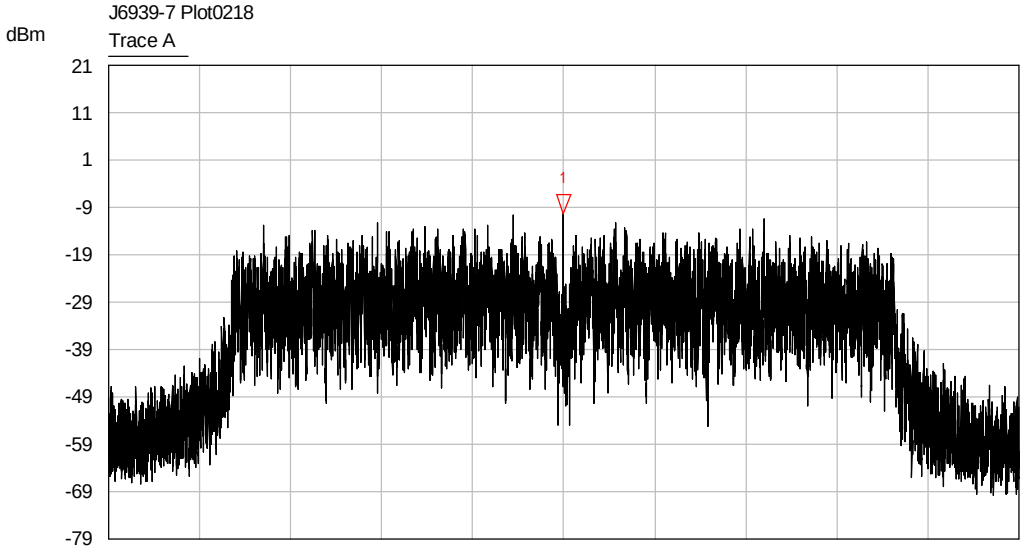
## High channel

### 6.5.7 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 12 MBPS



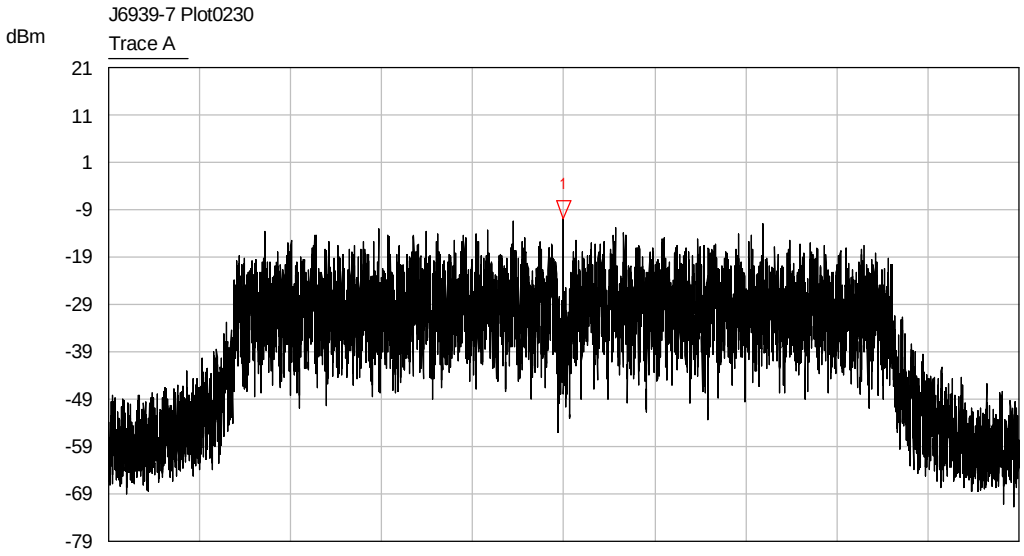

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4120 GHz | -10.23 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4370 GHz | -10.29 dBm | |

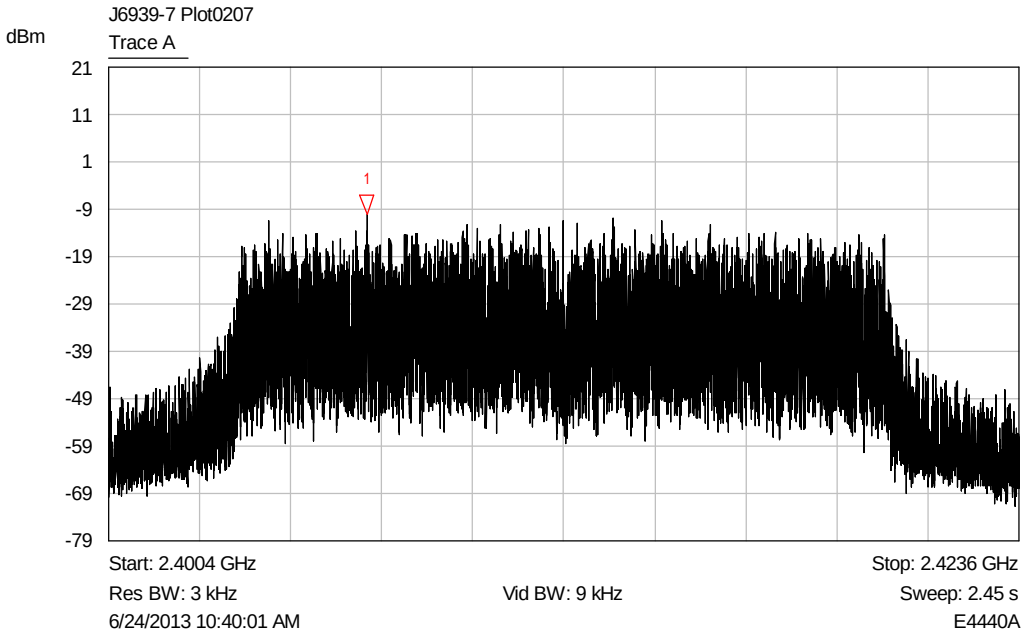
**Mid channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4620 GHz | -11.05 dBm | |

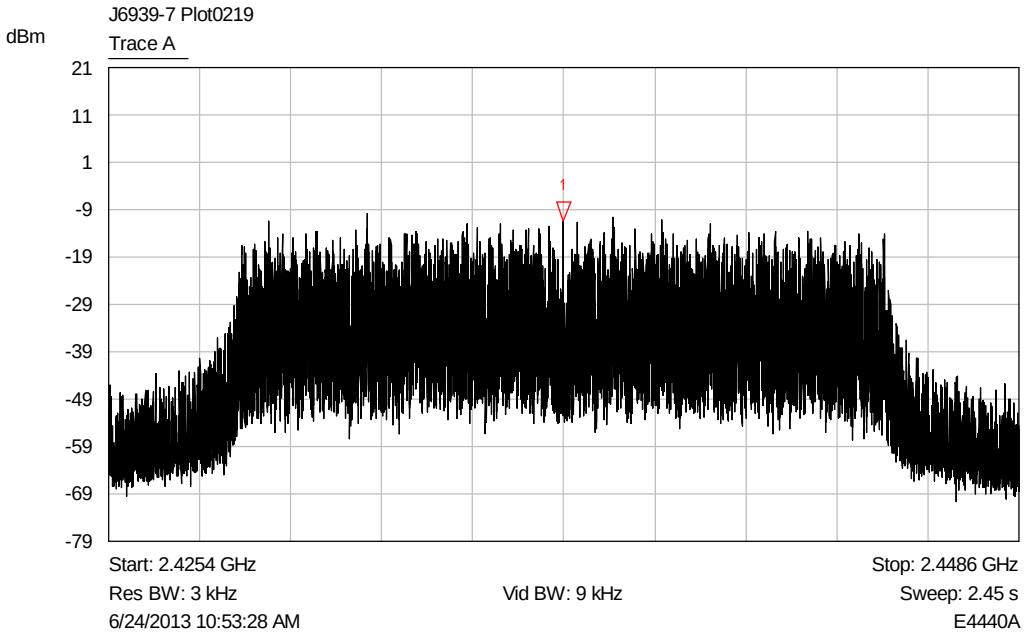
**High channel**

### 6.5.8 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 18 MBPS



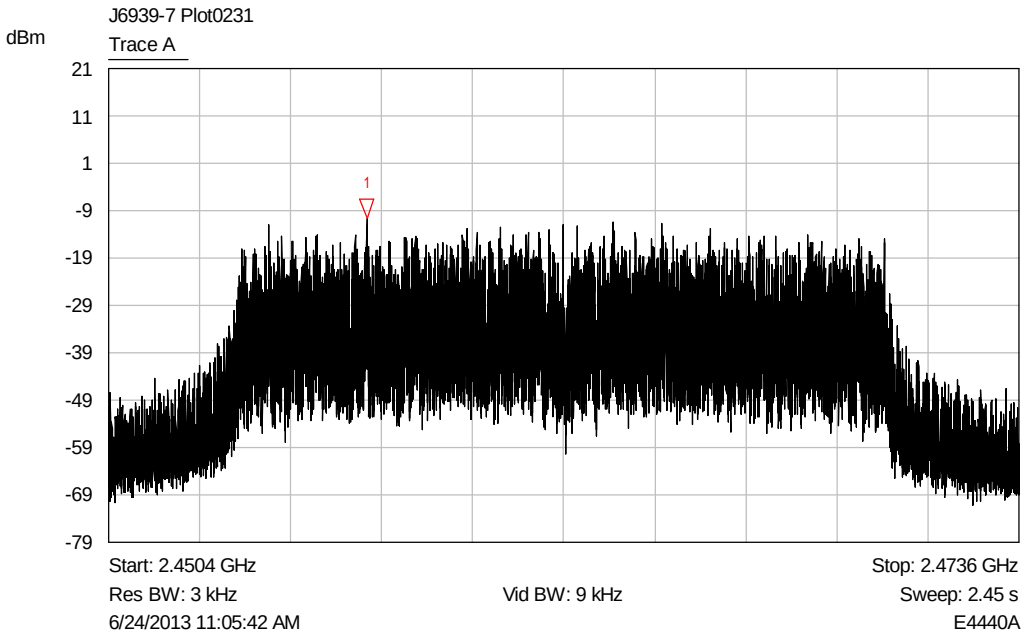

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4070 GHz | -10.06 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4370 GHz | -11.27 dBm | |

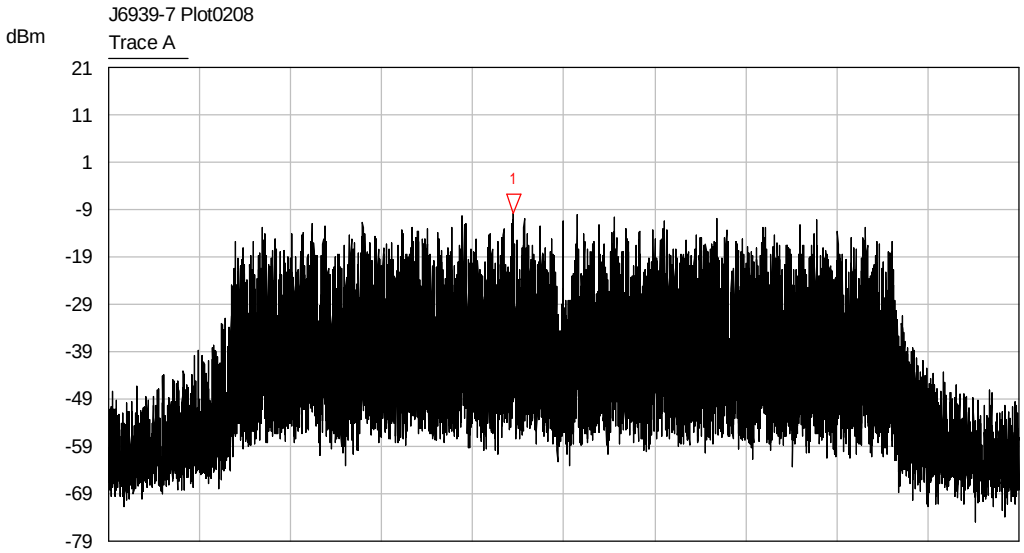
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4570 GHz | -10.55 dBm | |

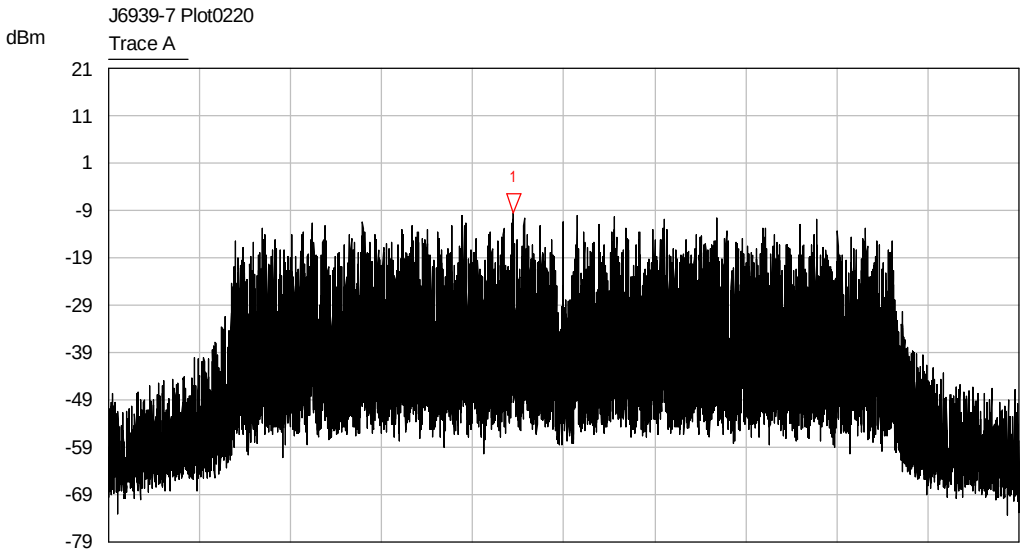
## High channel

### 6.5.9 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 24 MBPS



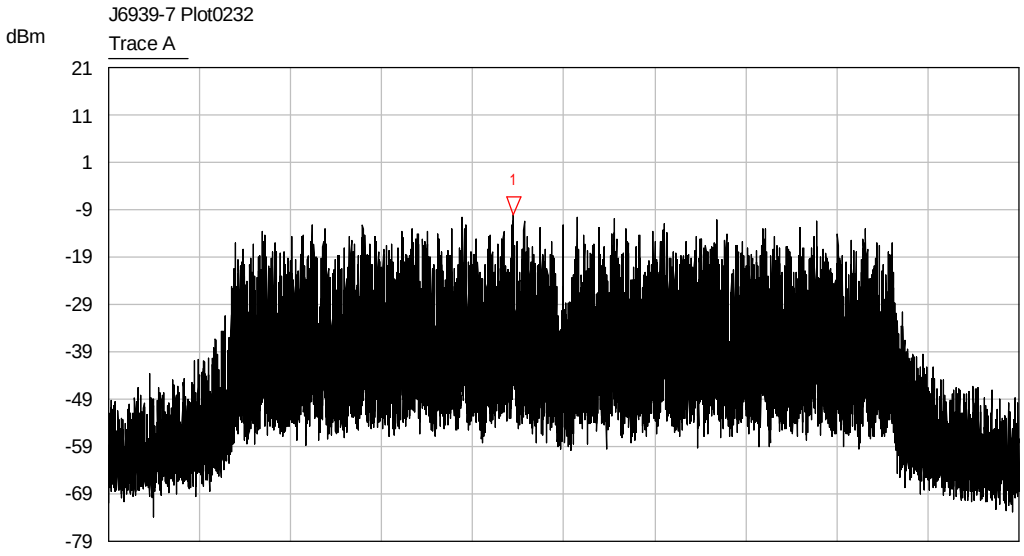

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4107 GHz | -9.86 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4357 GHz | -9.50 dBm | |

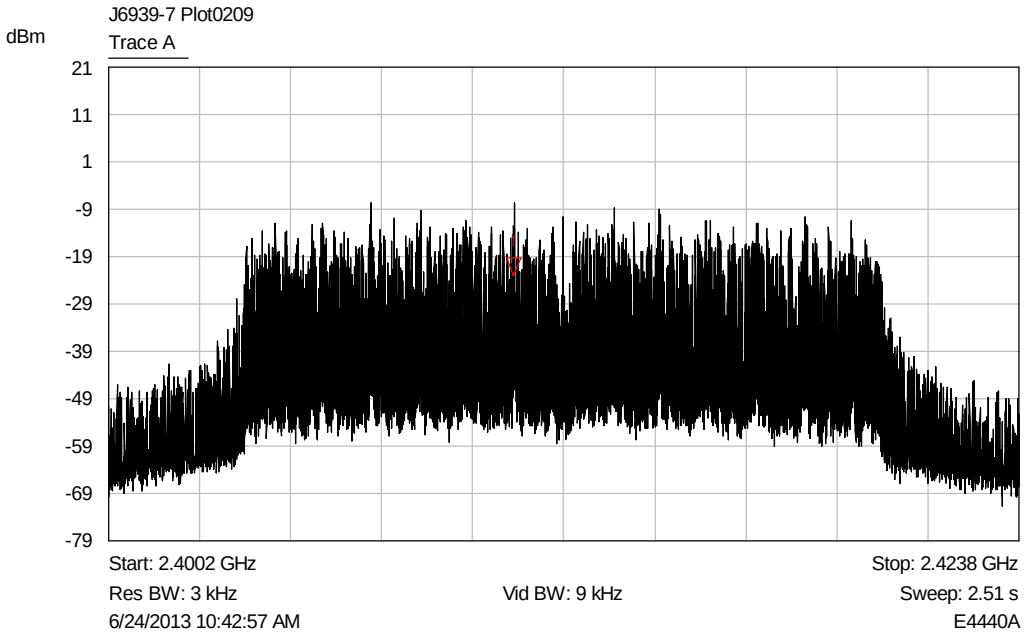
**Mid channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4607 GHz | -10.16 dBm | |

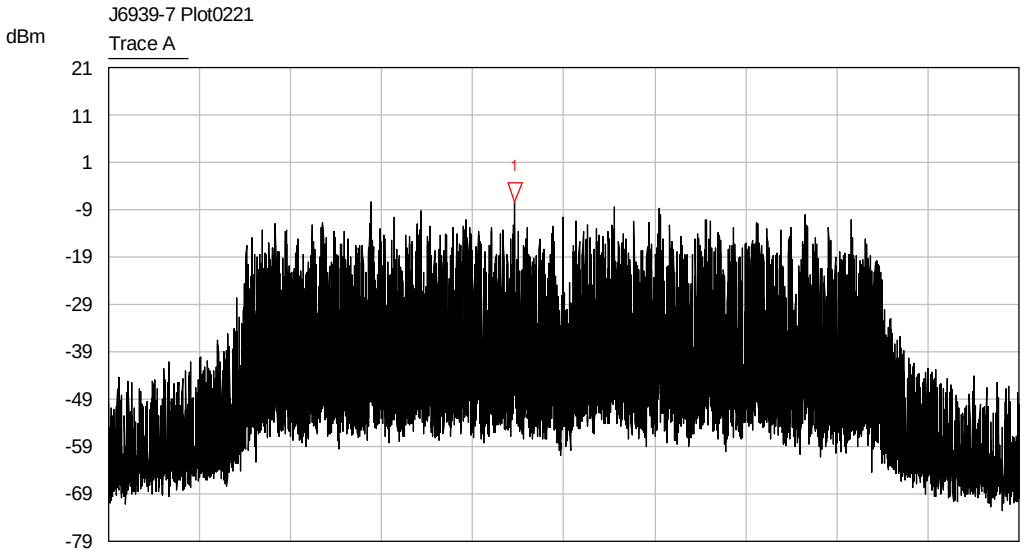
**High channel**

### 6.5.10 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 36 MBPS



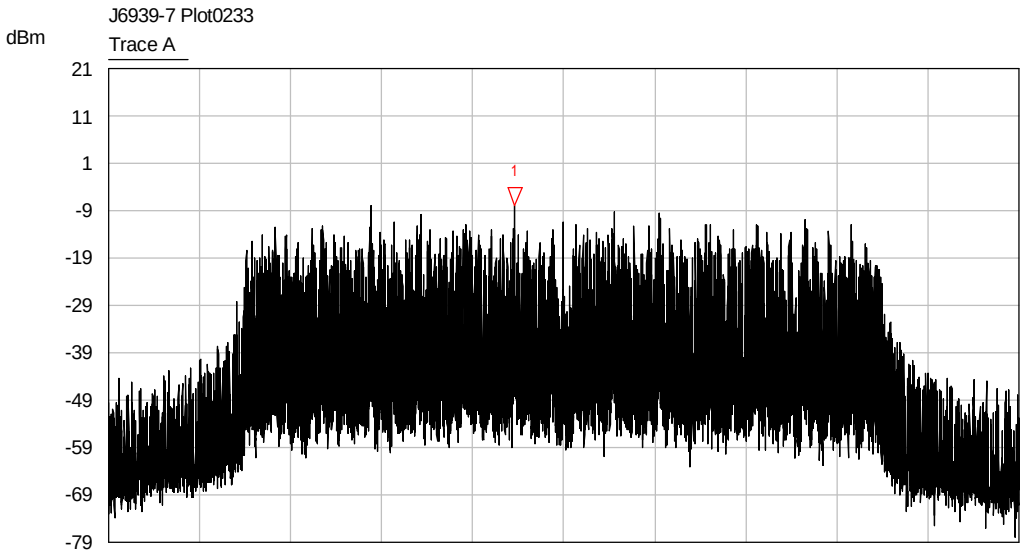

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4107 GHz | -23.17 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4357 GHz | -7.37 dBm | |

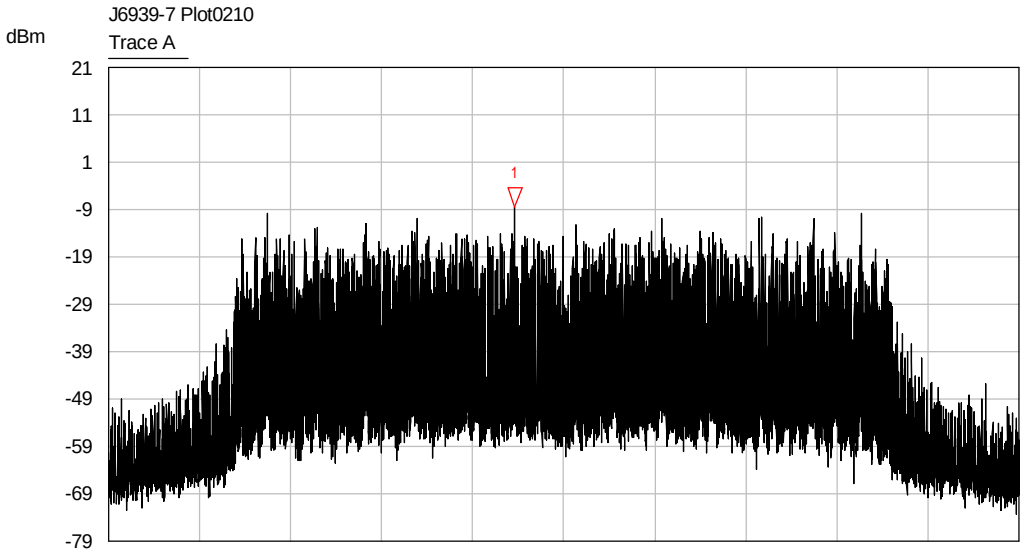
## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4607 GHz | -7.93 dBm | |

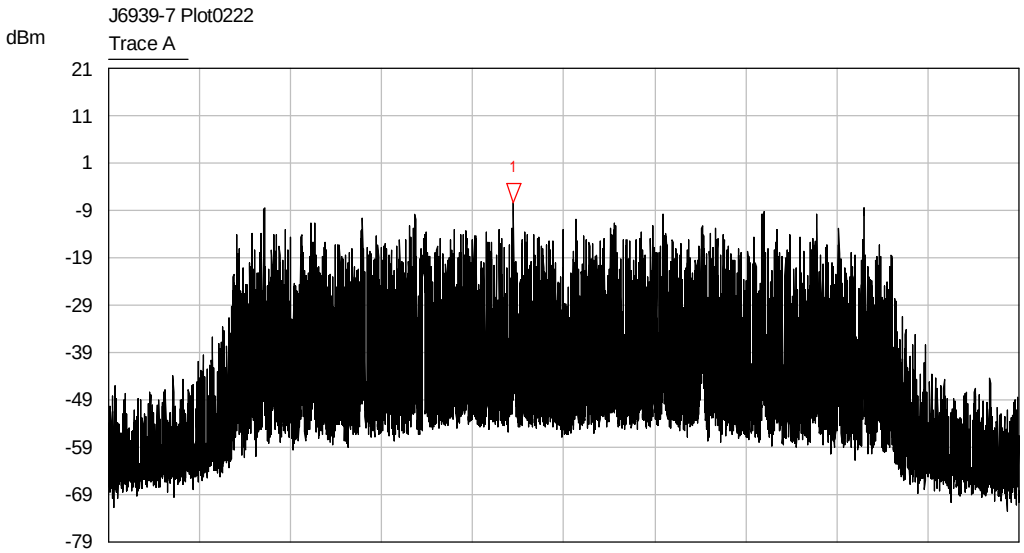
## High channel

### 6.5.11 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 48 MBPS



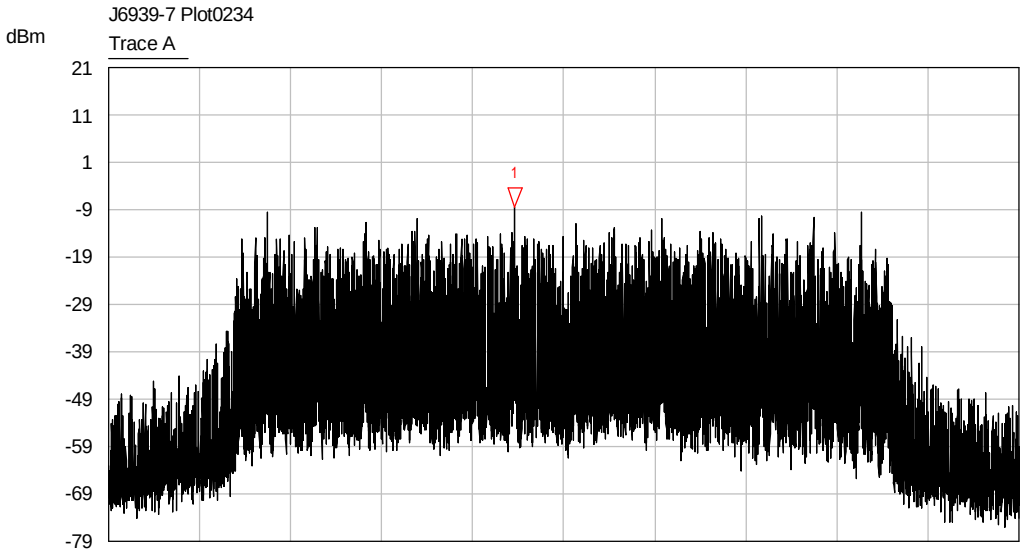

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4108 GHz | -8.48 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4358 GHz | -7.32 dBm | |

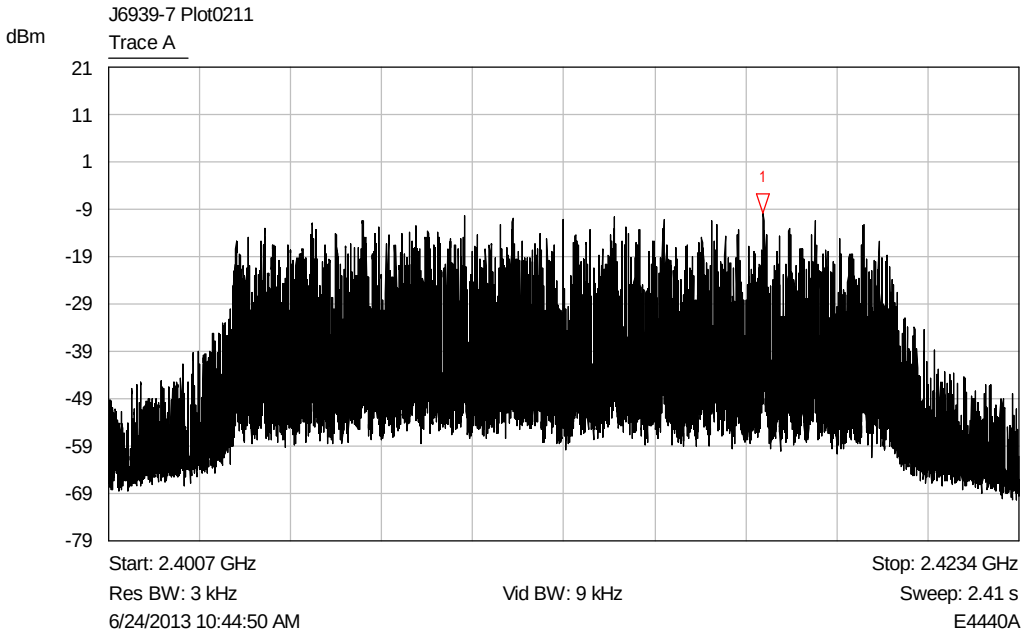
**Mid channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4608 GHz | -8.49 dBm | |

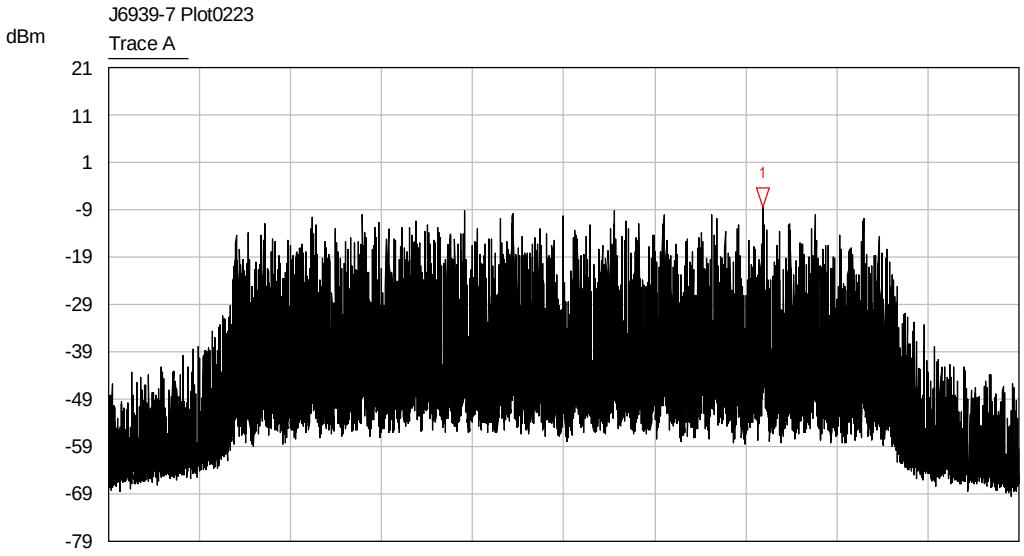
**High channel**

### 6.5.12 Plots for Band 2400-2483.5 MHz, Power 16 dBm, Spacing 5 MHz, and Modulation 54 MBPS



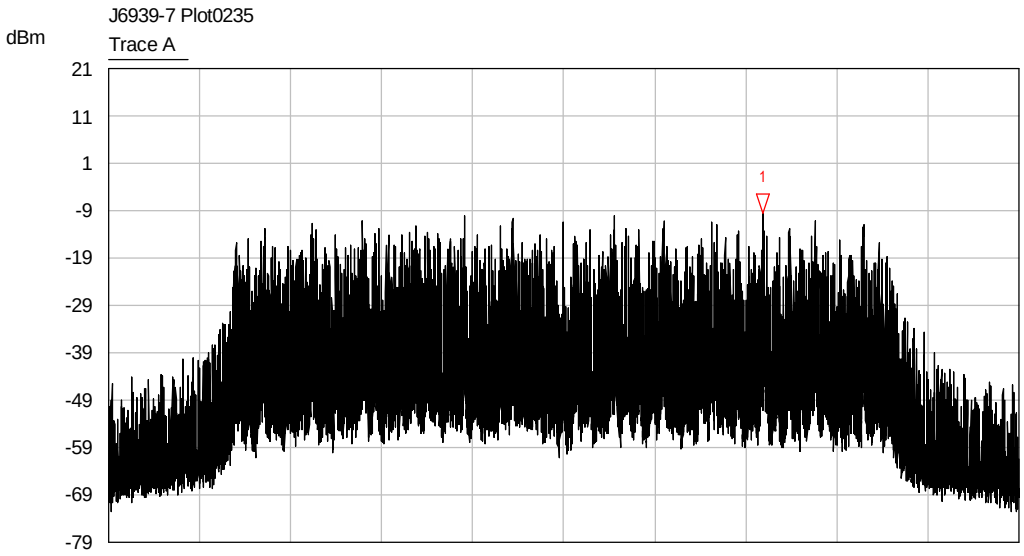

| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4170 GHz | -9.70 dBm | |

**Low channel**




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4420 GHz | -8.52 dBm | |

## Mid channel




| Mkr | Trace | X-Axis | Value | Notes |
|---|---|---|---|---|
| 1 ▽ | Trace A | 2.4670 GHz | -9.55 dBm | |

## High channel

# 7 Explanatory Notes

## 7.1 Explanation of Table of Signals Measured

Measurements are made as required by the standard. These measurements are made and recorded using detectors, either peak, quasi peak or average dependant on the test. A table of results has been given following the relevant plots. This table looks similar to the one illustrated below dependant on the measurements required by the test: -

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | Pk – Lim 1 (dB) | QP Amp (dBuV) | QP - Lim1 (dB) | Av Amp (dBuV) | Av - Lim1 (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 12345 | 54.9 | -10.5 | 48.0 | -12.6 | 37.6 | -14.4 |

Column One - Labelled Signal No. is an incremental number that the receiver has given to each signal that has been measured.

Column Two - Labelled Freq (MHz) is the approximate frequency of the signal received.

Column Three - Labelled Peak Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the peak detector.

Column Four - Labelled Pk - Lim1 (dB) is the difference in level from the peak signal given to the active limit line. If this column appears in the table the peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Five - Labelled QP Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the quasi-peak detector.

Column Six - Labelled QP - Lim1 (dB) is the difference in level from the quasi-peak signal given to the active limit line. If this column appears in the table the quasi-peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Seven - Labelled Av Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the average detector.

Column Eight - Labelled Av - Lim1 (dB) is the difference in level from the average signal given to the active limit line. If this column appears in the table the average detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Only signals highlighted in red are deemed to exceed the limit of the detector required.

## 7.2 Explanation of limit line calculations for radiated measurements

The limits given in the test standard are normally expressed as absolute values (e.g. in μV/m at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in dBμV/m referenced to the measuring instrument inputs. RN Electronics calibrate the test set-up to account for any path losses, antenna gains, etc. so that the value read at the receiver relates directly to the absolute value required, except that it is expressed in dB relative to one microVolt and may need to take account of any alternative measuring distance used. Examples:

(a) limit of 500 μV/m equates to 20.log (500) = 54 dB μV/m.
(b) limit of 300 μV/m at 10m equates to 20.log (300 . 10/3) = 60 dB μV/m at 3m

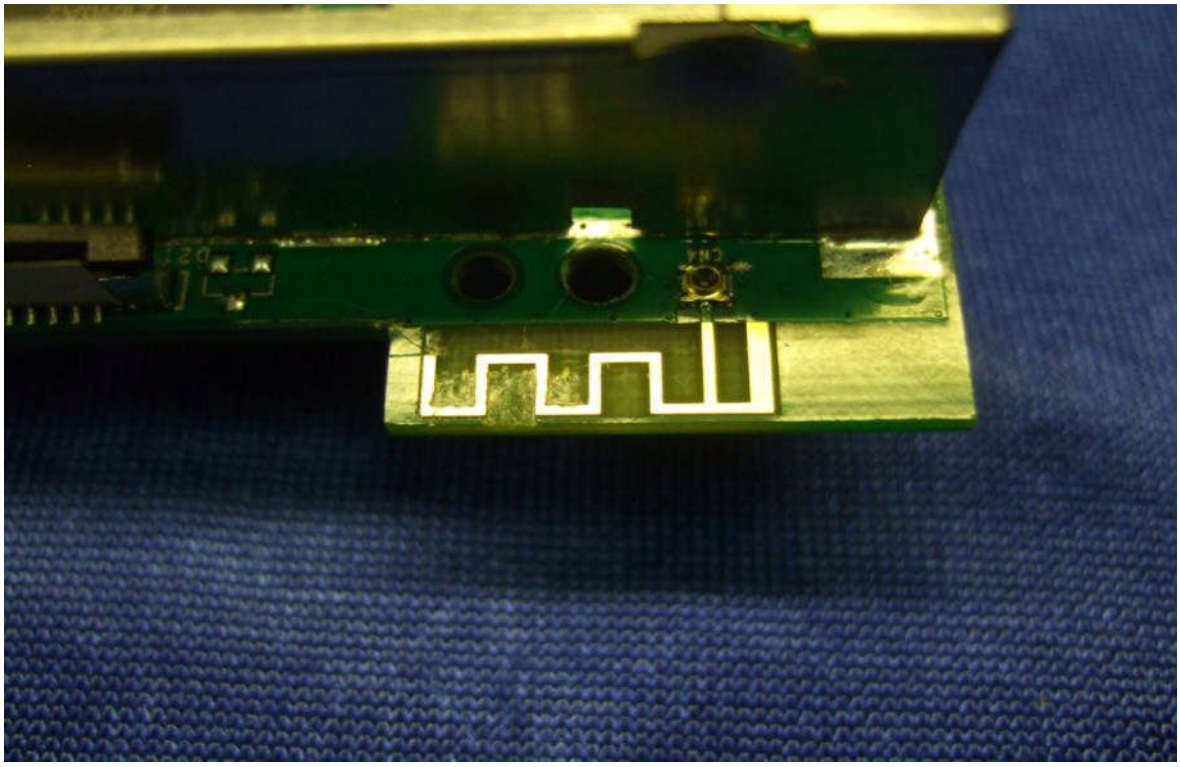
(c) limit of 30 µV/m at 30m, but below 30MHz, equates to 20.log(30) + 40.log(30/3) = 69.5 dBµV/m at 3m, as extrapolation factor below 30MHz is 40dB/decade per 15.31(f)(2).

# 8 Photographs

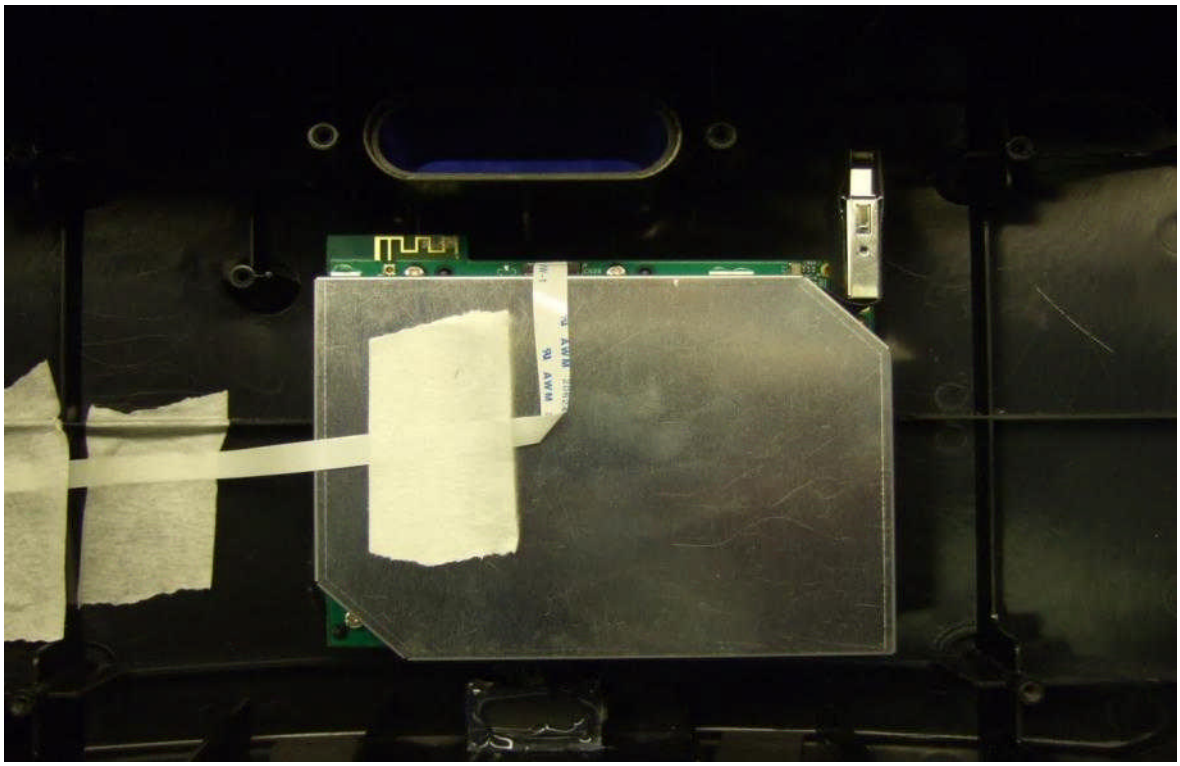
## 8.1 EUT Front View

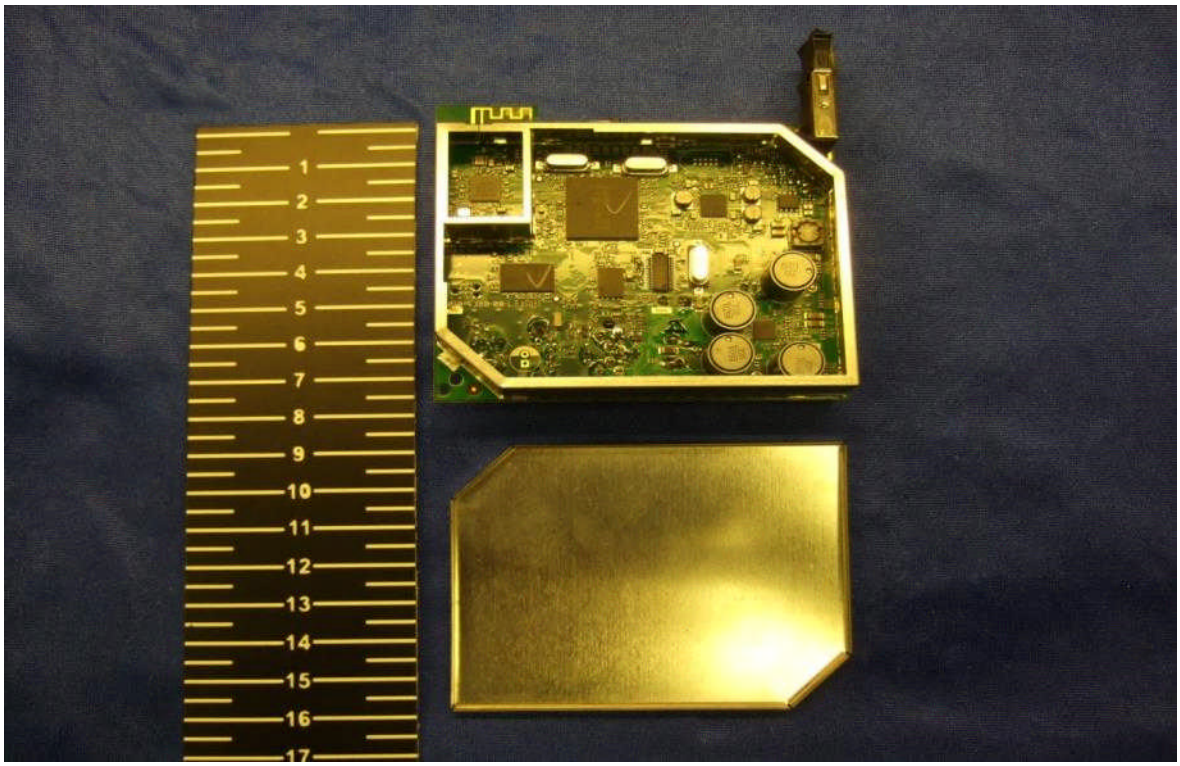
## 8.2 EUT Reverse Angle

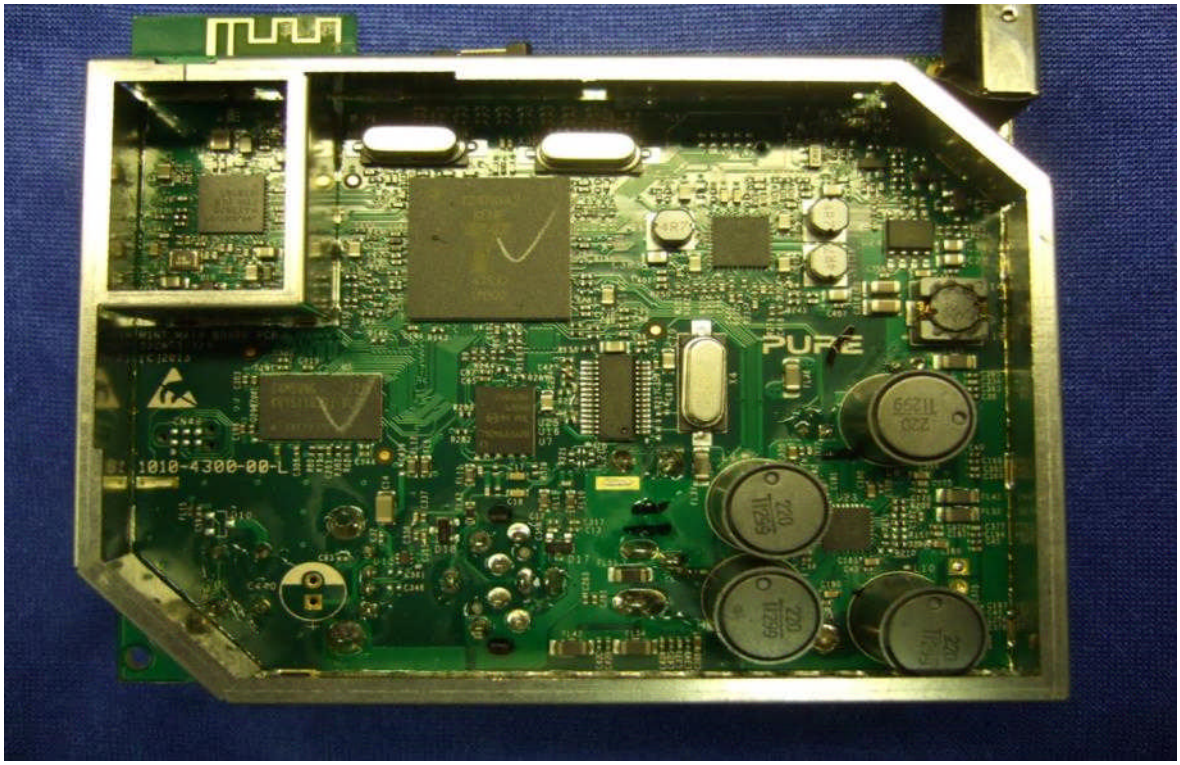
## 8.3 EUT Antenna Connector Port

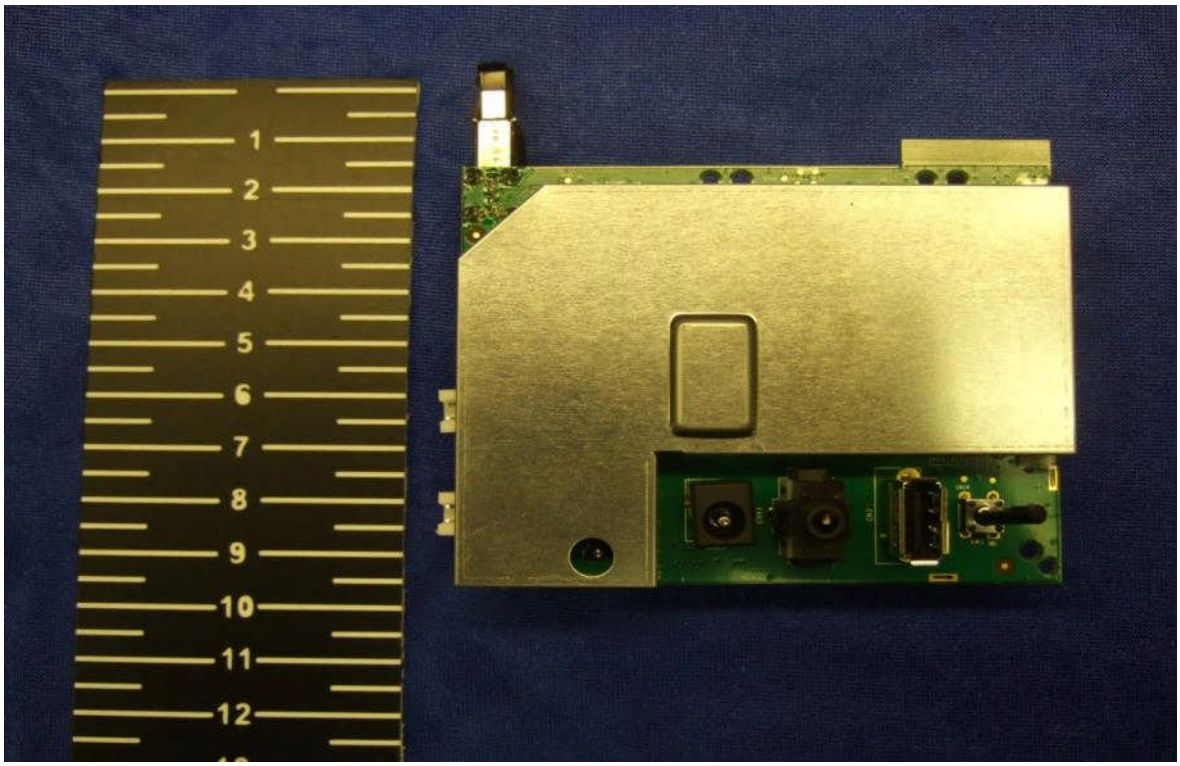


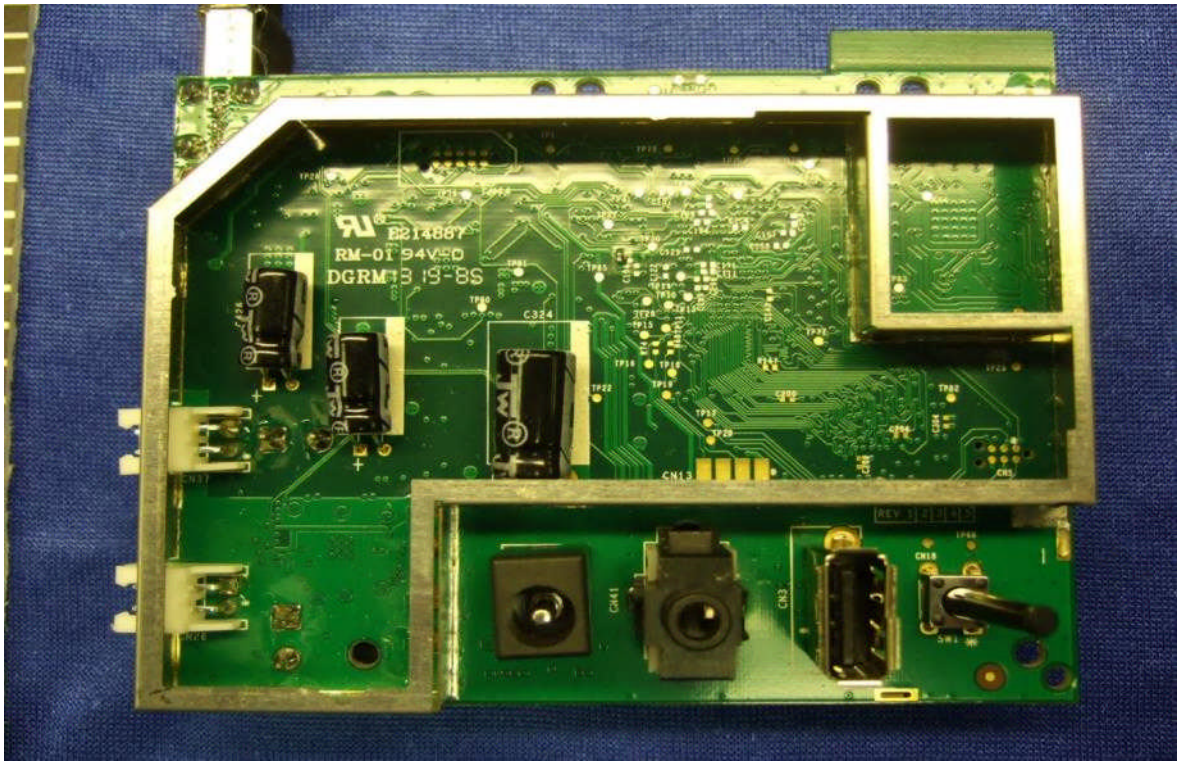
## 8.4 EUT Internal Construction

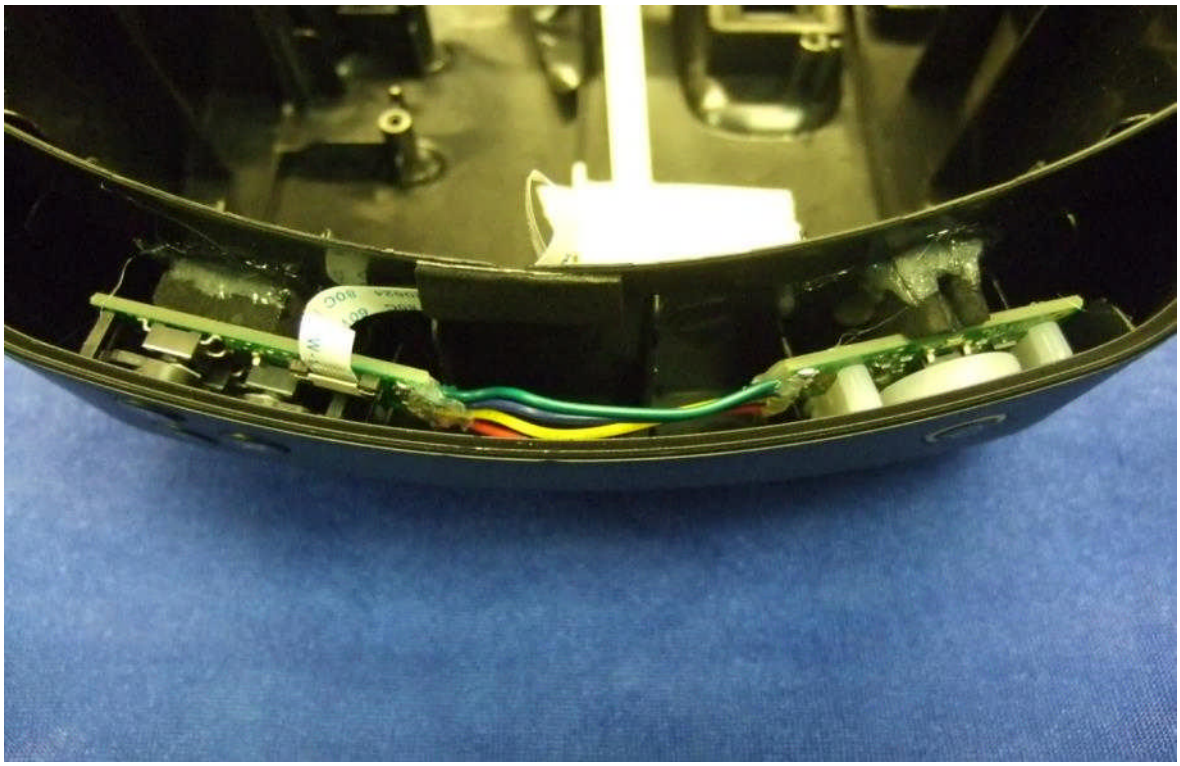





PURE
1010-4300-00-L







## 8.5 EUT Chassis

## 8.6 EUT supplied PSU

## 8.7 Test set-ups, spurious emissions

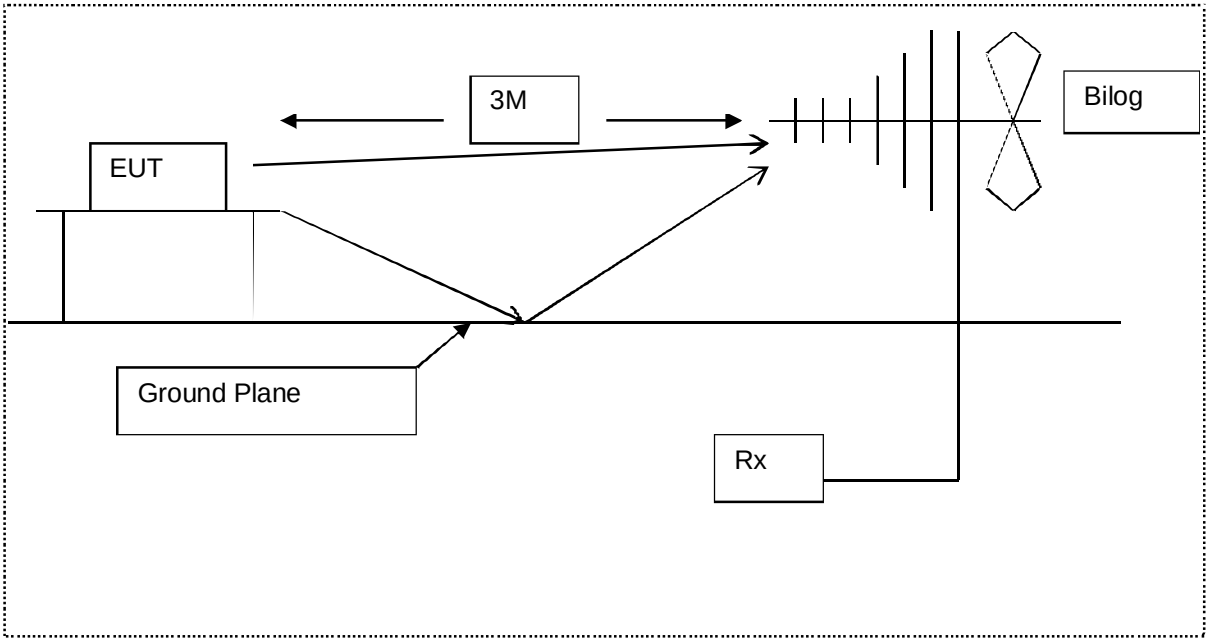
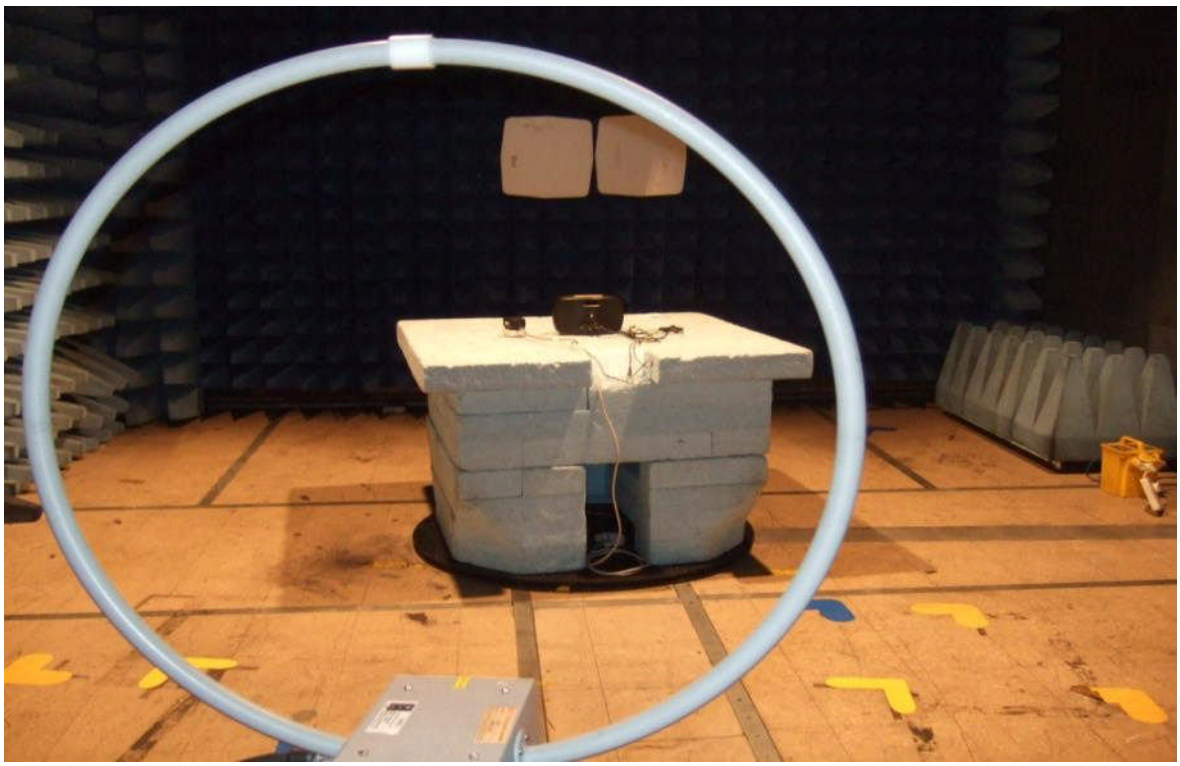
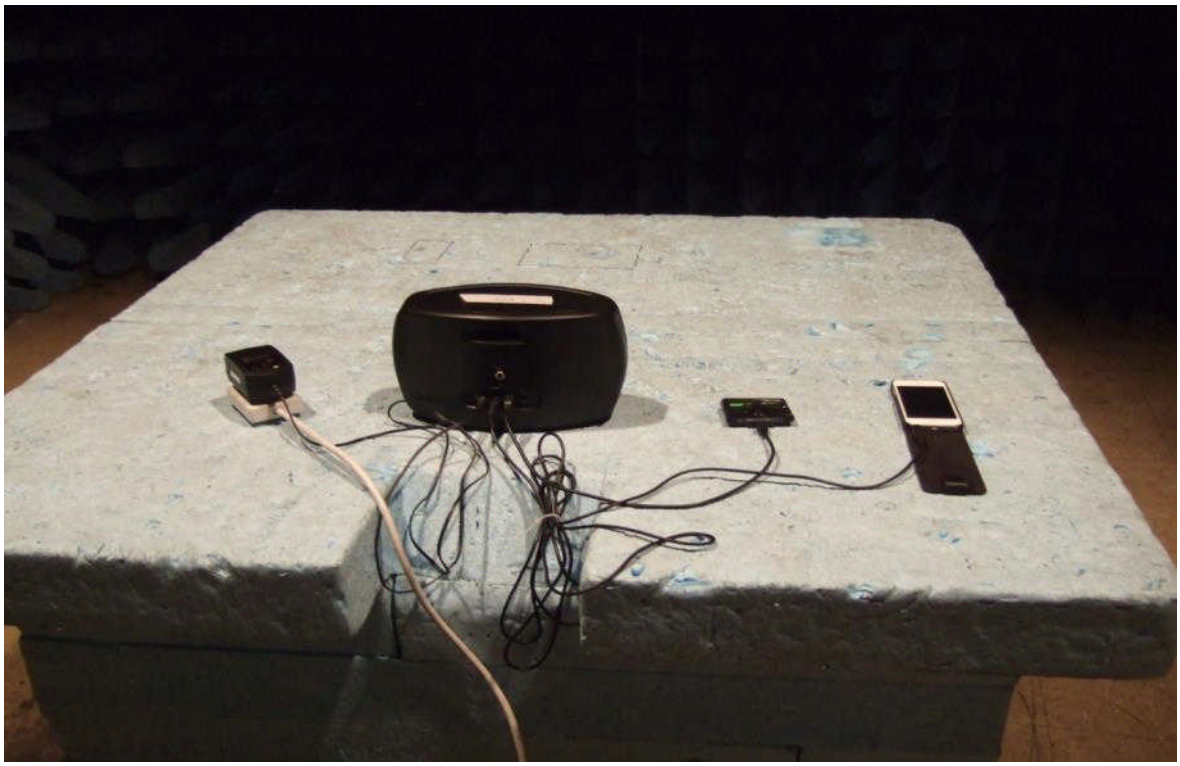
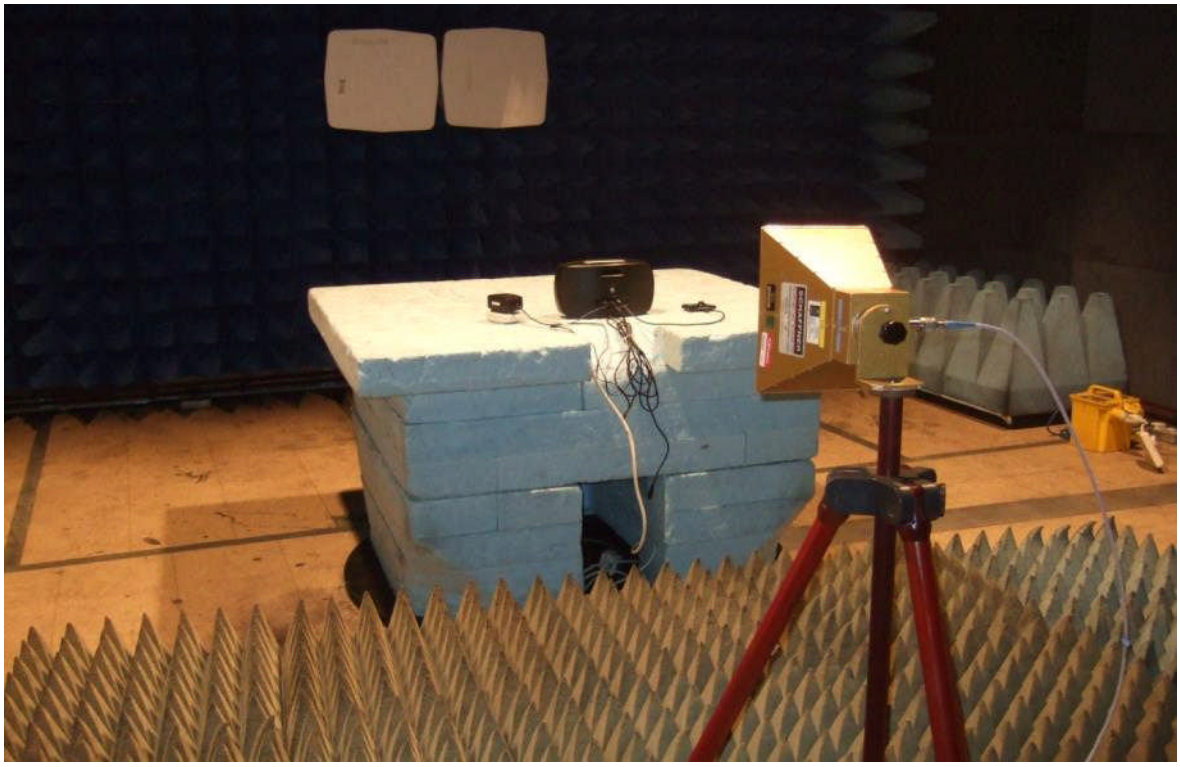
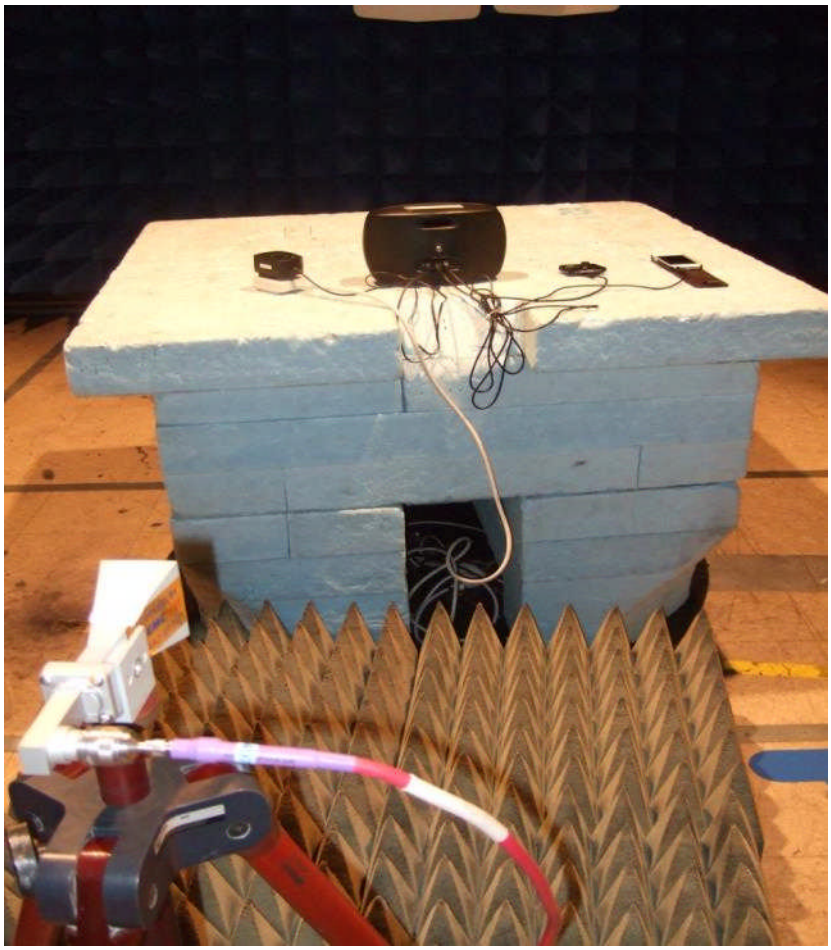



Diagram of the radiated emissions test setup 30-1000MHz.









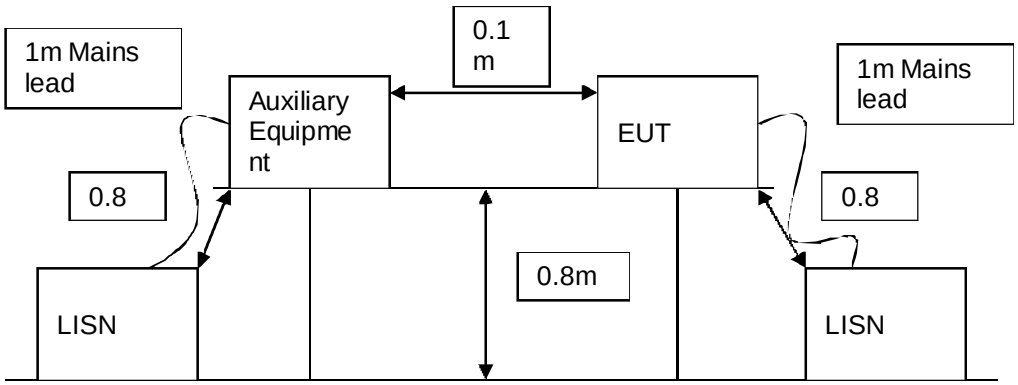



Diagram of the AC power line conducted emissions test setup.

Photograph of the EUT as viewed from screened room (AC power line conducted emissions)

# 9 Signal Leads

| Port Name | Cable Type | Connected |
|---|---|---|
| AC/DC adapter to DC | AC plug to 2 core DC | Yes |
| USB | standard USB | Yes |
| Auxiliary Audio input | 3.5mm audio | Yes |

# 10 Test Equipment Calibration list

The following table lists the test equipment used, last calibration date and calibration interval. All test equipment used has been maintained within the calibration requirements of ***R.N. Electronics Ltd.*** test facility quality system. Calibration intervals are regularly reviewed dependent on equipment manufacturer's recommendations and actual usage of the equipment.

| RN No. | Model | Description | Manufacturer | Last calibrated | Period |
|---|---|---|---|---|---|
| E010 | MN2050 | LISN 13A | Chase | OCT-02-2012 | 12 |
| E035 | HP11947A | Transient Limiter + 10dB Atten. | Hewlett Packard | FEB-11-2013 | 6 |
| E252 | 6810.19.A | 10 dB Attenuator | Suhner | MAY-09-2013 | 12 |
| E256 | 44 | 10 dB Attenuator | Weinschel Engineering | NOV-01-2012 | 12 |
| E268 | BHA 9118 | 1-18 GHz Horn Antenna | Schaffner | APR-14-2013 | 60 |
| E290 | 6914 | Power Sensor | Marconi Instruments | AUG-23-2011 | 24 |
| E342 | 8563E | Spectrum Analyser 26.5 GHz | HP | MAY-28-2013 | 24 |
| E397 | 6960B | RF Power Meter | Marconi Instruments | JUL-16-2011 | 24 |
| E410 | N5181A | 3 GHz MXG Signal Generator | Agilent Technologies | OCT-26-2011 | 36 |
| E411 | N9039A | 9 kHz - 1 GHz RF Filter Section | Agilent Technologies | OCT-18-2012 | 12 |
| E412 | E4440A | 3 Hz - 26.5 GHz PSA | Agilent Technologies | OCT-18-2012 | 12 |
| E429 | - | 5 Switch Filter Box 0.91 GHz - 16.3 GHz | RN Electronics | NOV-20-2012 | 12 |
| E465 | PCR2000LA | AC Power Supply | KIKUSUI | MAY-09-2013 | 12 |
| E533 | N5182A | 6 GHz MXG Signal Generator | Agilent Technologies | FEB-26-2013 | 36 |
| E534 | E4440A | 3 Hz - 26.5 GHz PSA | Agilent Technologies | FEB-22-2013 | 36 |
| E535 | N9039A | 9 kHz - 1 GHz RF Filter Section | Agilent Technologies | FEB-22-2013 | 36 |
| N240 | CRT700/3/2C | 100v Transformer | | N/A | N/A |
| TMS78 | 3160-08 | Std Gain Horn Antenna 12.4-18 GHz | ETS Systems | JUN-07-2013 | 24 |
| TMS79 | 3160-09 | Std Gain Horn Antenna 18-26.5 GHz | ETS Systems | JUN-07-2013 | 24 |
| TMS81 | 6502 | Active Loop Antenna | EMCO | OCT-24-2012 | 24 |
| TMS82 | 8449B | Pre Amplifier 1 - 26 GHz | Agilent | NOV-19-2012 | 12 |
| TMS933 | CBL6141A | Bilog Antenna 30MHz - 2GHz | York EMC | SEP-09-2010 | 36 |

Auxiliary equipment

## 10.1 Customer supplied Equipment

Auxiliary equipment used for the purpose of test supplied by the above has been listed below

| Item No. | Model No. | Description | Manufacturer | Serial No. |
|---|---|---|---|---|
| 1 | 300Di | Modified USB highway controller | Pure | V01.10 |

## 10.2 Supplied by RN Electronics Limited

Auxiliary equipment used for the purpose of test supplied by the above has been listed below

| RN No. | Model No. | Description | Manufacturer | Serial No |
|---|---|---|---|---|
| - | Iphone5 | Iphone5 audio output | Apple Inc | - |

# 11 Modifications

In order for the EUT to produce the results shown within this report the following modifications, if any, were implemented.

## 11.1 Modifications before test

There were no modifications made by R.N. Electronics Ltd before testing commenced.

## 11.2 Modifications during test

There were no modifications made by R.N. Electronics Ltd during testing.

# 12 Compliance information

Products subject to the Declaration of Conformity procedure are required to be supplied with a compliance information statement. A copy of this statement may be included here:

CERTIFIED equipment – DoC not required.

N.b. the EUT USB port does not connect to a PC, hence it is not a PC peripheral either.

# 13 Description of Test Sites

| | |
|---|---|
| Site A | Radio / Calibration Laboratory and anechoic chamber |
| Site B | Semi-anechoic chamber |
| Site B1 | Control Room for Site B |
| Site C | Transient Laboratory |
| Site D | Screened Room (Conducted Immunity) |
| Site E | Screened Room (Control Room for Site D) |
| Site F | Screened Room (AC power line conducted Emissions)<br>VCCI Registration No. C-2823 |
| Site G | Screened Room (Control Room for Site H) |
| Site H | 3m Semi-anechoic chamber (indoor OATS) |
| Site J | Screened Room |
| Site K | Screened Room (Control Room for Site M) |
| Site M | 3m Semi-anechoic chamber (indoor OATS)<br>FCC Registration No. 293246 |
| Site Q | Fully-anechoic chamber |
| Site OATS | 3m and 10m Open Area Test Site<br>FCC Registration No. 293246<br>IC Registration No. 5612A-1<br>VCCI Registration No. R-2580 |
| Site R | Screened Room (Conducted Immunity) |
| Site S | Safety Laboratory |
| Site T | Transient Laboratory |

# 14 Abbreviations and Units

| | | | |
|---|---|---|---|
| % | Percent | Hz | Hertz |
| µV | microVolts | IF | Intermediate Frequency |
| µW | microWatts | kHz | kiloHertz |
| AC | Alternating Current | LO | Local Oscillator |
| ALSE | Absorber Lined Screened Enclosure | mA | milliAmps |
| | | max | maximum |
| AM | Amplitude Modulation | mbar | milliBars |
| Amb | Ambient | MHz | MegaHertz |
| ANSI | American National Standards Institute | min | minimum |
| | | mm | milliMetres |
| ºC | Degrees Celsius | ms | milliSeconds |
| CFR | Code of Federal Regulations | mW | milliWatts |
| | | NA | Not Applicable |
| CS | Channel Spacing | nom | Nominal |
| CW | Continuous Wave | nW | nanoWatt |
| dB | deciBels | OATS | Open Area Test Site |
| dBµV | deciBels relative to 1µV | OFDM | Orthogonal Frequency Division Multiplexing |
| dBc | deciBels relative to Carrier | | |
| dBm | deciBels relative to 1mW | ppm | Parts per million |
| DC | Direct Current | QAM | Quadrature Amplitude Modulation |
| EIRP | Equivalent Isotropic Radiated Power | QPSK | Quadrature Phase Shift Keying |
| ERP | Effective Radiated Power | | |
| EUT | Equipment Under Test | Ref | Reference |
| FCC | Federal Communications Commission | RF | Radio Frequency |
| | | RTP | Room Temperature and Pressure |
| FM | Frequency Modulation | | |
| FSK | Frequency Shift Keying | s | Seconds |
| g | Grams | Tx | Transmitter |
| GHz | GigaHertz | V | Volts |