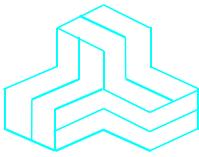


ENGINEERING TEST REPORT



Verity Studios Lucie
Model: LUCP51
FCC ID: 2AGUC-LUCP51

Applicant:

Verity Studios AG
Zurcherstrasse 39
Schlieren, Zurich 8952
Switzerland

In Accordance With

Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.247
Digital Modulation Systems (DTS) Operating in 2400 – 2483.5 MHz Band

UltraTech's File No.: 17VERS001_FCC15C247

This Test report is Issued under the Authority of
Tri M. Luu
Vice President of Engineering
UltraTech Group of Labs

Date: October 2, 2017

Report Prepared by: Dan Huynh

Tested by: Hung Trinh

Issued Date: October 2, 2017

Test Dates: August 10 - 26, 2017

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- This report must not be used by the client to claim product endorsement by any agency of the US Government.*
- This test report shall not be reproduced, except in full, without a written approval from UltraTech*

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1309



46390-2049



AT-1945



SL2-IN-E-1119R



Korea
KCC-RRA
CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

| | |
|--------------------------------------|---|
| Reference: | FCC Part 15, Subpart C, Section 15.247 |
| Title: | Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15 – Radio Frequency Devices |
| Purpose of Test: | Equipment Certification for Digital Modulation Systems (DTS) Operating Under §15.247 |
| Test Procedures: | <ul style="list-style-type: none">▪ ANSI C63.4▪ ANSI C63.10▪ FCC KDB Publication No. 558074 D01 DTS Meas Guidance v04 |
| Environmental Classification: | <input checked="" type="checkbox"/> Commercial, industrial or business environment <input type="checkbox"/> Residential environment |

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

| Publication | Year | Title |
|---|------|---|
| 47 CFR Parts 0-19 | 2017 | Code of Federal Regulations (CFR), Title 47 – Telecommunication |
| ANSI C63.4 | 2014 | 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 |
| ANSI C63.10 | 2013 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices |
| FCC, KDB Publication No. 558074 D01 DTS Meas Guidance v04 | 2017 | Guidance for Performing Compliance Measurements for Digital Transmission Systems (DTS) Operating Under Section 15.247 |

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

| Applicant | |
|------------------------|--|
| Name: | Verity Studios AG |
| Address: | Zurcherstrasse 39 Schlieren, Zurich 8952 Switzerland |
| Contact Person: | Markus Waibel Phone #: +41 44 586 5588 Fax #: n/a Email Address: mwaibel@veritystudios.com |

| Manufacturer | |
|------------------------|--|
| Name: | Verity Studios AG |
| Address: | Zurcherstrasse 39 Schlieren, Zurich 8952 Switzerland |
| Contact Person: | Markus Waibel Phone #: +41 44 586 5588 Fax #: n/a Email Address: mwaibel@veritystudios.com |

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

| | |
|---------------------------------------|--|
| Brand Name: | Verity Studios AG |
| Product Name: | Verity Studios Lucie |
| Model Name or Number: | LUCP51 |
| Serial Number: | Test Sample |
| Type of Equipment: | Digital Transmission System (DTS) |
| Input Power Supply Type: | External DC Power Supply / Lithium Polymer Battery |
| Primary User Functions of EUT: | Flying light for live entertainment |

2.3. EUT'S TECHNICAL SPECIFICATIONS

| Transmitter | |
|--|--|
| Equipment Type: | Mobile |
| Intended Operating Environment: | Commercial, industrial or business environment |
| Power Supply Requirement: | 3.7V(nominal) from on-board LiPo battery, regulated internally to 3.3V |
| RF Output Power Rating: | +1 dBm conducted power |
| Operating Frequency Range: | 2402 - 2480 MHz |
| RF Output Impedance: | 50 Ω |
| Duty Cycle: | Continuous |
| Modulation Type: | GFSK |
| Antenna Connector Types: | Integral chip antenna |

2.4. ASSOCIATED ANTENNA DESCRIPTIONS

| | |
|------------------|-----------------|
| Manufacturer: | Johan |
| Type: | Chip (SMT) |
| Model: | 2450AT18B100E |
| Frequency Range: | 2400 – 2500 MHz |
| Gain (dBi): | 0.5 |

2.5. LIST OF EUT'S PORTS

| Port Number | EUT's Port Description | Number of Identical Ports | Connector Type | Cable Type (Shielded/Non-shielded) |
|-------------|-------------------------|---------------------------|----------------|--------------------------------------|
| 1 | Charging contacts | 1 | Gold contacts | Direct connection to docking station |
| 2 | Micro-B USB Power Input | 1 | Micro-B USB | 1.5 m shielded |

2.6. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

| Ancillary Equipment # 1 | |
|--------------------------------|------------------------|
| Description: | Switching Adapter |
| Brand name: | Not available |
| Model Name or Number: | ASSA58-050800 |
| Serial Number: | -- |
| Connected to EUT's Port: | Docking Station of EUT |

| Ancillary Equipment # 2 | |
|--------------------------------|-------------------|
| Description: | Docking Station |
| Brand name: | Verity Studio AG |
| Model Name or Number: | Not Available |
| Serial Number: | -- |
| Connected to UUT's Port: | Charging contacts |

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

| | |
|---------------------|--|
| Temperature: | 21 to 23 °C |
| Humidity: | 45 to 58% |
| Pressure: | 102 kPa |
| Power Input Source: | 5.0 VDC via AC/DC adapter or 3.7 V(nominal) from on-board LiPo battery |

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

| | |
|----------------------------------|--|
| Operating Modes: | The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data. |
| Special Test Software: | Test software provided by the Applicant to operate the EUT at each channel frequency continuously and in the range of typical modes of operation. |
| Special Hardware Used: | N/A |
| Transmitter Test Antenna: | The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment as described with the test results. |

| Transmitter Test Signals | |
|---|------------------------------|
| Frequency Band(s): | 2402 - 2480 MHz |
| Frequency(ies) Tested: | 2402 MHz, 2440 MHz, 2480 MHz |
| RF Power Output: (measured maximum output power at antenna terminals) | 0.82 dBm Peak |
| Normal Test Modulation: | GFSK |
| Modulating Signal Source: | Internal |

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with ANAB File No.: AT-1945.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

| FCC Section(s) | Test Requirements | Compliance (Yes/No) |
|-----------------------------------|---|---------------------|
| 15.203 | Antenna requirements | Yes |
| 15.207(a) | AC Power Line Conducted Emissions | Yes |
| 15.247(a)(2) | 6 dB Bandwidth | Yes |
| 15.247(b)(3) | Peak Conducted Output Power | Yes |
| 15.247(d) | RF Conducted Spurious Emissions at the Transmitter Antenna Terminal | N/A |
| 15.247(d), 15.209 & 15.205 | Band-Edge and Transmitter Spurious Radiated Emissions | Yes |
| 15.247(e) | Power Spectral Density | Yes |
| 15.247(i), 1.1307, 1.1310, 2.1091 | RF Exposure | Yes |

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. TEST DATA

5.1. POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.1.1. Limit(s)

The equipment shall meet the limits of the following table:

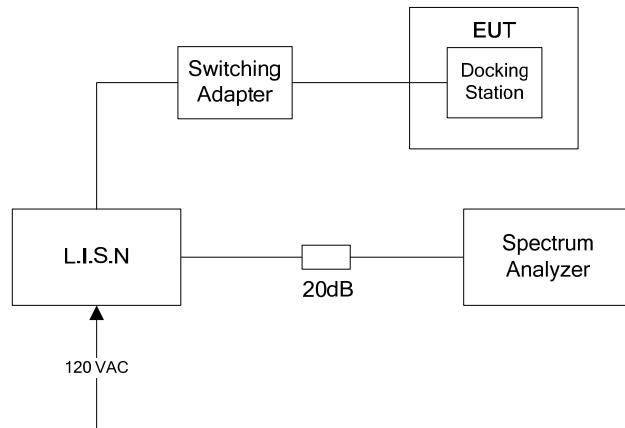
| Frequency of emission (MHz) | Conducted Limits (dB μ V) | |
|--------------------------------|-------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |

*Decreases linearly with the logarithm of the frequency

5.1.2. Method of Measurements

ANSI C63.4

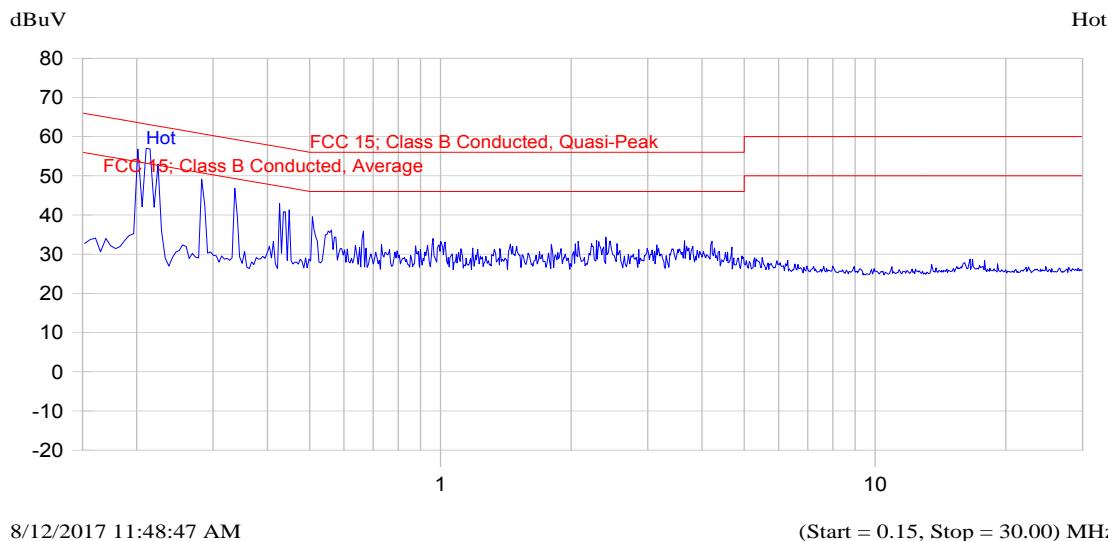
5.1.3. Test Arrangement



5.1.4. Test Data

Plot 5.1.4.1. Power Line Conducted Emissions (Tx Mode)
Line Voltage: 120 VAC; Line Tested: Hot

Current Graph

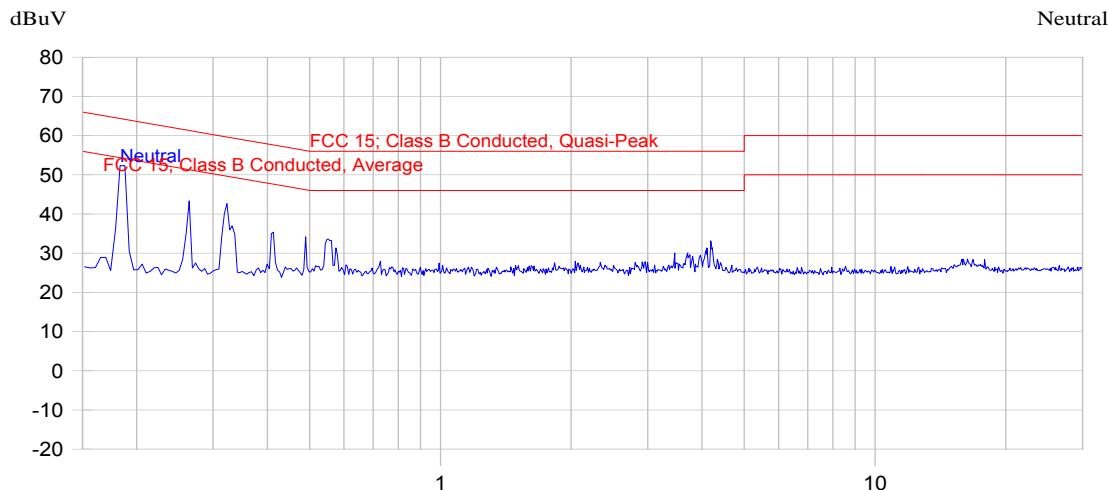


Current List

| Frequency MHz | Peak dBuV | QP dBuV | QP-QP Limit dB | Avg dBuV | Avg-Avg Limit dB | Trace Name |
|------------------|--------------|------------|-------------------|-------------|---------------------|------------|
| 0.187 | 60.8 | 52.9 | -11.3 | 25.4 | -28.7 | Hot |
| 0.198 | 59.9 | 51.7 | -12.0 | 25.0 | -28.7 | Hot |
| 0.210 | 57.7 | 49.9 | -13.3 | 24.8 | -28.4 | Hot |
| 0.276 | 52.4 | 44.6 | -16.4 | 26.4 | -24.5 | Hot |
| 0.333 | 49.4 | 40.3 | -19.0 | 24.7 | -24.6 | Hot |
| 0.416 | 44.5 | 36.4 | -21.2 | 26.7 | -20.9 | Hot |

Plot 5.1.4.2. Power Line Conducted Emissions (Tx Mode)
Line Voltage: 120 VAC; Line Tested: Neutral

Current Graph

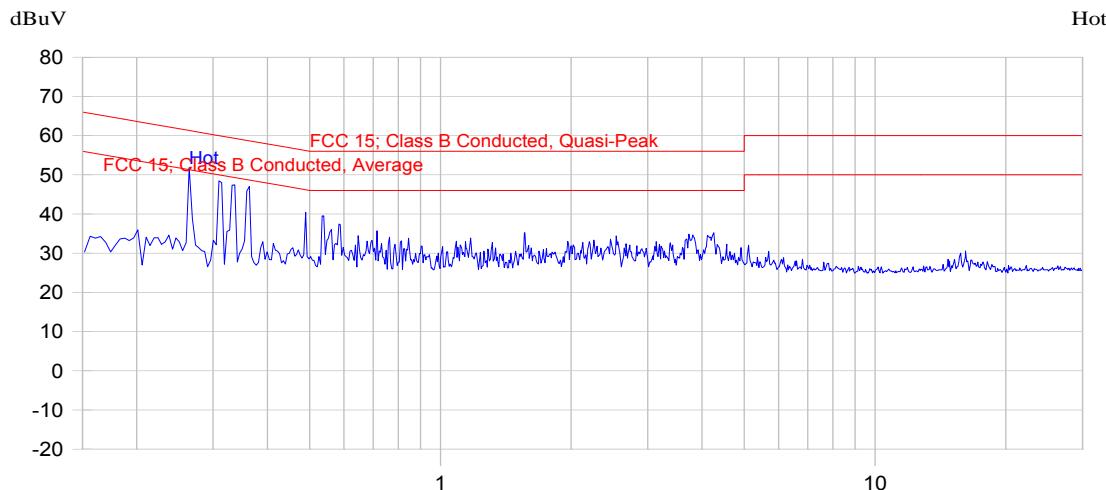


Current List

| Frequency MHz | Peak dBuV | QP dBuV | QP-QP Limit dB | Avg dBuV | Avg-Avg Limit dB | Trace Name |
|------------------|--------------|------------|-------------------|-------------|---------------------|------------|
| 0.184 | 54.5 | 47.0 | -17.3 | 25.0 | -29.3 | Neutral |
| 0.260 | 46.8 | 39.0 | -22.5 | 24.2 | -27.3 | Neutral |
| 0.315 | 43.3 | 35.0 | -24.9 | 24.0 | -25.8 | Neutral |
| 0.413 | 39.2 | 33.0 | -24.6 | 26.6 | -21.0 | Neutral |

Plot 5.1.4.3. Power Line Conducted Emissions (Rx Mode)
Line Voltage: 120 VAC; Line Tested: Hot

Current Graph



8/12/2017 10:38:41 AM

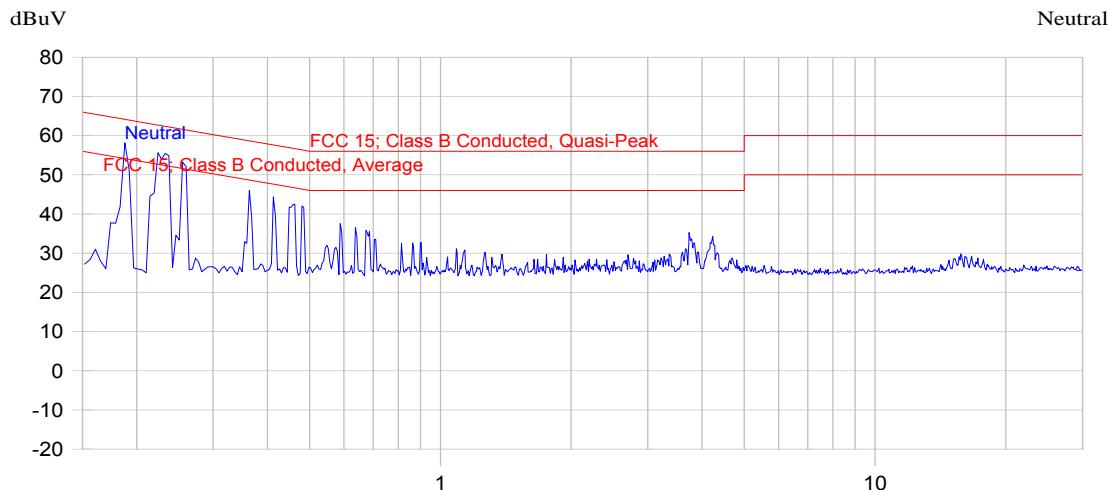
(Start = 0.15, Stop = 30.00) MHz

Current List

| Frequency MHz | Peak dBuV | QP dBuV | QP-QP Limit dB | Avg dBuV | Avg-Avg Limit dB | Trace Name |
|------------------|--------------|------------|-------------------|-------------|---------------------|------------|
| 0.247 | 55.7 | 48.6 | -13.3 | 27.5 | -24.3 | Hot |
| 0.300 | 51.9 | 44.4 | -15.8 | 26.6 | -23.6 | Hot |
| 0.326 | 50.0 | 42.6 | -16.9 | 26.3 | -23.3 | Hot |
| 0.354 | 48.3 | 40.4 | -18.4 | 25.2 | -23.7 | Hot |
| 0.481 | 42.7 | 34.9 | -21.4 | 23.8 | -22.5 | Hot |

Plot 5.1.4.4. Power Line Conducted Emissions (Rx Mode)
Line Voltage: 120 VAC; Line Tested: Neutral

Current Graph



8/12/2017 10:47:17 AM

(Start = 0.15, Stop = 30.00) MHz

Current List

| Frequency MHz | Peak dBuV | QP dBuV | QP-QP Limit dB | Avg dBuV | Avg-Avg Limit dB | Trace Name |
|------------------|--------------|------------|-------------------|-------------|---------------------|------------|
| 0.170 | 62.5 | 56.0 | -8.9 | 26.4 | -28.6 | Neutral |
| 0.216 | 58.2 | 50.8 | -12.2 | 25.8 | -27.2 | Neutral |
| 0.243 | 55.5 | 48.3 | -13.6 | 26.0 | -26.0 | Neutral |
| 0.372 | 47.2 | 39.6 | -18.9 | 23.0 | -25.5 | Neutral |
| 0.419 | 44.5 | 37.1 | -20.3 | 24.4 | -23.1 | Neutral |
| 0.451 | 43.8 | 35.9 | -21.0 | 22.6 | -24.2 | Neutral |
| 0.489 | 41.0 | 33.3 | -22.8 | 22.8 | -23.4 | Neutral |

5.2. OCCUPIED BANDWIDTH [§ 15.247(a)(2)]

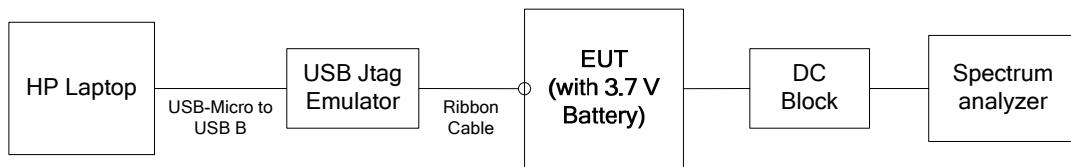
5.2.1. Limit(s)

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

5.2.2. Method of Measurements

KDB 558074 D01 DTS Meas Guidance v04, Section 8.2 Option 2.

5.2.3. Test Arrangement

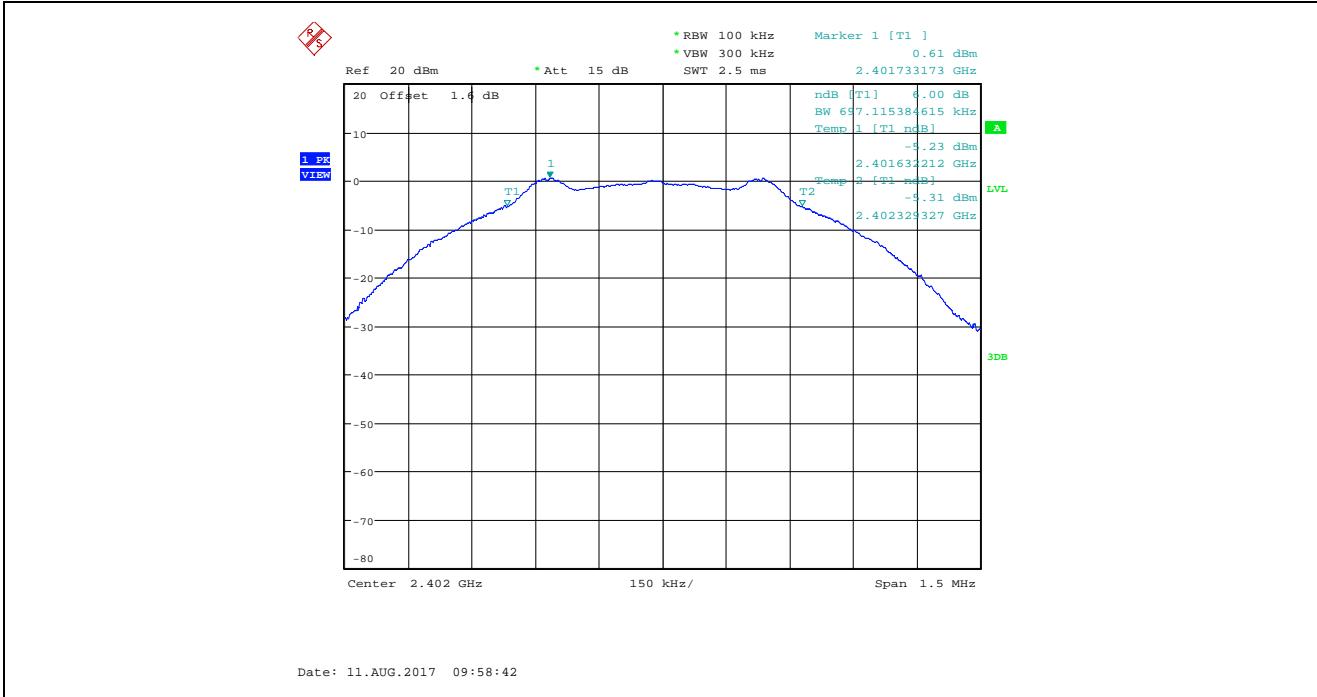


The laptop with USB Jtag Emulator was temporarily connected to the EUT to configured the unit for testing purposes only, removed upon completion.

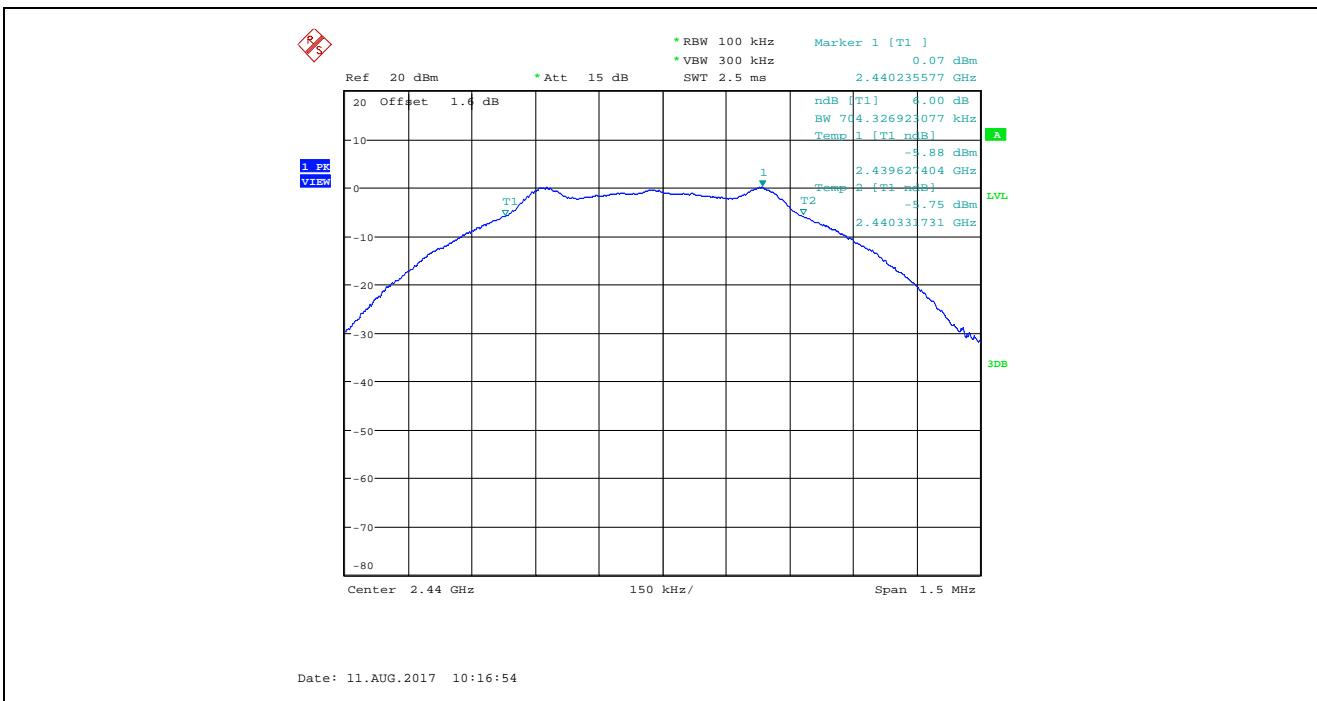
5.2.4. Test Data

| Modulation | Channel | Frequency (MHz) | 6dB BW (kHz) | Min. Limit (kHz) |
|------------|---------|-----------------|--------------|------------------|
| GFSK | 37 | 2402 | 697.12 | 500 |
| | 17 | 2440 | 704.33 | 500 |
| | 39 | 2480 | 721.15 | 500 |

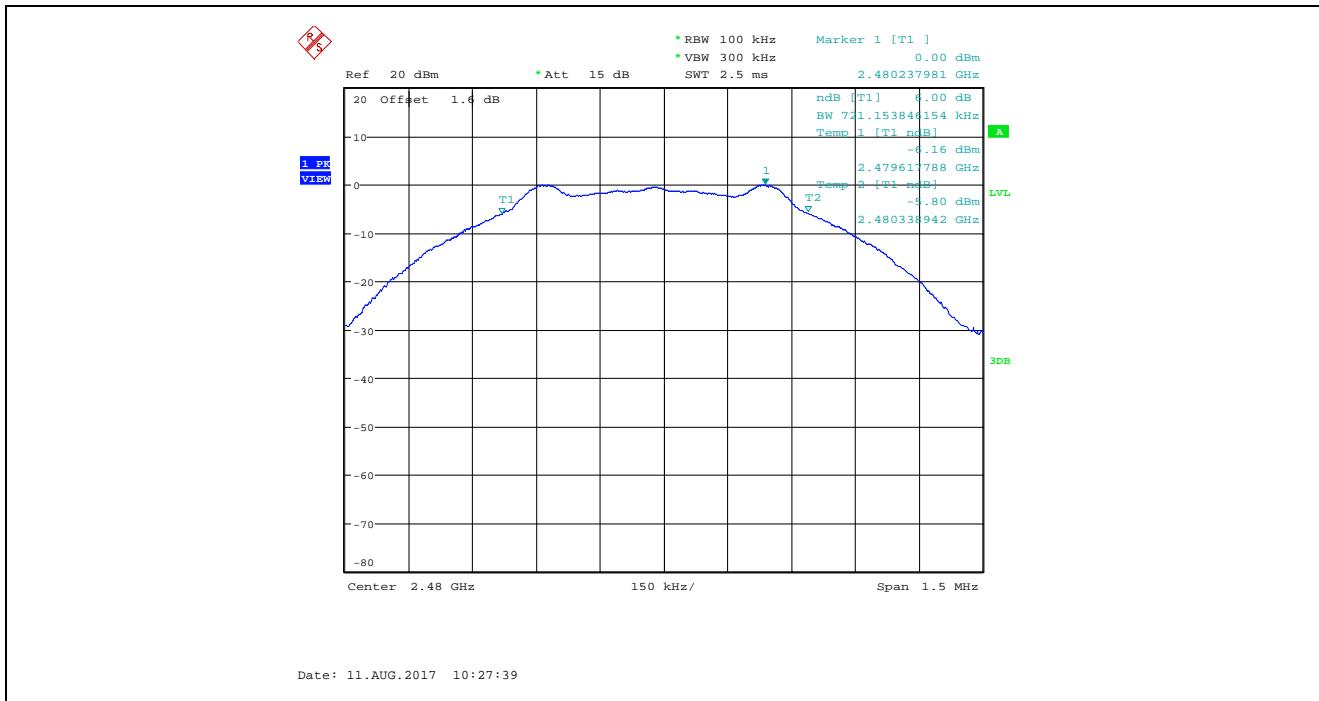
Plot 5.2.4.1. 6 dB Bandwidth, Channel 37, 2402 MHz



Plot 5.2.4.2. 6 dB Bandwidth, Channel 17, 2440 MHz



Plot 5.2.4.3. 6 dB Bandwidth, Channel 39, 2480 MHz



5.3. PEAK CONDUCTED OUTPUT POWER - DTS [§ 15.247(b)(3)]

5.3.1. Limit(s)

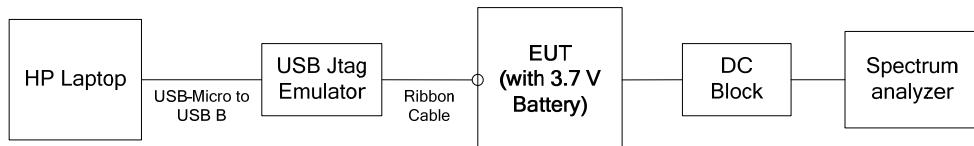
§ 15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

§ 15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.2. Method of Measurements & Test Arrangement

KDB 558074 D01 DTS Meas Guidance v04, Section 9.1.1 method RBW > DTS Bandwidth.

5.3.3. Test Arrangement

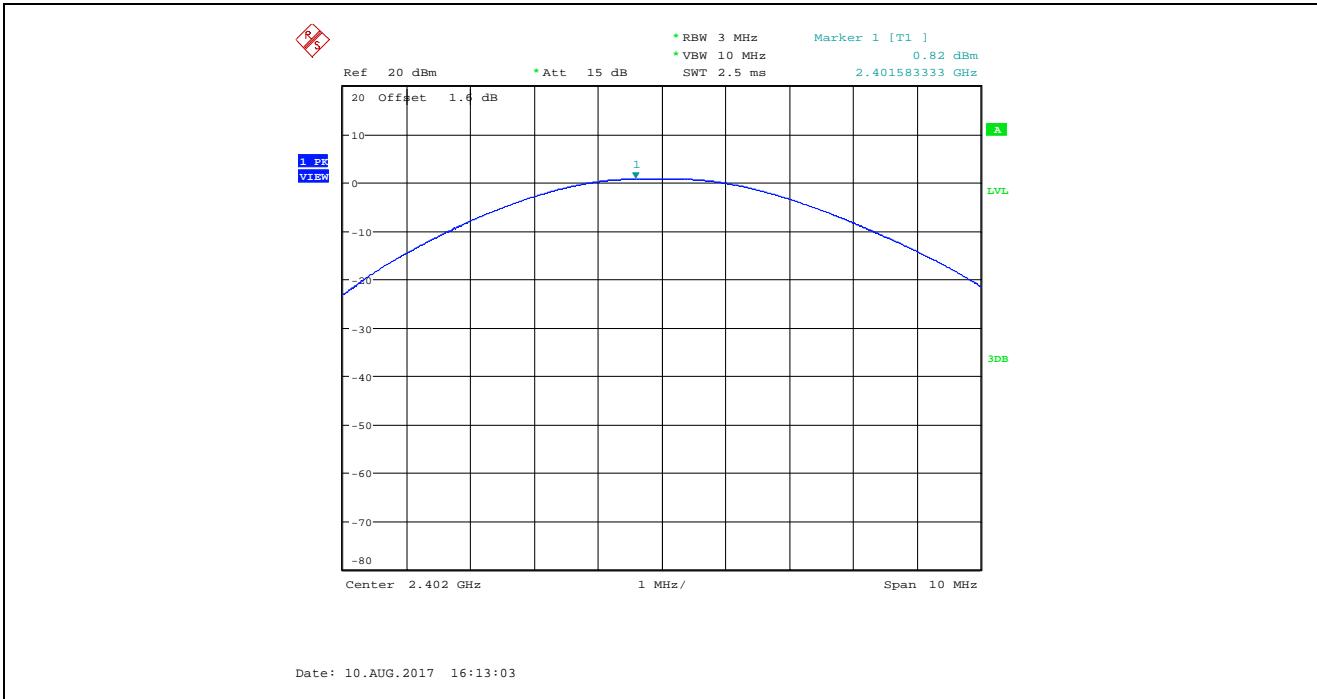


The laptop with USB Jtag Emulator was temporarily connected to the EUT to configured the unit for testing purposes only, removed upon completion.

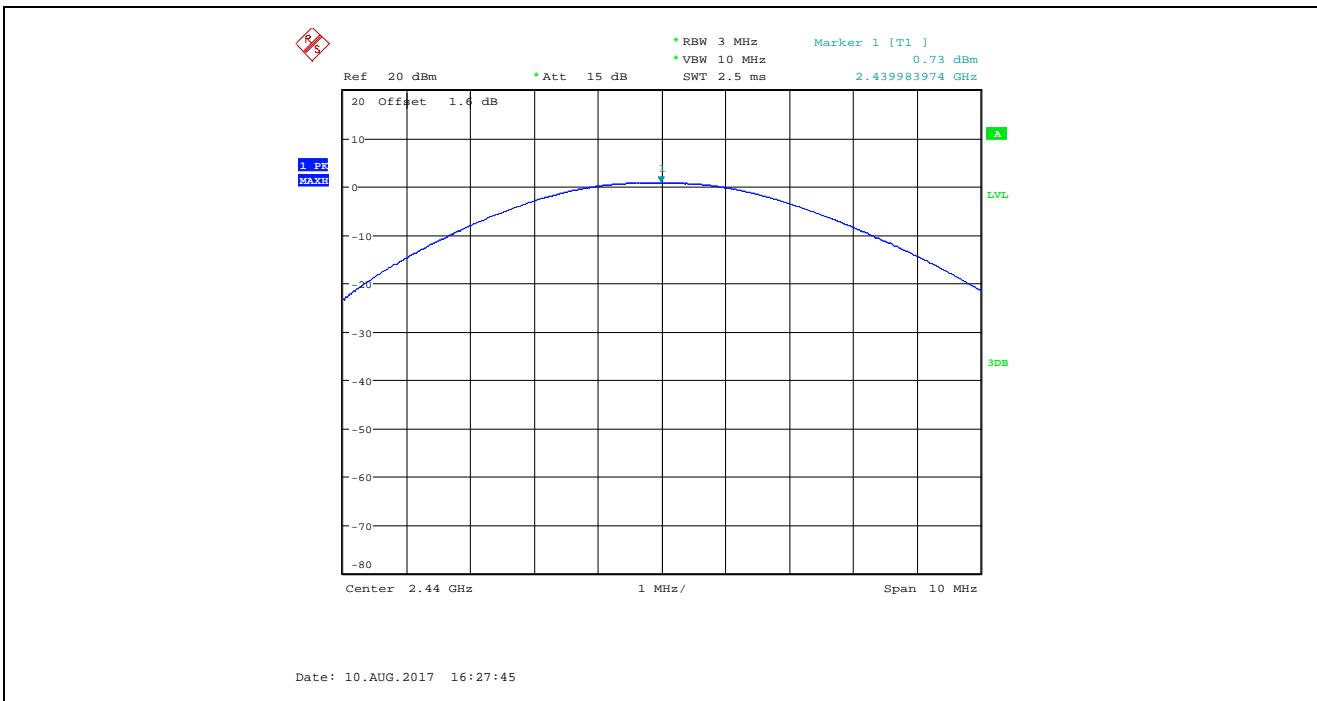
5.3.4. Test Data

| Modulation | Channel | Frequency (MHz) | Peak Power (dBm) | Peak Power Limit (dBm) | Margin (dBm) |
|------------|---------|-----------------|------------------|------------------------|--------------|
| GFSK | 37 | 2402 | 0.82 | 30 | -29.18 |
| | 17 | 2440 | 0.73 | 30 | -29.27 |
| | 39 | 2480 | 0.35 | 30 | -29.65 |

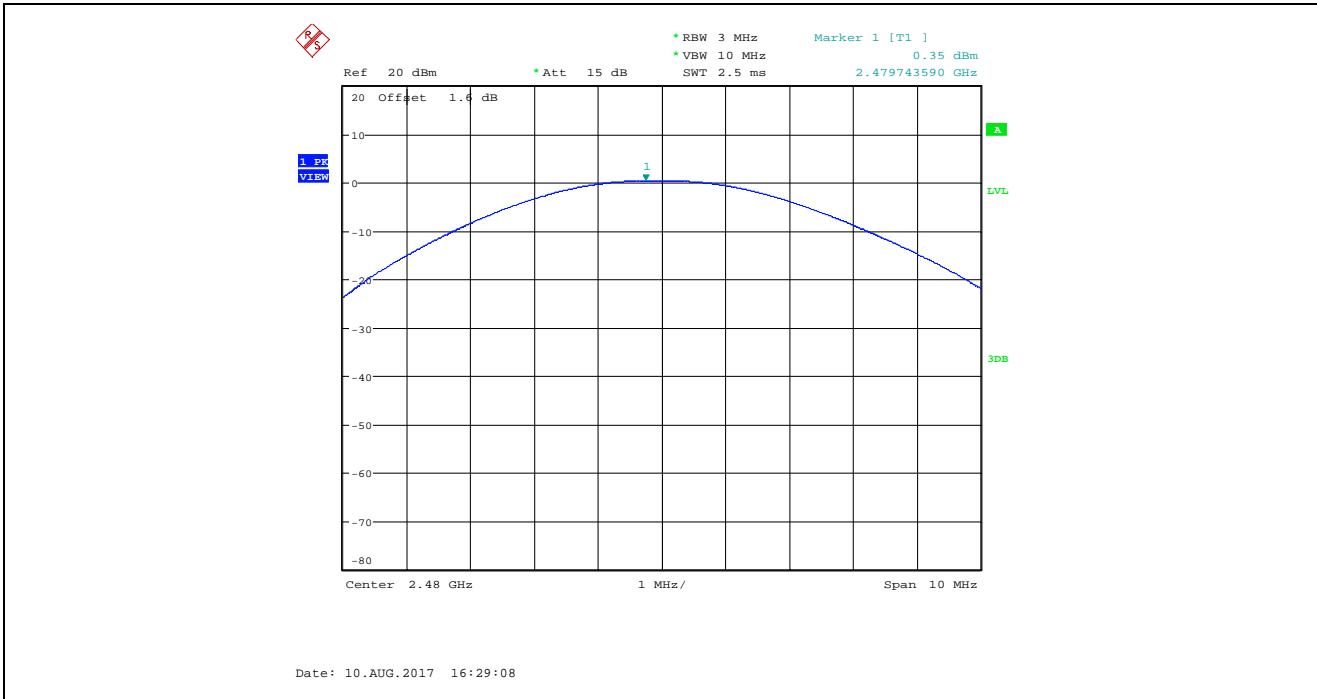
Plot 5.3.4.1. Maximum Peak Conducted Output Power, Channel 37, 2402 MHz



Plot 5.3.4.2. Maximum Peak Conducted Output Power, Channel 17, 2440 MHz



Plot 5.3.4.3. Maximum Peak Conducted Output Power, Channel 39, 2480 MHz



5.4. TRANSMITTER SPURIOUS RADIATED EMISSIONS AT 3 METERS [§§ 15.247(d), 15.209 & 15.205]

5.4.1. Limit(s)

§ 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Section 15.205(a) - Restricted Bands of Operation

| MHz | MHz | MHz | GHz |
|-------------------------|---------------------|---------------|------------------|
| 0.090–0.110 | 16.42–16.423 | 399.9–410 | 4.5–5.15 |
| 10.495–0.505 | 16.69475–16.69525 | 608–614 | 5.35–5.46 |
| 2.1735–2.1905 | 16.80425–16.80475 | 960–1240 | 7.25–7.75 |
| 4.125–4.128 | 25.5–25.67 | 1300–1427 | 8.025–8.5 |
| 4.17725–4.17775 | 37.5–38.25 | 1435–1626.5 | 9.0–9.2 |
| 4.20725–4.20775 | 73–74.6 | 1645.5–1646.5 | 9.3–9.5 |
| 6.215–6.218 | 74.8–75.2 | 1660–1710 | 10.6–12.7 |
| 6.26775–6.26825 | 108–121.94 | 1718.8–1722.2 | 13.25–13.4 |
| 6.31175–6.31225 | 123–138 | 2200–2300 | 14.47–14.5 |
| 8.291–8.294 | 149.9–150.05 | 2310–2390 | 15.35–16.2 |
| 8.362–8.366 | 156.52475–156.52525 | 2483.5–2500 | 17.7–21.4 |
| 8.37625–8.38675 | 156.7–156.9 | 2655–2900 | 22.01–23.12 |
| 8.41425–8.41475 | 162.0125–167.17 | 3260–3267 | 23.6–24.0 |
| 12.29–12.293 | 167.72–173.2 | 3332–3339 | 31.2–31.8 |
| 12.51975–12.52025 | 240–285 | 3345.8–3358 | 36.43–36.5 |
| 12.57675–12.57725 | 322–335.4 | 3600–4400 | (²) |
| 13.36–13.41. | | | |

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

Section 15.209(a) - Field Strength Limits within Restricted Frequency Bands

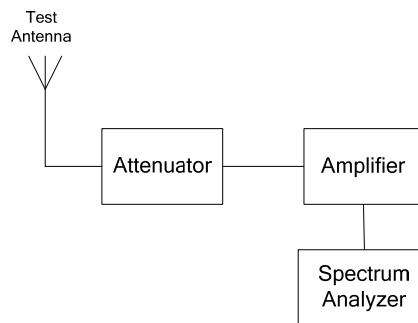
| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009 - 0.490 | 2,400 / F (kHz) | 300 |
| 0.490 - 1.705 | 24,000 / F (kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

5.4.2. Method of Measurements

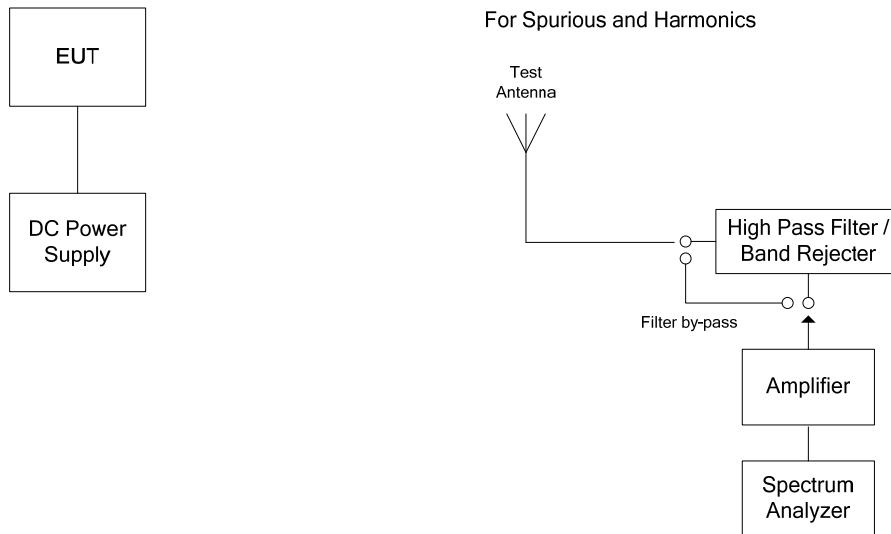
ANSI C63.10, ANSI 63.4 and KDB 558074 D01 DTS Meas Guidance v04, Section 13 Band-Edge measurements

5.4.3. Test Arrangement

For Band-Edge



For Spurious and Harmonics



5.4.4. Test Data

Remark(s):

- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- EUT shall be tested in three orthogonal positions.
- The following test data represent the worst-case derived from exploratory tests.

5.4.4.1. Spurious Radiated Emissions: EUT with 0.5 dBi integral Chip Antenna

| Fundamental Frequency: 2402 MHz Frequency Test Range: 30 MHz – 25 GHz | | | | | | | |
|--|------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------------|-------------|------------|
| Frequency (MHz) | RF Peak Level (dB μ V/m) | RF Avg Level (dB μ V/m) | Antenna Plane (H/V) | Limit 15.209 (dB μ V/m) | Limit 15.247 (dB μ V/m) | Margin (dB) | Pass/ Fail |
| 2402 | 89.28 | -- | V | -- | -- | -- | -- |
| 2402 | 89.84 | -- | H | -- | -- | -- | -- |
| 4804 | 47.48 | 35.84 | V | 54.0 | 69.8 | -18.2 | Pass* |
| 4804 | 48.64 | 38.98 | H | 54.0 | 69.8 | -15.0 | Pass* |

All other spurious emissions and harmonics are more than 20 dB below the applicable limit.

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

| Fundamental Frequency: 2440 MHz Frequency Test Range: 30 MHz – 25 GHz | | | | | | | |
|--|------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------------|-------------|------------|
| Frequency (MHz) | RF Peak Level (dB μ V/m) | RF Avg Level (dB μ V/m) | Antenna Plane (H/V) | Limit 15.209 (dB μ V/m) | Limit 15.247 (dB μ V/m) | Margin (dB) | Pass/ Fail |
| 2440 | 88.22 | -- | V | -- | -- | -- | -- |
| 2440 | 90.54 | -- | H | -- | -- | -- | -- |
| 4880 | 49.31 | 40.26 | V | 54.0 | 70.5 | -13.7 | Pass* |
| 4880 | 48.12 | 38.20 | H | 54.0 | 70.5 | -15.8 | Pass* |
| 7320 | 54.24 | 45.45 | V | 54.0 | 70.5 | -8.6 | Pass* |
| 7320 | 52.92 | 43.39 | H | 54.0 | 70.5 | -10.6 | Pass* |

All other spurious emissions and harmonics are more than 20 dB below the applicable limit.

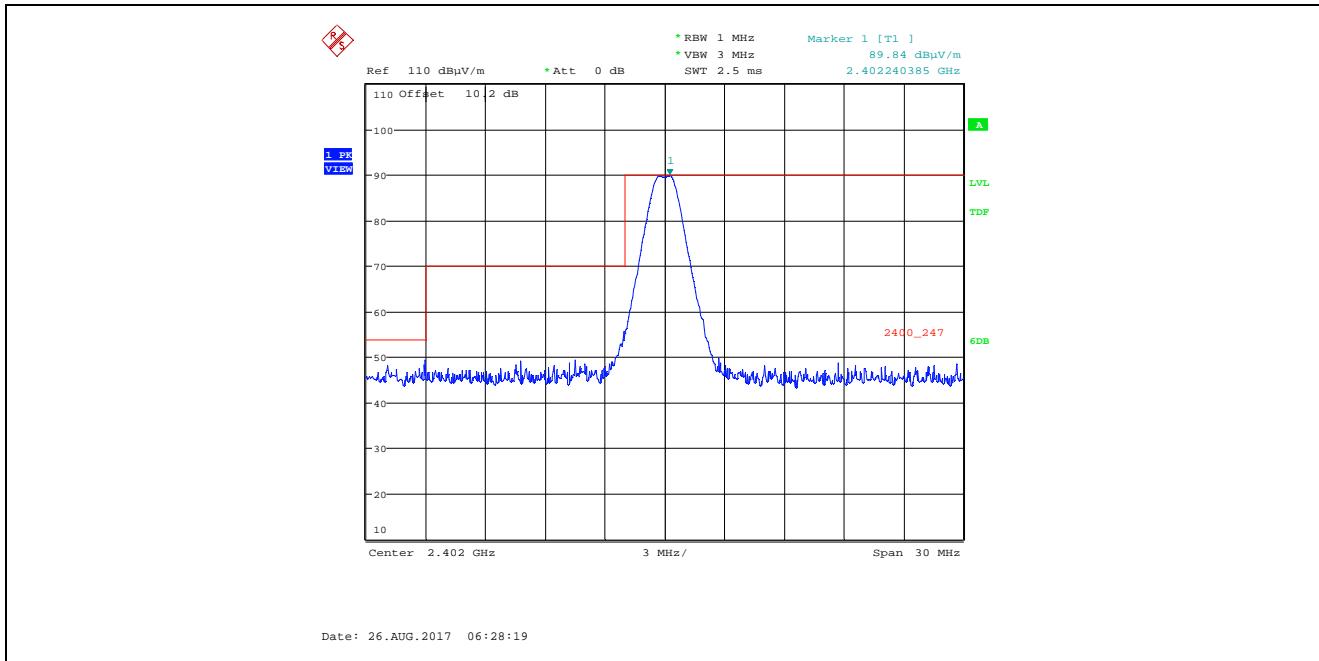
*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

| Fundamental Frequency: 2480 MHz | | | | | | | |
|--|------------------------------|-----------------------------|---------------------|-----------------------------|-----------------------------|-------------|-----------|
| Frequency Test Range: 30 MHz – 25 GHz | | | | | | | |
| Frequency (MHz) | RF Peak Level (dB μ V/m) | RF Avg Level (dB μ V/m) | Antenna Plane (H/V) | Limit 15.209 (dB μ V/m) | Limit 15.247 (dB μ V/m) | Margin (dB) | Pass/Fail |
| 2480 | 87.50 | -- | V | -- | -- | -- | -- |
| 2480 | 92.77 | -- | H | -- | -- | -- | -- |
| 4960 | 50.44 | 42.66 | V | 54.0 | 72.8 | -11.3 | Pass* |
| 4960 | 49.17 | 38.68 | H | 54.0 | 72.8 | -15.3 | Pass* |
| 7440 | 55.03 | 44.42 | V | 54.0 | 72.8 | -9.6 | Pass* |
| 7440 | 54.39 | 43.15 | H | 54.0 | 72.8 | -10.9 | Pass* |
| All other spurious emissions and harmonics are more than 20 dB below the applicable limit. | | | | | | | |

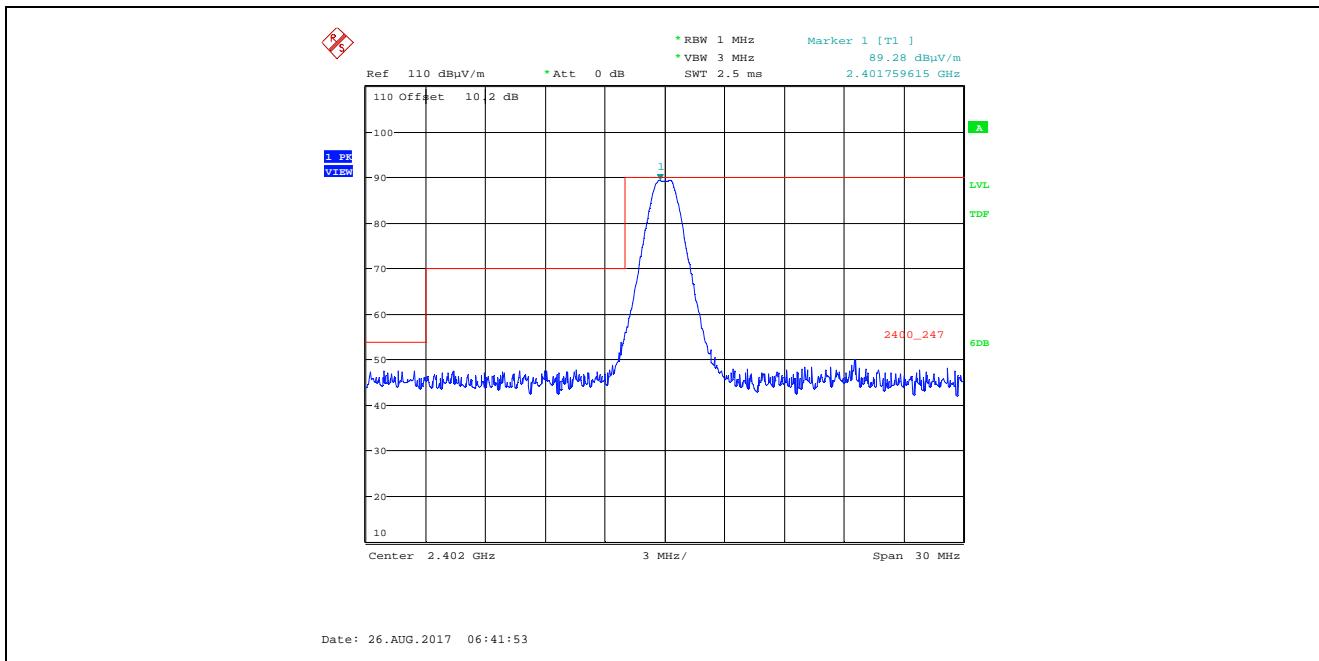
*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

5.4.4.2. Band –Edge RF Radiated Emissions

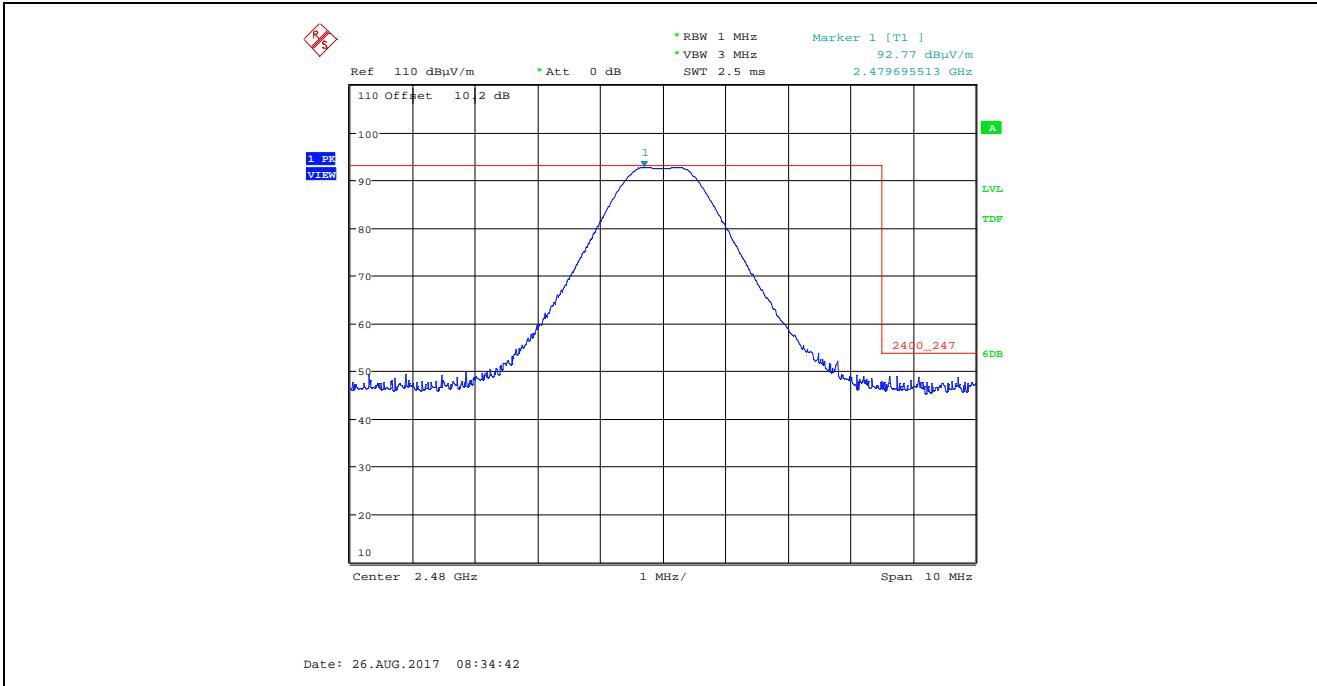
Plot 5.4.4.2.1. Band-Edge RF Radiated Emissions at 3 m, Horizontal Polarization
Lowest Frequency Channel, RBW = 1 MHz, VBW = 3 MHz



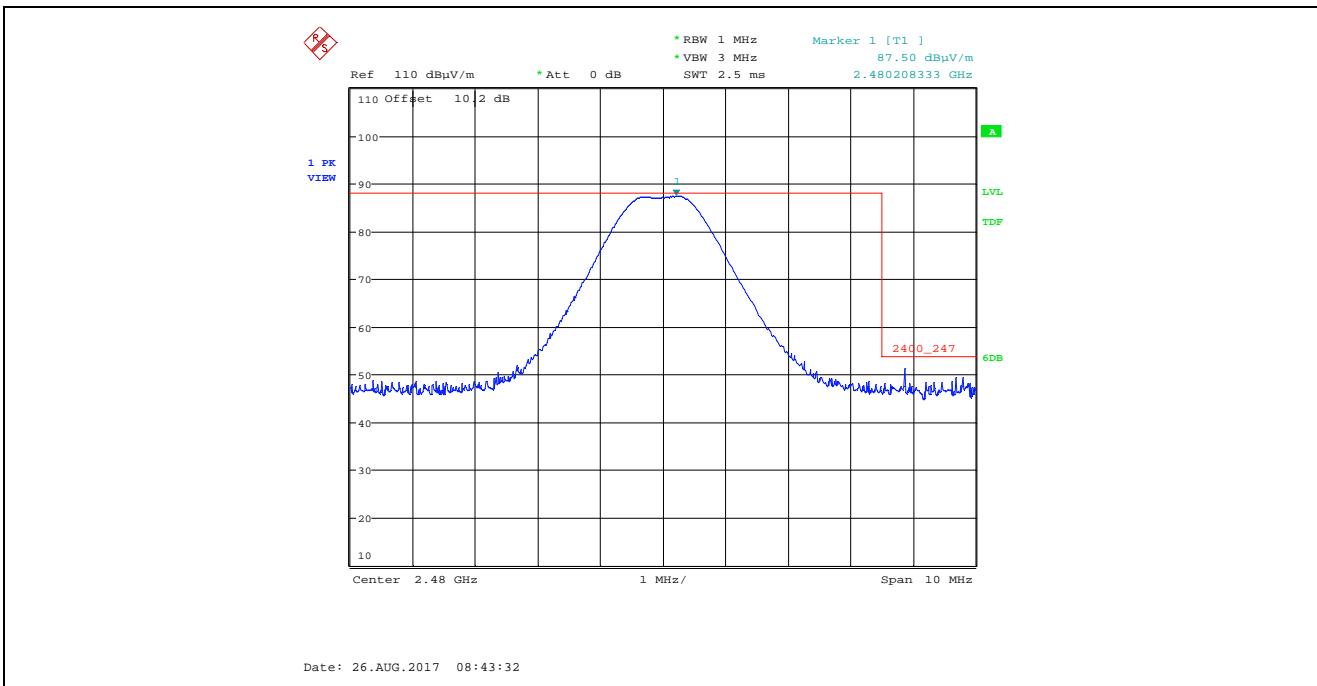
Plot 5.4.4.2.2. Band-Edge RF Radiated Emissions at 3 m, Vertical Polarization
Lowest Frequency Channel, RBW = 1 MHz, VBW = 3 MHz



**Plot 5.4.4.2.3. Band-Edge RF Radiated Emissions at 3 m, Horizontal Polarization
Highest Frequency Channel, RBW = 1 MHz, VBW = 3 MHz**



**Plot 5.4.4.2.4. Band-Edge RF Radiated Emissions at 3 m, Vertical Polarization
Highest Frequency Channel, RBW = 1 MHz, VBW = 3 MHz**



5.5. POWER SPECTRAL DENSITY [§ 15.247(e)]

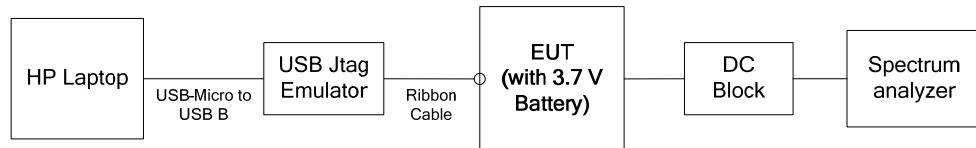
5.5.1. Limit(s)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.5.2. Method of Measurements

KDB 558074 D01 DTS Meas Guidance v04, Section 10.2 Method PKPSD (peak PSD).

5.5.3. Test Arrangement

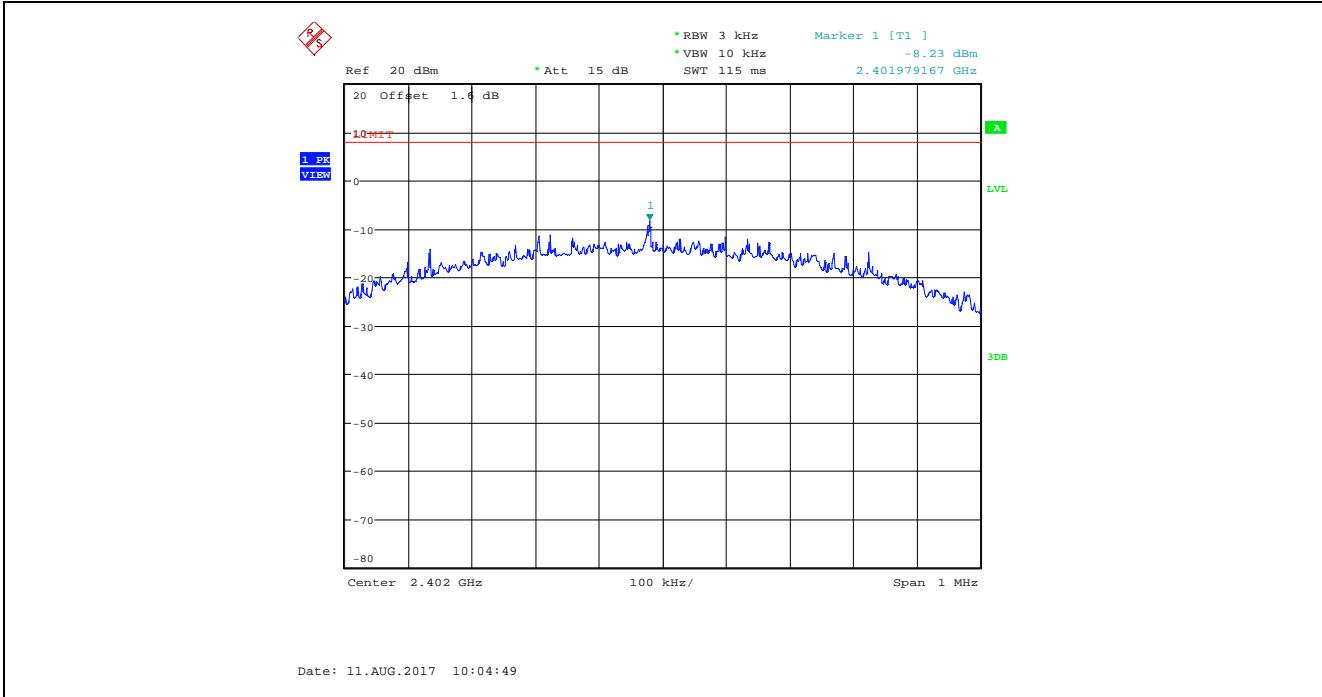


The laptop with USB Jtag Emulator was temporarily connected to the EUT to configured the unit for testing purposes only, removed upon completion.

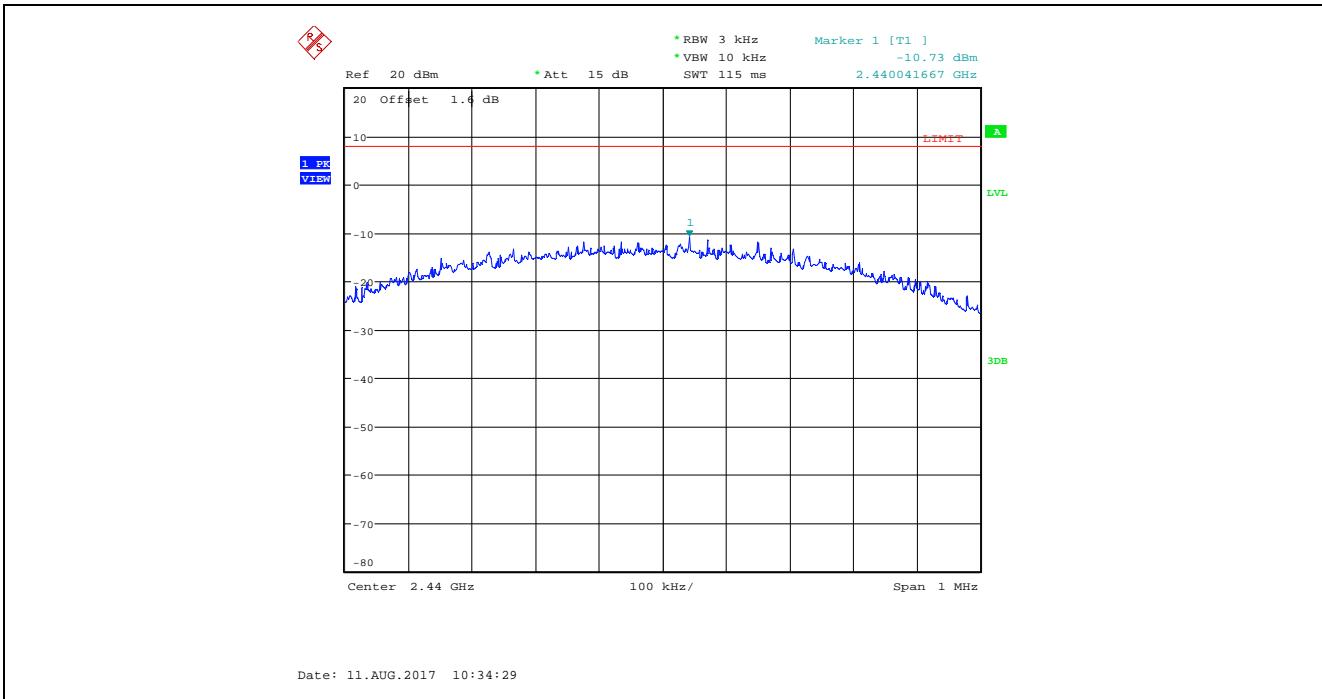
5.5.4. Test Data

| Modulation | Channel | Frequency (MHz) | PSD (dBm) | Max. Limit (dBm) | Margin (dBm) |
|------------|---------|-----------------|-----------|------------------|--------------|
| GFSK | 37 | 2402 | -8.23 | 8 | -16.23 |
| | 17 | 2440 | -10.73 | 8 | -18.73 |
| | 39 | 2480 | -12.51 | 8 | -20.51 |

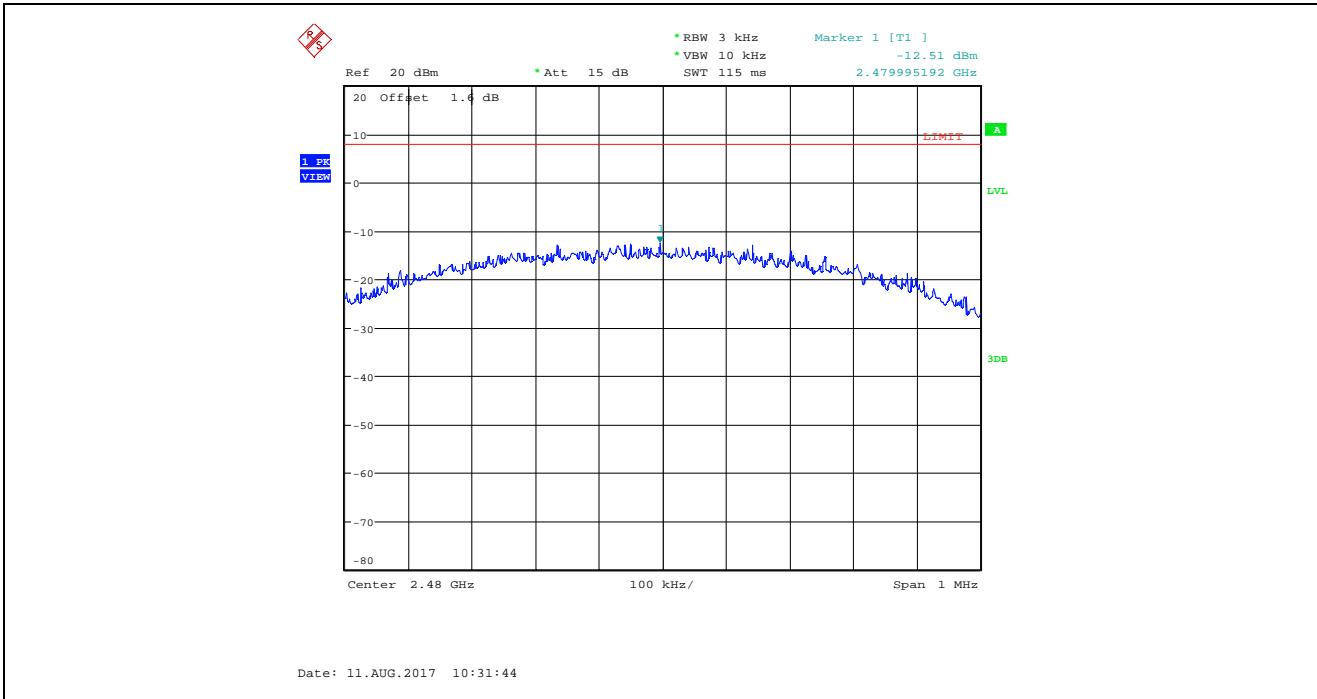
Plot 5.5.4.1. Power Spectral Density, Channel 37, 2402 MHz



Plot 5.5.4.2. Power Spectral Density, Channel 17, 2440 MHz



Plot 5.5.4.3. Power Spectral Density, Channel 39, 2480 MHz



5.6. RF EXPOSURE REQUIREMENTS [§§ 15.247(i), 1.1310 & 2.1091]

5.6.1. Limits

§ 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures | | | | |
| 0.3-3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0-30 | 1842/f | 4.89/f | *(900/f ²) | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | | | f/300 | 6 |
| 1500-100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *(180/f ²) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | | | f/1500 | 30 |
| 1500-100,000 | | | 1.0 | 30 |

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

5.6.2. Method of Measurements

Calculation Method of Power Density/RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where, P: power input to the antenna in mW

EIRP: Equivalent (effective) isotropic radiated power.

S: power density mW/cm²

G: numeric gain of antenna relative to isotropic radiator

r: distance to centre of radiation in cm

5.6.3. RF Evaluation

| Frequency (MHz) | EIRP (dBm) | EIRP (mW) | Evaluation Distance, r (cm) | Power Density, S (mW/cm ²) | MPE Limit (mW/cm ²) | Margin (mW/cm ²) |
|-----------------|------------|-----------|-----------------------------|--|---------------------------------|------------------------------|
| 2402 | 1.32 | 1.36 | 20 | 0.0003 | 1.0 | -0.9997 |

EXHIBIT 6. TEST EQUIPMENT LIST

| Test Instruments | Manufacturer | Model No. | Serial No. | Frequency Range | Cal. Due Date |
|--------------------|-----------------------|--------------------|-------------|-----------------------|---------------|
| Spectrum Analyzer | Hewlett Packard | HP 8593EM | 3710A00223 | 9 kHz–22 GHz | 04 Oct 2017 |
| Attenuator | Pasternack | PE7010-20 | 09 | DC–2 GHz | 13 Mar 2018 |
| LISN Used | EMCO | 3825/2 | 1531 | 10 kHz–100 MHz | 11 Nov 2017 |
| Spectrum Analyzer | Rohde & Schwarz | FSU26 | 200946 | 20Hz–26.5 GHz | 21 Jul 2018 |
| DC Block | Hewlett Packard | 11742A | 12460 | 0.045 – 26.5 GHz | See Note 1 |
| EMI Receiver | Rohde & Schwarz | ESU40 | 100037 | 20Hz–40 GHz | 09 May 2018 |
| RF Amplifier | Com-Power | PAM-0118A | 551052 | 0.5 – 18 GHz | 17 Jul 2018 |
| RF Amplifier | Hewlett Packard | 84498 | 3008A00769 | 1 – 26.5 GHz | 01 May 2018 |
| Biconilog | EMCO | 3142 | 9601-1005 | 26-1000 MHz | 12 May 2018 |
| Horn Antenna | EMCO | 3155 | 6570 | 1 – 18 GHz | 13 Oct 2018 |
| Horn Antenna | ETS-Lindgren | 3160-09 | 001183858 | 18 – 26.5 GHz | 11 Oct 2018 |
| High Pass Filter | K & L | 11SH10-4000/T12000 | 4 | Cut off 2.4 GHz | See Note 1 |
| Band Reject Filter | Micro-Tronics | BRM50701 | 105 | Cut off 2.4-2.483 GHz | See Note 1 |
| Spectrum Analyzer | Rohde & Schwarz | FSU26 | 200946 | 20Hz–26.5 GHz | 21 Jul 2018 |
| Attenuator | Pasternack | PE7024-10 | 4 | DC–26.5 GHz | See Note 1 |
| USB Jtag Emulator | Spectrum Digital Inc. | XDS200 | X2B_1701287 | --- | --- |
| HP Laptop | Hewlett Packard | 71025 | --- | --- | --- |
| DC Power Supply | Xantrex | HPD 60-5SX | 63903 | 0 – 60 Vdc | See Note 1 |

Note 1: Internal Verification/Calibration check

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

| | Line Conducted Emission Measurement Uncertainty (9 kHz – 30 MHz): | Measured | Limit |
|-------|--|------------|-----------|
| u_c | Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$ | ± 1.44 | ± 1.8 |
| U | Expanded uncertainty U: $U = 2u_c(y)$ | ± 2.89 | ± 3.6 |

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

| | Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz): | Measured (dB) | Limit (dB) |
|-------|--|------------------|---------------|
| u_c | Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$ | ± 2.39 | ± 2.6 |
| U | Expanded uncertainty U: $U = 2u_c(y)$ | ± 4.79 | ± 5.2 |

| | Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz): | Measured (dB) | Limit (dB) |
|-------|--|------------------|---------------|
| u_c | Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$ | ± 2.39 | ± 2.6 |
| U | Expanded uncertainty U: $U = 2u_c(y)$ | ± 4.78 | ± 5.2 |

| | Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz): | Measured (dB) | Limit (dB) |
|-------|--|------------------|---------------------|
| u_c | Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$ | ± 1.87 | Under consideration |
| U | Expanded uncertainty U: $U = 2u_c(y)$ | ± 3.75 | Under consideration |