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**EMC testing of the Levven Automation Souplay wireless FHSS radio in
accordance with**

**FCC Part 15.247, ANSI C63.4: 2014 and ANSI C63.10: 2013 as referenced by
FCC DA-00-705 rel. March 30, 2000.**

FCC ID: 2AA9N-LASY40

Prepared for: Levven Automation
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REVISION RECORD

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1.0 INTRODUCTION

1.1 Scope

The purpose of this report is to present the results of compliance testing performed in accordance with FCC Part 15.247, ANSI C63.4-2014 and ANSI C63.10-2013 to gain FCC Certification Authorization for Low-Power License-Exempt transmitters. All test procedures, limits, criteria, and results described in this report apply only to the Levven Automation Soulplay test sample, referred to herein as the EUT (Equipment Under Test).

The sample has been provided by the customer.

This report does not imply product endorsement by the Electronics Test Centre, A2LA, nor any Canadian Government agency.

1.2 Applicant

This test report has been prepared for Levven Automation, located in Edmonton, Alberta, Canada.

1.3 Test Sample Description

As provided to ETC (Airdrie) by Levven Automation:

| | | |
|-------------------------|--|--|
| Product Name: | Soulplay | |
| | Frequency Band | 2400 – 2483.5 MHz |
| | EUT Classification | FHSS |
| | Type of Modulation | Gaussian Frequency Shift Keying (GFSK) Phase Shift Keying (PSK) |
| | Frequency Range | 2402 – 2480 MHz |
| | Associated Antenna | PCB trace: inverted-F Antenna, 4.8 dBi |
| BT Radio | Detachable/Non Detachable | Non-detachable |
| Model# / Serial# | LA-SY40 (with enclosure), s/n N/A LA-SY40 (PCBA), s/n N/A | |
| Power supply: | 120VAC / 60 Hz | |

1.4 General Test Conditions and Assumptions

The EUT was set up and exercised using the configurations, modes of operation and arrangements defined in this report only. All inputs and outputs to and from other equipment associated with the EUT were adequately simulated.

Test software provided by the customer was used to program the EUT to transmit continuously. The device can operate in GFSK, PSK modulations and all modes were tested and included in this report. Channel numbers 0, 78 were used as Low, Mid and High Channels respectively.

The channels used for the test are:

Low = 2402 MHz

MID = 2442 MHz

High = 2480 MHz

The environmental conditions are recorded during each test and are reported in the relevant sections of this document.

1.5 Scope of Testing

Tests were performed in accordance with FCC Part 15.247, ANSI C63.4: 2014, ANSI C63.10: 2013 as referenced in FCC DA 00 705 rel. March 30, 2000.

1.5.1 Test Methodology

Test methods are specified in the Basic Standard as referenced and/or modified by the Product Standard in the part of Section 2 of this report associated with each particular test case.

1.5.2 Variations in Test Methodology

Any variance in methodology or deviation from the reference Standard is documented in the part of Section 2 of this report associated with each particular Test Case.

1.5.3 Test Sample Verification, Configuration & Modifications

EUT setup, configuration, protocols for operation and monitoring of EUT functions, and any modifications performed in order to meet the requirements, are detailed in each Test Case of Section 2 of this report.

1.5.4 Uncertainty of Measurement:

The factors contributing to uncertainty of measurement are identified and calculated in accordance with UKAS (United Kingdom Accreditation Service) document "Lab 34, The Expression of Uncertainty in EMC Testing, Aug 2002." as based on the "ISO Guide to the Expression of Uncertainty in Measurement, 1995."

This uncertainty estimate represents an expended uncertainty expressed at approximately 95% confidence using a coverage factor of $k = 2$.

| Test Method | Uncertainty |
|---|-------------|
| Radiated Emissions Level (9 KHz – 1 GHz) | ±4.6 dB |
| Radiated Emissions Level (1 GHz – 26.5 GHz) | ±5.31 dB |
| Conducted Emissions Level (150 KHz – 30 MHz) | ±2.7 dB |
| Uncertainty Conducted Power level | ±0.5 dB |
| Uncertainty Conducted Spurious emission level | ±0.6 dB |
| Uncertainty for Bandwidth test | ±1.5 % |

2.0 TEST CONCLUSION

STATEMENT OF COMPLIANCE

The customer equipment referred to in this report was found to comply with the requirements, as summarized below.

The EUT was subjected to the following tests. Compliance status is reported as **Compliant** or **Non-compliant**. **N/A** indicates the test was Not Applicable to the EUT.

Note: Maintenance of compliance is the responsibility of the Manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the EUT with respect to the standards detailed in this test report.

The following table summarizes the tests performed in terms of the specification, class or performance criterion applied, and the EUT modification state.

| Test Case | Test Type | Specification | Test Sample | Modifications | Config. | Result |
|--|-----------------------------|------------------------------|--------------------------|---------------|------------|------------------|
| Frequency Range = 2402 – 2480 MHz Max. Conducted Tx Power=6.683 dBm (4.66 mW) | | | | | | |
| 2.1 | AC Conducted Emissions (Tx) | 15.207 | LA-SY40 (PCBA) | none | see § 2.1 | Compliant |
| 2.2 | Occupied Bandwidth | 15.247(a)(1) 15.247(2)(2) | LA-SY40 (PCBA) | none | see § 2.2 | Compliant |
| 2.3 | Max Output Power Conducted | 15.247(b) | LA-SY40 (PCBA) | none | see § 2.3 | Compliant |
| 2.4 | Band Edge | 15.247(d) | LA-SY40 (PCBA) | none | see § 2.4 | Compliant |
| 2.5 | Conducted Spurious | 15.247(d) | LA-SY40 (PCBA) | none | see § 2.5 | Compliant |
| 2.6 | Minimum channel separation | 15.247(a)(1) | LA-SY40 (PCBA) | none | see § 2.6 | Compliant |
| 2.7 | Hopping Channels | 15.247(a, 1(iii)) | LA-SY40 (PCBA) | none | see § 2.7 | Compliant |
| 2.8 | Average time of Occupancy | 15.247(a, 1(iii)) | LA-SY40 (PCBA) | none | see § 2.8 | Compliant |
| 2.9 | EUT Position | ANSI C63.4 | LA-SY40 (with enclosure) | none | see § 2.9 | n/a |
| 2.10 | Radiated Spurious (Tx Mode) | 15.205, 15.209 15.247(d) | LA-SY40 (with enclosure) | none | see § 2.11 | Compliant |
| 2.11 | RF Exposure | 15.247(i) | LA-SY40 (PCBA) | none | see § 2.10 | Exempt |

Refer to the test data for applicable test conditions.

2.1 AC Power Line Conducted Emissions: Transmit Mode

| | |
|--|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Bushra Muharram | Standard: FCC Part 15.207 |
| Date: 2018-12-19 (21.3°C, 14.3 % RH) | Basic Standard: ANSI C63.10: 2013 |
| EUT status: Compliant | |
| Comments The conducted emissions produced by a device shall not exceed the limits as specified. | |

2.1.1 Test Guidance: ANSI C63.10-2013, Clause 6.2

Before any testing is performed, the Ambient (measurement noise floor) is recorded, and a QC check is performed to show that the system is functioning correctly.

Testing starts with a scan, performed under software control. After this is complete, the list of frequencies of interest is generated. These frequencies are then investigated for quasi-peak and average amplitude, as applicable. Emissions measured with a QP detector that fall below the Average limit are deemed to meet both requirements.

2.1.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.1.3 Test Equipment

Testing was performed with the following equipment:

| Equipment | Manufacturer | Model # | Asset # | Calibration Date | Calibration Due |
|----------------|--------------|----------|----------------|------------------|-----------------|
| EMC Software | UL | Ver. 9.5 | ETC-SW-EMC 2.1 | N/A | N/A |
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 2019-05-02 |
| LISN | Com-Power | LI-215A | 6180 | 2018-06-06 | 2020-06-06 |
| Temp/RH logger | Extech | 42270 | 5892 | 2018-04-13 | 2019-04-13 |

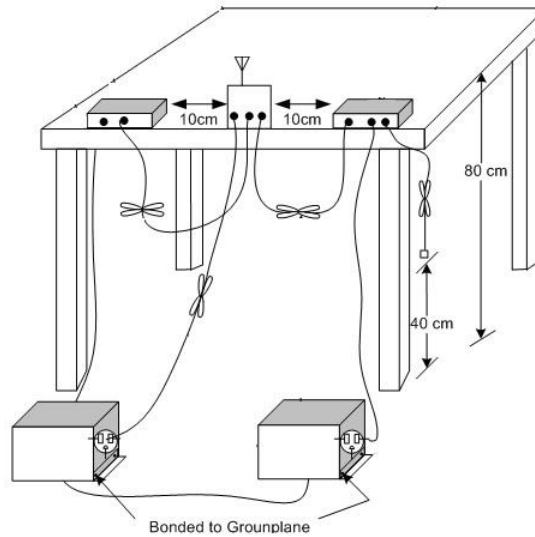
2.1.4 Test Sample Verification, Configuration & Modifications

The Soulplay was power up by main. Unit is transmitting during the test.

All Bluetooth TX mode were evaluated, but only the worst case (PSK modulation) are shown in the test report.

The EUT met the requirements without modification.

Test setup diagram:



2.1.5 Conducted Emissions Data:

The EUT was evaluated in all transmit.

The emissions data is presented in tabular form, showing the uncorrected spectrum analyzer reading, the correction factors applied, the net result, the value(s) of limit at the frequency measured, and the Delta between the result and the limit.

| Freq. Marker | Freq. (MHz) | Raw reading (dBµV) | Det. | LISN Factor (dB/m) | Cable Loss (dB) | Corrected Reading (dBµV) | FCC 15.207 Limit (dBµV) | Delta (dB) | L / N |
|--------------|-------------|--------------------|------|--------------------|-----------------|--------------------------|-------------------------|------------|---------|
| 1 | 0.15269 | 35.47 | Av | .8 | 0 | 36.27 | 55.85 | -19.58 | Line |
| 2 | 0.67825 | 26.09 | Av | 0 | 0 | 26.09 | 46 | -19.91 | Line |
| 1 | 0.15276 | 31.9 | Av | .8 | 0 | 32.7 | 55.85 | -23.15 | Neutral |
| 2 | 0.15814 | 32.88 | Av | .7 | 0 | 33.58 | 55.56 | -21.98 | Neutral |
| 3 | 0.68878 | 26.55 | Av | 0 | 0 | 26.55 | 46 | -19.45 | Neutral |

Av = Average Detector

Raw Reading in dBµV + Antenna Factor in dB/m + Gain/Loss Factor in dB = Corrected Field Strength in dBµV/m.

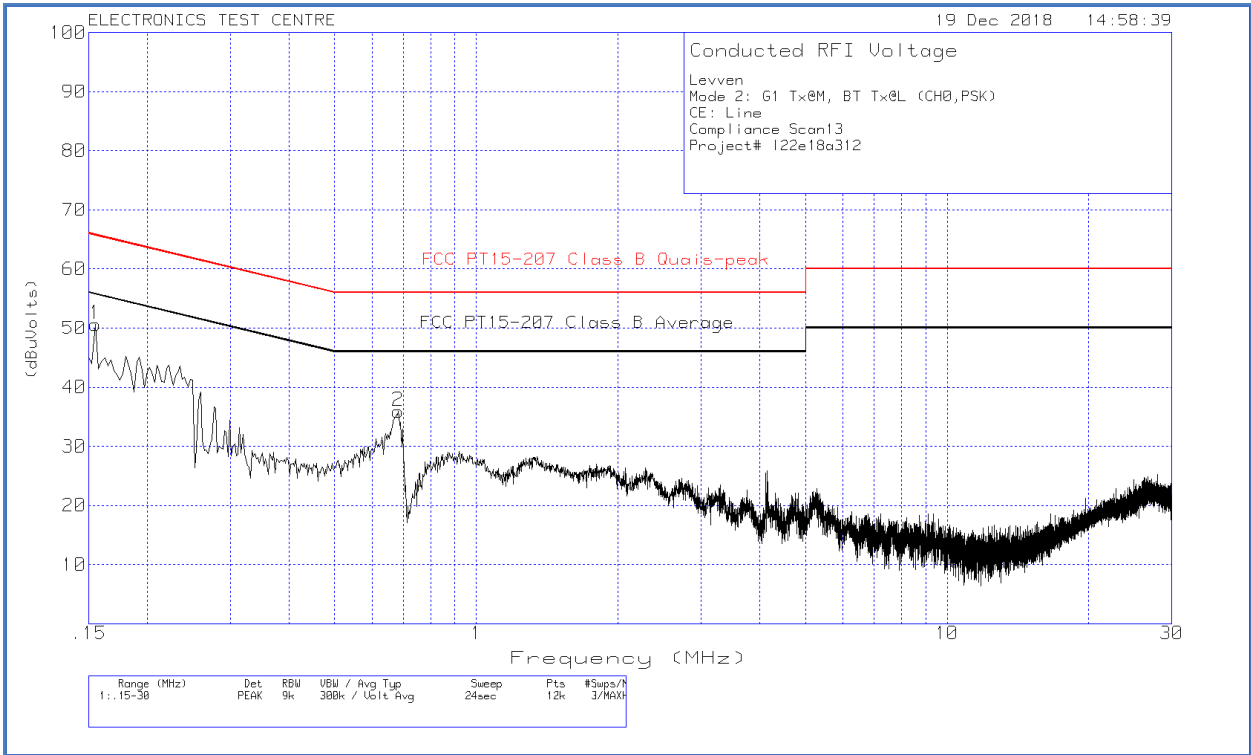
Note: When a preamp is used, the resulting gain is compensated, producing a negative value for the Cable Loss.

Negative values for Delta indicate compliance.

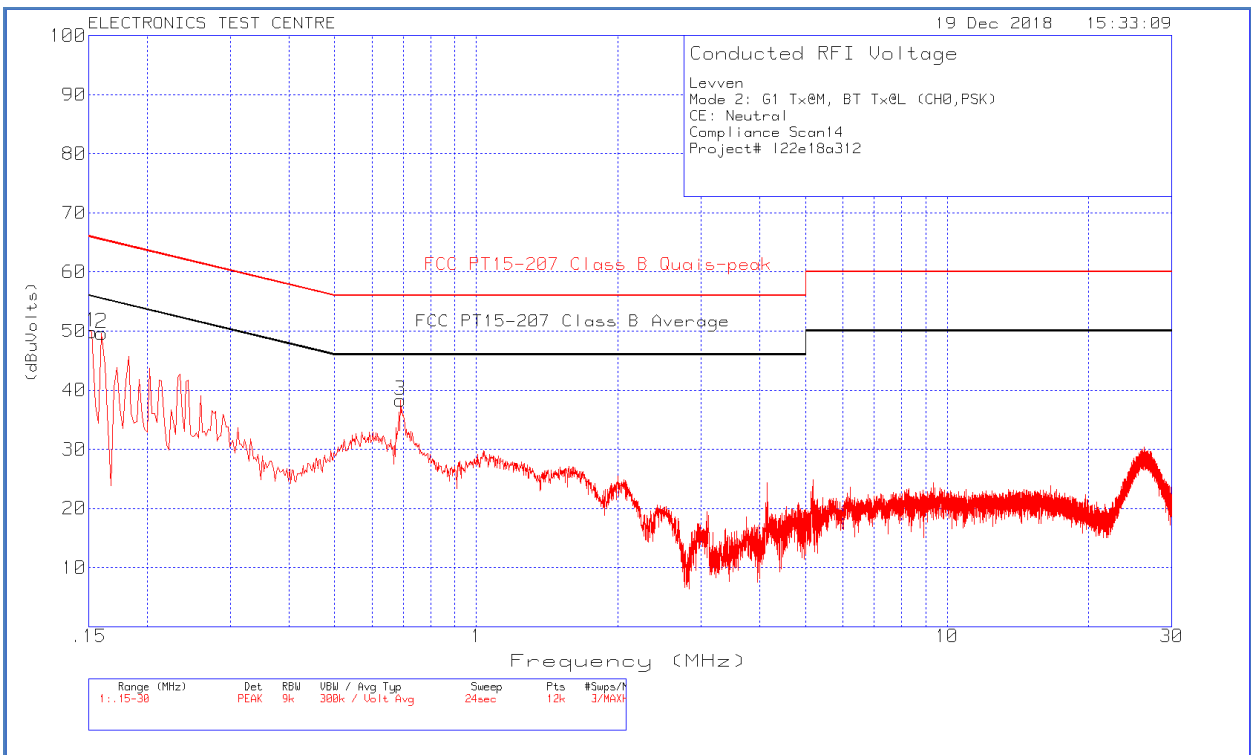
The Ground Bond was measured and found to be 1.1 mΩ.

Note: When a preamp is used, the resulting gain is compensated, producing a negative value for the Cable Loss.

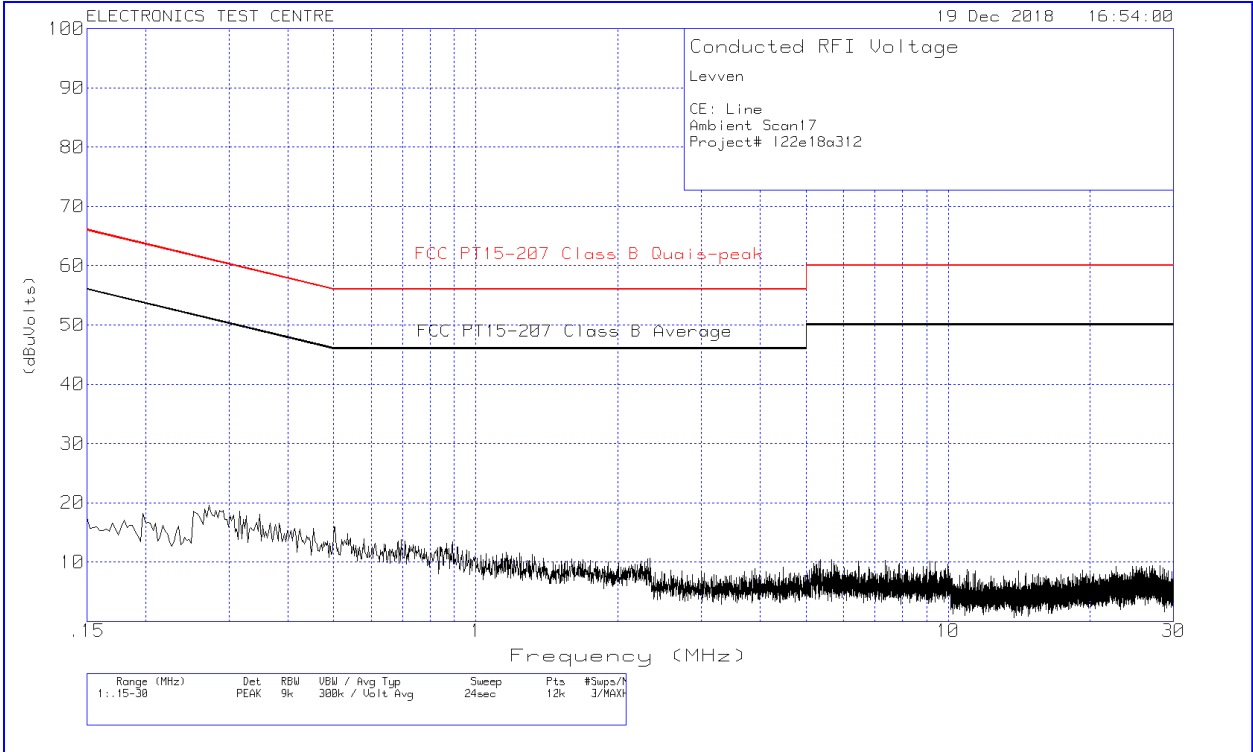
Plot of Conducted Emissions: Line (Tx Mode BT/ Ginseng1)



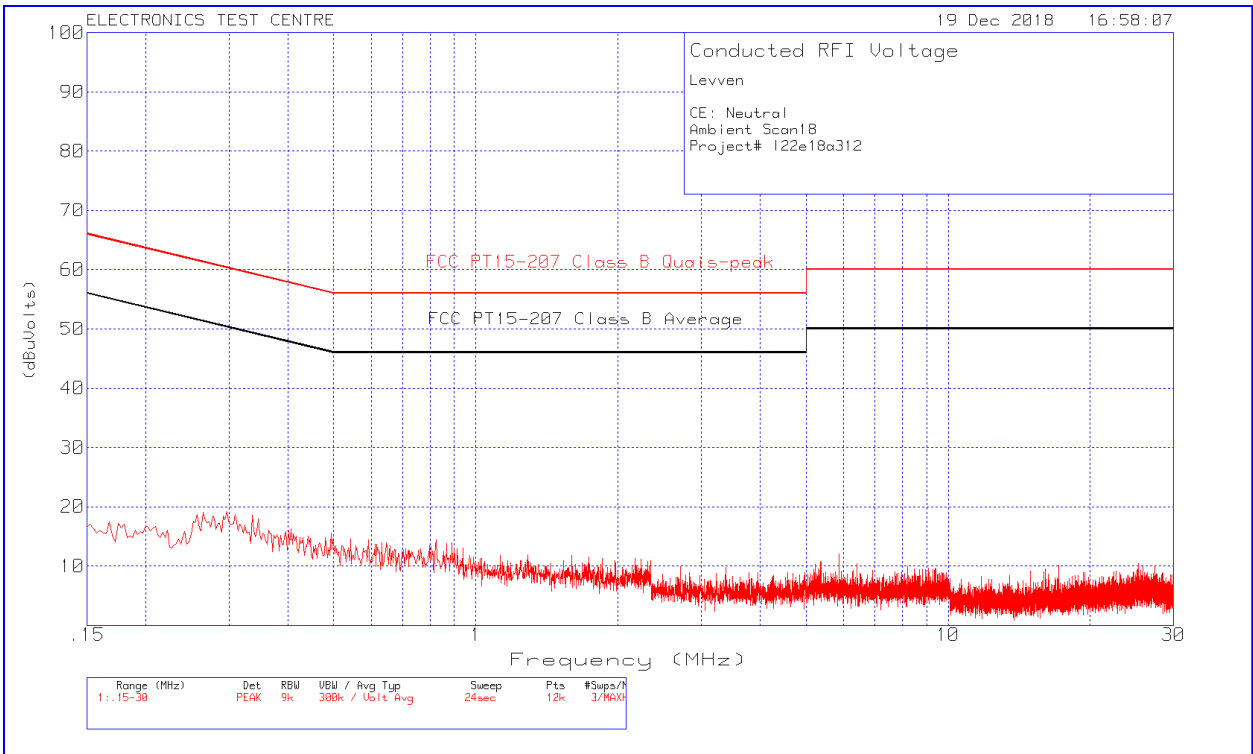
Plot of Conducted Emissions: Neutral (Tx Mode BT/Ginseng1)



Plot of Test Chamber Ambient: Line



Plot of Test Chamber Ambient: Neutral



2.2 Channel Occupied Bandwidth

| | |
|--|---|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 Basic Standard: ANSI C63.10-2013 |
| Date: 2018-12-18 (20.6°C, 14.2 % RH) | |
| EUT status: Compliant | |

Specification: FCC 15.247 (a, 1)

Criteria: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

2.2.1 Test Guidance: ANSI C63.10-2013, Clause 6.9.2 & 6.9.3 / DA 00-705

This measurement is performed at low, mid and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

| | |
|--|---|
| Use the following spectrum analyzer settings: | |
| Span | approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel |
| RBW | > 1% of the 20 dB bandwidth |
| VBW | ≥ RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |
| Allow the trace to stabilize. The automated 99% BW function of the spectrum analyzer is engaged, 20 dB OBW is measured with the x dB function. | |

2.2.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.2.3 Test Equipment

Testing was performed with the following equipment:

| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EML receiver | Agilent | N9038A | 6130 | 2018-05-2 | 1 year | 2019-05-2 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.2.4 Test Sample Verification, Configuration & Modifications

The EUT was set to transmit continuously on a selected channel with test-specific software. The output was modulated as in normal operation.

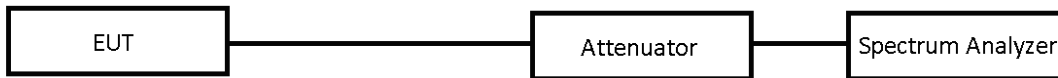
The EUT modified to provide the direct access to antenna trace for conducted measurements.

For compliance purposes EUT met requirements without any modification

There is no Deviation and exclusions from test specifications.

Test setup diagrams for Occupied Bandwidth testing:

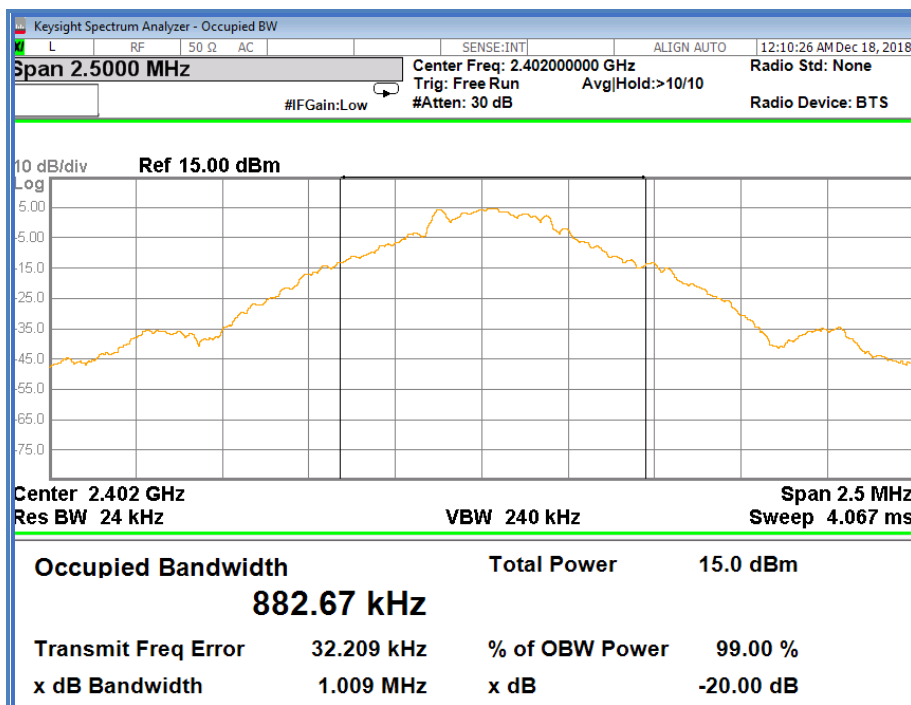
Conducted:



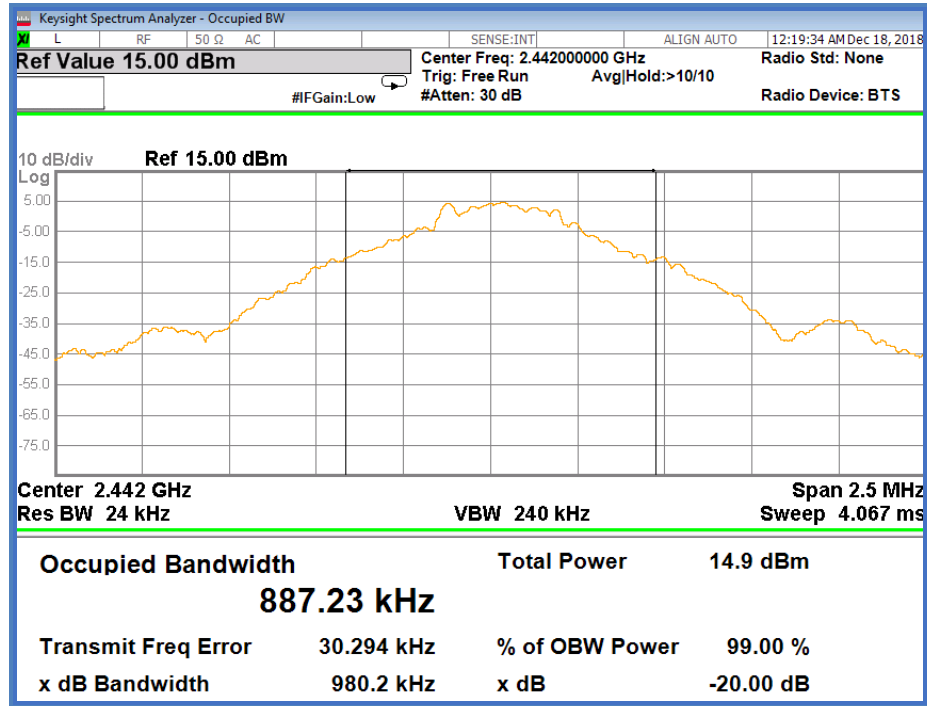
2.2.5 Channel Occupied Bandwidth Data: (GFSK MODE)

| Channel | Freq. [MHz] | 20 dB OBW [MHz] | 99% OBW [KHz] |
|---------|-------------|-----------------|---------------|
| Low | 2402 | 1.009 | 882.67 |
| Mid | 2442 | 0.9802 | 887.23 |
| High | 2480 | 0.9805 | 885.53 |

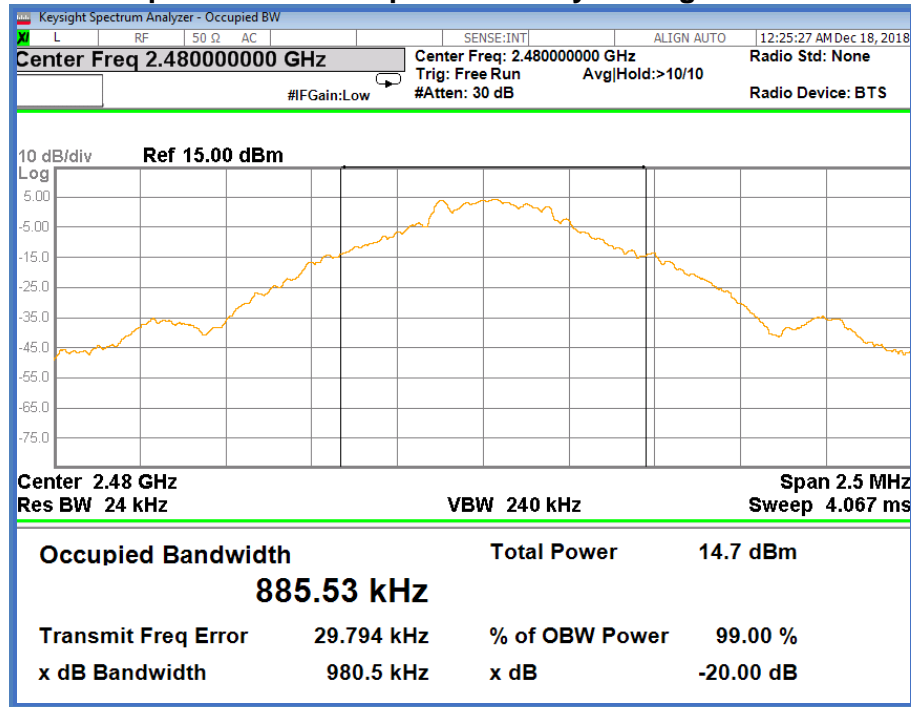
Screen captures from the spectrum analyzer: Low Channel



Screen captures from the spectrum analyzer: MID Channel



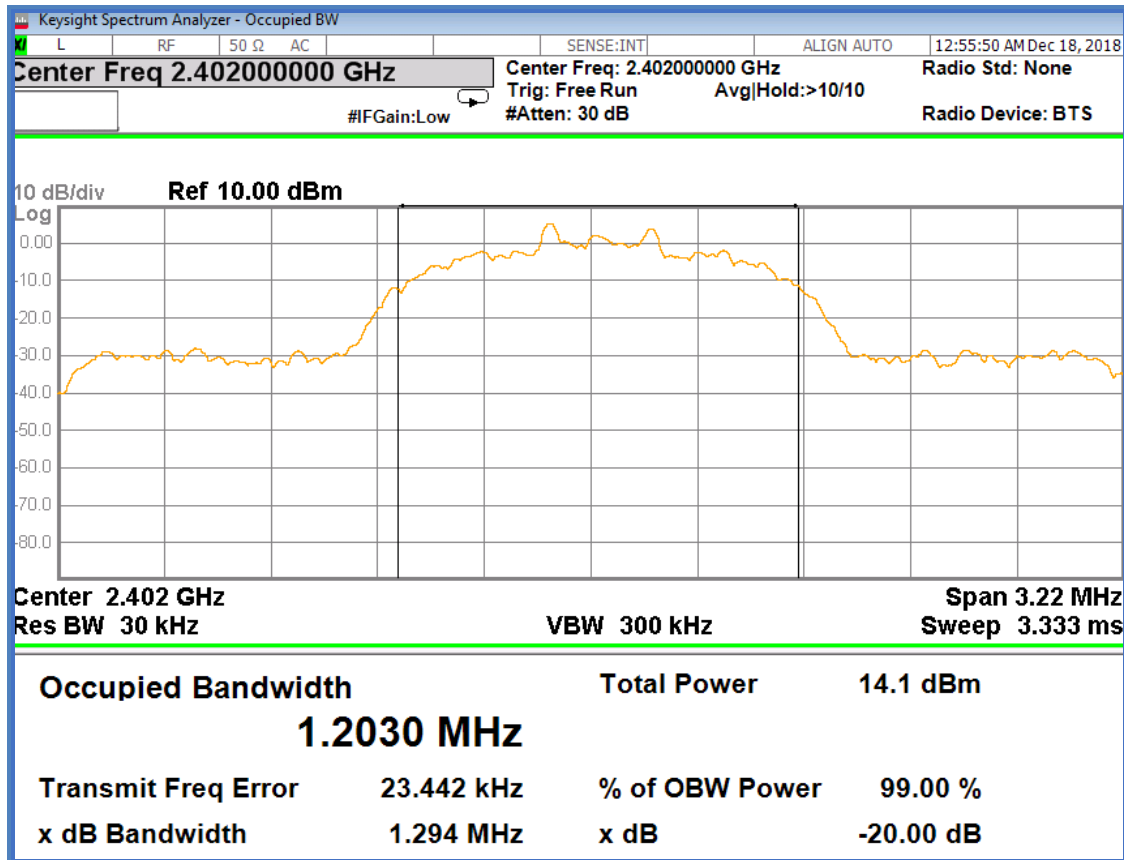
Screen captures from the spectrum analyzer: High Channel



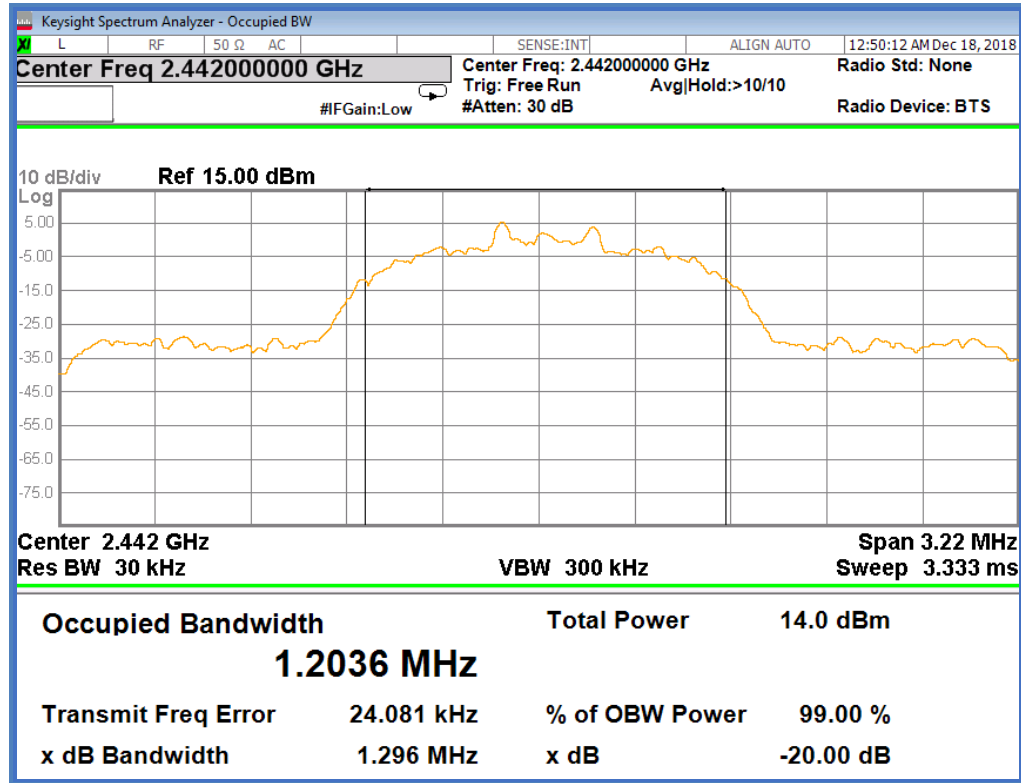
2.2.6 Channel Occupied Bandwidth Data: (PSK MODE)

| Channel | Freq. [MHz] | 20 dB OBW [MHz] | 99% OBW [MHz] |
|---------|-------------|-----------------|---------------|
| Low | 2402 | 1.294 | 1.2030 |
| Mid | 2442 | 1.296 | 1.2036 |
| High | 2480 | 1.297 | 1.2030 |

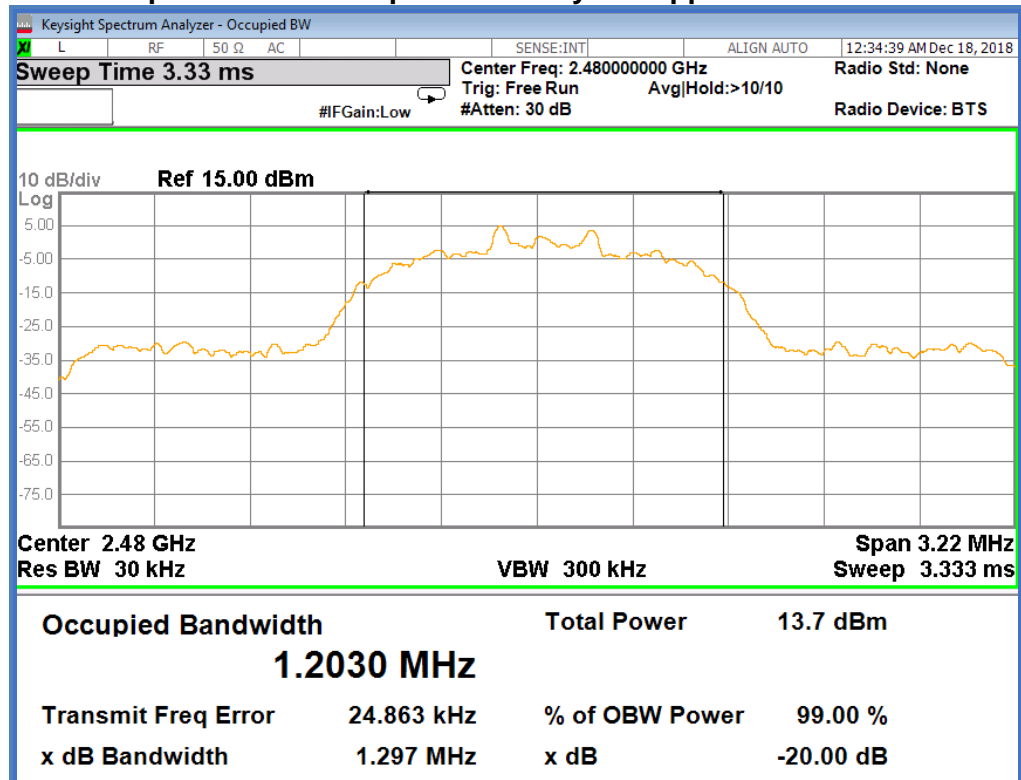
Screen captures from the spectrum analyzer: Low Channel



Screen captures from the spectrum analyzer: MID Channel



Screen captures from the spectrum analyzer: Upper Channel



2.3 Peak Output Power (Conducted)

| | |
|---|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 Basic Standard: ANSI C63.10: 2013 |
| Date: 2018-12-18 (20.6°C, 14.2 % RH) | |
| EUT status: Compliant | |

Specification: FCC Part 15.247(b, 1)

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

Criteria: For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

2.3.1 Test Guidance: ANSI C63.10-2013, Clause 11.9.2.2.2, Clause 7.8.5 / DA 00-705

This measurement is performed at low, mid and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

| Use the following spectrum analyzer settings: | |
|--|--|
| Span | approximately 5 times the 20 dB bandwidth, centered on a hopping channel |
| RBW | > the 20 dB bandwidth of the emission being measured |
| VBW | ≥ RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |
| Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. | |

2.3.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.3.3 Test Equipment

Testing was performed with the following equipment:

| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.3.4 Test Sample Verification, Configuration & Modifications

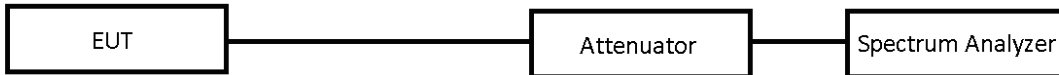
The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT modified to provide the direct access to antenna trace for conducted measurements.

For compliance purposes EUT met requirements without any modification

Test setup diagrams for Peak Power testing:

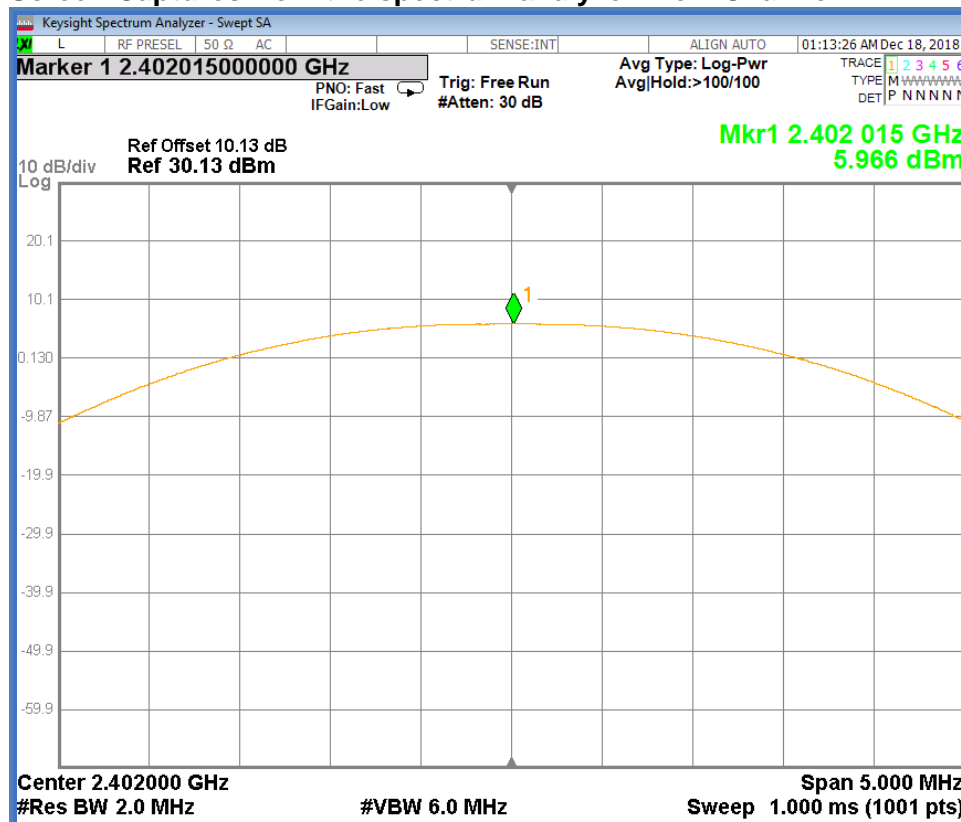
Conducted:



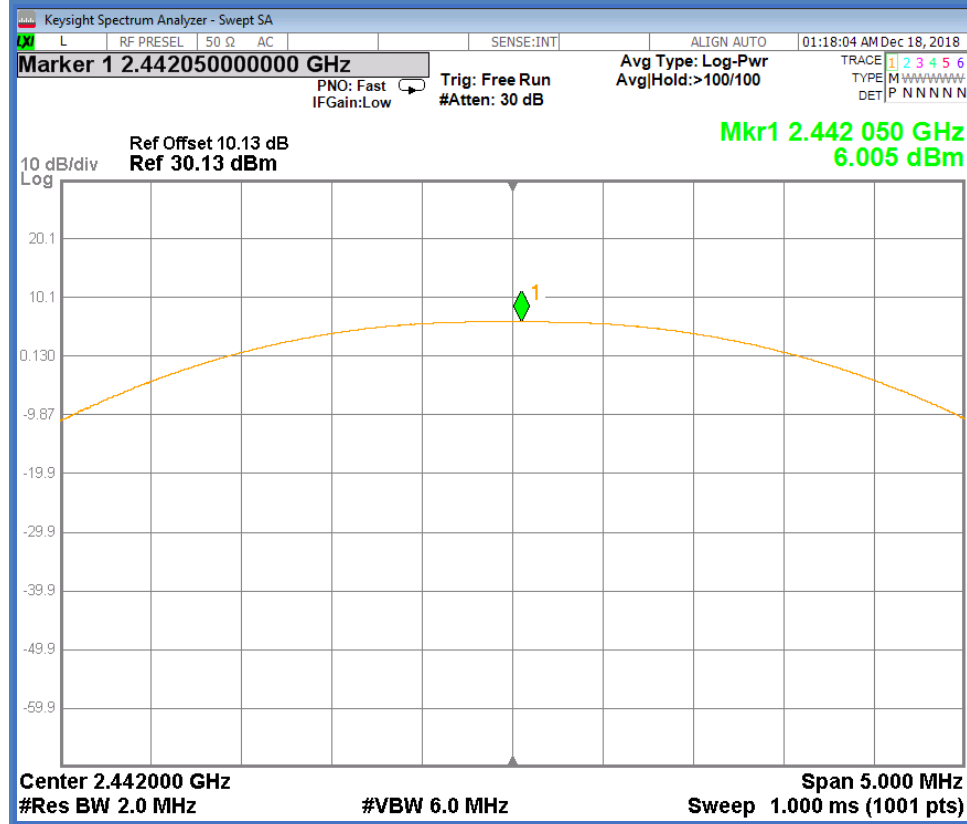
2.3.5 Peak Output Power Data (GFSK MODE)

| Channel | Freq. [MHz] | Output Power measured (dBm) | Output Power Limit (dBm) | Output Power measured (mW) | Output Power Limit (mW) | Result |
|---------|-------------|-----------------------------|--------------------------|----------------------------|-------------------------|-----------|
| Low | 2402 | 5.966 | 20.97 | 3.95 | 125 | Compliant |
| Mid | 2442 | 6.005 | 20.97 | 3.99 | 125 | Compliant |
| High | 2480 | 5.595 | 20.97 | 3.63 | 125 | Compliant |

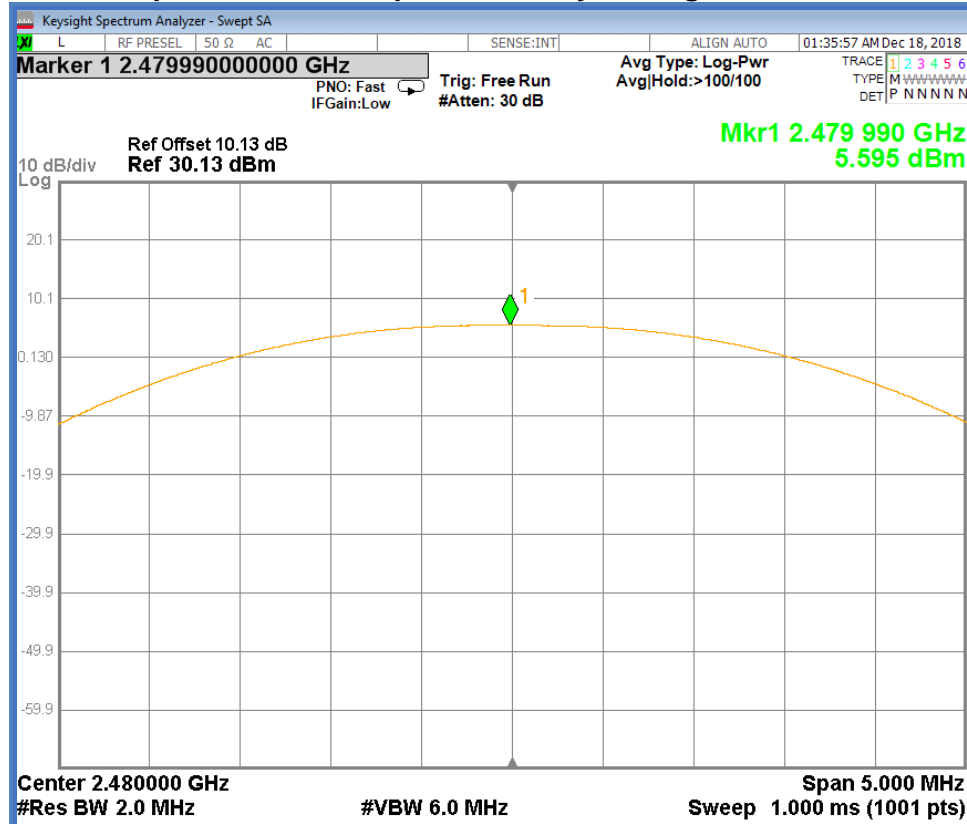
Screen Captures from the spectrum analyzer: Low Channel



Screen Captures from the spectrum analyzer: MID Channel



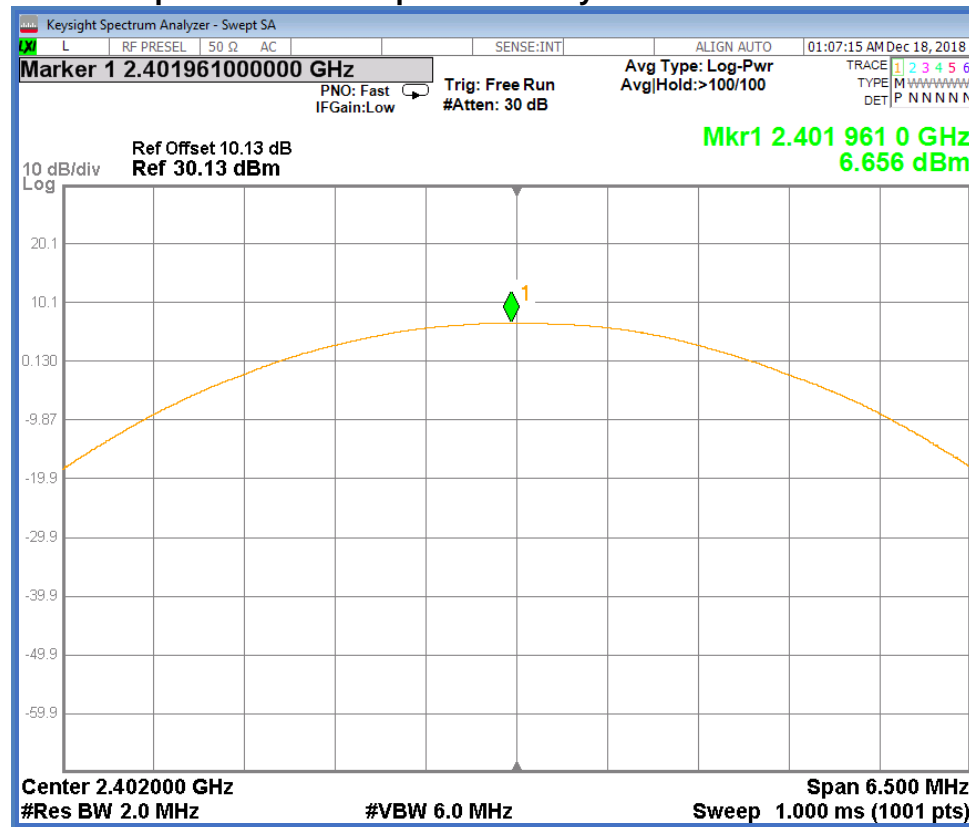
Screen Captures from the spectrum analyzer: High Channel



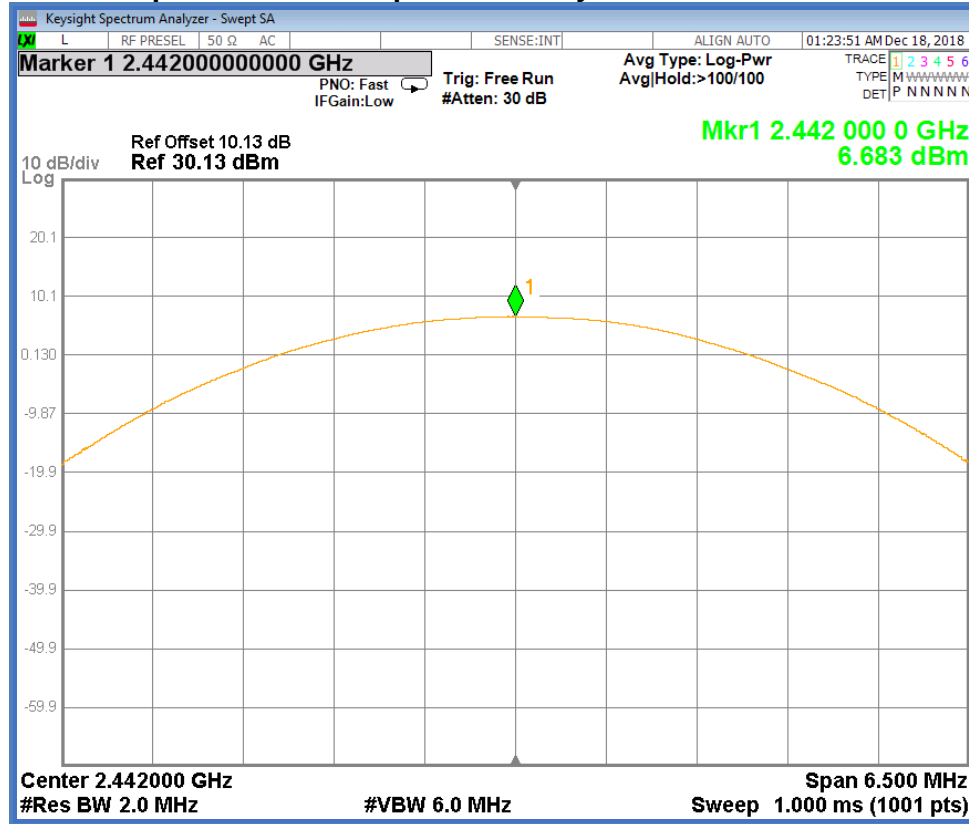
2.3.6 Peak Output Power Data (PSK MODE)

| Channel | Freq. [MHz] | Output Power measured (dBm) | Output Power Limit (dBm) | Output Power measured (mW) | Output Power Limit (mW) | Result |
|---------|-------------|-----------------------------|--------------------------|----------------------------|-------------------------|-----------|
| Low | 2404 | 6.656 | 20.97 | 4.63 | 125 | Compliant |
| Mid | 2441 | 6.683 | 20.97 | 4.66 | 125 | Compliant |
| High | 2477 | 6.363 | 20.97 | 4.33 | 125 | Compliant |

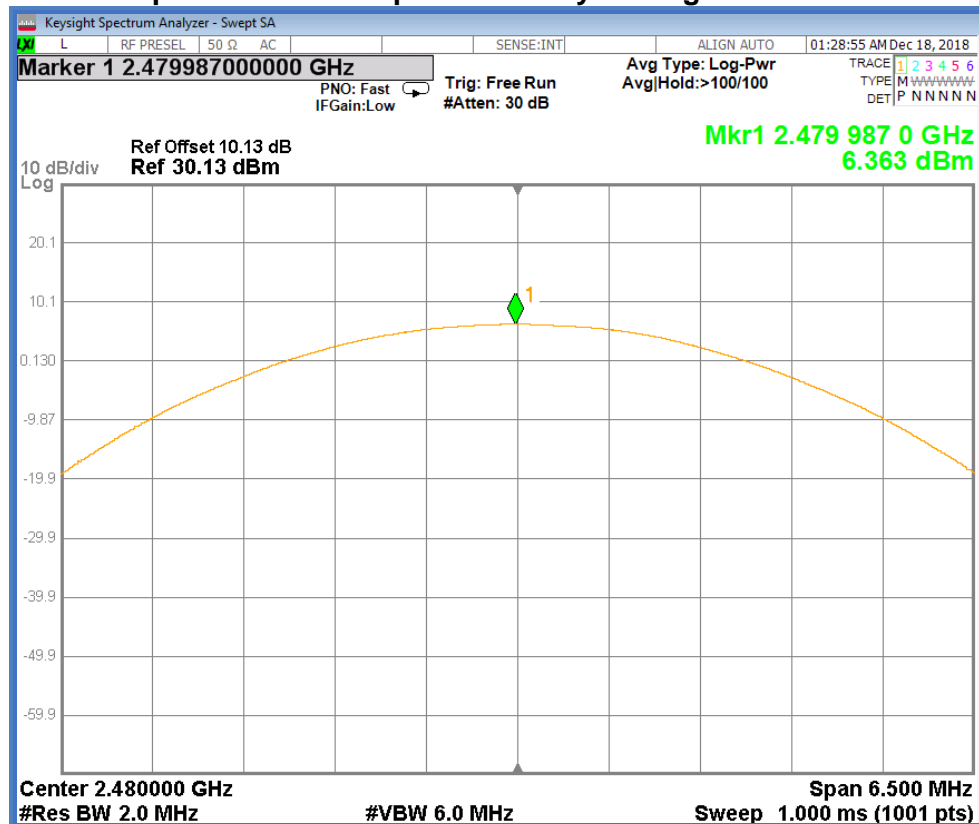
Screen Captures from the spectrum analyzer: Low Channel



Screen Captures from the spectrum analyzer: MID Channel



Screen Captures from the spectrum analyzer: High Channel



2.4 Band Edge Attenuation

| | |
|---|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 |
| Date: 2018-12-18 (20.6°C,14.2 % RH) | Basic Standard: ANSI C63.10: 2013 |
| EUT status: Compliant | |

Specification: FCC Part 15.247(d)

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

2.4.1 Test Guidance: ANSI C63.10-2013 Clause 11.13.2 & 6.10.4, 6.10.6 / DA 00-705

This measurement is performed at the low and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

| | |
|---|--|
| Use the following spectrum analyzer settings: | |
| Span | wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation. |
| RBW | > 1% of the span |
| VBW | ≥ RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |
| Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the specified limit. Now, using the same instrument settings, enable the hopping function of the EUT and Follow the same procedure listed above. | |

2.4.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.4.3 Test Equipment

Testing was performed with the following equipment:

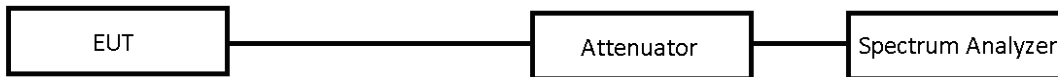
| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.4.4 Test Sample Verification, Configuration & Modifications

The EUT was set to transmit continuously on a selected channel with test-specific software. The output was modulated as in normal operation. The EUT met the requirements without modification.

Test setup diagrams for Band Edge Attenuation testing:

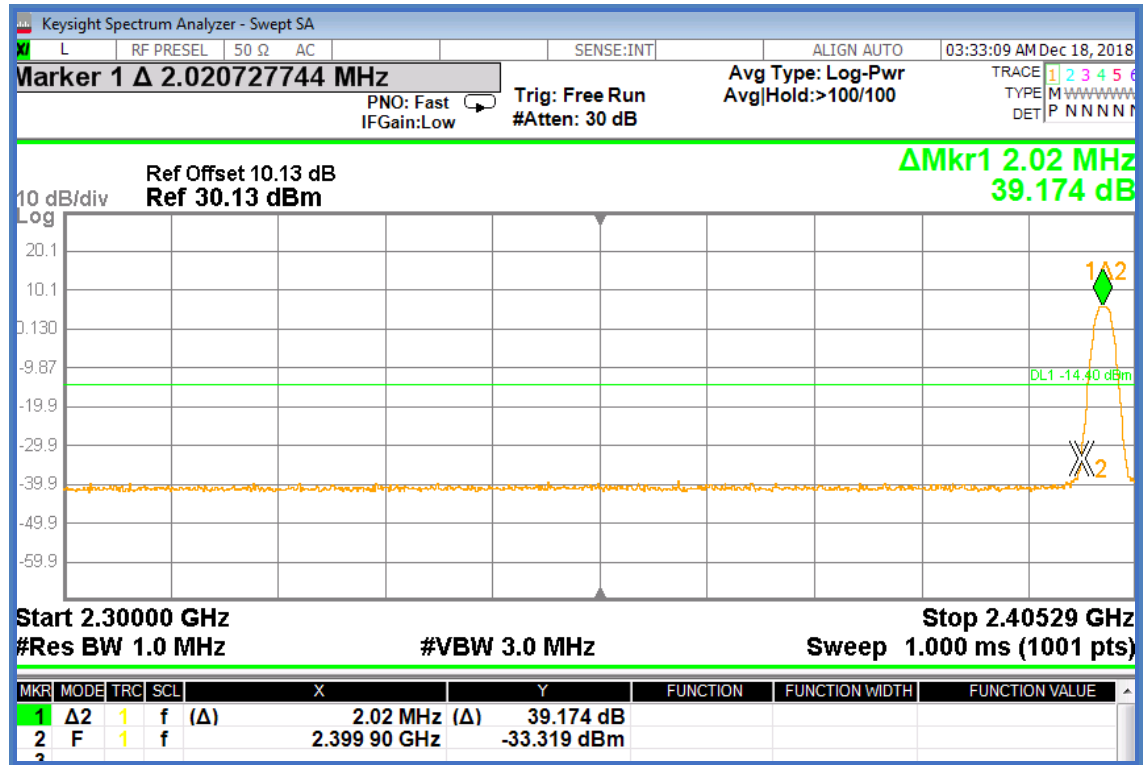
Conducted:



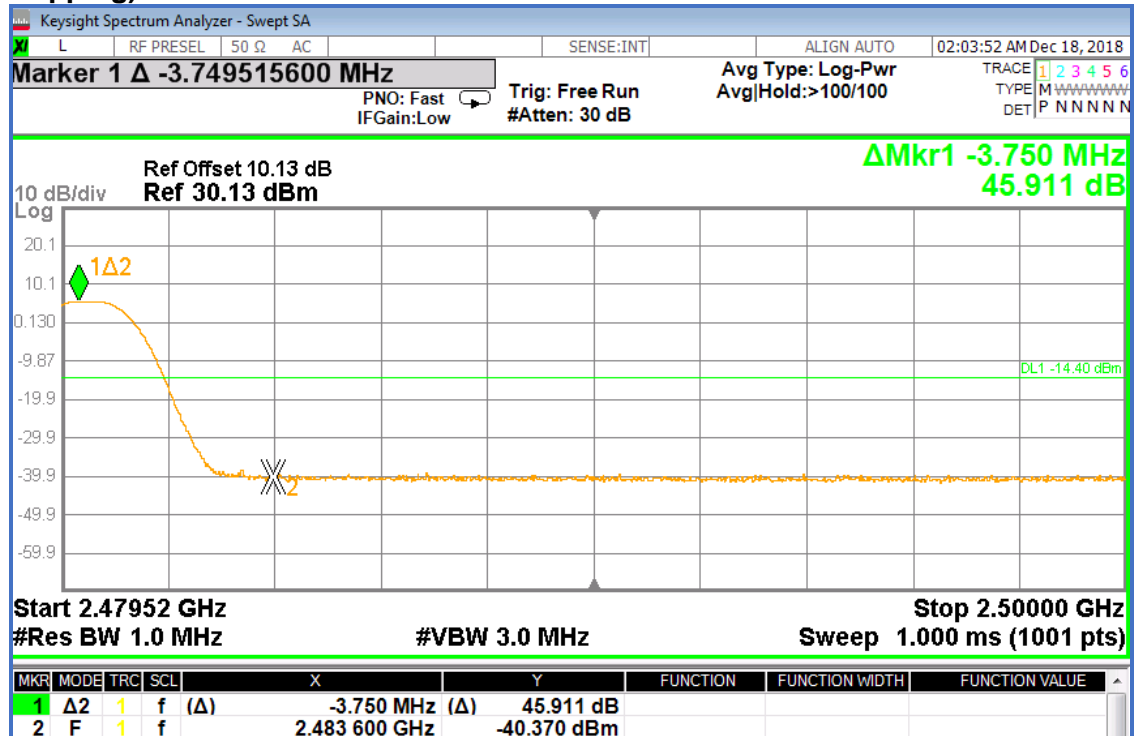
2.4.5 Band Edge Data (GFSK MODE)

| Modulation | Channel | Attenuation at Band Edge | Attenuation Limit at Band Edge |
|-----------------|----------|--------------------------|--------------------------------|
| (Non – Hopping) | 2402 MHz | 39.171 dBc | 20 dBc |
| | 2480 MHz | 45.911 dBc | 20 dBc |
| (Hopping) | 2402 MHz | 54.480 dBc | 20 dBc |
| | 2480 MHz | 56.245 dBc | 20 dBc |

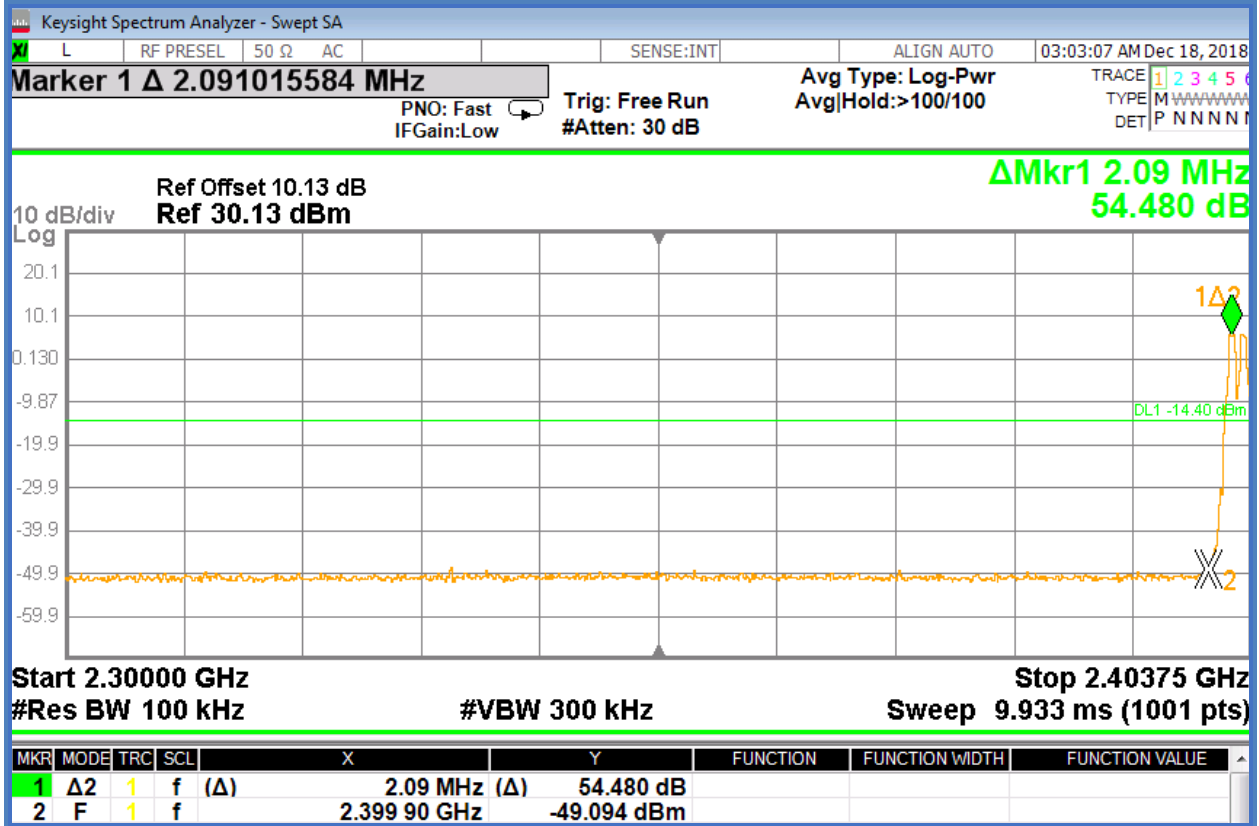
Screen Capture from the spectrum analyzer: Lower Band Edge (Non Hopping)



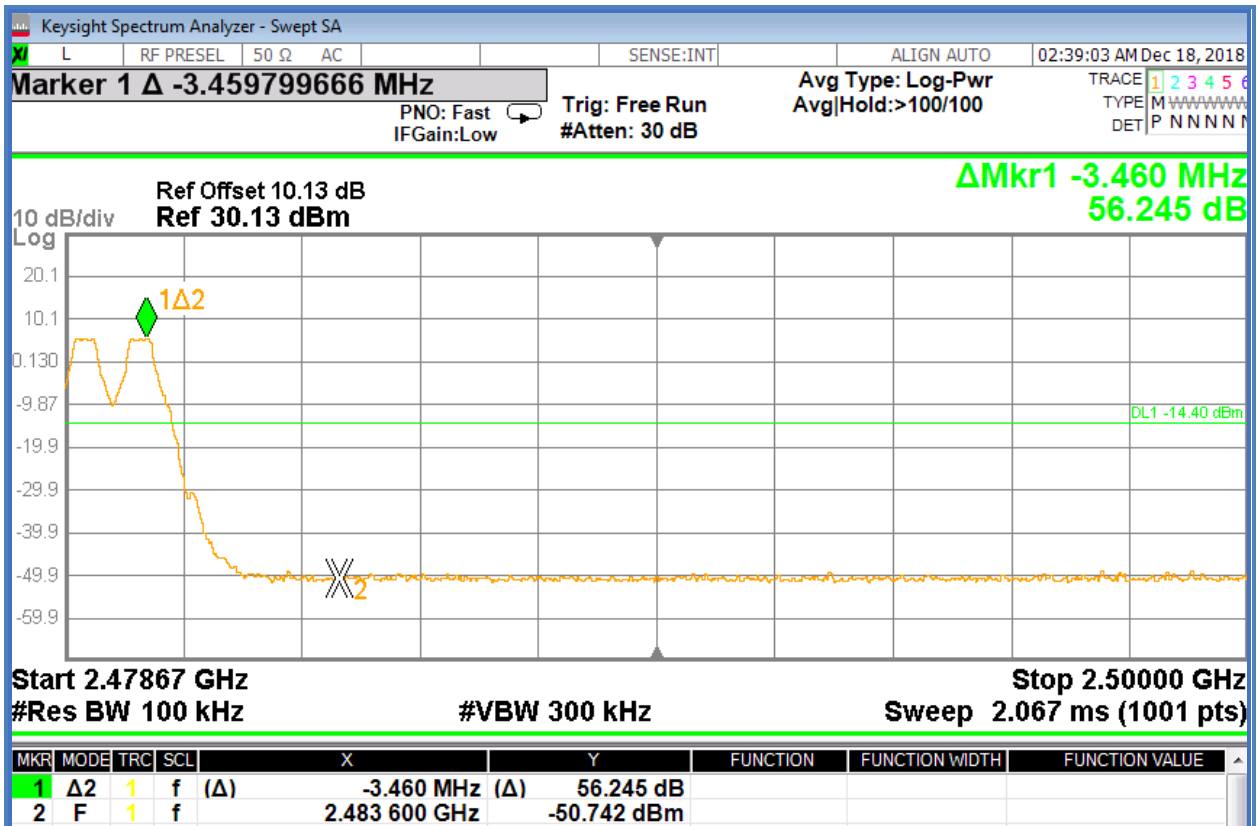
Screen Capture from the spectrum analyzer: Upper Band Edge (Non Hopping)



Screen Capture from the spectrum analyzer: Lower Band Edge (Hopping)



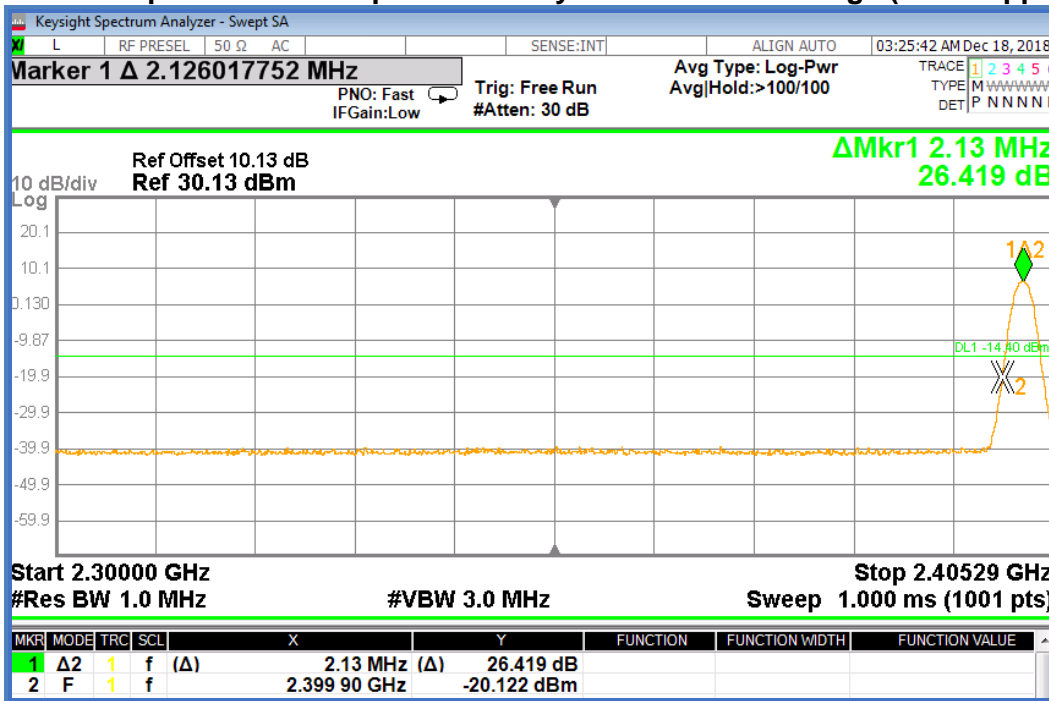
Screen Capture from the spectrum analyzer: Upper Band Edge (Hopping)



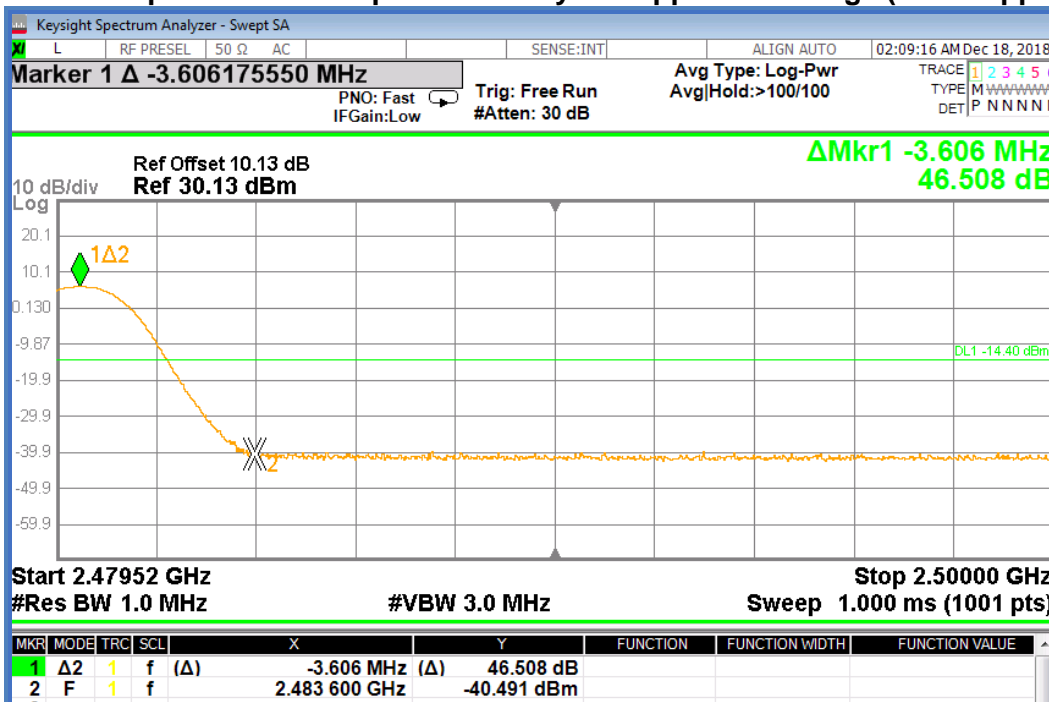
2.4.6 Band Edge Data (PSK MODE)

| Modulation | Channel | Attenuation at Band Edge | Attenuation Limit at Band Edge |
|---------------|----------|--------------------------|--------------------------------|
| (Non-Hopping) | 2402 MHz | 26.419 dBc | 20 dBc |
| | 2480 MHz | 45.508 dBc | 20 dBc |
| (Hopping) | 2402 MHz | 50.029 dBc | 20 dBc |
| | 2480 MHz | 56.222 dBc | 20 dBc |

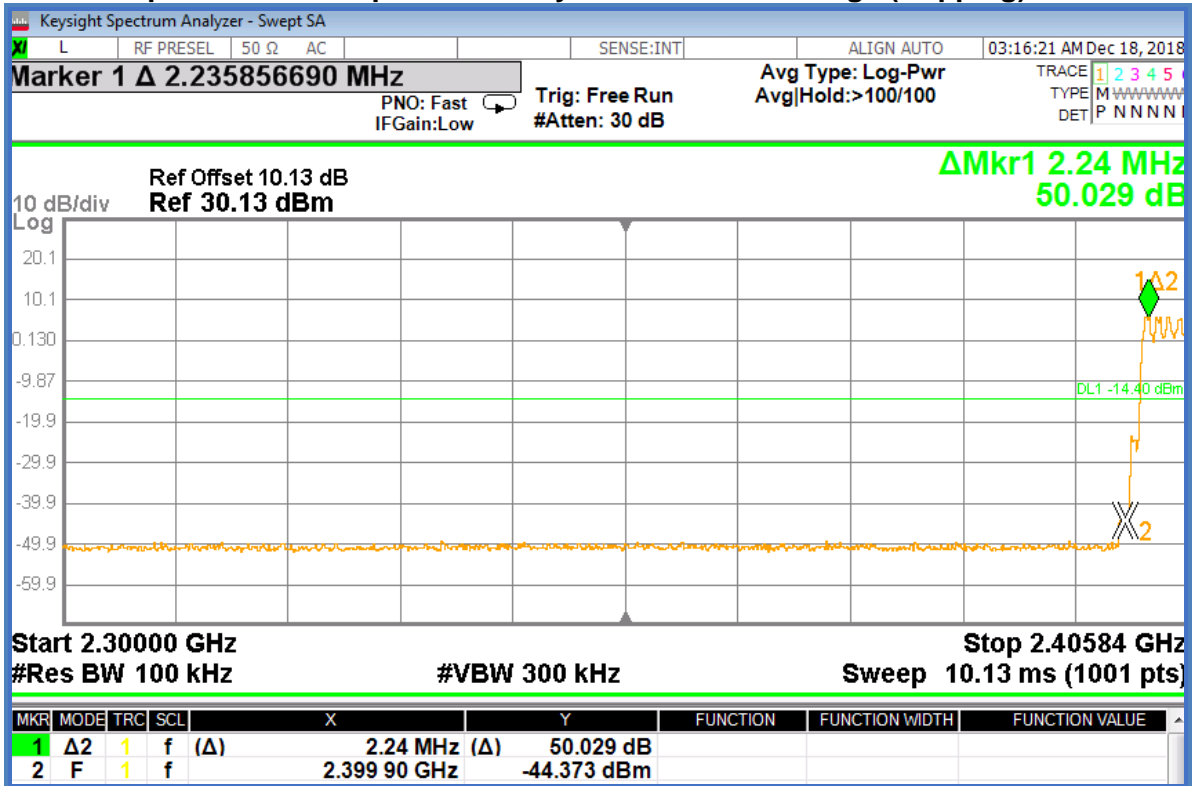
Screen Capture from the spectrum analyzer: Lower Band Edge (Non Hopping)



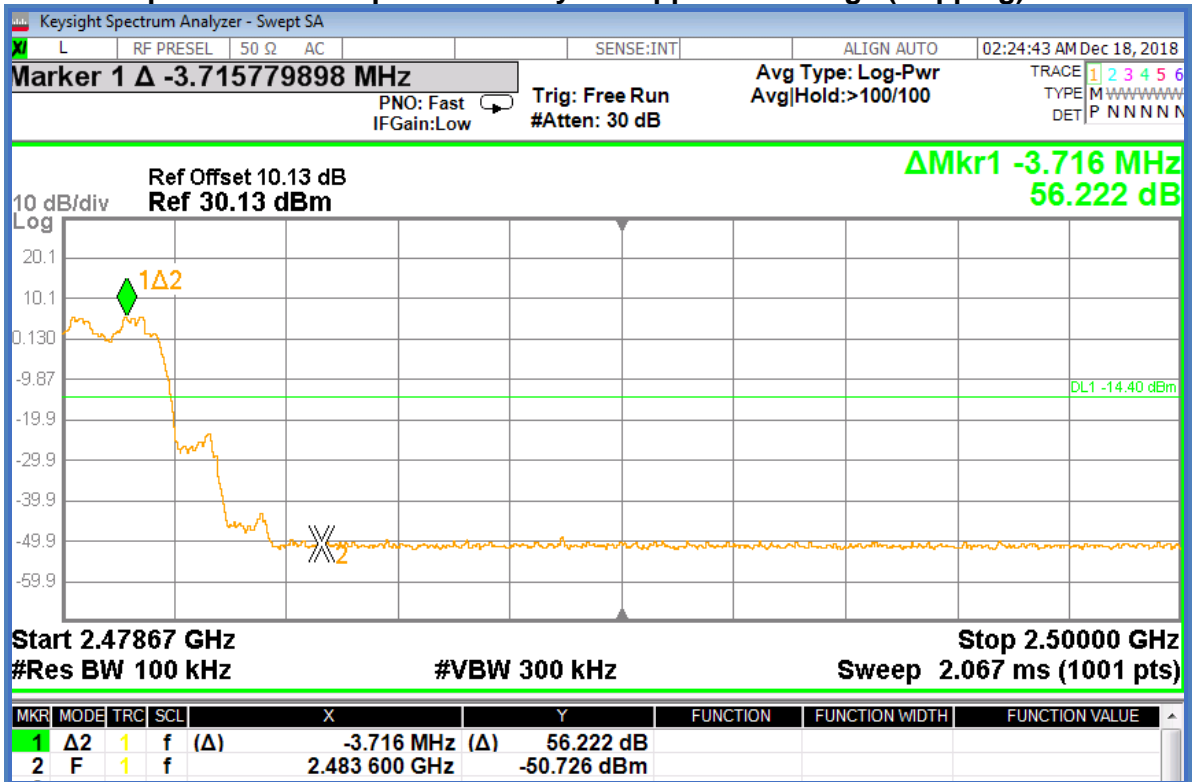
Screen Capture from the spectrum analyzer: Upper Band Edge (Non Hopping)



Screen Capture from the spectrum analyzer: Lower Band Edge (Hopping)



Screen Capture from the spectrum analyzer: Upper Band Edge (Hopping)



2.5 Conducted Harmonic and Spurious Emissions

| | |
|---|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 Basic Standard: ANSI C63.4-2014 |
| Date: 2018-12-18 (20.6°C,14.2 % RH) | |
| EUT status: Compliant | |

Specification: FCC Part 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.

2.5.1 Test Guidance: ANSI C63.10-2013, Clause 6.7

This measurement is performed at the low, mid and high frequencies, with modulation. The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

| | |
|---|---|
| Use the following spectrum analyzer settings: | |
| Span | Wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. |
| RBW | 100 kHz |
| VBW | ≥ RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |
| Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. | |

2.5.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.5.3 Test Equipment

Testing was performed with the following equipment:

2.5.4 Test Sample Verification, Configuration & Modifications

| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| 2.4GHz Notch Filter | Micro-Tronics | BRM 50702 | - | 2018-01-15 | 1 year | 2019-01-15 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

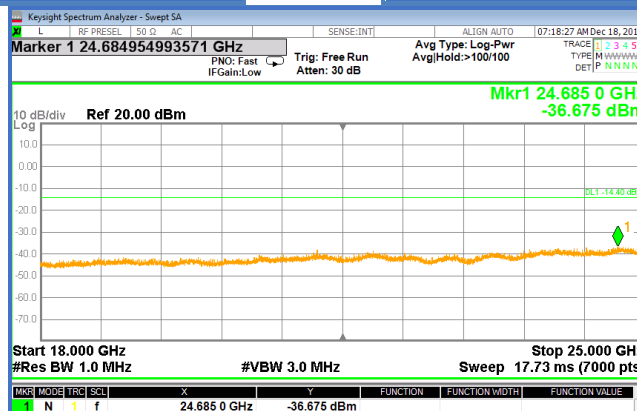
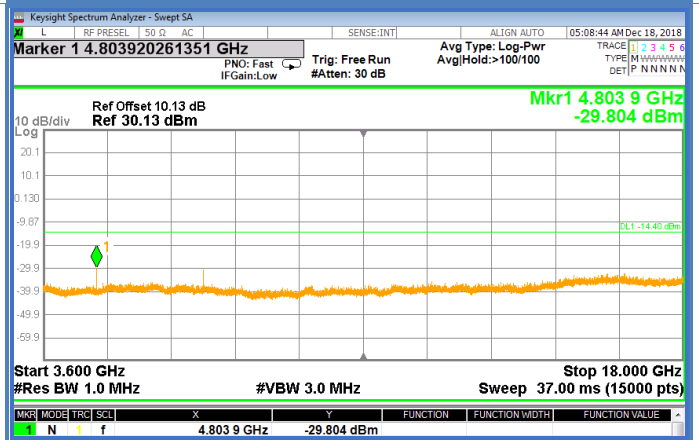
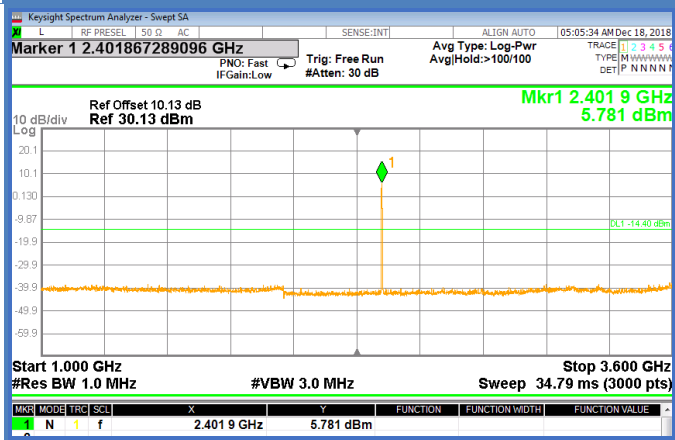
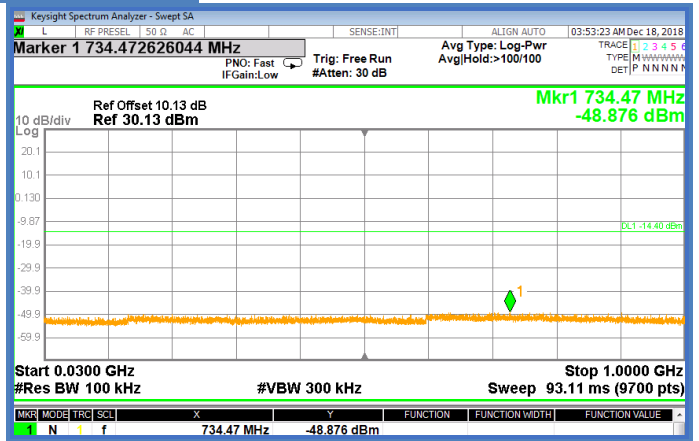
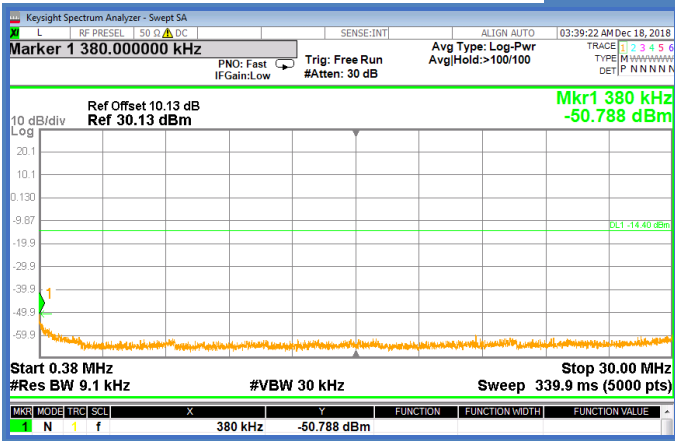
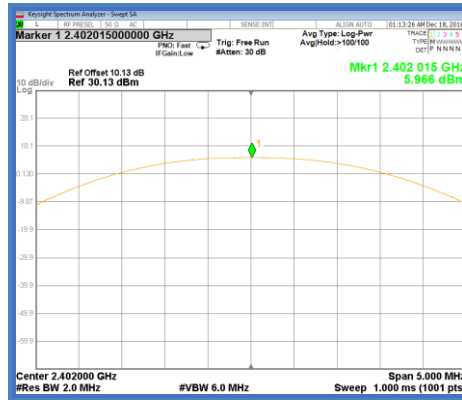
The EUT met the requirements without modification.

The EUT modified to provide the direct access to antenna trace for conducted measurements.

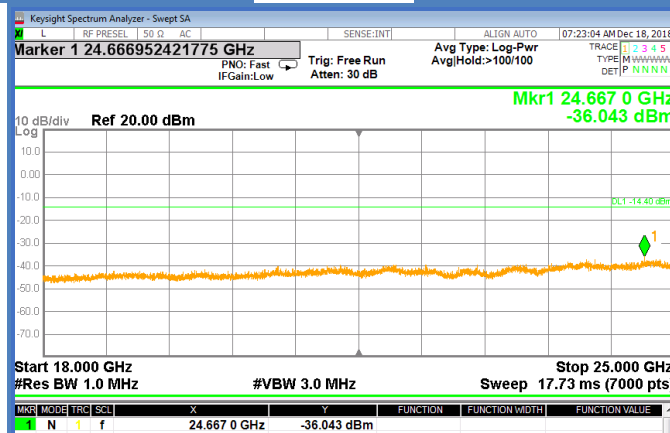
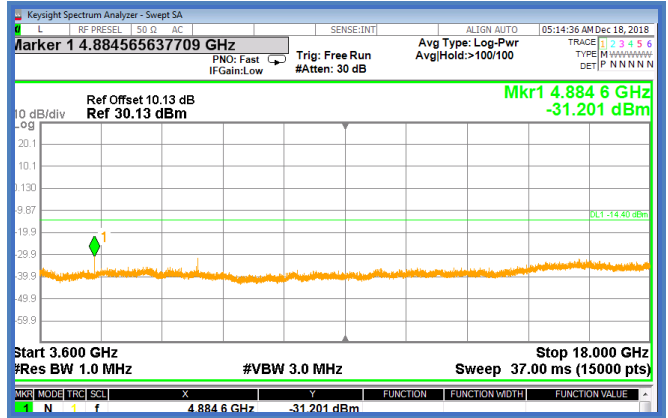
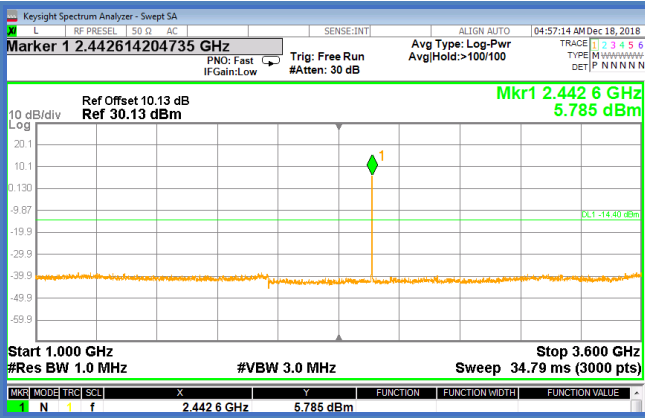
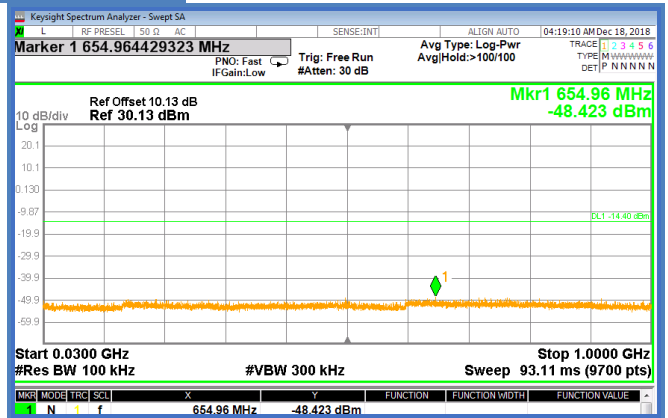
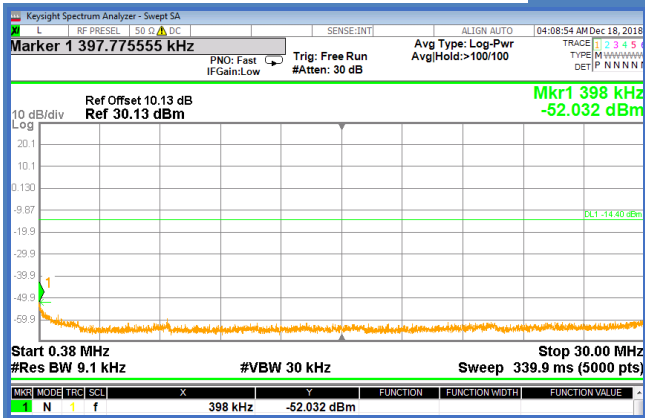
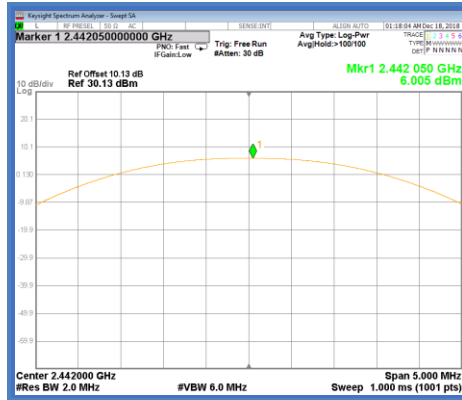
Test setup diagram for Conducted Spurious Emissions testing:



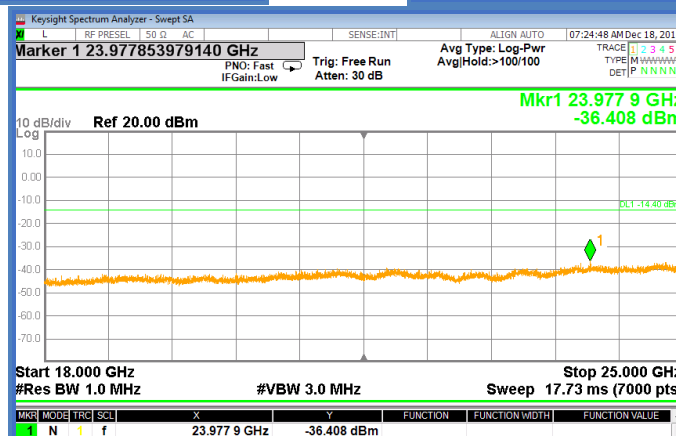
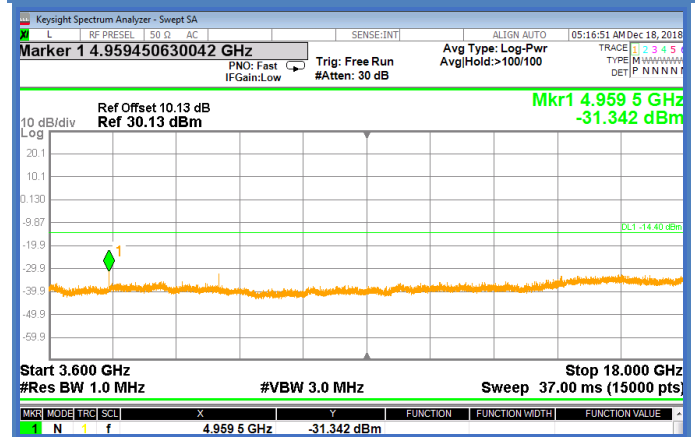
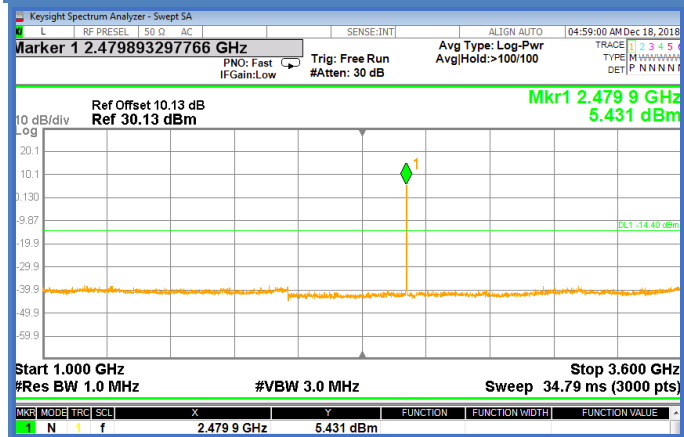
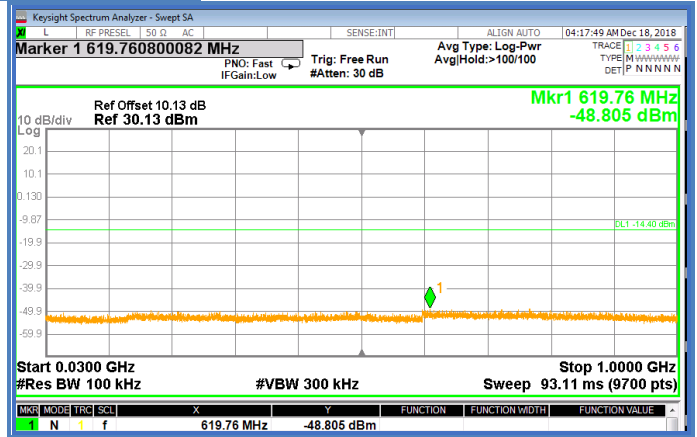
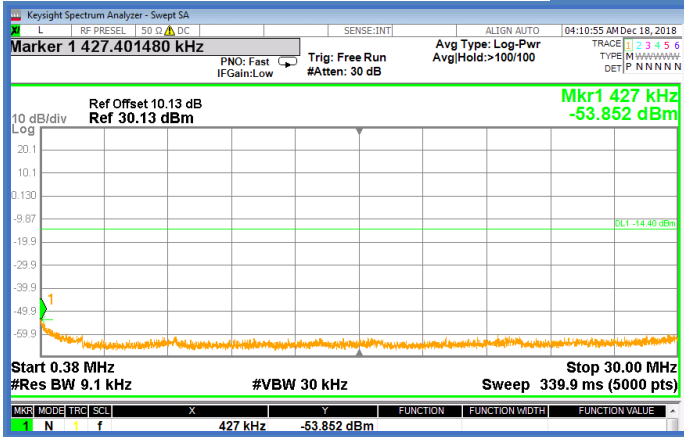
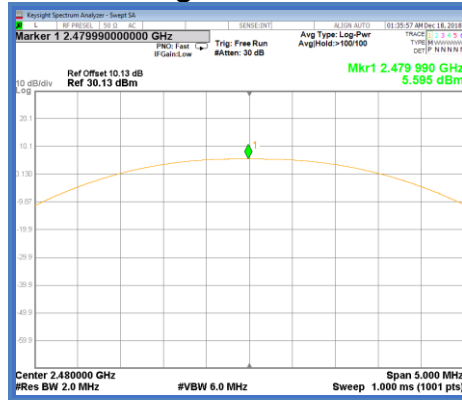
2.5.5 Conducted Emissions Data: (GFSK MODE) Low Channel



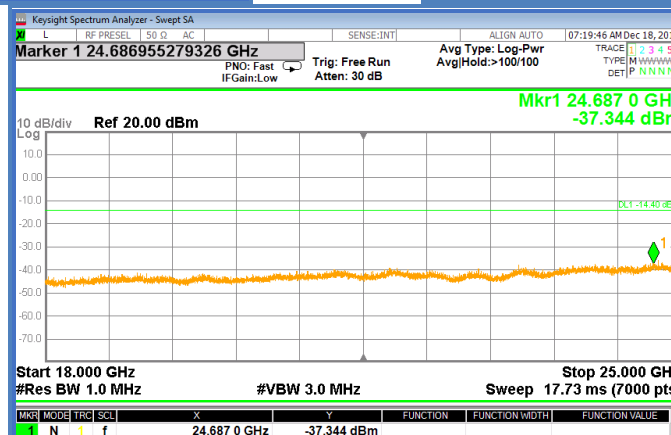
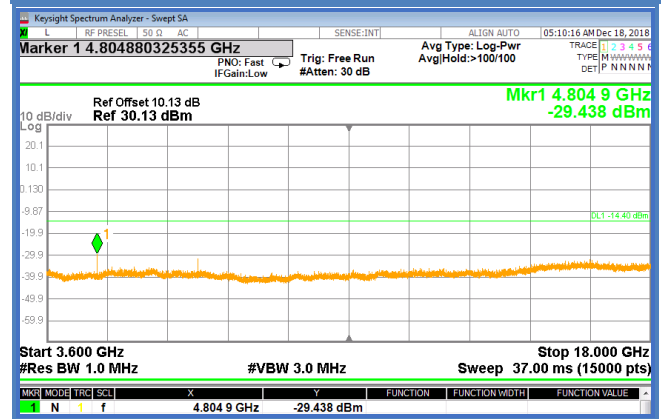
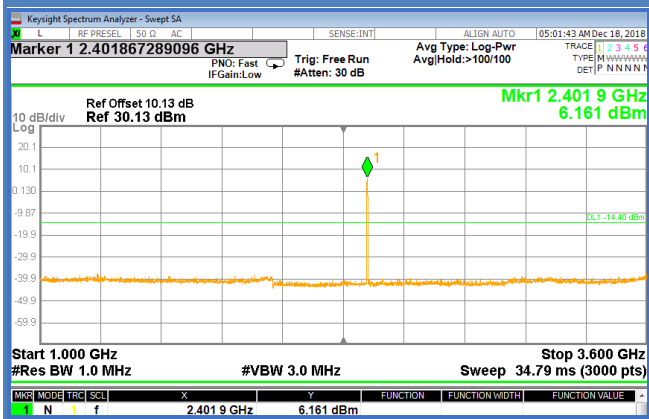
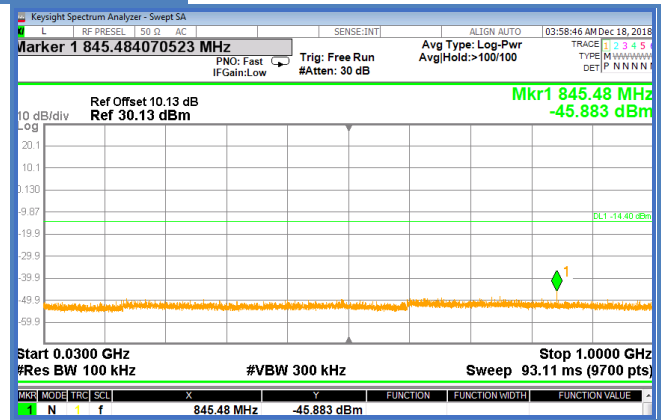
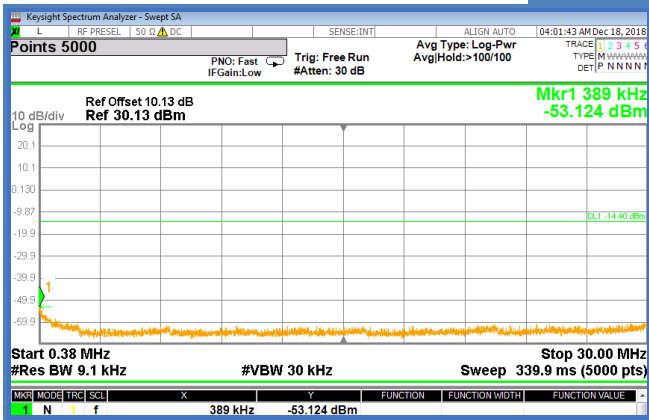
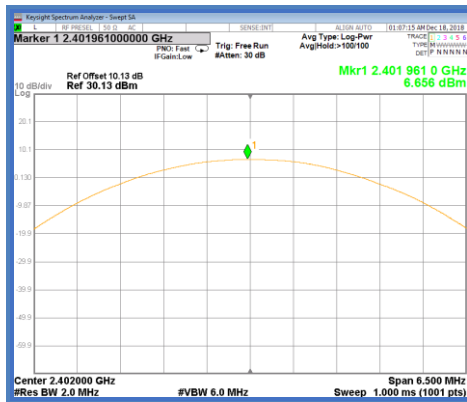
MID Channel



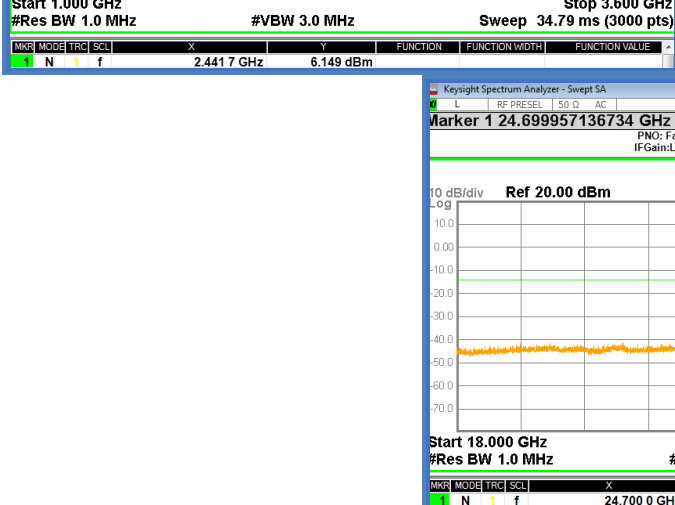
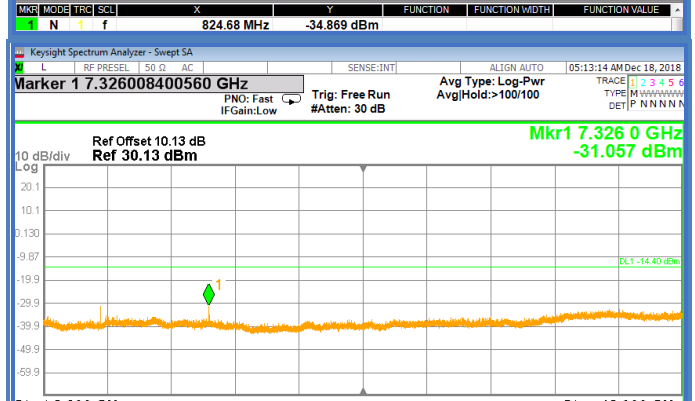
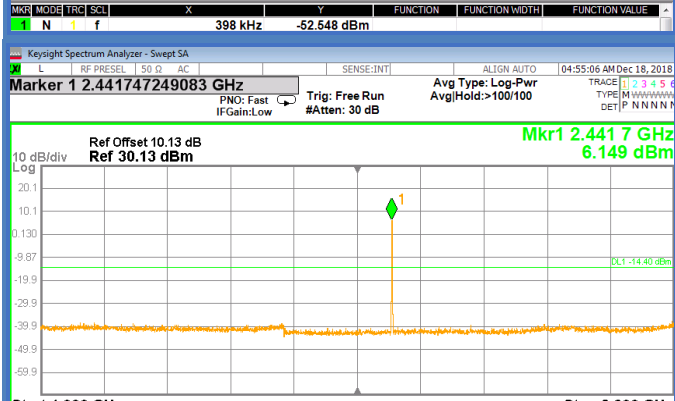
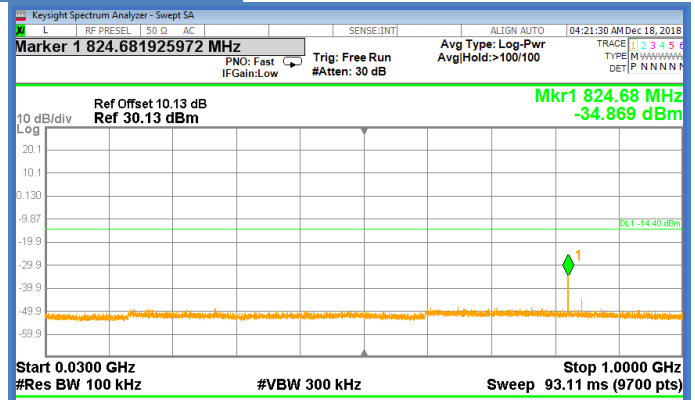
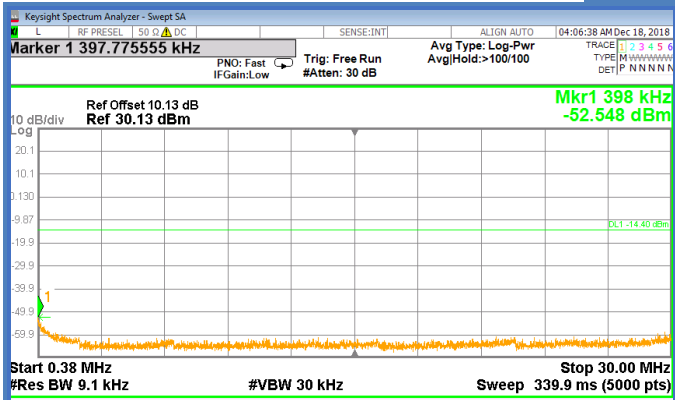
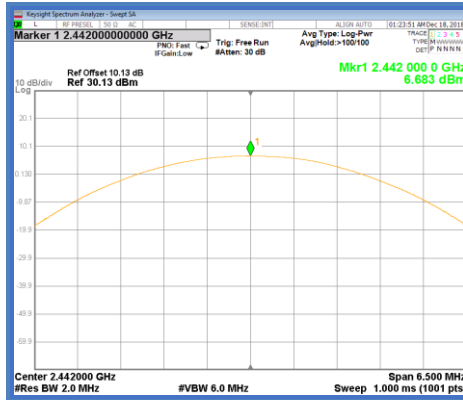
High Channel



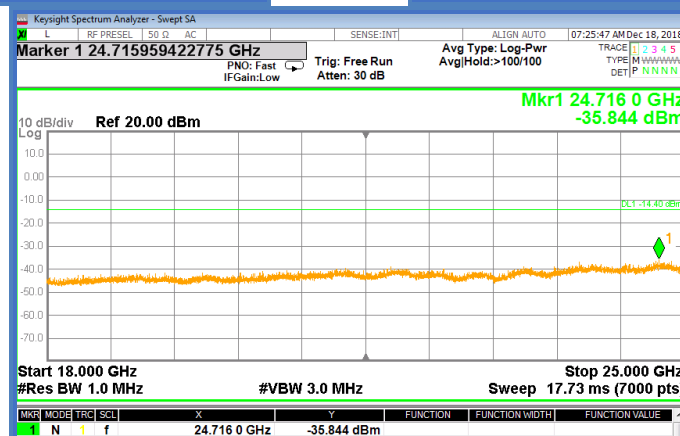
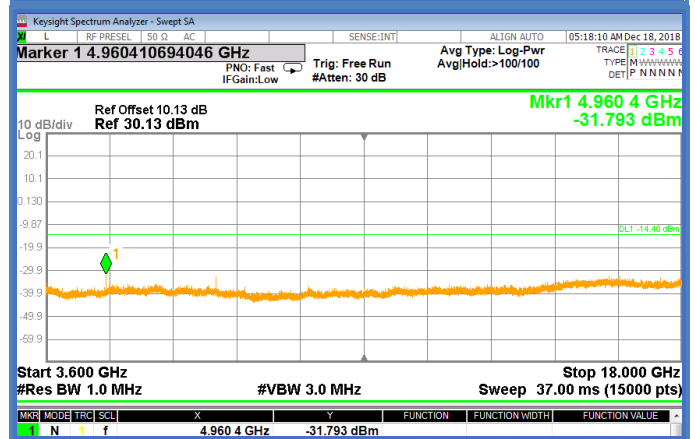
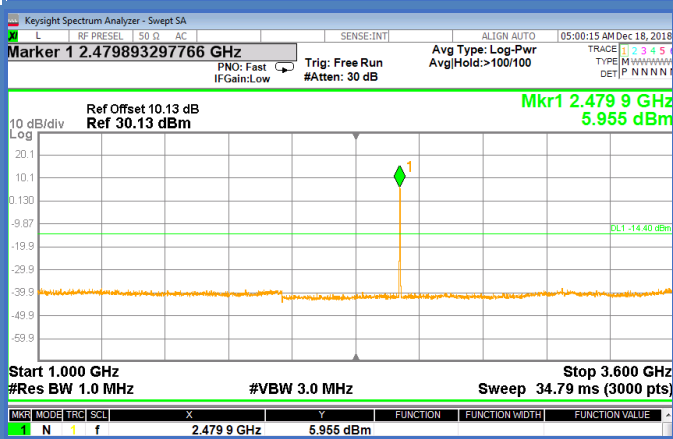
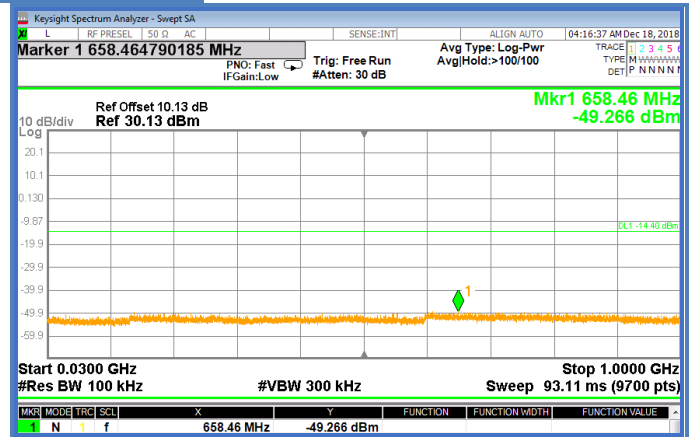
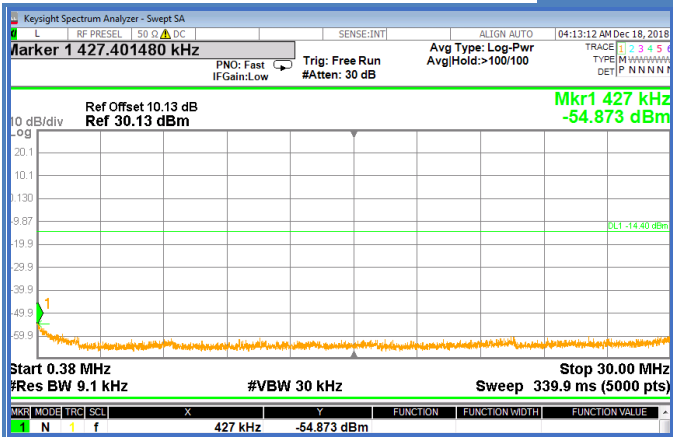
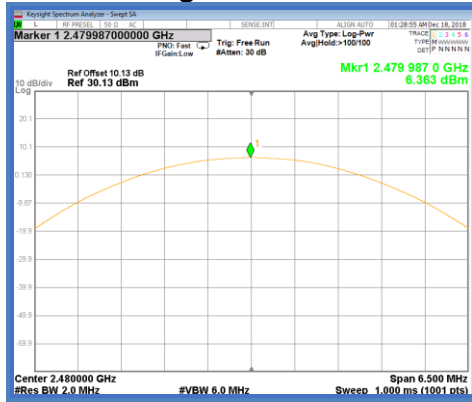
2.5.6 Conducted Emissions Data: (PSK MODE) Low Channel



MID Channel



High Channel



2.6 Channel Separation

| | |
|--|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC Part 15.247 |
| Date: 2018-12-18 (20.6°C,14.2% RH) | Basic Standard: ANSI C63.10: 2013 |
| EUT status: Compliant | |

Specification: FCC Part 15.247(a, 1)

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

2.6.1 Test Guidance: ANSI 63.10 Clause 7.8.2/FCC DA 00-705

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

| | |
|-------------------|--|
| Span | wide enough to capture the peaks of two adjacent channels. |
| RBW | ≥ 1% of the span |
| VBW | ≥RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

2.6.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.6.3 Equipment List:

Testing was performed with the following equipment:

| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.6.4 Test Sample Verification, Configuration & Modifications

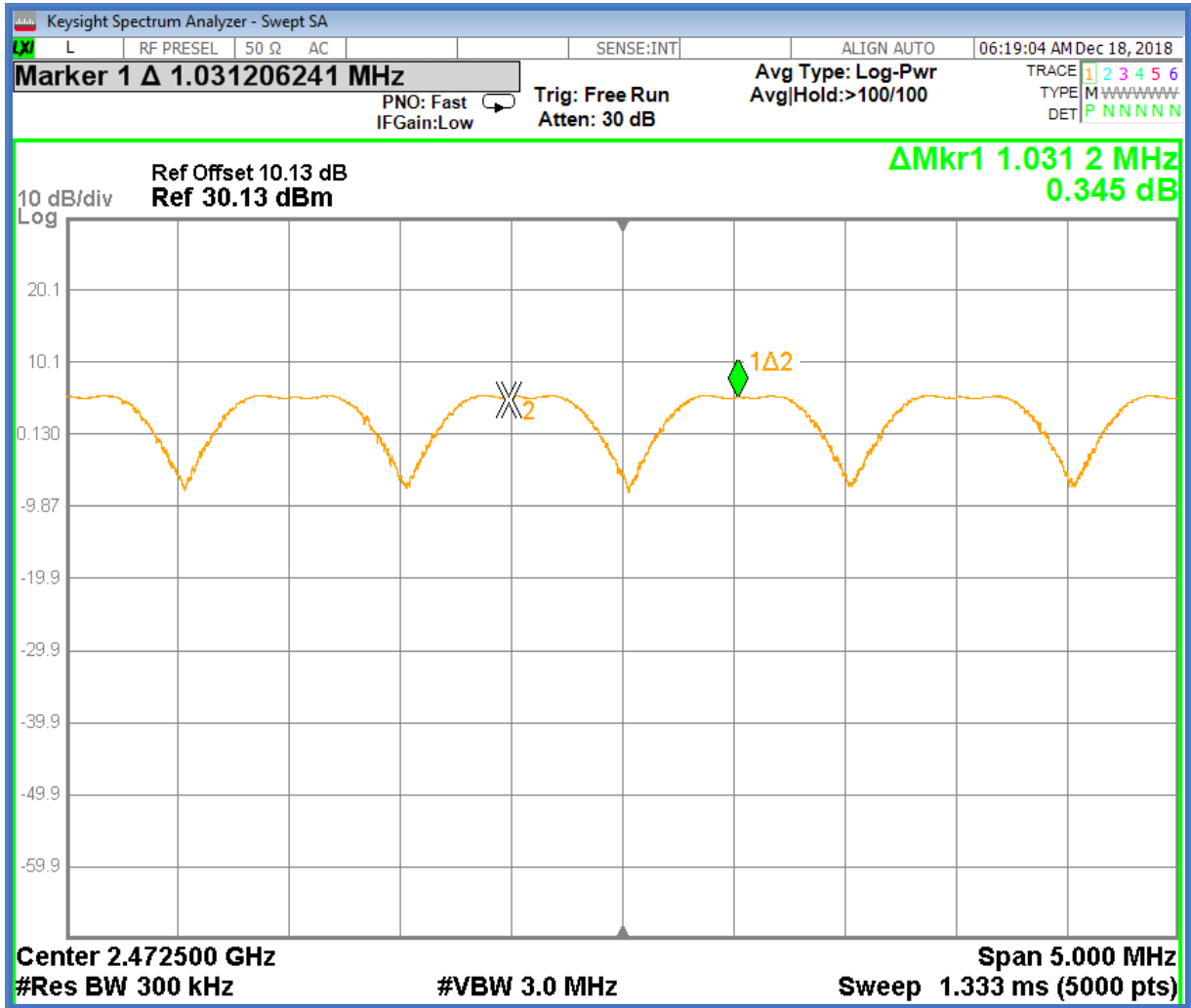
EUT configuration for Channel Separation testing:



2.6.4 Channel Separation Data: (GFSK MODE)

| Test | Channel Separation (MHz) | ≥ (2/3 of 20dB Bandwidth) (KHz) | Result |
|--------------------|--------------------------|---------------------------------|-----------|
| Channel Separation | 1.0314 | 672.67 | Compliant |

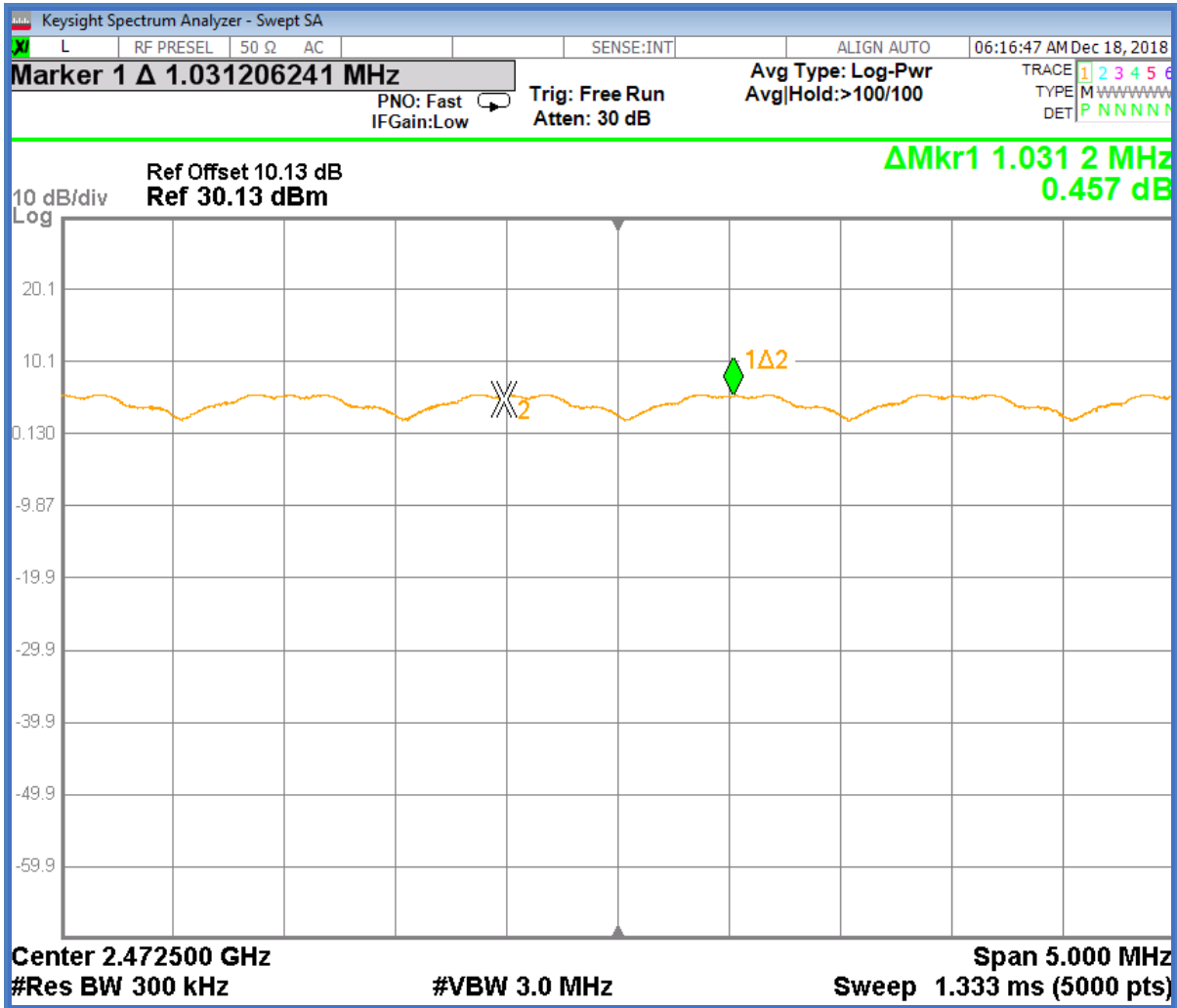
Screen Captures from the spectrum analyzer:



2.6.5 Channel Separation Data: (PSK MODE)

| Test | Channel Separation (MHz) | ≥ (2/3 of 20dB Bandwidth) (KHz) | Result |
|--------------------|--------------------------|---------------------------------|-----------|
| Channel Separation | 1.0312 | 864.67 | Compliant |

Screen Captures from the spectrum analyzer:



2.7 Number of Hopping Channels

| | |
|--|--|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC Part 15.247 |
| Date: 2018-12-18 (20.6°C,14.2 % RH) | Basic Standard: ANSI C63.10: 2013 |
| | Number of Channels: 79 |
| EUT status: Compliant | |

Specification: FCC Part 15.247 [a, 1(iii)]

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

2.7.1 Test Guidance: ANSI 63.10 Clauses 7.8.3 / FCC DA-00-0705A1

This measurement is performed with the EUT transmitter frequency hopping function active.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

| | |
|---|---------------------------------|
| The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: | |
| Span | the frequency band of operation |
| RBW | ≥ 1% of the span |
| VBW | ≥RBW |
| Sweep | auto |
| Detector function | peak |
| Trace | max hold |
| Allow the trace to stabilize. | |

2.7.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.7.3 Test Equipment

Testing was performed with the following equipment:

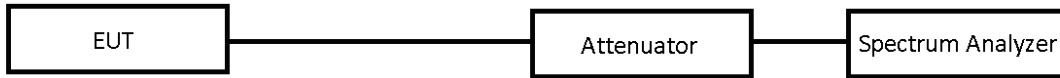
| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.7.4 Test Sample Verification, Configuration & Modifications

The EUT was operating normally.

The EUT met the requirements without modification.

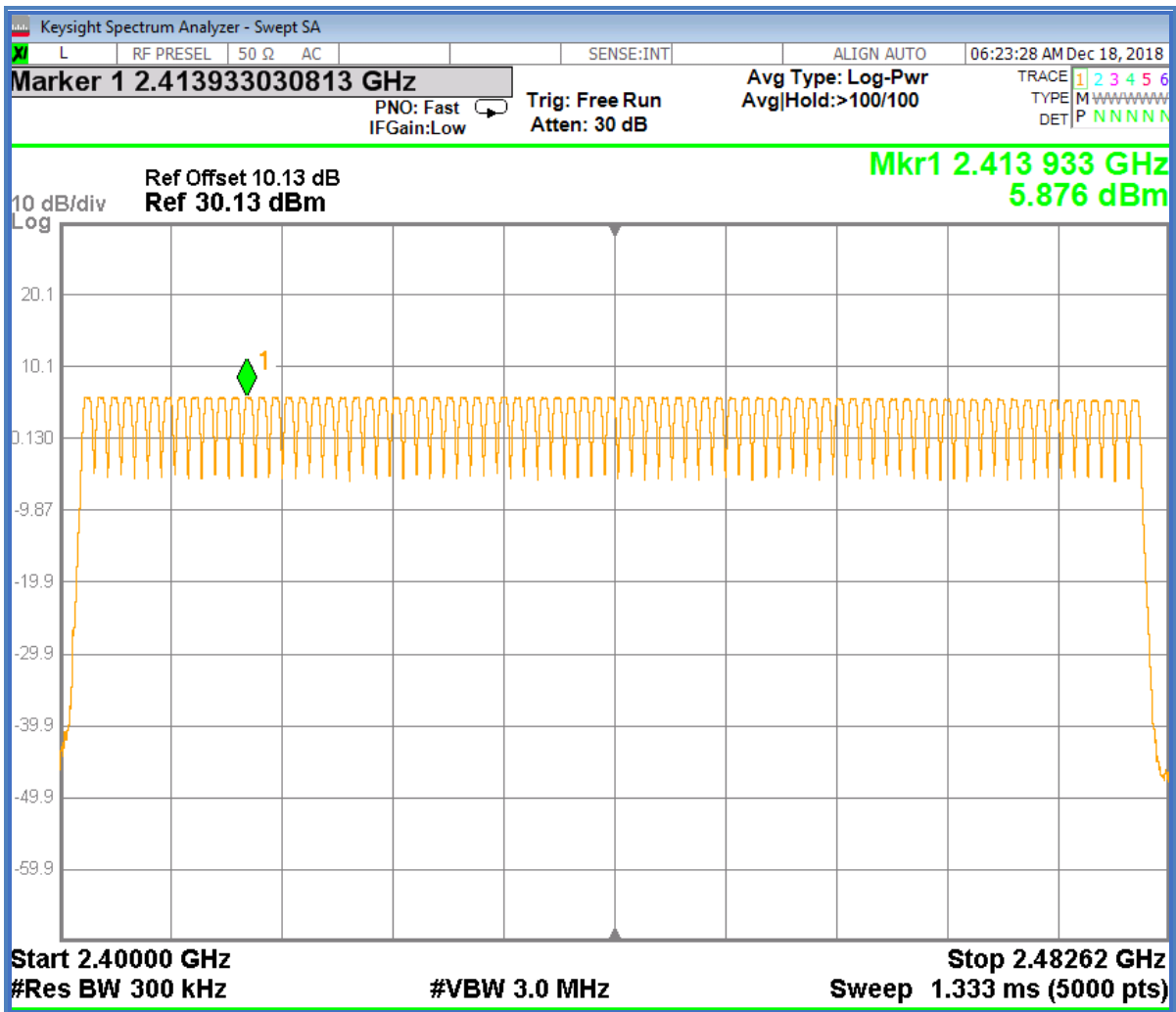
EUT configuration for Radiated Emissions testing:



2.7.5 Hopping Channel Data: (GFSK MODE)

There are 79 hopping channels

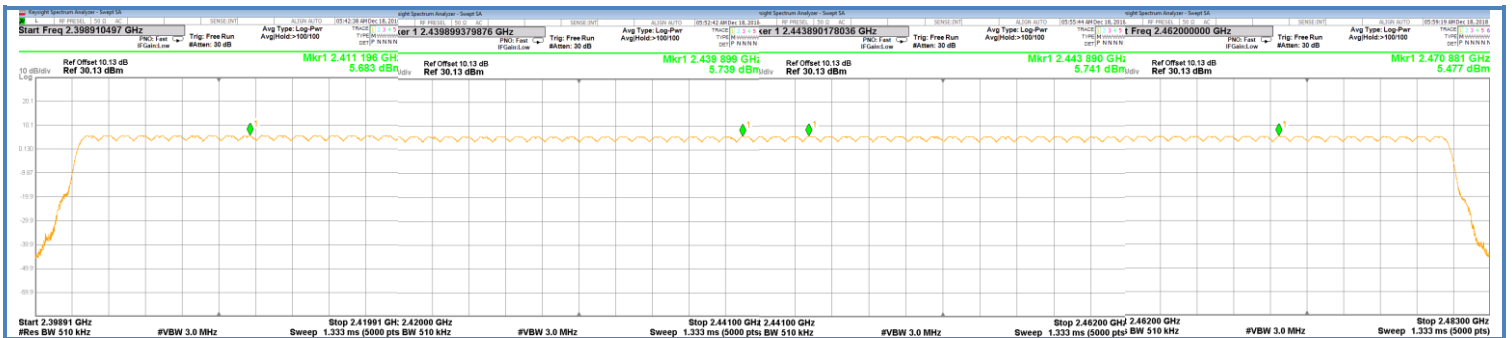
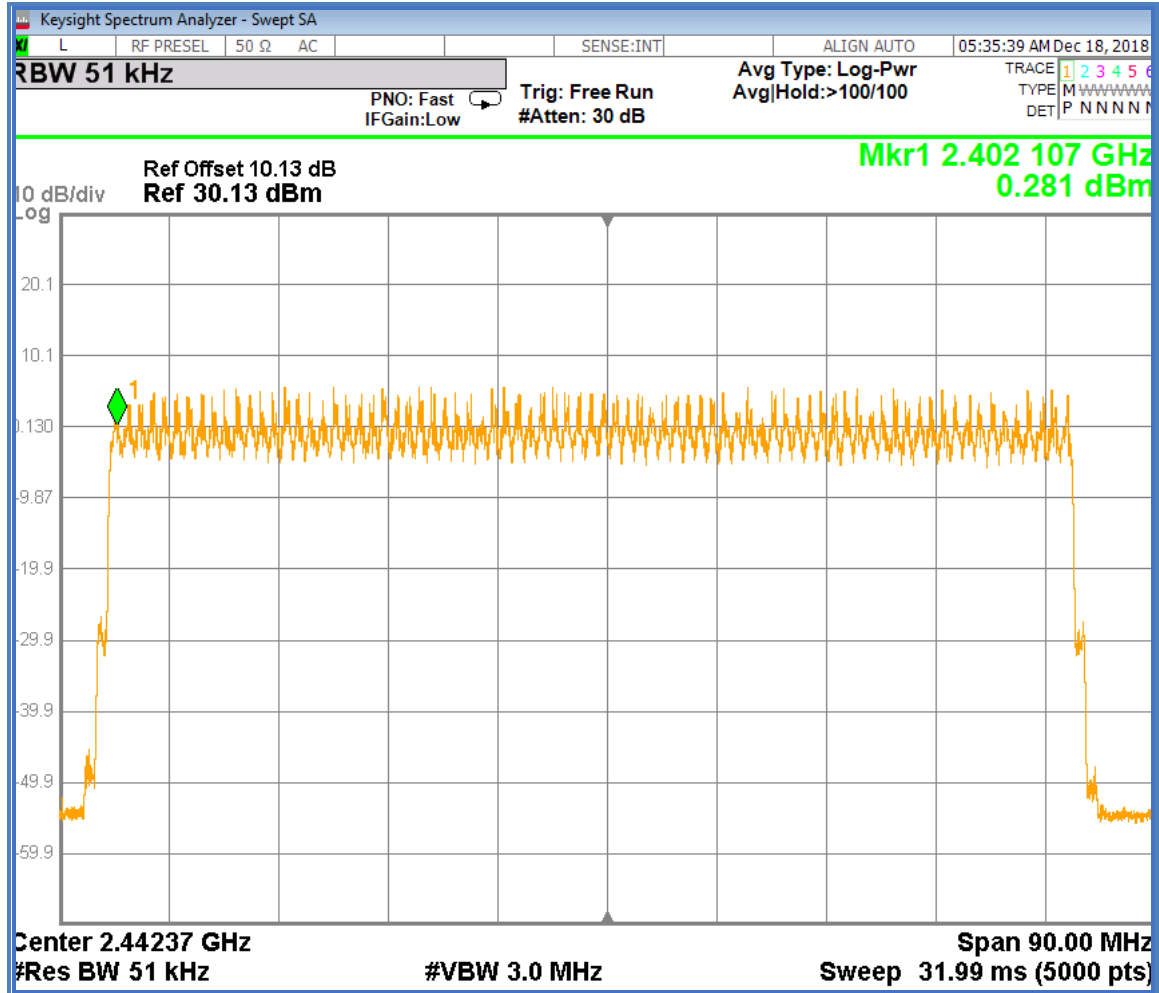
Screen Capture from the spectrum analyzer:



2.7.5 Hopping Channel Data: (PSK MODE)

There are 79 hopping channels

Screen Capture from the spectrum analyzer:



2.8 Time of Occupancy (Dwell Time)

| | |
|---|---|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 |
| Date: 2018-12-18 (20.6°C,14.2% RH) | Basic Standard: ANSI C63.10: 20013 |
| EUT status: Compliant | |

Specification: FCC Part 15.247 [a, 1(iii)]

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

2.8.1 Test Guidance: ANSI 63.10 Clause 7.8.4 / FCC DA-00-0705

This measurement is performed with the EUT frequency hopping function active.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

| | |
|-------------------|---|
| Span | zero span, centered on a hopping channel |
| RBW | The RBW shall be \leq Channel spacing and where possible RBW should be set $\gg 1/T$, where T is the expected dwell time per channel |
| VBW | \geq RBW |
| Sweep | as necessary to capture the entire dwell time per hopping channel |
| Detector function | peak |
| Trace | max hold |

Allow the trace to stabilize. If possible, use the marker-delta function to determine the dwell time.

2.8.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.8.3 Test Equipment

Testing was performed with the following equipment:

| Equipment | Manufacturer | Model # | Asset # | Cal. Date | Interval | Cal. Due |
|------------------------|--------------------|----------------|---------|------------|----------|------------|
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1 year | 2019-05-02 |
| Temp/Humidity | Extech | 42270 | 5892 | 2018-04-13 | 1 year | 2019-04-13 |
| Attenuator | FairView Microwave | SA18N5WA-10 | 6886 | 2018-11-23 | 1 year | 2019-11-23 |
| DC Blocker | MCL | BLK-89-S+ | - | 2018-01-15 | 1 year | 2019-01-15 |
| CE Cable (50cm length) | Huber+Suhner | Enviroflex 400 | - | 2018-01-15 | 1 year | 2019-01-15 |

2.8.4 Test Sample Verification, Configuration & Modifications

The EUT was operating in normal mode. The EUT met the requirements without modification.

EUT configuration for Dwell Time testing:



2.8.5 Dwell Time Data: (GFSK MODE)

| Mode | Pulse Width (ms) | Hopping Channel Number | Hops over Occupancy Time (hops) | Dwell Time (sec) | Limit (sec) |
|--------|------------------|------------------------|---------------------------------|------------------|-------------|
| Normal | 2.883 | 79 | 106.67 | 0.30753 | 0.4 (400ms) |

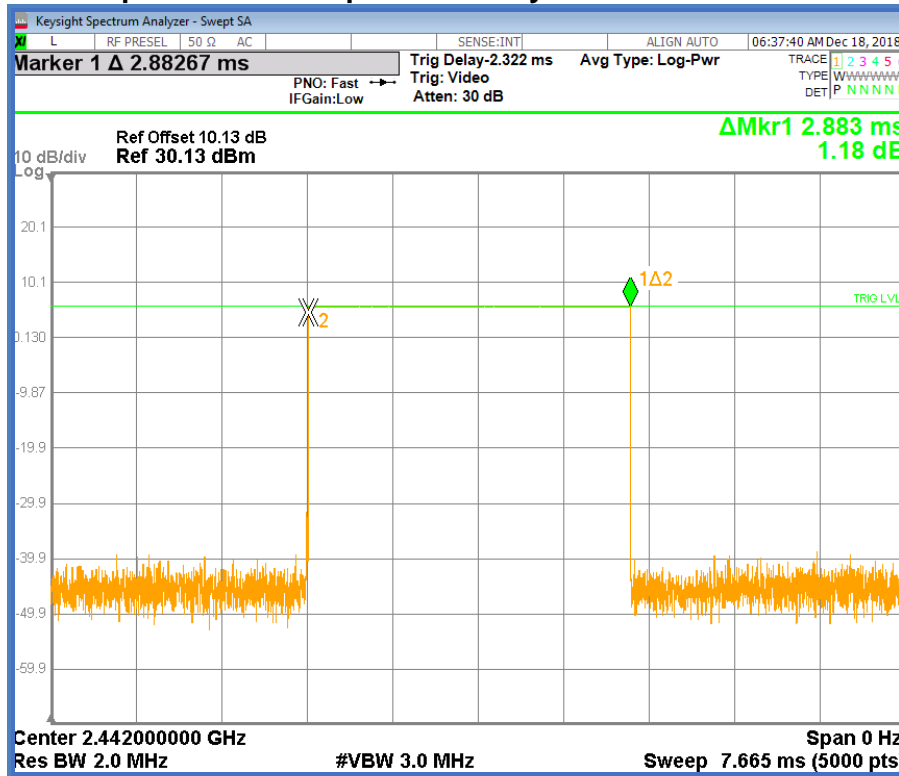
In normal mode, hopping rate is 1600hops/sec with 6 slots in 79 hopping channels.

6 Slots = (5 time slots RX, 1 time slot TX)

With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) sec, Hops over occupancy time comes to (1600 / 6 / 79) x (0.4 x 79) = 106.67 hops

Dwell Time (s) = Hops over occupancy Time (hops) x Pulse width

Screen Capture from the spectrum analyzer: Pulse Width



2.8.5 Dwell Time Data (PSK MODE)

| Mode | Pulse Width (ms) | Hopping Channel Number | Hops over Occupancy Time (hops) | Dwell Time (sec) | Limit (sec) |
|--------|------------------|------------------------|---------------------------------|------------------|-------------|
| Normal | 2.884 | 79 | 106.67 | 0.307636 | 0.4 (400ms) |

In normal mode, hopping rate is 1600hops/sec with 6 slots in 79 hopping channels.

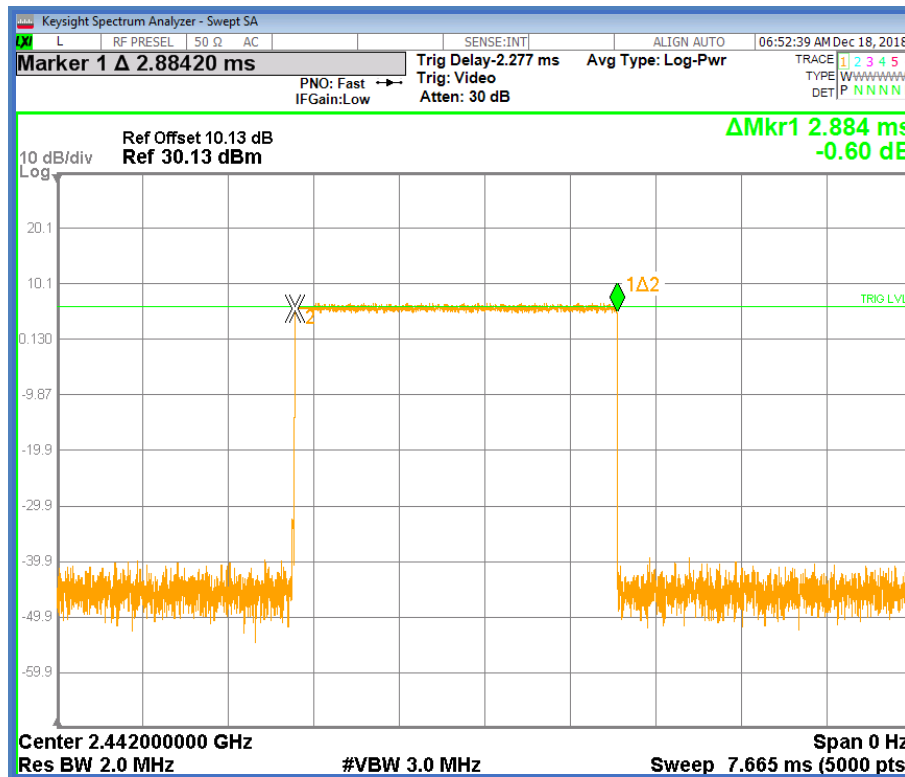
6 Slots = (5 time slots RX, 1 time slot TX)

With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) sec,

Hops over occupancy time comes to (1600 / 6 / 79) x (0.4 x 79) = 106.67 hops

Dwell Time (s) = Hops over occupancy Time (hops) x Pulse width

Screen Capture from the spectrum analyzer: Pulse Width



2.9 EUT Positioning Assessment

| | |
|--|---------------------------------|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: | Standard: FCC PART 15.247 |
| Date: | Basic Standard: ANSI C63.4-2014 |
| N/A - Fixed Wall Mount | |
| Comments: EUT will be oriented in one fix position. | |

Specification: ANSI C63.4-2014, Clause 6.3.2.1

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs (see Figure 6, Figure 7, and Figure 9). For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

2.10 Radiated Spurious Emissions (Tx Mode)

| | |
|--|---|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: Imran Akram Bushra Muharram | Standard: FCC PART 15.247 |
| Date: 2018-12-12/14/18 (20.6°C,14.2 % RH) | Basic Standard: ANSI C63.10-2013 |
| EUT status: Compliant | |

Specification: FCC PART 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Restricted Bands of Operation:

| MHz | MHz | MHz | MHz | MHz | GHz | GHz |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 0.090000 – 0.110000 | 8.291000 - 8.294000 | 16.804250 - 16.804750 | 162.01250 - 167.17000 | 1660.0000 – 1710.0000 | 3.6000000 – 4.4000000 | 14.470000 – 14.500000 |
| 0.4950000 - 0.5050000 | 8.3620000 - 8.3660000 | 25.500000 - 25.670000 | 167.72000 - 173.20000 | 1718.8000 – 1722.2000 | 4.5000000 – 5.1500000 | 15.350000 – 16.200000 |
| 2.1735000 - 2.1905000 | 8.3762500 - 8.3867500 | 37.500000 - 38.250000 | 240.00000 – 285.00000 | 2200.0000 – 2300.0000 | 5.3500000 – 5.4600000 | 17.700000 – 21.400000 |
| 4.1250000 - 4.1280000 | 8.4142500 - 8.4147500 | 73.000000 - 74.600000 | 322.00000 - 335.40000 | 2310.0000 – 2390.0000 | 7.2500000 – 7.7500000 | 22.010000 – 23.120000 |
| 4.1772500 - 4.1777500 | 12.290000 - 12.293000 | 74.800000 - 75.200000 | 399.90000 – 410.00000 | 2483.5000 – 2500.0000 | 8.0250000 – 8.5000000 | 23.600000 – 24.000000 |
| 4.2072500 - 4.2077500 | 12.519750 - 12.520250 | 108.00000 - 121.94000 | 608.00000 – 614.00000 | 2655.0000 – 2900.0000 | 9.0000000 – 9.2000000 | 31.200000 – 31.800000 |
| 5.6770000 - 5.6830000 | 12.576750 - 12.577250 | 123.00000 - 138.00000 | 960.00000 – 1240.0000 | 3260.0000 – 3267.0000 | 9.3000000 – 9.5000000 | 36.430000 – 36.500000 |
| 6.2150000 - 6.2180000 | 13.360000 - 13.410000 | 149.90000 - 150.05000 | 1300.0000 – 1427.0000 | 3332.0000 – 3339.0000 | 10.600000 – 12.700000 | Above 38.600000 |
| 6.2677500 - 6.2682500 | 16.420000 - 16.423000 | 156.52475 - 156.52525 | 1435.0000 – 1626.5000 | 3345.8000 – 3358.0000 | 13.250000 – 13.400000 | |
| 6.3117500 - 6.3122500 | 16.694750 - 16.695250 | 156.70000 - 156.90000 | 1645.5000 – 1646.5000 | 3500.0000 – 3600.0000 | | |

■ US only
 ■ Canada 108 – 138 MHz
 ■ Canada 960 – 1427 MHz
 ■ Canada only

2.10.1 Test Guidance: ANSI C63.10-2013, Clause 13.4.2

From 9 kHz to 150 kHz (resolution bandwidth of 200 Hz) and from 150 kHz to 30 MHz (resolution bandwidth 9 kHz) measurements are performed with a loop antenna (as per KDB 460108).

From 30 MHz to 1000 MHz, measurements are performed with a broadband biconilog antenna and a resolution bandwidth of 120 kHz.

Above 1000 MHz, measurements are performed with a DRG Horn antenna or a Standard Gain horn, and a resolution bandwidth of 1 MHz. The EUT is raised to 150 cm above the ground plane, and the area between the EUT and the antenna mast is covered with RF absorbent material.

The scan is performed at discrete increments of turntable azimuth and antenna height, which are selected in accordance with the applicable standard in order to assure capture of frequencies of interest. Optimization is performed based on the scan data.

Frequencies having peak emissions within 10dB of the limits are optimized. The EUT is rotated in azimuth over 360 degrees and the direction of maximum emission is noted.

Antenna height is varied from 1 – 4 meters at this azimuth to obtain the maximum emission. Then the maximum level is measured with the appropriate detector and recorded. Up to 1 GHz, measurements are performed with a Quasi-Peak detector. Above 1 GHz, measurements are recorded with Peak and/or Average detectors, as applicable.

2.10.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.10.3 Test Equipment

Testing was performed with the following equipment:

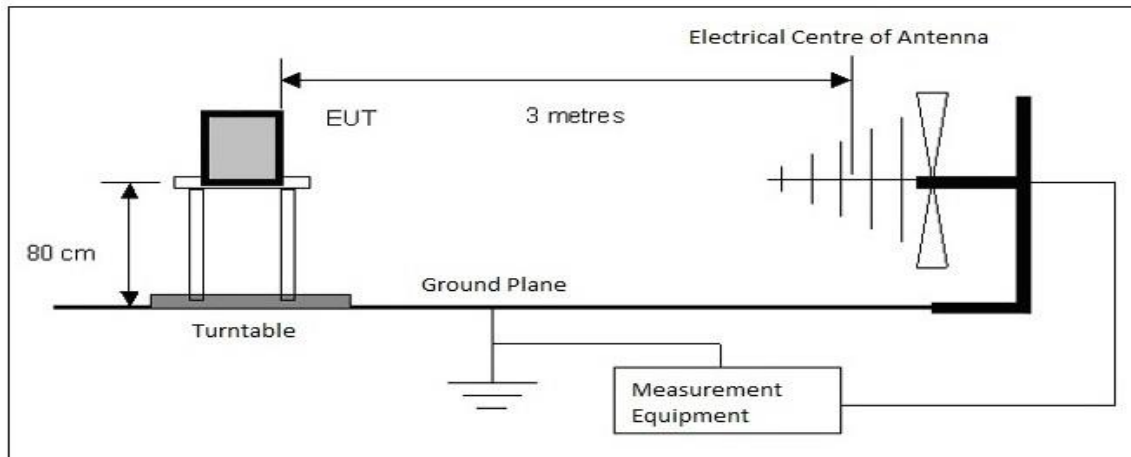
| Equipment | Manufacturer | Model # | Asset # | Calibration Date | Interval | Calibration Due |
|-----------------------------------|--------------------------|-----------------------------|----------------|------------------|----------|-----------------|
| EMC Software | UL | Ver. 9.5 | ETC-SW-EMC 2.1 | N/A | | |
| EMI receiver | Agilent | N9038A | 6130 | 2018-05-02 | 1yr | 2019-05-02 |
| Loop Antenna | EMCO | 6502 | 10868 | 2017-03-29 | 2yr | 2019-03-29 |
| Biconilog Antenna | ARA | LPB-2520/A | 4318 | 2018-09-19 | 2yr | 2020-09-19 |
| DRG Horn | EMCO | 3115 | 19357 | 2018-09-12 | 2yr | 2020-09-12 |
| Standard Horn | QuinStar Technology Inc. | QWH-KPRS00 | 6163 | 2018-09-13 | 2yr | 2020-09-13 |
| Humidity/Temp Logger | Extech Ins. Corp. | 42270 | 5892 | 2018-04-13 | 1yr | 2019-04-13 |
| Low Noise Amplifier (1 – 18 GHz) | MITEQ | JS43-01001800-21-5P | 4354 | 2018-01-03 | 1yr | 2019-01-03 |
| Low Noise Amplifier (18 – 26 GHz) | MITEQ | JS44-01002650-33-3P | 6163 | 2018-01-03 | 1yr | 2019-01-03 |
| Pre-Amplifier (30 – 1300 MHz) | hp | 8447D | 9291 | 2018-01-03 | 1yr | 2019-01-03 |
| RE Cable below 1GHz | Insulated Wire Inc. | KPS-1501A-3600-KPA-01102006 | 4419 | 2018-01-03 | 1yr | 2019-01-03 |
| RE Cable Above 1 GHz | A.H. System Inc. | SAC-26G-8.23 | 6187 | 2018-01-03 | 1yr | 2019-01-03 |

2.10.4 Test Sample Verification, Configuration & Modifications

The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

Test setup diagram for Radiated Spurious Emissions testing (below 1GHz):



Above 1GHz, the EUT is raised using a low permittivity material (polystyrene) to a height of 1.5m.

2.10.5 Radiated Emissions Data:

The emissions data are presented in tabular form, showing turntable azimuth, antenna height and polarization, the uncorrected spectrum analyzer reading, the correction factors applied, the net result, the value of the limit at the frequency investigated, and the Delta between the result and the limit.

Meter Reading in dB μ V + Antenna Factor in dB/m + Gain/Loss Factor in dB = Corrected Field Strength in dB μ V/m.

Delta = Field Strength - Limit

Notes:

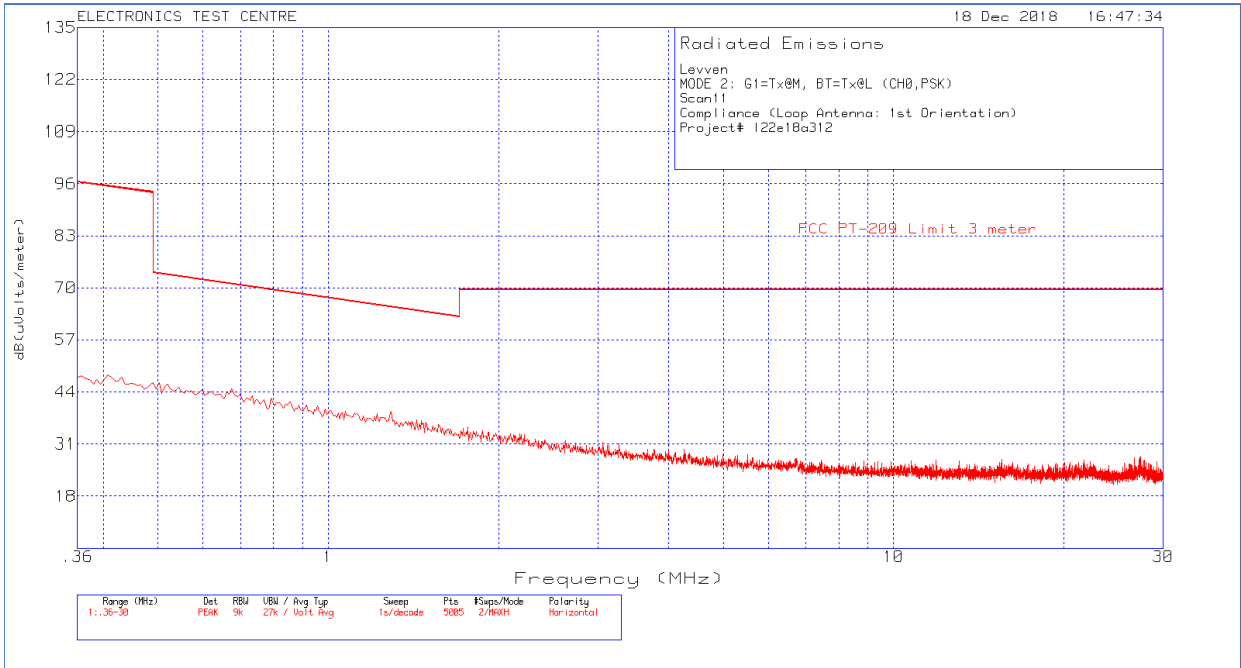
- When a preamp is used, the resulting gain is compensated, producing a negative value for the Cable Loss.
- Measurements reported are the result of adjusting the turntable azimuth and antenna height to obtain the maximum EUT emission. This may produce a different reading than the plot trace. The plot is a Peak Hold function obtained at discrete increments of height and azimuth, while the reported measurement is obtained with the appropriate Quasi Peak or Average detector after the height and azimuth have been adjusted for maximum emission.
- Preliminary scans were performed for all channels in Transmit modes. The MID band channel 2442 MHz for Ginseng Radio 1 and low channel 2402 MHz for BT Radio 1 were selected as the worst-case condition for detailed examination.
- In Transmit mode, the EUT was assessed up to 25.0 GHz.

Negative values for Delta indicate compliance.

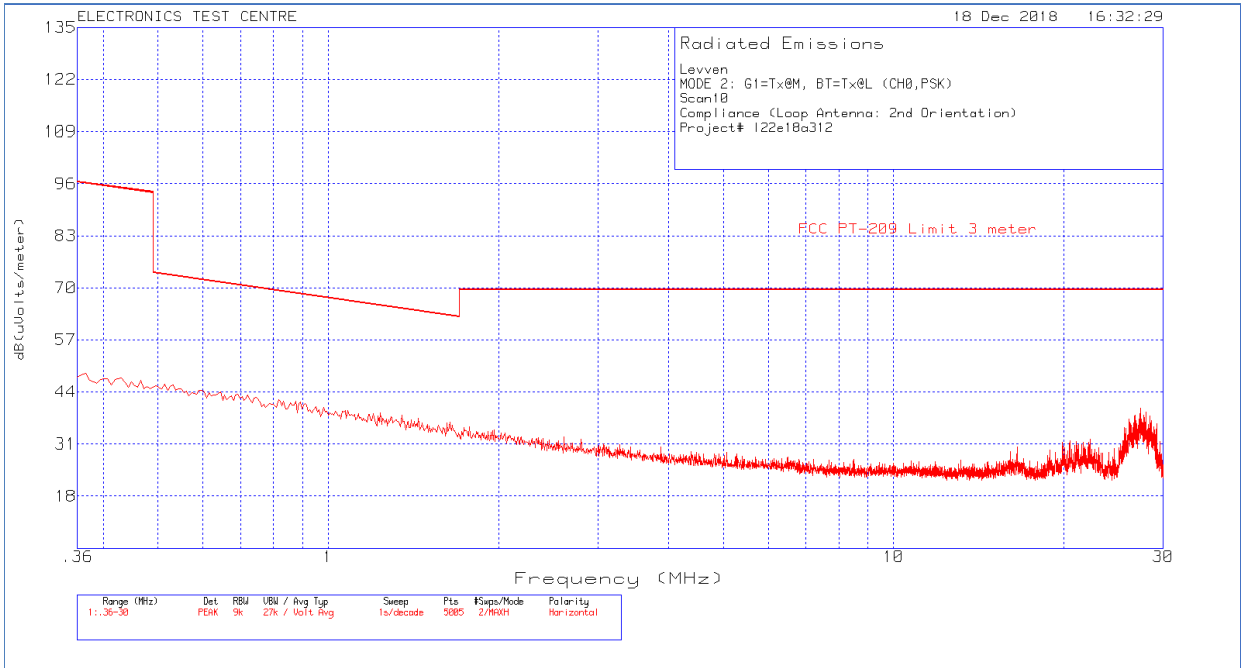
| Freq. Marker | Freq. [GHz] | Raw reading [dBµv] | Det | Antenna Factor [dB/m] | Pre amp Gain [dB] | Corrected Reading [dBµv/m] | FCC 15.209 Limit [dBµv/m] | Delta [dB] | Azimuth [Deg] | Height [cm] | Polarization |
|--------------|-------------|--------------------|-----|-----------------------|-------------------|----------------------------|---------------------------|------------|---------------|-------------|--------------|
| 9 | 1.197 | 28.79 | Av | 25 | -35.6 | 18.19 | 54 | -35.81 | 223 | 341 | Horizontal |
| 10 | 1.9956 | 27.33 | Av | 27.5 | -34.7 | 20.13 | 54 | -33.87 | 46 | 207 | Horizontal |
| 1 | *4.8037 | 41.55 | PK | 32.8 | -31.9 | 42.45 | 74 | -31.55 | 296 | 352 | Horizontal |
| 1 | *4.8037 | 29.73 | Av | 32.8 | -31.9 | 30.63 | 54 | -23.37 | 296 | 352 | Horizontal |
| 2 | *4.8814 | 53.79 | PK | 33 | -31.7 | 55.09 | 74 | -18.91 | 232 | 169 | Horizontal |
| 2 | *4.8814 | 47.13 | Av | 33 | -31.7 | 48.43 | 54 | -5.57 | 232 | 169 | Horizontal |
| 11 | 6.0001 | 30.99 | Av | 34.4 | -29.9 | 35.49 | 54 | -18.51 | 4 | 243 | Horizontal |
| 3 | *7.3223 | 47.96 | PK | 36.4 | -27.8 | 56.56 | 74 | -17.44 | 122 | 104 | Horizontal |
| 3 | *7.3223 | 42.63 | Av | 36.4 | -27.8 | 51.23 | 54 | -2.77 | 122 | 104 | Horizontal |
| 4 | 9.7632 | 39.48 | PK | 37.9 | -26.9 | 50.48 | 74 | -23.52 | 161 | 241 | Horizontal |
| 4 | 9.7632 | 29 | Av | 37.9 | -26.9 | 40 | 54 | -14.0 | 161 | 241 | Horizontal |
| 12 | 1.1971 | 29.38 | Av | 25 | -35.6 | 18.78 | 54 | -18.5 | 51 | 170 | Vertical |
| 13 | 1.9916 | 27.82 | Av | 27.5 | -34.7 | 20.62 | 54 | -4.89 | 60 | 145 | Vertical |
| 5 | *4.8037 | 43.27 | PK | 32.8 | -31.9 | 44.17 | 74 | -29.83 | 151 | 278 | Vertical |
| 5 | *4.8037 | 30.92 | Av | 32.8 | -31.9 | 31.82 | 54 | -22.18 | 151 | 278 | Vertical |
| 6 | *4.8814 | 53.79 | PK | 33 | -31.7 | 55.09 | 74 | -18.91 | 147 | 279 | Vertical |
| 6 | *4.8814 | 47.14 | Av | 33 | -31.7 | 48.44 | 54 | -5.56 | 147 | 279 | Vertical |
| 14 | 5.9998 | 38.02 | Av | 34.4 | -29.9 | 42.52 | 54 | -11.48 | 63 | 104 | Vertical |
| 7 | *7.3223 | 45.35 | PK | 36.4 | -27.8 | 53.95 | 74 | -20.05 | 243 | 109 | Vertical |
| 7 | *7.3223 | 39.5 | Av | 36.4 | -27.8 | 48.1 | 54 | -5.9 | 243 | 109 | Vertical |
| 8 | 9.7632 | 42.14 | PK | 37.9 | -26.9 | 53.14 | 74 | -20.86 | 238 | 280 | Vertical |
| 8 | 9.7632 | 32.77 | Av | 37.9 | -26.9 | 43.77 | 54 | -10.23 | 238 | 280 | Vertical |

* Restricted Band
 PK - Peak detector
 Av - Average detector

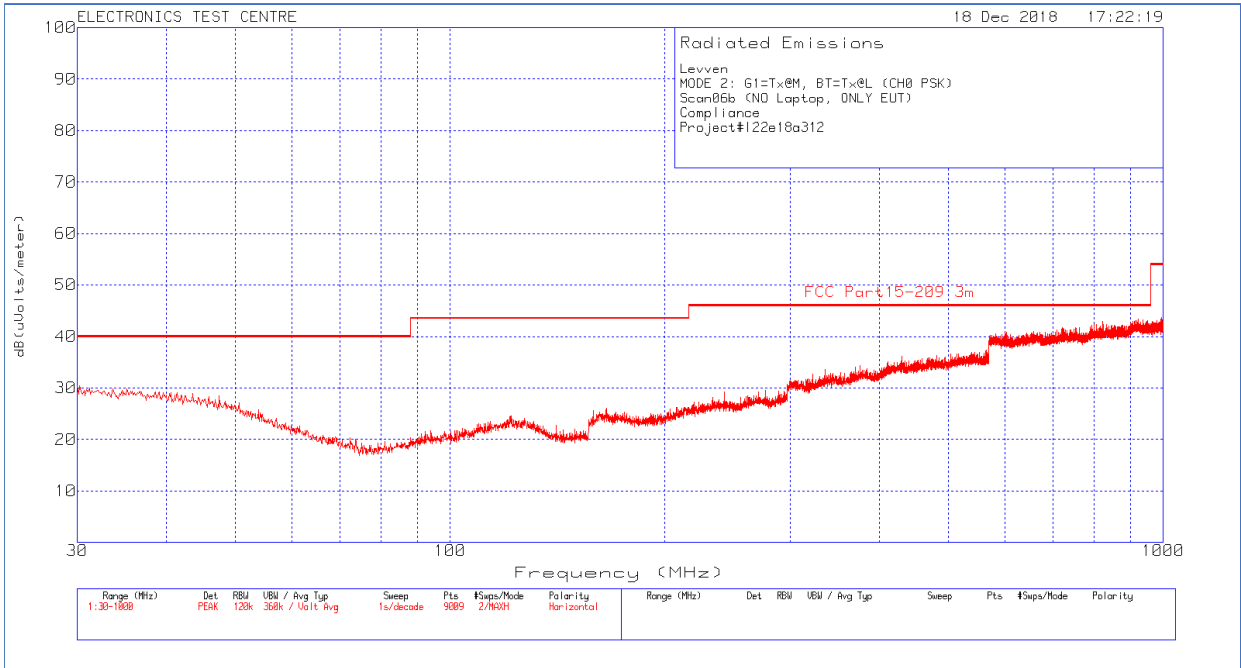
Plot of Radiated Emissions: Measuring Antenna Parallel



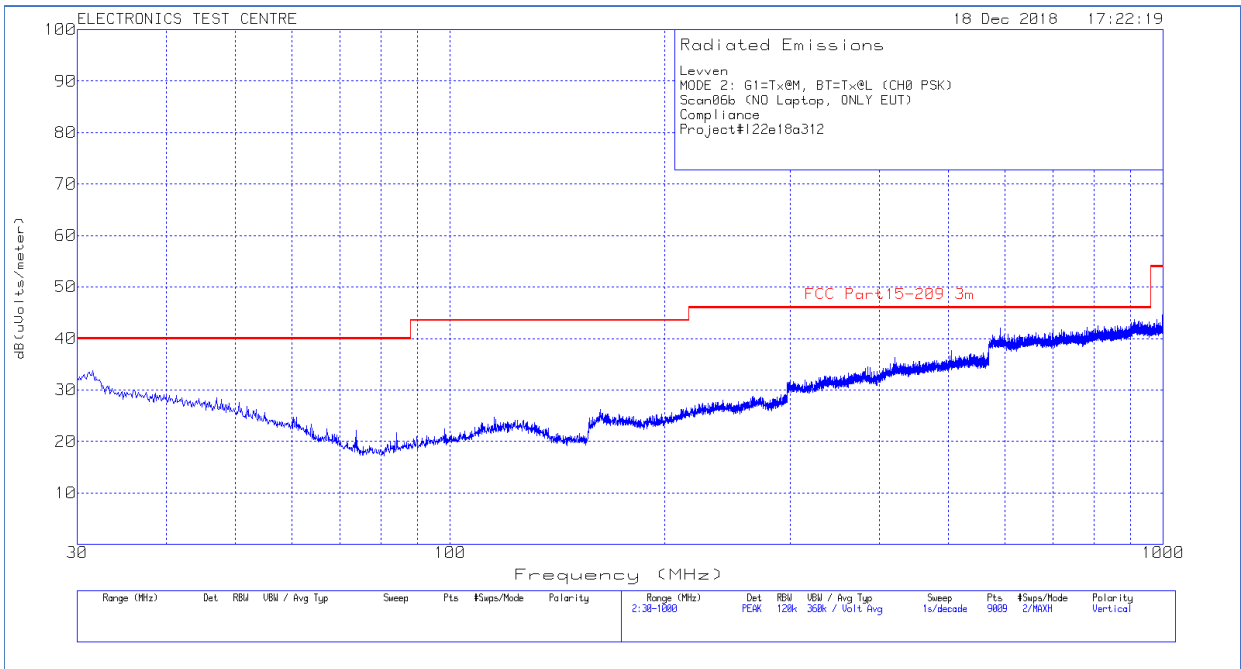
Plot of Radiated Emissions: Measuring Antenna Perpendicular



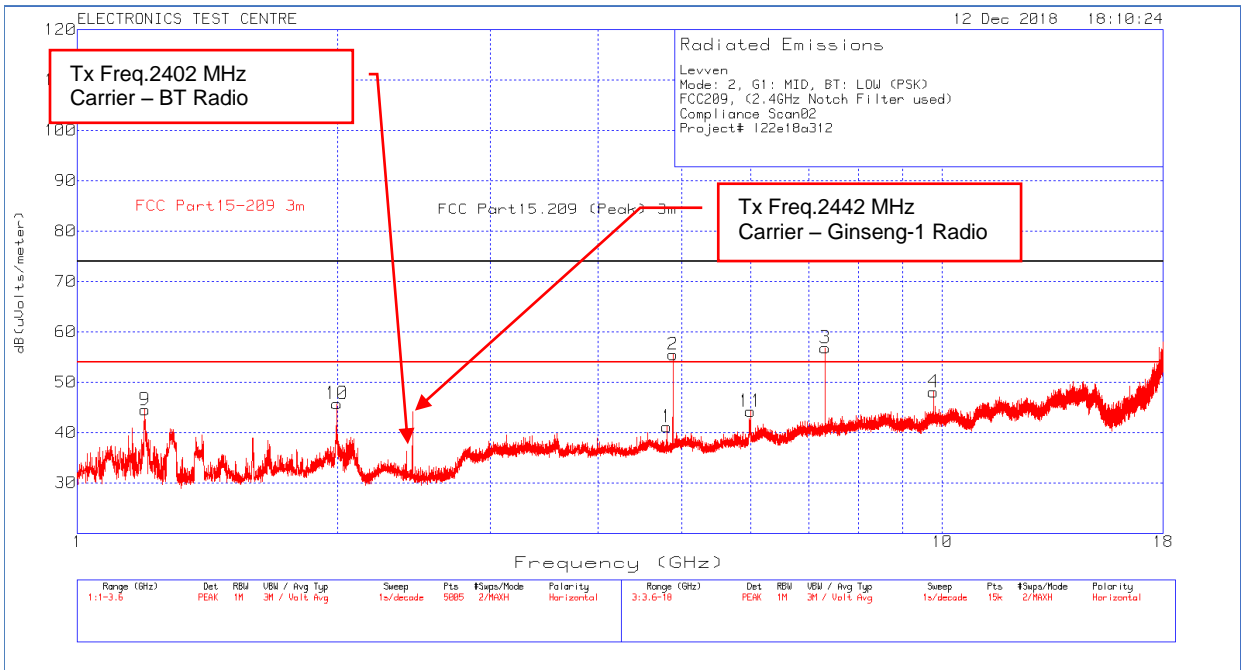
Plot of Radiated Emissions: Horizontal polarization



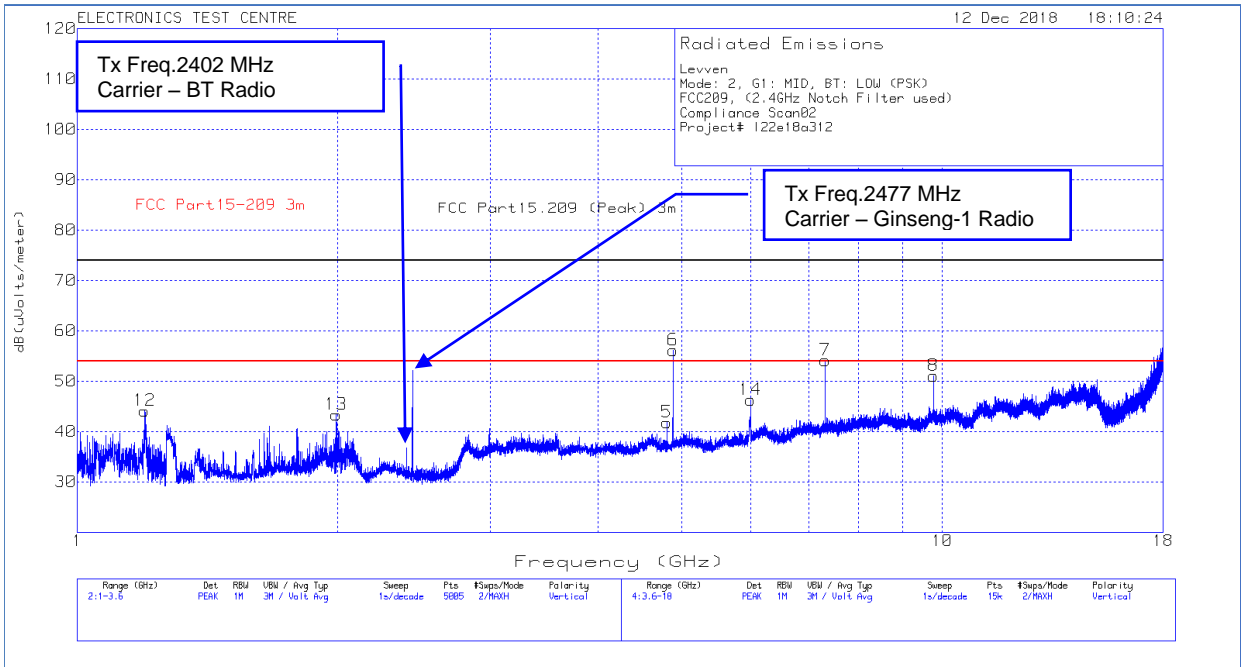
Plot of Radiated Emissions: Vertical polarization



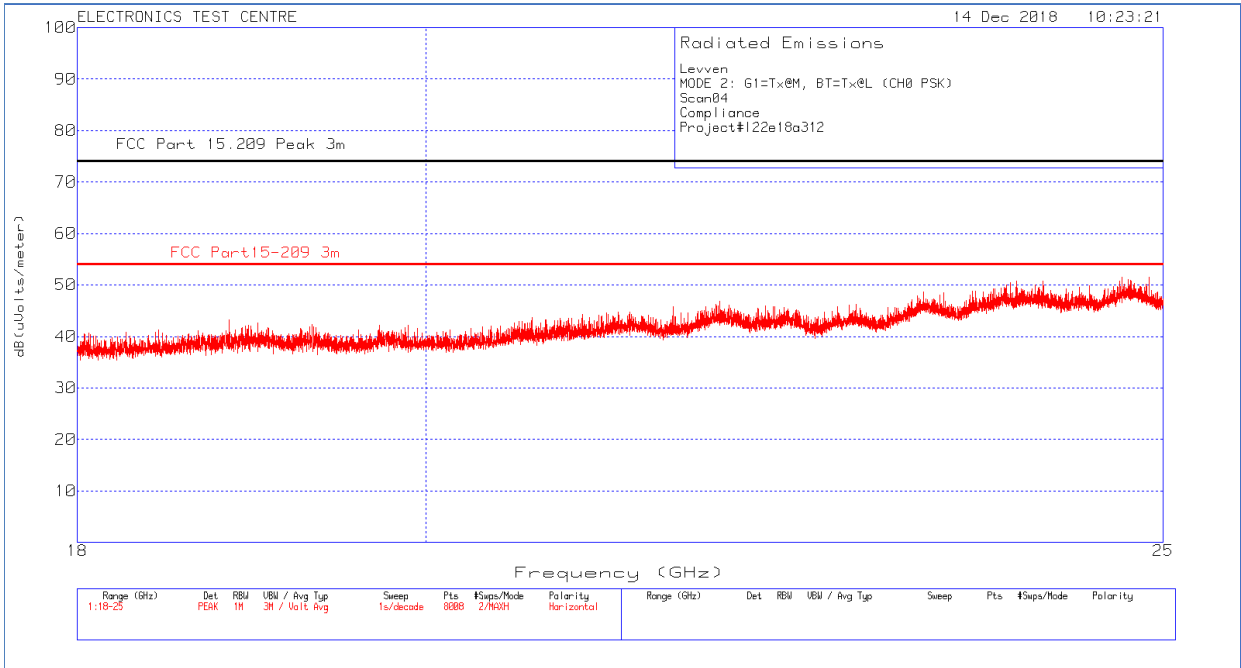
Plot of Radiated Emissions: Horizontal polarization



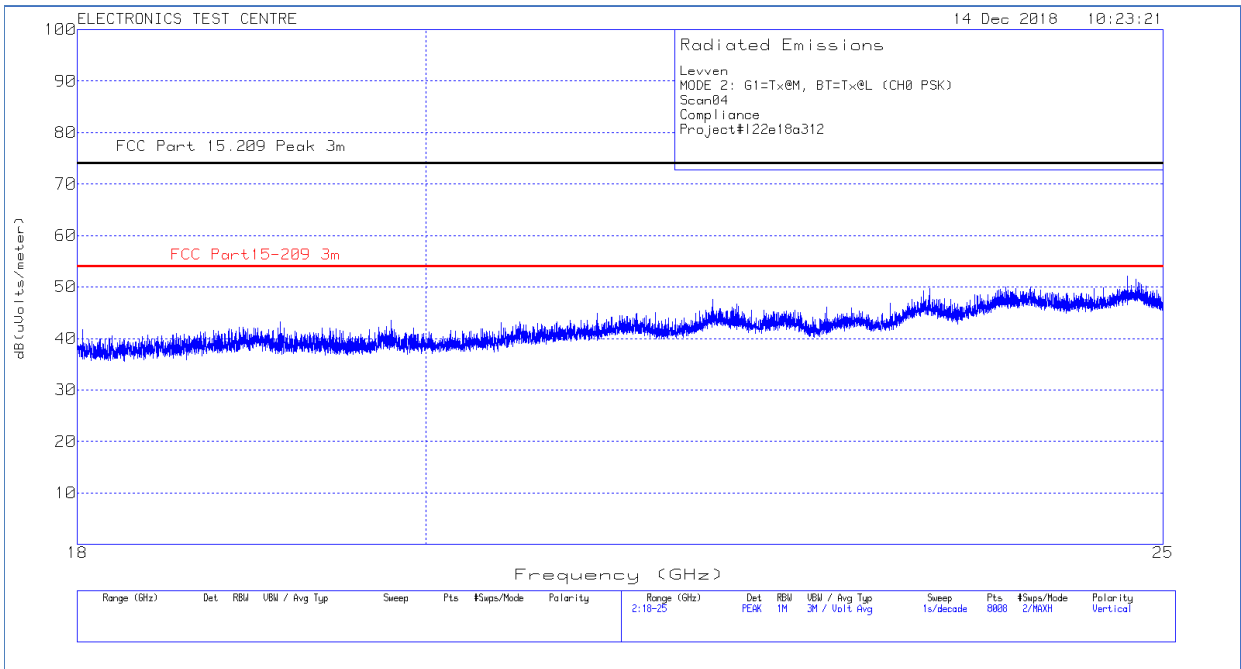
Plot of Radiated Emissions: Vertical polarization



Plot of Radiated Emissions: Horizontal polarization



Plot of Radiated Emissions: Vertical polarization



2.11 RF Exposure

| | |
|--|---------------------------|
| Test Lab: Electronics Test Centre, Airdrie | EUT: Soulplay |
| Test Personnel: | Standard: FCC PART 15.247 |
| Date: | |
| EUT status: Exempt | |

Compliant: RF exposure assessment to be provided in a separate Exhibit.

3.0 TEST FACILITY

3.1 Location

The Soulplay was tested for emissions at the Electronics Test Centre laboratory located in Airdrie, Alberta, Canada. The Radio Frequency Anechoic Chamber (RFAC), identified as Chamber 1, has a usable working space measuring 10.6 m long x 7.3 m wide x 6.5 m high.

Measurements taken at this site are accepted by Industry Canada as evidence of conformity per registration file # 2046A. This site is also listed with the FCC under Registration Number CA2046.

The floor, walls and ceiling consist of annealed steel panels. The walls and ceiling are covered with ferrite tile, augmented by RF absorbant foam material on the end wall nearest the turntable, and on the adjacent walls and the ceiling. The chamber floor supports a 15 cm high internal floor, constructed of annealed steel panels, that forms the ground plane, and is bonded to the chamber walls.

The 3-m diameter turntable is flush-mounted with the floor. A sub-floor cable-way is provided to route cables between the turntable pit and EUT support equipment located in the Control Room. Cables reach the EUT through an opening in the centre of the turntable.

Test instrumentation and EUT support equipment is located in the Control Room, consisting of two shielded vestibules joined together at the side of the main room. Cables are routed through bulkhead panels between the rooms and the test chamber as required. Power feeds are routed into the main room and vestibules through line filters providing at least 100 dB of attenuation between 10 kHz and 10 GHz.

Either floor mounted or table-top equipment can be tested at this facility.

3.2 Grounding Plan

The Soulplay was placed at the center of the test chamber turntable on top of an 80-cm high polystyrene foam table. The EUT was grounded according to Levven Automation specifications.

3.3 Power Supply

All EUT power was supplied by filtered 120VAC / 60Hz main.

End of Document