

**EMC Test Report**  
As per  
**RSS-247 Issue 2:2017**  
**&**  
**FCC Part 15 Subpart 15.247:2016**

**Unlicensed Intentional Radiators**

on the

**XBRG-1140-A, XBRG-1140-x**  
**(x depends on firmware)**



Canada

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Issued by: **TÜV SÜD Canada Inc.**  
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Abderrahmane  
Ferhat,  
Project Engineer

A handwritten signature in black ink, appearing to read 'Abderrahmane Ferhat', written over a horizontal line.

Testing produced for  
 **Trilliant**


See Appendix A for full client &  
EUT details.



Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

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Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> <b>(x depends on firmware)</b>	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

## Report Scope

This report addresses the EMC verification testing and test results of the **XBRG-1140-A, XBRG-1140-x (x depends on firmware)**, herein referred to as EUT (Equipment Under Test). Results in this report are applicable to all units, except where indicated as otherwise or individually. The EUT was tested for emissions compliance against the following standards:

RSS-247 Issue 2:2017


FCC Part 15 Subpart C 15.247:2016

For a more detailed list of the standards and the revision used, see the "Applicable Standards, Specifications and Methods" section of this report.

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc, unless otherwise stated.


Client	<b>Trilliant Networks Inc.</b>	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

## Summary

The results contained in this report relate only to the item(s) tested.

EUT:	<b>XBRG-1140-A, XBRG-1140-x (x depends on firmware)</b>
FCC Certification #, FCC ID:	RV7-5G1100
Industry Canada Certification #, IC:	6028A- 5G1100
EUT passed all tests performed	Yes
Tests conducted by	Abderrahmane Ferhat


For testing dates, see 'Testing Environmental Conditions and Dates'.

Client	<b>Trilliant Networks Inc.</b>	
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## Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS-GEN (Table 6)	Restricted Bands for Intentional Operation	QuasiPeak Average	Pass See Justification
FCC 15.207 RSS-GEN (Table 3)	Power Line Conducted Emissions	QuasiPeak Average	Pass See Justification
FCC 15.209 RSS-GEN (Table 4)	Spurious Radiated Emissions	QuasiPeak Average	Pass
FCC 15.247(a)2 RSS-247 6.2.4.1	6 dB Bandwidth	> 500 kHz	Pass See Justification
FCC 15.247(b)2 RSS-247 6.2.4.1	Max Output Power	< 1 Watt	Pass See Justification
FCC 15.247(c) ii RSS-247 6.2.4.1	Antenna Gain	> 6 dBi	Pass See Justifications
FCC 15.247(d) RSS-247 6.2.4.2 / 5.5	Antenna Conducted Spurious	< 20 dBc	Pass See Justification
FCC 15.247(e) RSS-247 6.2.4.1	Spectral Density	< 8 dBm (3 kHz BW)	Pass See Justification
<b>Overall Result</b>			<b>Pass</b>

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '\*'.

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### **Notes, Justifications, or Deviations**

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

“This report represents a combination of two previously approved modules, FCC ID: RV7-5G1100 and FCC ID: TMB-OSDI4W1 the characteristics of the previous filing(s) were deemed to not be affected.

The top/middle/low of each band was investigated in combination the top/middle/low of each other band. The radiated emissions results presented represent the worst case results.

The host is a Class A device operating in a non-residential environment. The emissions related to the module were verified to not exceed the 15.209 limits where applicable. Those radiated emissions that exceeded the 15.209 limits where applicable, were deemed to be originating from the host, and met the applicable Class A limit.

A later revision of the standard may have been substituted in place of the previous dated referenced revision. The year of the specification used is listed under applicable standards. Using the later revision accomplishes the goal of ensuring compliance to the intent of the previous specification, while allowing the laboratory to incorporate the extensions and clarifications made available by a later revision.


### **Sample Calculation(s)**

#### **Radiated Emission Test**

Margin = Limit – (Received Signal + Antenna Factor + Cable Loss – Pre-Amp Gain)


Margin = 50.5dB $\mu$ V/m – (50dB $\mu$ V + 10dB + 2.5dB – 20dB)

Margin = 8.0 dB (pass)

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## Applicable Standards, Specifications and Methods


ANSI C63.4:2014	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 For Testing Unlicensed Wireless Devices
CFR 47 FCC 15 Subpart C:2016	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
CISPR 22:2008	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
FCC KDB 558074: 2016	FCC KDB 558074 Digital Transmission Systems, measurements and procedures
ICES-003 Issue 6 2016	Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
RSS-GEN Issue 4 2014	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2:2017	Digital Transmission Systems (DTSSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ISO 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories

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## Document Revision Status

Revision 0	December 11, 2017	Initial Release
Revision 1	January 12, 2018.	Antenna gain and clauses reference corrections
	Corrected	
Revision 2	January 31, 2018.	Revised 5G measurement table.



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## Definitions and Acronyms

The following definitions and acronyms are applicable in this report.  
See also ANSI C63.14.

**LISN** – Line Impedance Stabilization Network

**NCR** – No Calibration Required

**NSA** – Normalized Site Attenuation

**N/A** – Not Applicable

**RF** – Radio Frequency

**AE** – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

**BW** – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

**Class A Device** – A device that is marketed for use in a commercial, industrial or business environment. A 'Class A' device should not be marketed for use by the general public. A 'Class A' device should contain the following warning in its user manual: "**Warning:** This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures."


**Class B Device** – A device that is marketed for use in a residential environment and may also be used in a commercial, business or industrial environments. NOTE: A residential environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10m of the device concerned.

**EMC** – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

**EMI** – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

**EUT** – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

**ITE** – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.


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## Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada testing lab in Laval, near Montréal, Québec, Canada. The testing lab has a calibrated 3m semi-anechoic chamber which allows measurements on an EUT that has a maximum width or length of up to 2m and a height of up to 3m. The chamber is equipped with a turntable that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120Vac and 240Vac single phase, or devices that are rated for a 208Vac 3 phase input. DC capability is also available for testing. The chamber is equipped with a mast that controls the polarization and height of the antenna. Control of the mast occurs in the control room adjoining the shielded chamber. Radiated emission measurements are performed using a BiLog antenna and a Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN and using the Vertical Ground plane if applicable. For ESD testing, the HCP is 1.6m x 0.8m and the VCP is 0.5m x 0.5m. The reference ground plane, when applicable, is 1.6m x 1.6m.

### **Calibrations and Accreditations**


The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, 382292) and Industry Canada (IC, 6844B-1). This chamber was calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at TÜV SÜD Canada. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at TÜV SÜD Canada. TÜV SÜD Canada Inc is accredited to ISO 17025 by A2LA with Testing Certificate #2955.02. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

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### ***Testing Environmental Conditions and Dates***

Following environmental conditions were recorded in the facility during time of testing:

<b>Date</b>	<b>Test</b>	<b>Initials</b>	<b>Temperature (°C)</b>	<b>Humidity (%)</b>	<b>Pressure (kPa)</b>
2017-11-14 to 2017-11-26	Radiated Emissions	AF	20 – 24	40 – 51	98.0 – 102.0

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## Detailed Test Result Section

Client	<b>Trilliant Networks Inc.</b>	
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## ***Transmitter Spurious Radiated Emissions***

### **Purpose**

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

### **Limits and Method**

The method is as defined in Section 12.2 of FCC KDB 558074 and ANSI C63.10.

The limits, as defined in 15.247(d) for unintentional radiated emissions, apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).

All unintentional emissions must also meet the ‘Spurious Conducted Emissions’ requirements of -20 dBc or greater.


<b>Frequency</b>	<b>Limit</b>
0.009 MHz – 0.490 MHz	2400/F(kHz) uV/m at 300m <sup>1</sup>
0.490 MHz – 1.705 MHz	24000/F(kHz) uV/m at 30m <sup>1</sup>
1.705 MHz – 30 MHz	30 uV/m at 30m <sup>1</sup>
30 MHz – 88 MHz	100 uV/m (40.0 dBuV/m <sup>1</sup> ) at 3m
88 MHz – 216 MHz	150 uV/m (43.5 dBuV/m <sup>1</sup> ) at 3m
216 MHz – 960 MHz	200 uV/m (46.0 dBuV/m <sup>1</sup> ) at 3m
Above 960 MHz	500 uV/m (54.0 dBuV/m <sup>1</sup> ) at 3m
Above 1000 MHz	500 uV/m (54 dBuV/m <sup>2</sup> ) at 3m
Above 1000 MHz	500 uV/m (74 dBuV/m <sup>3</sup> ) at 3m

<sup>1</sup>Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

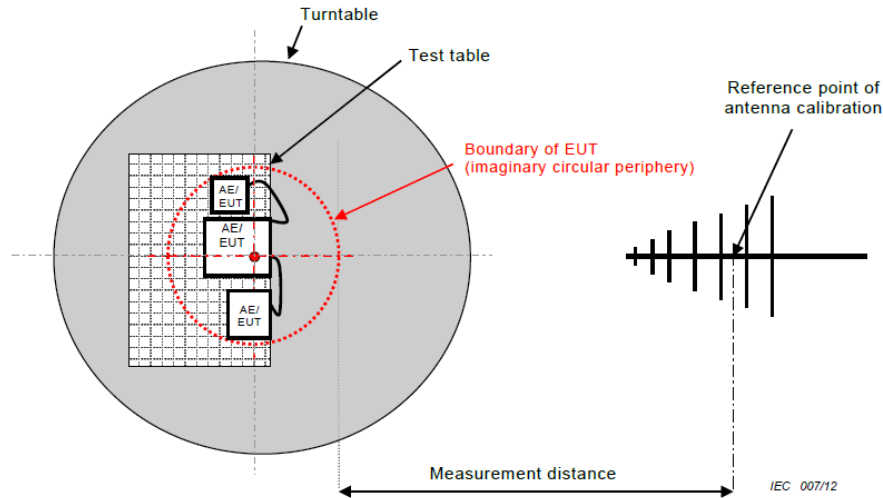
<sup>2</sup>Limit is with 1 MHz measurement bandwidth and using an Average detector

<sup>3</sup>Limit is with 1 MHz measurement bandwidth and using a Peak detector

Based on ANSI C63.4 Section 4.2, if the Peak detector measurements do not exceed the Quasi-Peak limits, where defined, then the EUT is deemed to have passed the requirements.

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### Typical Radiated Emissions Setup



### Measurement Uncertainty


The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is  $\pm 4.25\text{dB}$  for 30MHz – 1GHz and  $\pm 4.93\text{dB}$  for 1GHz – 18GHz with a 'k=2' coverage factor and a 95% confidence level.

### Preliminary Graphs

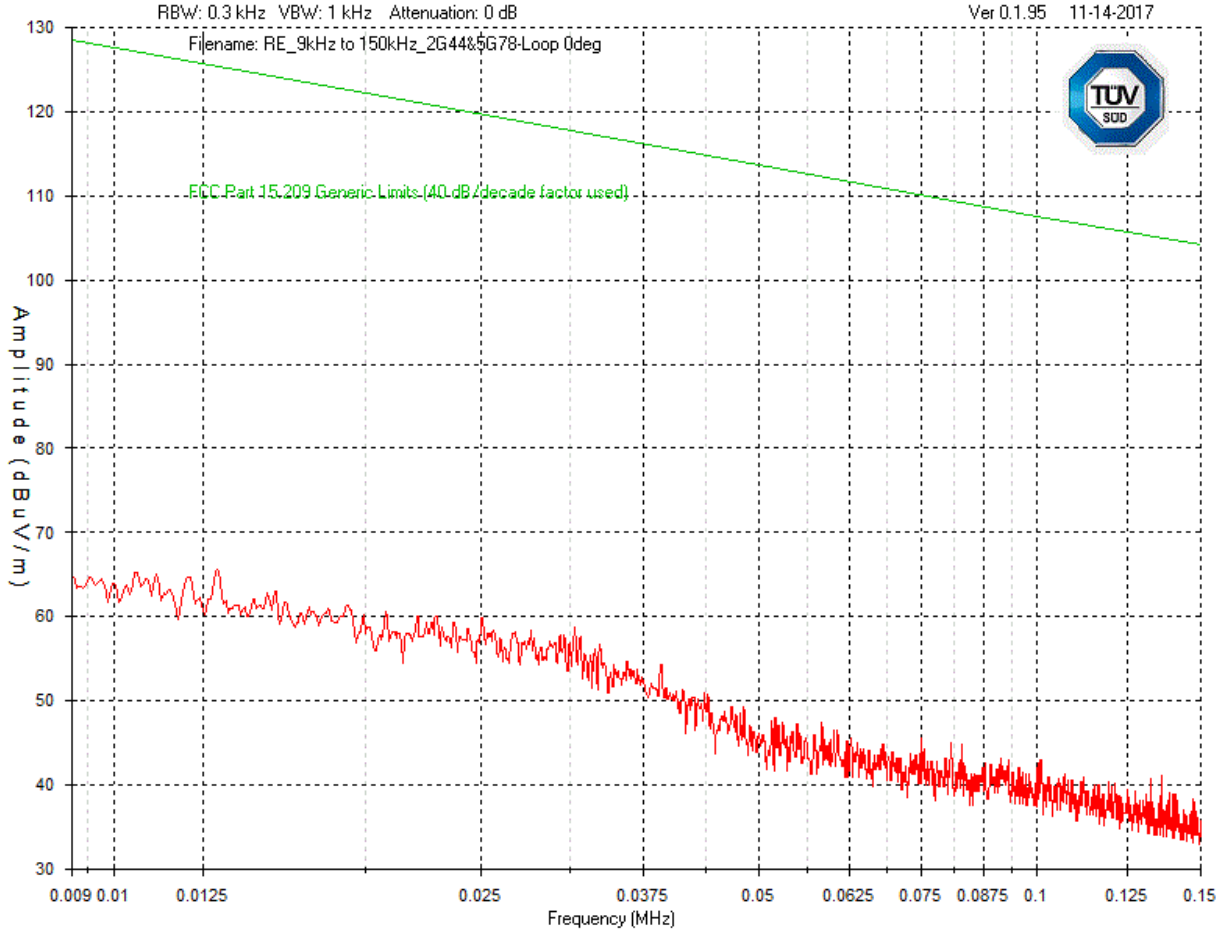
The graphs shown below are maximized peak measurement graphs measured with a resolution bandwidth greater than or equal to the final required detector over a full 0-360°. This peaking process is done as a worst case measurement and enables the detection of frequencies of concern for final measurement. For final measurements with the appropriate detector, where applicable, please refer to the tables under Final Measurements.


In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10<sup>th</sup> harmonic. The EUT was set to transmit continuously and simultaneously in 2.4GHz and 5GHz bands. Worst case is reported in this report. Prescan was done up to 40GHz and no emissions observed above 26GHz.

Devices scanned may be scanned at alternate test distances and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.

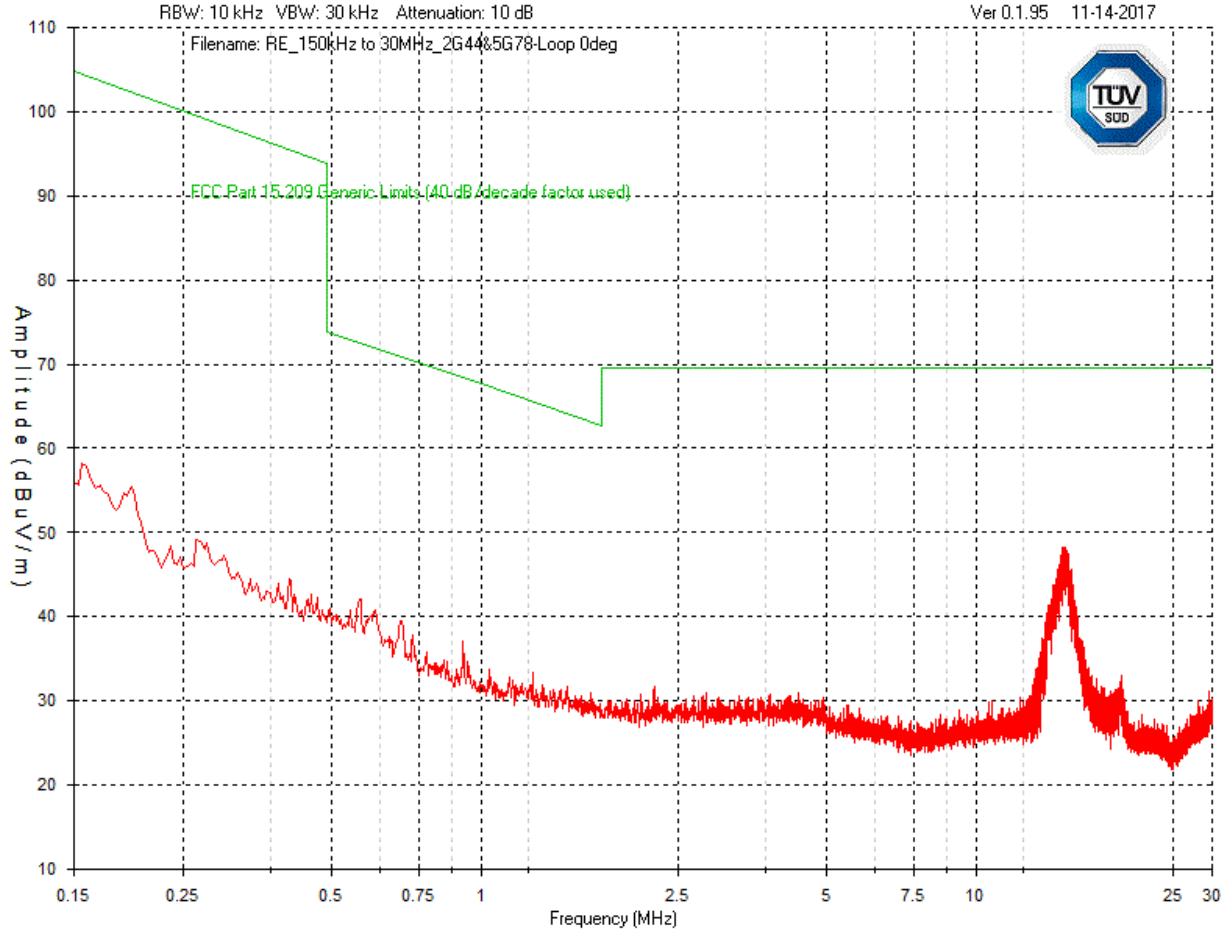
Client	<b>Trilliant Networks Inc.</b>	
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**Peak Emission Graph – Loop 0deg**  
**Channels 18 & 5.780GHz continuously transmitting – 9 kHz – 150 kHz**




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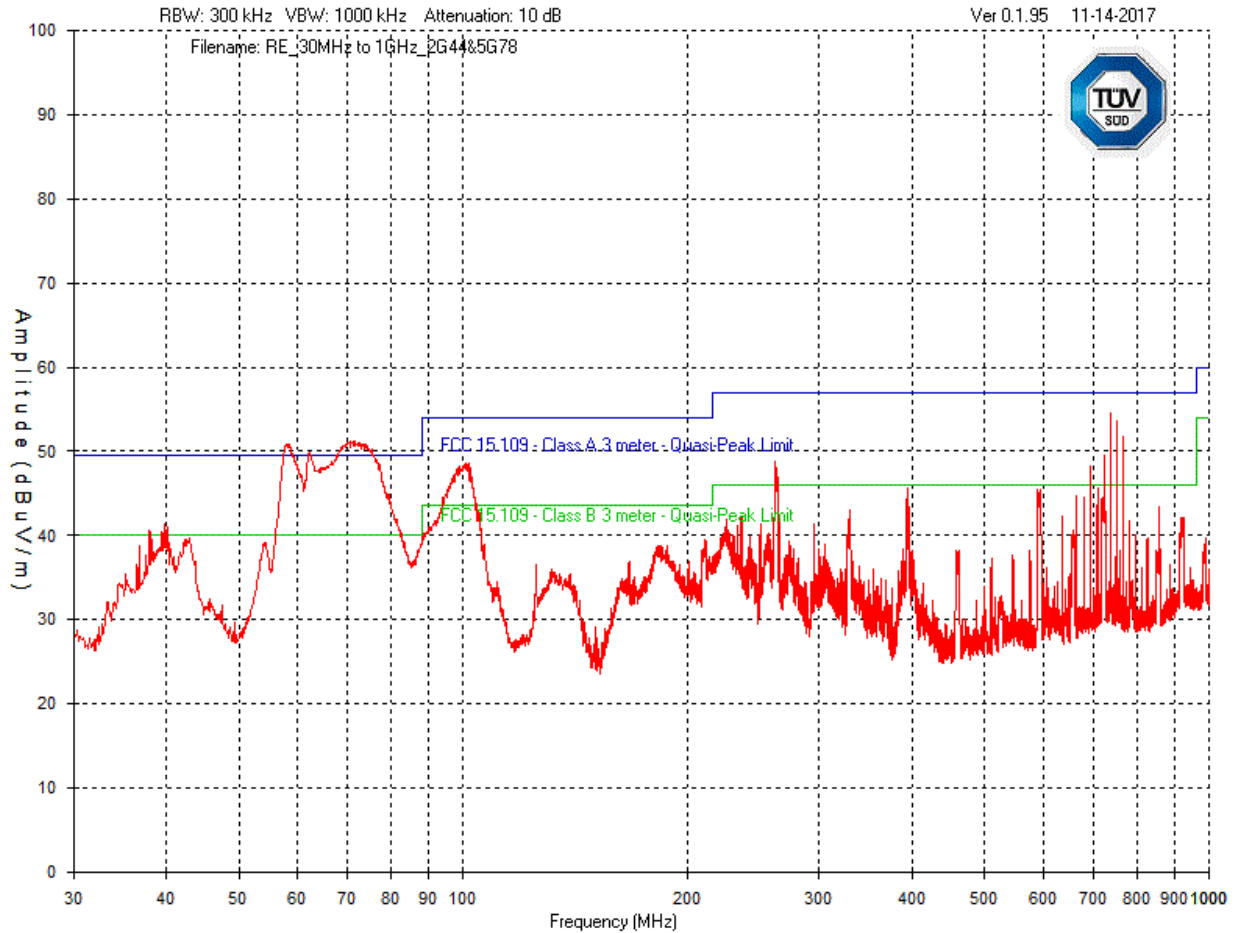
**Peak Emission Graph – Loop 0deg**  
**Channels 18 & 5.780GHz continuously transmitting – 150 kHz – 30 MHz**






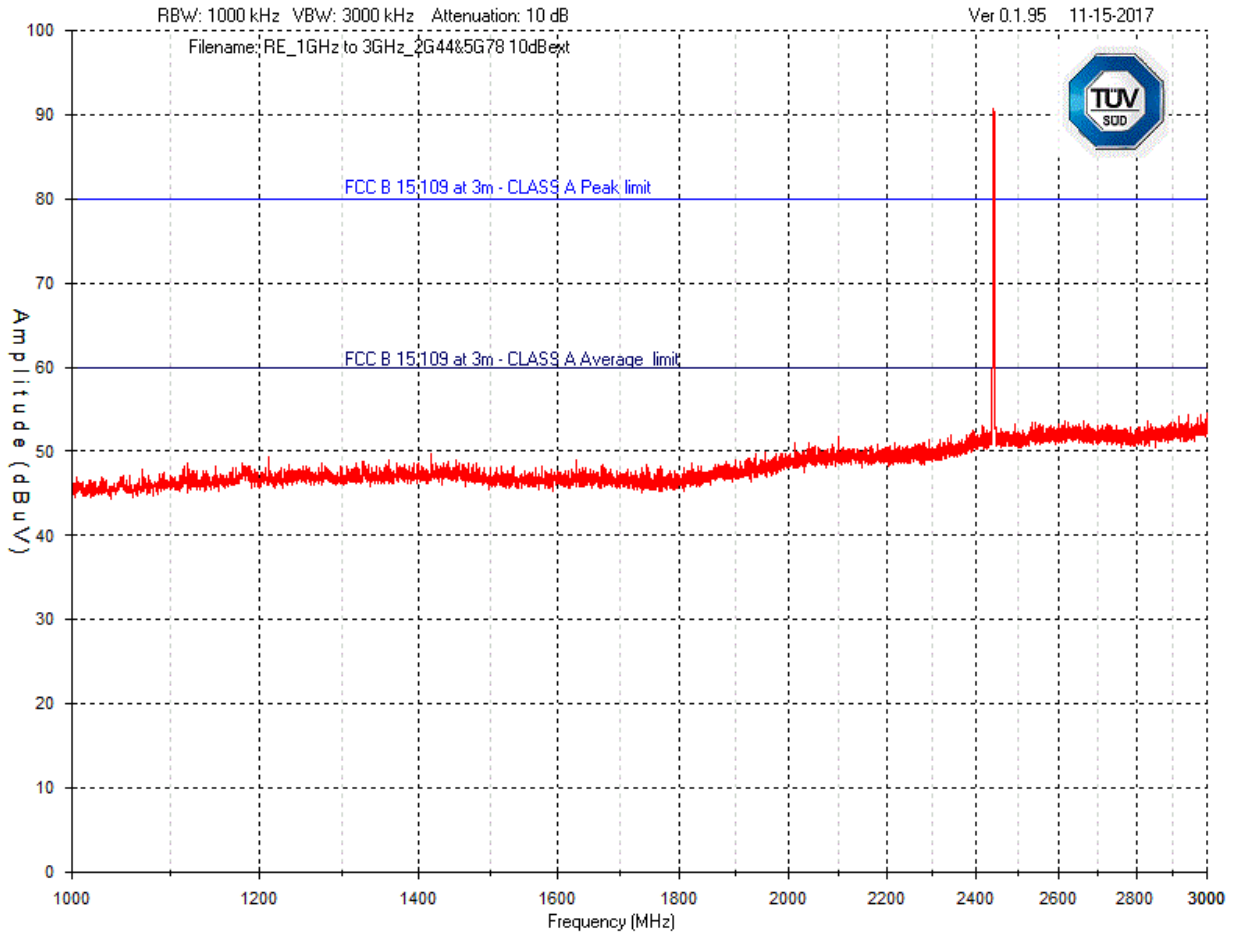
Client	<b>Trilliant Networks Inc.</b>	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Horizontal - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 30MHz - 1GHz**



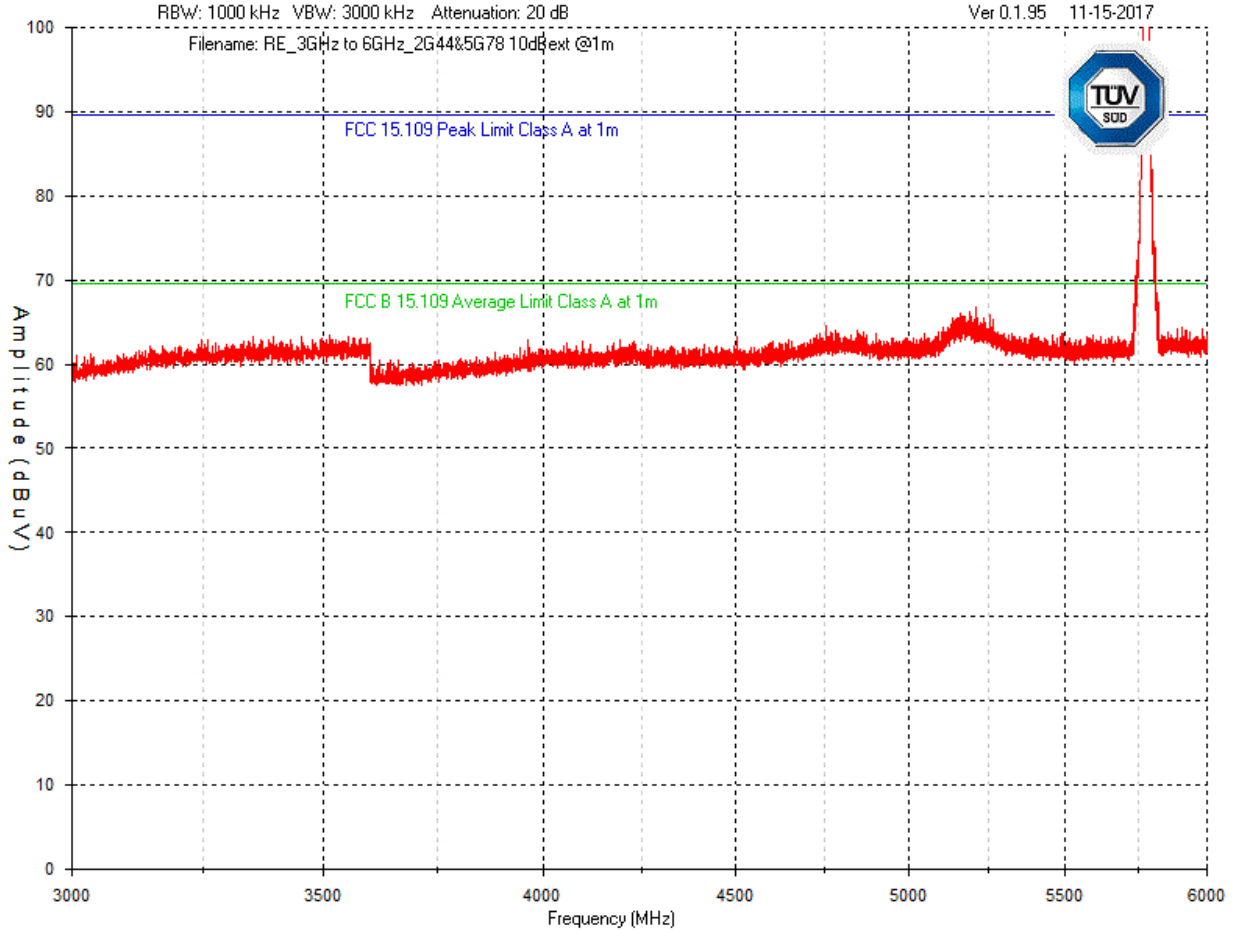
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Horizontal - Peak Emissions Graph**  
Channels 18 & 5.780GHz continuously transmitting – 1GHz - 3GHz



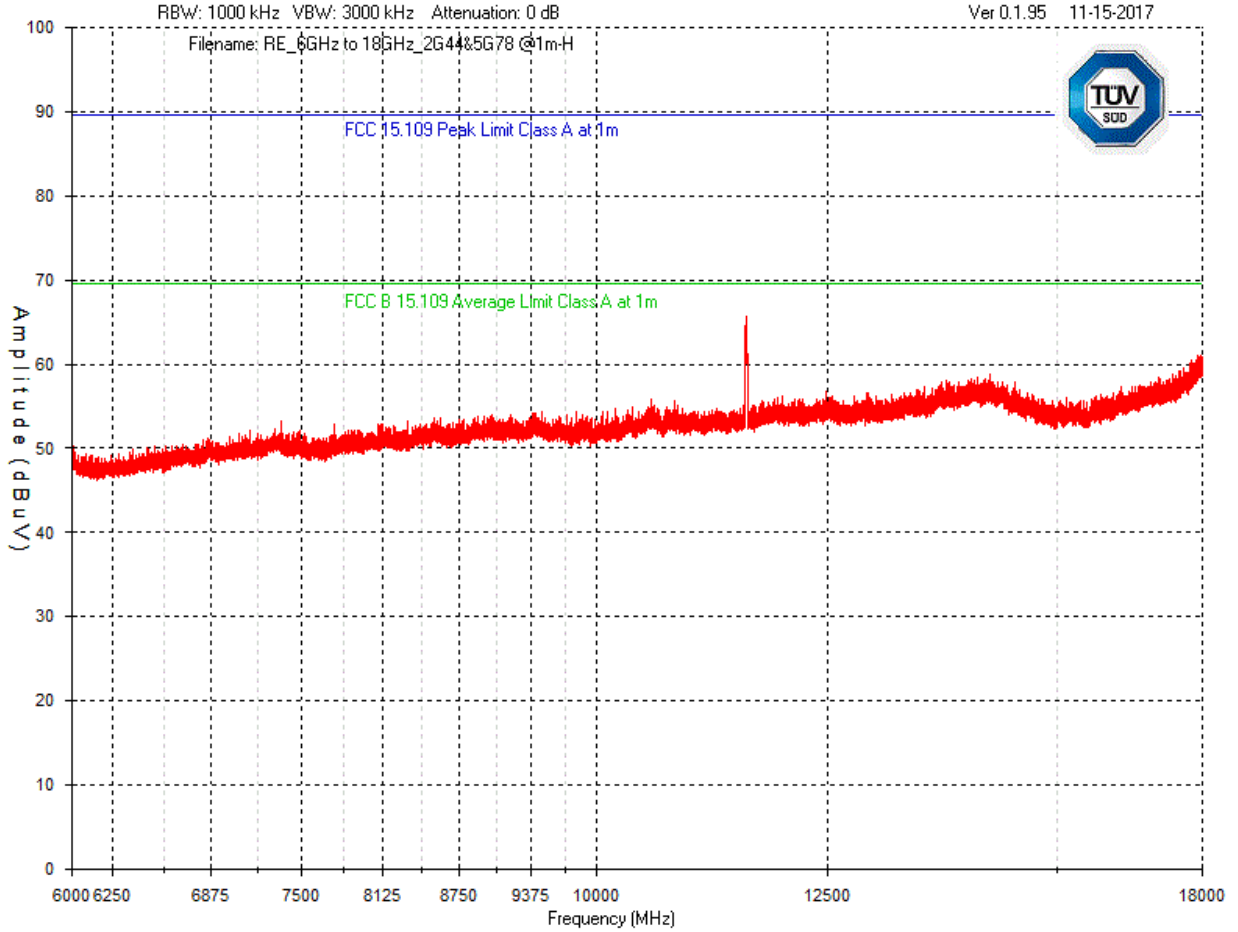
Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Horizontal - Peak Emissions Graph**  
Channels 18 & 5.780GHz continuously transmitting – 3GHz - 6GHz



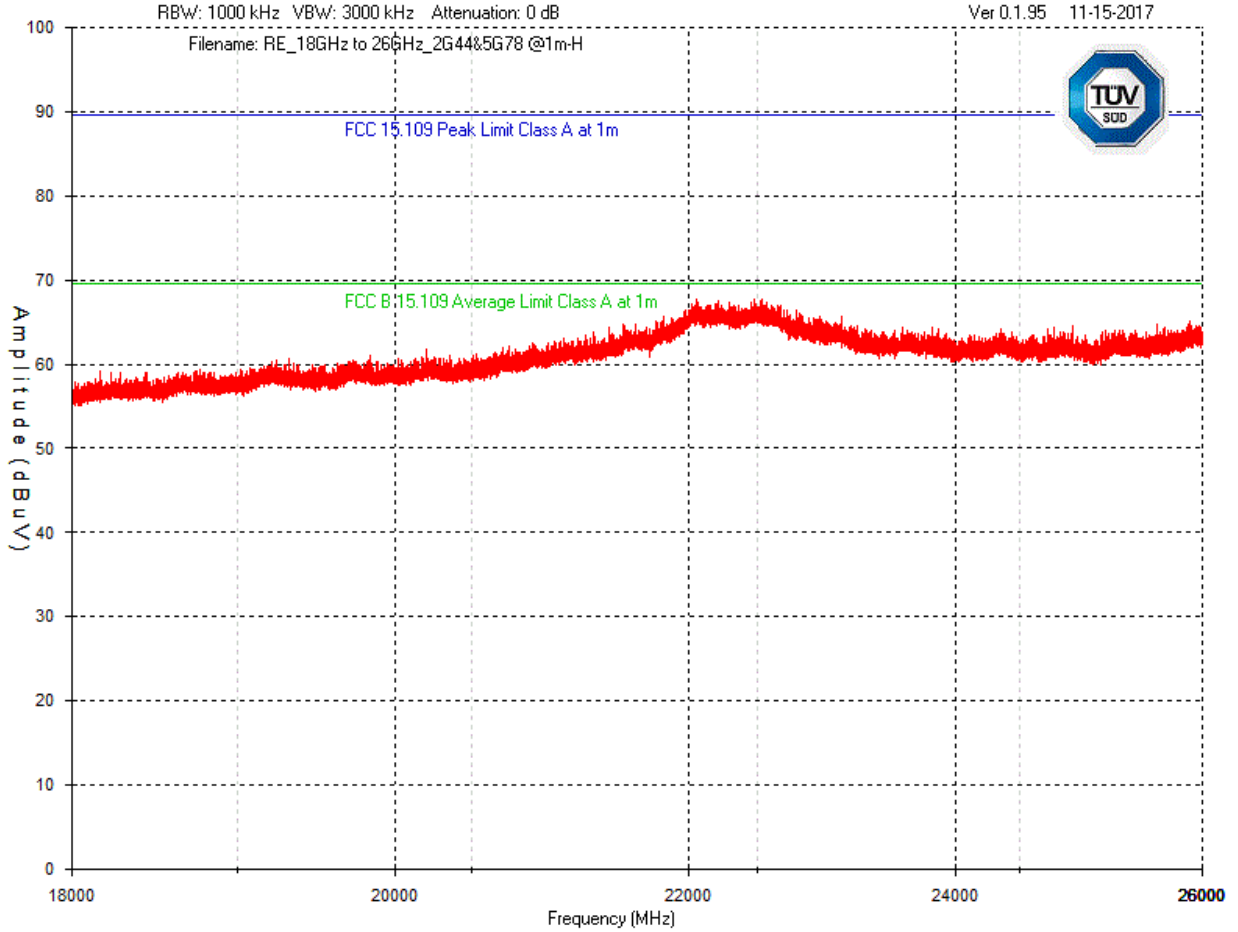
Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Horizontal - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 6GHz - 18GHz**



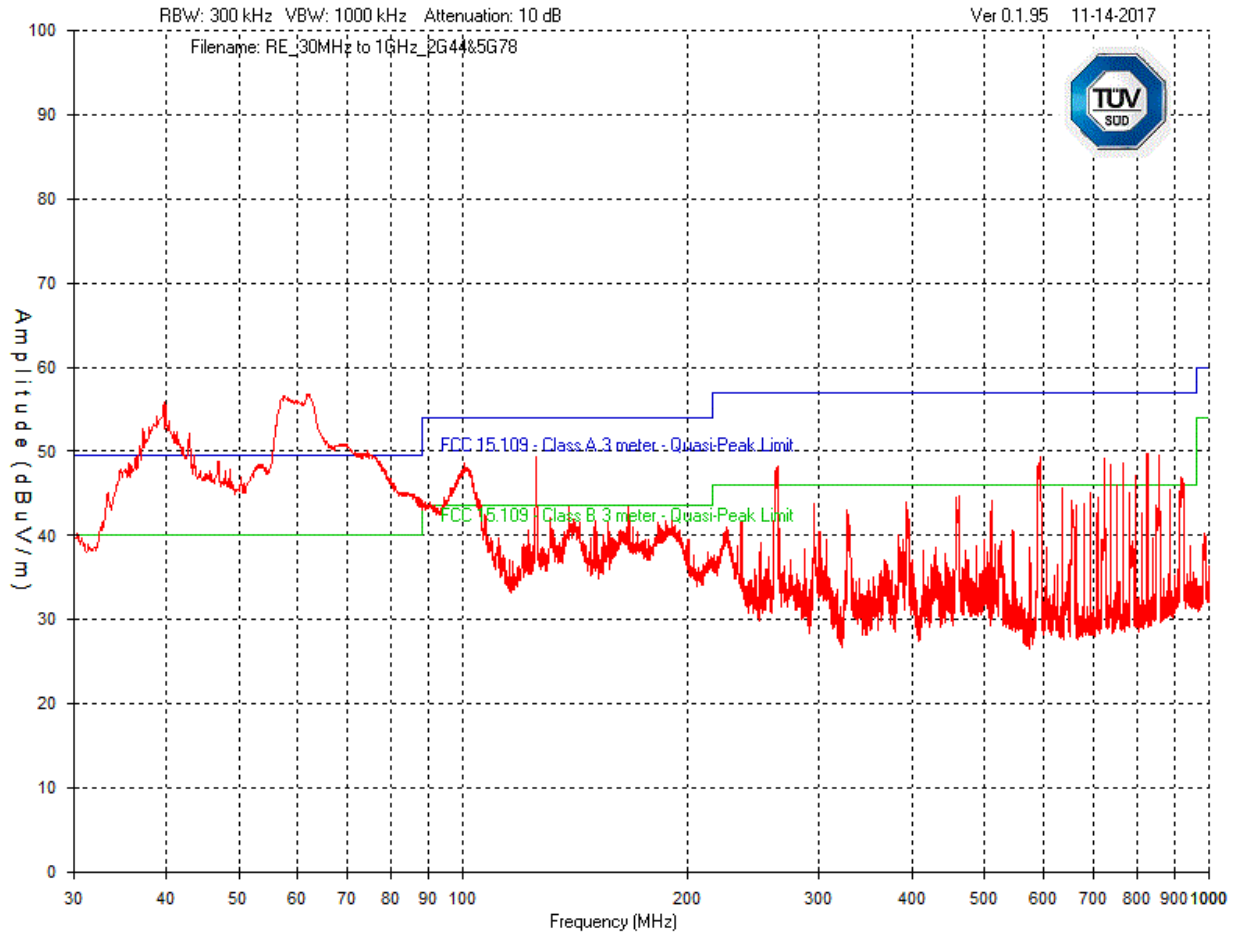
Client	<b>Trilliant Networks Inc.</b>	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Horizontal - Peak Emissions Graph**  
Channels 18 & 5.780GHz continuously transmitting – 18GHz - 26GHz



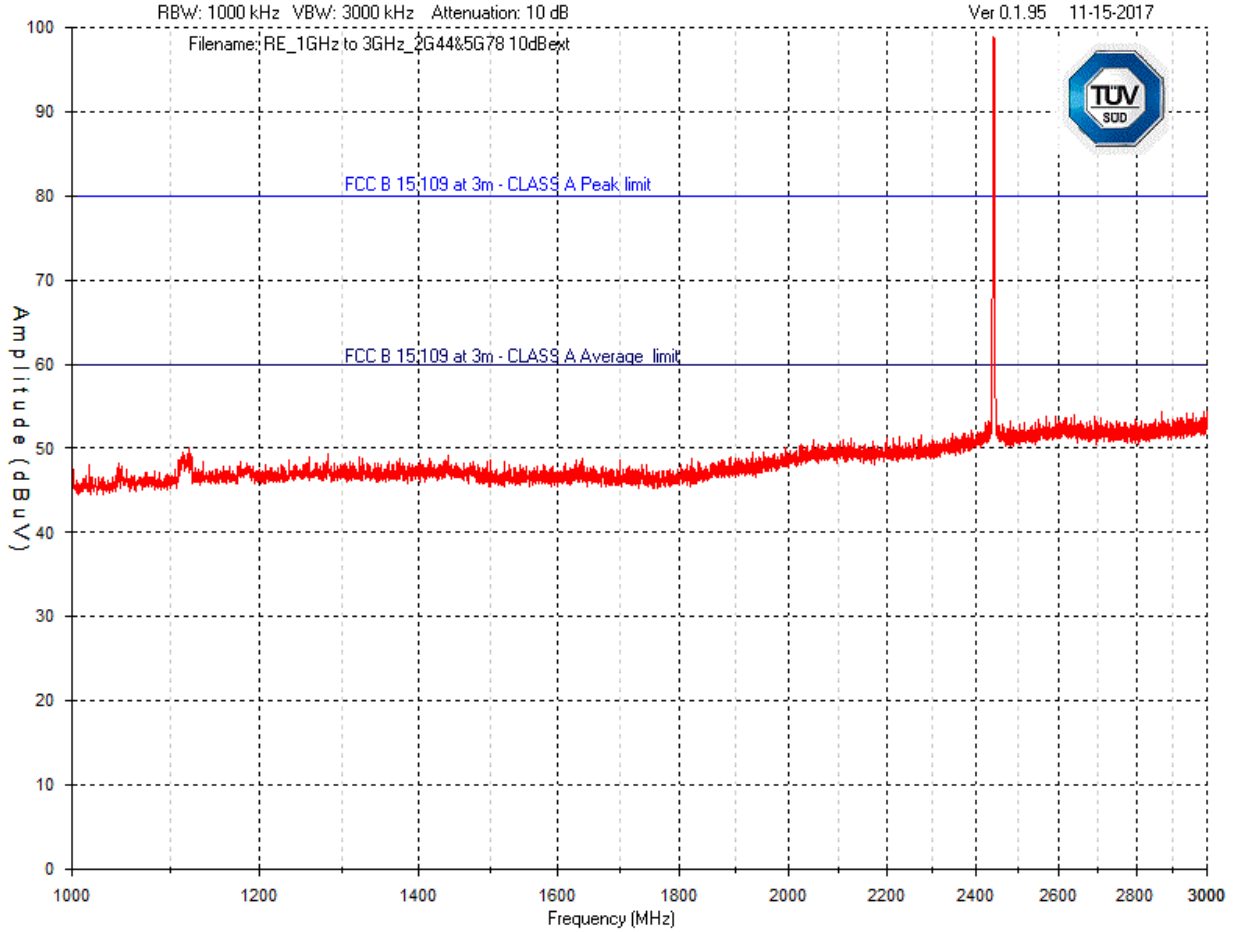
Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Vertical - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 30MHz - 1GHz**



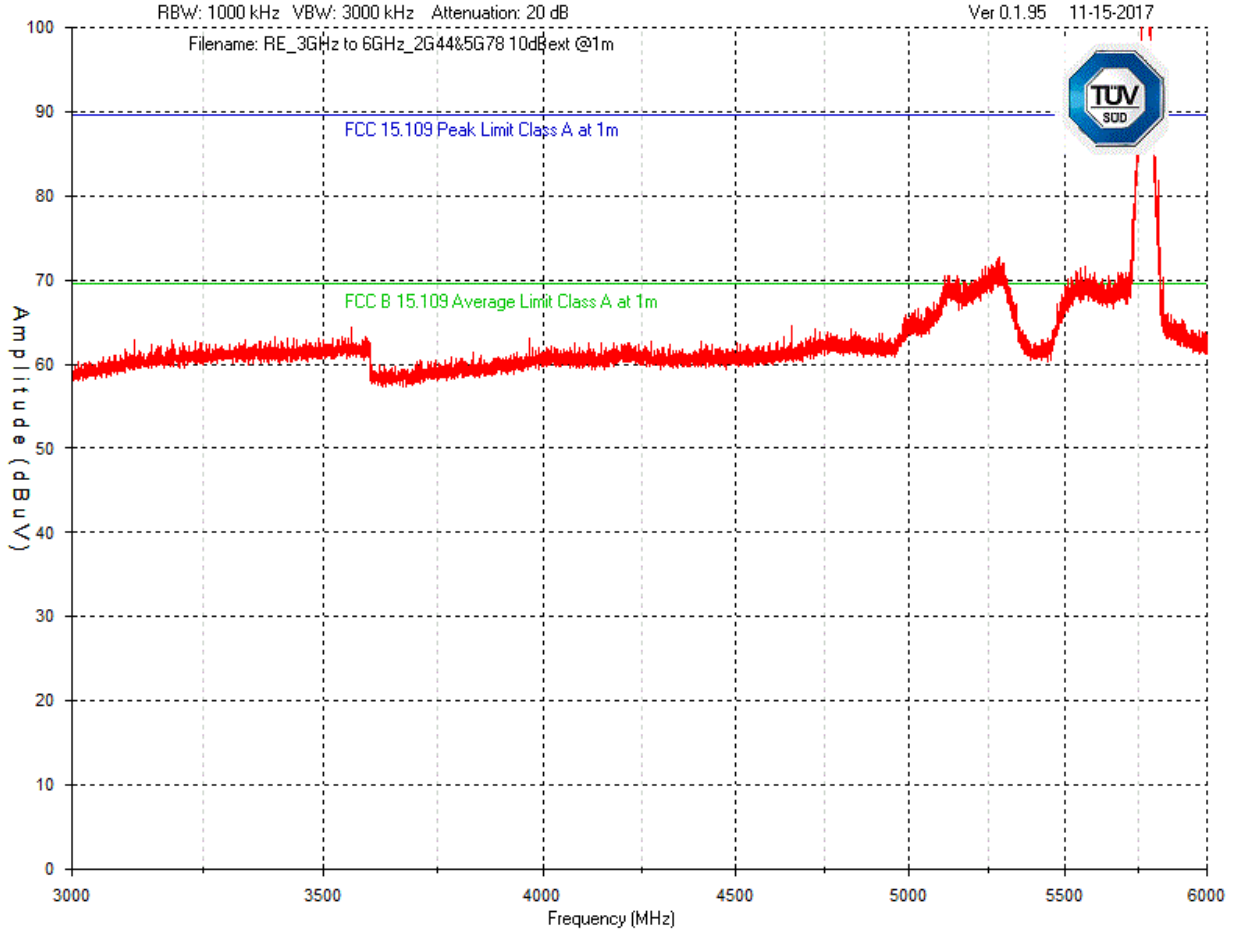
Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Vertical - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 1GHz - 3GHz @3m**




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Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

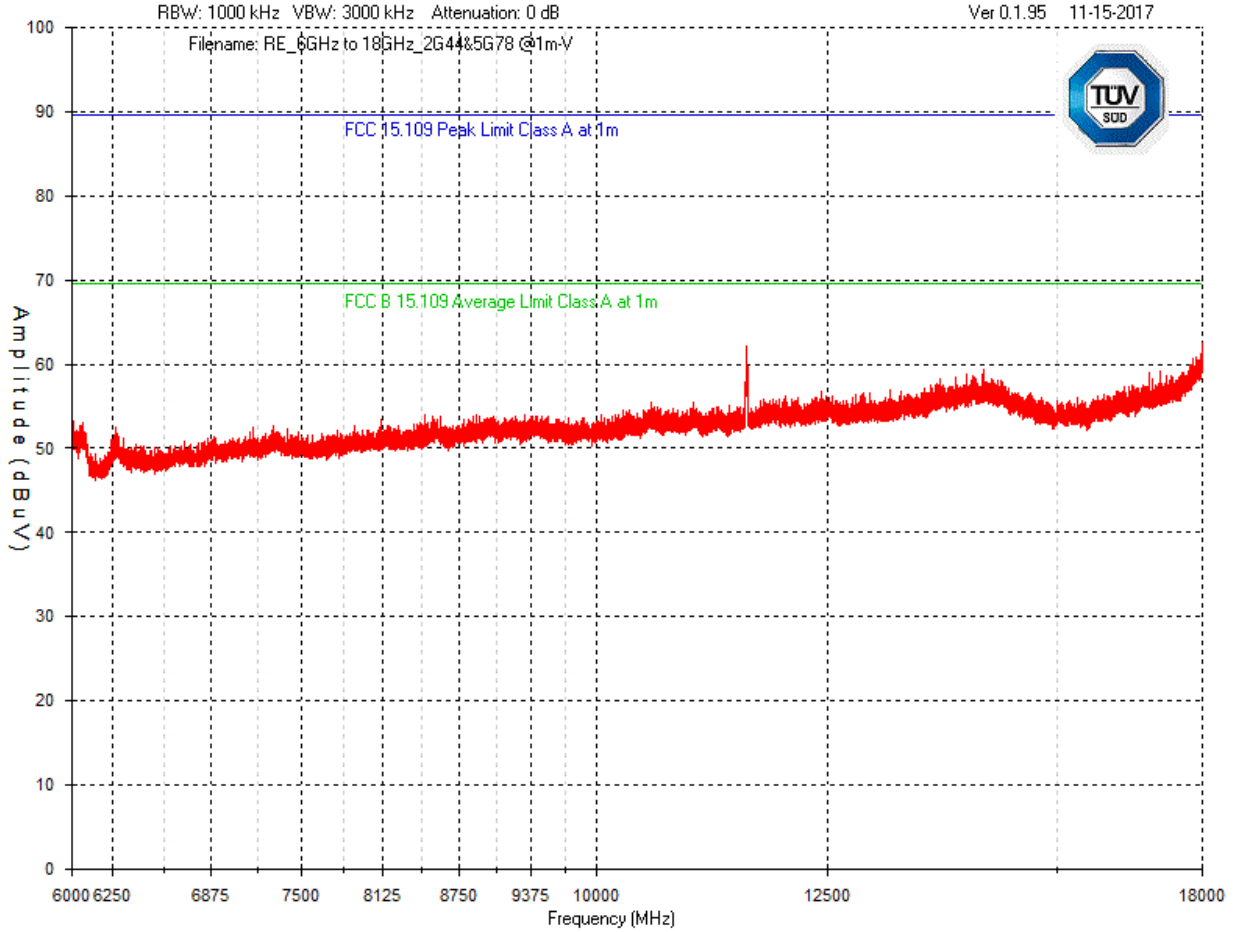
**Vertical - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 3GHz - 6GHz @ 1m**






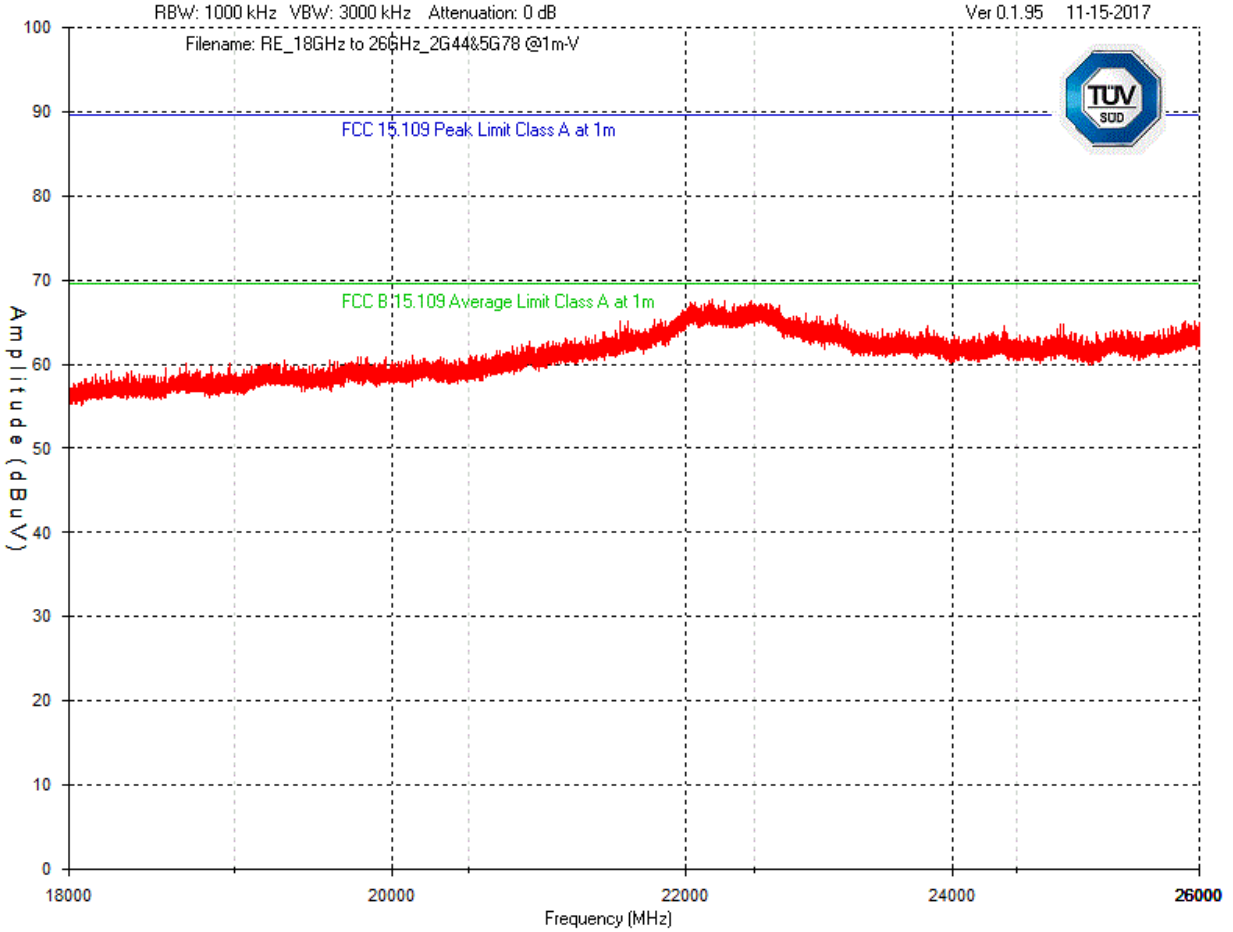
Client	<b>Trilliant Networks Inc.</b>	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Vertical - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 6GHz - 18GHz @1m**



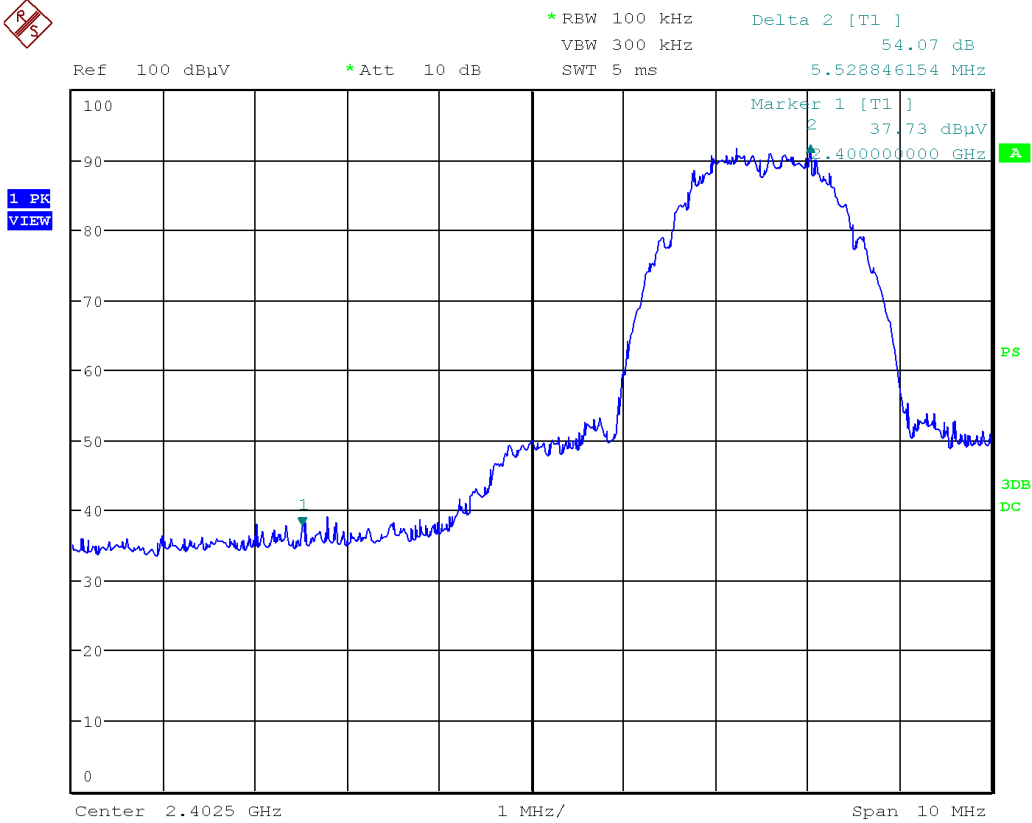
Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Vertical - Peak Emissions Graph**  
**Channels 18 & 5.780GHz continuously transmitting – 18Hz - 26GHz @ 1m**




Client	Trilliant Networks Inc.	
Product	XBRG-1140-A, XBRG-1140-x (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Band Edge – Low Channel (11) OQPSK  
Vertical - Peak Emission**

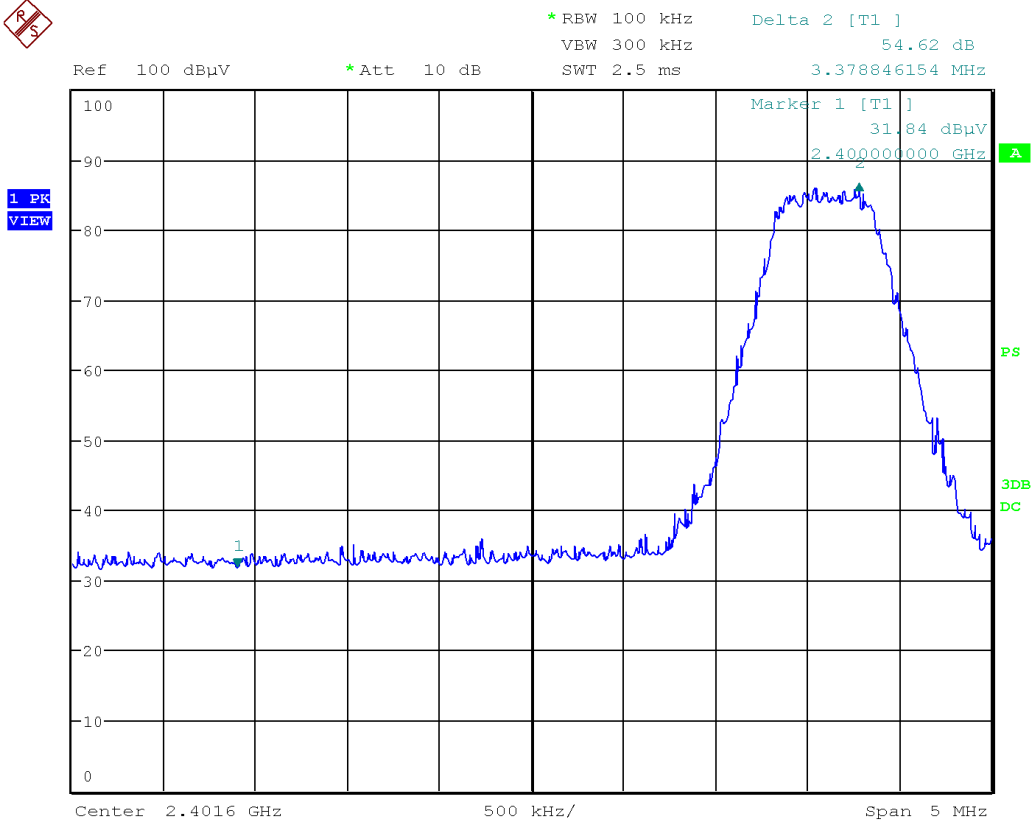


Date: 26.NOV.2017 22:11:04

Note: Restricted band, Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Trilliant Networks Inc.	
Product	XBRG-1140-A, XBRG-1140-x (x depends on firmware)	
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**Band Edge – Low Channel (03) OFDM  
Vertical - Peak Emission**

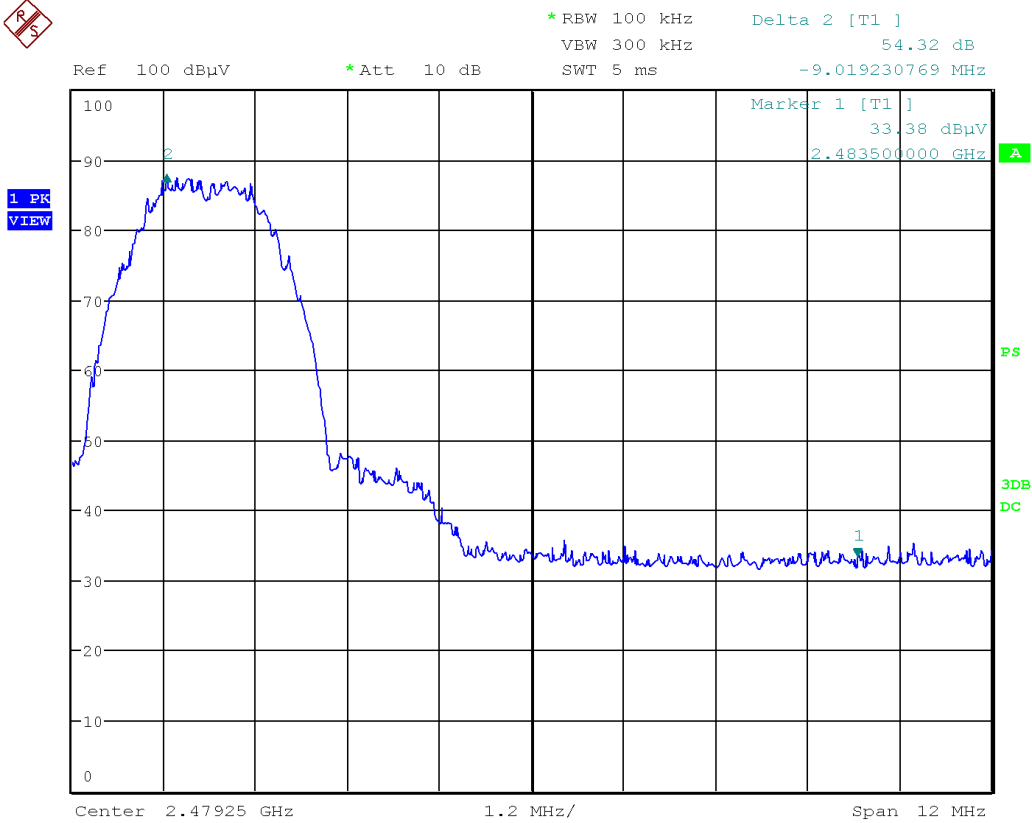


Date: 26.NOV.2017 23:28:21

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


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**Band Edge – Hi Channel (25) OQPSK  
Vertical - Peak Emission**

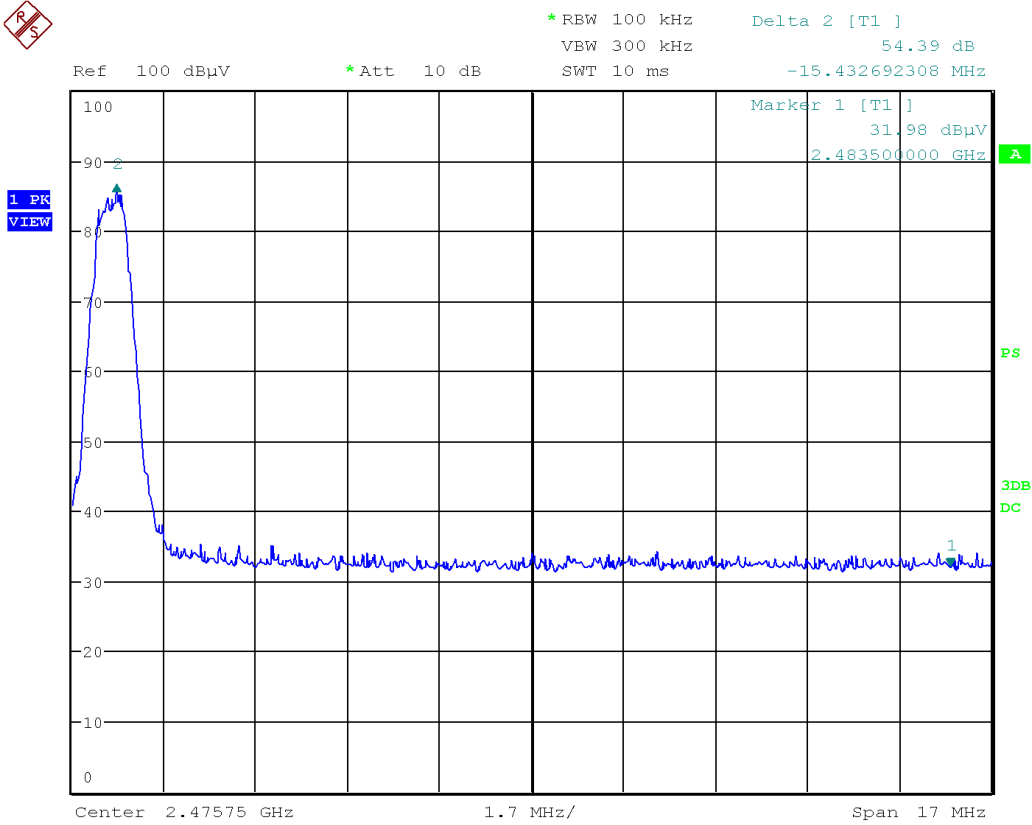


Date: 26.NOV.2017 22:42:04

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Band Edge – Hi Channel (84) OFDM  
Vertical - Peak Emission**

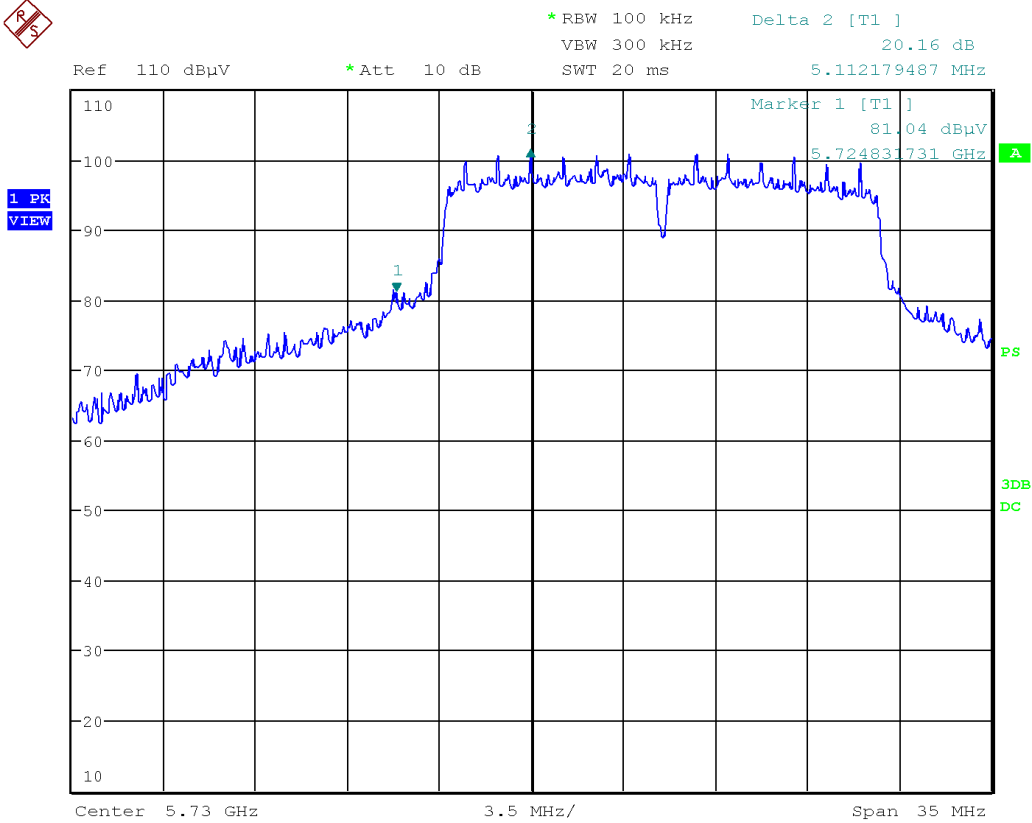


Date: 26.NOV.2017 23:53:05

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Trilliant Networks Inc.	
Product	XBRG-1140-A, XBRG-1140-x (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Band Edge – 5G Low Channel  
Vertical - Peak Emission**

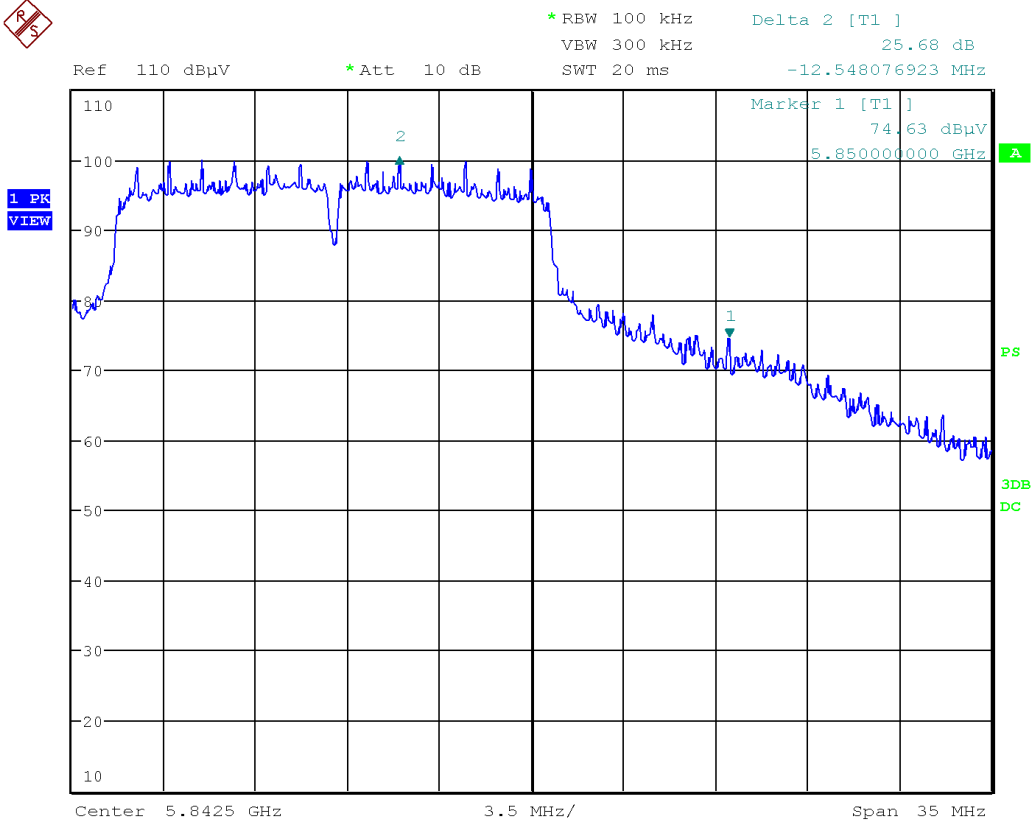


Date: 27.NOV.2017 00:39:48

Note: Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.

Client	Trilliant Networks Inc.	
Product	XBRG-1140-A, XBRG-1140-x (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	


**Band Edge – 5G High Channel  
Vertical - Peak Emission**



Date: 27.NOV.2017 01:07:38

Note: Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.




Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

## Final Measurements

The worst case measurement as listed in the table below appeared at a Horizontal antenna height of 100 cm and a table azimuth of 41 degrees, as pictured in Appendix B.


Quasi-Peak Emissions Table – 30MHz to 1GHz

Product Category			Class A							
Supply			POE (24Vdc)							
Frequency (MHz)	Detector Peak/ QP	Received Signal (dBµV)	Antenna Factor (dB/m)	Atten Factor (dB)	Cable Factor (dB)	Pre-Amp (dB)	Level (dBµV/ m)	QP Limit (dB)	QP Margin (dB)	Pass / Fail
Horizontal Antenna Polarization										
70.6837	QP	60.3	7.7	3	0.8	-33.4	38.4	49.6	11.2	Pass
737.312	QP	59.4	22.5	3	2.5	-33	54.4	56.9	2.5	Pass
752.051	QP	57.4	22.4	3	2.5	-33	52.3	56.9	4.6	Pass
766.967	QP	55.7	22.7	3	2.5	-32.9	51	56.9	5.9	Pass
100.784	QP	56.9	8.7	3	0.9	-33.5	36	54	18	Pass
722.594	QP	55.2	22.7	3	2.5	-33	50.4	56.9	6.5	Pass
Vertical Antenna Polarization										
62.042	QP	66.1	7.8	3	0.8	-33.3	44.4	49.6	5.2	Pass
39.7097	QP	58.4	12.8	3	0.6	-32.8	42	49.6	7.6	Pass
125.0096	QP	68.4	8.2	3	1.1	-33.4	47.3	54	6.7	Pass
100.201	QP	60.5	8.6	3	0.9	-33.5	39.5	54	14.5	Pass
825.808	QP	53.4	23.1	3	2.6	-32.8	49.3	56.9	7.6	Pass
855.325	QP	53.4	22.7	3	2.7	-32.6	49.2	56.9	7.7	Pass


Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

High, Low Channels and Band Edge Measurements Table

Test Freq. (MHz)	Detection mode (Q-Peak)	Ant. polarity (Horz/ Vert)	Raw signal dB(μV)	Ant. factor dB	Cable loss dB + Presel.	Atten. dB	Pre-Amp Gain dB	Received signal dB(μV/m)	Emission limit dB(μV/m)	Margin dB(μV)	Result
Low Channel #11 - OQPSK											
2405	Peak	Horz	89.6	30.6	5.2	10.0	33.0	102.4			PASS
2405	Peak	Vert	95.1	30.6	5.2	10.0	33.0	107.9			PASS
2405	Avg	Horz	87.3	30.6	5.2	10.0	33.0	100.1			PASS
2405	Avg	Vert	92.8	30.6	5.2	10.0	33.0	105.6			PASS
2390	Peak	Horz	43.6	28.8	5.0	10.0	33.1	54.3	74.0	19.7	PASS
2390	Avg	Horz	30.2	28.8	5.0	10.0	33.1	40.9	54.0	13.1	PASS
2390	Peak	Vert	44.6	28.8	5.0	10.0	33.1	55.3	74.0	18.7	PASS
2390	Avg	Vert	30.4	28.8	5.0	10.0	33.1	41.1	54.0	12.9	PASS
High channel #25 - OQPSK											
2475	Peak	Horz	83.1	30.6	5.2	10.0	33.0	95.9			PASS
2475	Avg	Horz	80.7	30.6	5.2	10.0	33.0	93.5			PASS
2475	Peak	Vert	91.3	30.6	5.2	10.0	33.0	104.1			PASS
2475	Avg	Vert	89.0	30.6	5.2	10.0	33.0	101.8			PASS
2483.5	Peak	Horz	44.1	30.6	5.2	10.0	33.0	56.9	74.0	17.1	PASS
2483.5	Avg	Horz	30.2	30.6	5.2	10.0	33.0	43.0	54.0	11.0	PASS
2483.5	Peak	Vert	44.8	30.6	5.2	10.0	33.0	57.6	74.0	16.4	PASS
2483.5	Avg	Vert	31.8	30.6	5.2	10.0	33.0	44.6	54.0	9.4	PASS
Low Channel #03 - OFDM											
2403.2	Peak	Horz	88.3	30.6	5.2	10.0	33.0	101.1			PASS
2403.2	Peak	Vert	93.8	30.6	5.2	10.0	33.0	106.6			PASS
2403.2	Avg	Horz	78.4	30.6	5.2	10.0	33.0	91.2			PASS
2403.2	Avg	Vert	83.9	30.6	5.2	10.0	33.0	96.7			PASS
2390	Peak	Horz	43.8	28.8	5.0	10.0	33.1	54.5	74.0	19.5	PASS
2390	Avg	Horz	30.1	28.8	5.0	10.0	33.1	40.8	54.0	13.2	PASS
2390	Peak	Vert	43.9	28.8	5.0	10.0	33.1	54.6	74.0	19.4	PASS
2390	Avg	Vert	30.1	28.8	5.0	10.0	33.1	40.8	54.0	13.2	PASS
High channel #84 - OFDM											
2468	Peak	Horz	84.8	30.6	5.2	10.0	33.0	97.6			PASS
2468	Avg	Horz	74.9	30.6	5.2	10.0	33.0	87.7			PASS
2468	Peak	Vert	93.5	30.6	5.2	10.0	33.0	106.3			PASS
2468	Avg	Vert	83.3	30.6	5.2	10.0	33.0	96.1			PASS
2483.5	Peak	Horz	43.6	30.6	5.2	10.0	33.0	56.4	74.0	17.6	PASS
2483.5	Avg	Horz	29.9	30.6	5.2	10.0	33.0	42.7	54.0	11.3	PASS
2483.5	Peak	Vert	43.3	30.6	5.2	10.0	33.0	56.1	74.0	17.9	PASS
2483.5	Avg	Vert	30.1	30.6	5.2	10.0	33.0	42.9	54.0	11.1	PASS

Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Test Freq. (MHz)	Detection mode (Q-Peak)	Ant. polarity (Horz/Vert)	Raw signal dB(μV)	Ant. factor dB	Cable loss dB + Presel.	Atten. dB	Pre-Amp Gain dB	Received signal dB(μV/m)	Emission limit dB(μV/m)	Margin dB(μV)	Result
<b>Low Channel - 5.735 GHz</b>											
5735	Peak	Horz	92.3	32.8	7.8	10.0	32.7	110.2	—	—	PASS
5735	PEAK 25	Horz	102.1	32.8	7.8	10.0	32.7	120.0	—	—	PASS
5735	Avg	Horz	82.8	32.8	7.8	10.0	32.7	100.7	—	—	PASS
5735	Avg25	Horz	93.4	32.8	7.8	10.0	32.7	111.3	—	—	PASS
5735	Peak	Vert	111.6	32.8	7.8	10.0	32.7	129.5	—	—	PASS
5735	PEAK 25	Vert	122.1	32.8	7.8	10.0	32.7	140.0	—	—	PASS
5735	Avg	Vert	102.8	32.8	7.8	10.0	32.7	120.7	—	—	PASS
5735	Avg25	Vert	113.5	32.8	7.8	10.0	32.7	131.4	—	—	PASS
<b>Mid Channel - 5.785 GHz</b>											
5460	Peak	Horz	44.1	28.8	5.0	10.0	33.1	54.8	74.0	19.2	PASS
5460	Avg	Horz	30.5	28.8	5.0	10.0	33.1	41.2	54.0	12.8	PASS
5460	Peak	Vert	44.6	28.8	5.0	10.0	33.1	55.3	74.0	18.7	PASS
5460	Avg	Vert	31.6	28.8	5.0	10.0	33.1	42.3	54.0	11.7	PASS
5725	Peak	Horz	69.2	28.9	5.0	10.0	33.1	80.0	80.2	0.2	PASS
5725	Avg	Horz	55.8	28.9	5.0	10.0	33.1	66.6	69.8	3.2	PASS
5725	Peak	Vert	88.2	28.9	5.0	10.0	33.1	99.0	99.9	0.9	PASS
5725	Avg	Vert	75.2	28.9	5.0	10.0	33.1	86.0	88.6	2.6	PASS
5785	Peak	Horz	93.8	33.0	7.9	10.0	32.7	112.0			PASS
5785	Peak25	Horz	104.1	33.0	7.9	10.0	32.7	122.3			PASS
5785	Avg	Horz	84.9	33.0	7.9	10.0	32.7	103.1			PASS
5785	Avg25	Horz	95.6	33.0	7.9	10.0	32.7	113.8			PASS
5785	Peak	Vert	110.7	33.0	7.9	10.0	32.7	128.9			PASS
5785	Peak25	Vert	121.2	33.0	7.9	10.0	32.7	139.4			PASS
5785	Avg	Vert	102.3	33.0	7.9	10.0	32.7	120.5			PASS
5785	Avg25	Vert	112.7	33.0	7.9	10.0	32.7	130.9			PASS


Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> <b>(x depends on firmware)</b>	
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High channel – 5.580 GHz											
5835	Peak	Horz	96.9	33.2	7.9	10.0	32.8	115.2			PASS
5835	Peak25	Horz	106.9	33.2	7.9	10.0	32.8	125.2			PASS
5835	Avg	Horz	88.1	33.2	7.9	10.0	32.8	106.4			PASS
5835	Avg25	Horz	98.6	33.2	7.9	10.0	32.8	116.9			PASS
5835	Peak	Vert	111.9	33.2	7.9	10.0	32.8	130.2			PASS
5835	Peak25	Vert	122.4	33.2	7.9	10.0	32.8	140.7			PASS
5835	Avg	Vert	103.4	33.2	7.9	10.0	32.8	121.7			PASS
5835	Avg25	Vert	114.1	33.2	7.9	10.0	32.8	132.4			PASS
5850	Peak	Horz	72.9	33.3	8.0	10.0	32.8	91.4	95.2	3.8	PASS
5850	Avg	Horz	56.1	33.3	8.0	10.0	32.8	74.6	86.4	11.8	PASS
5850	Peak	Vert	84.9	33.3	8.0	10.0	32.8	103.4	110.2	6.8	PASS
5850	Avg	Vert	69.0	33.3	8.0	10.0	32.8	87.5	112.4	24.9	PASS
7250	Peak	Horz	44.0	36.9	8.3	10.0	33.0	66.2	74.0	7.8	PASS
7250	Avg	Horz	30.4	36.9	8.3	10.0	33.0	52.6	54.0	1.4	PASS
7250	Peak	Vert	43.9	36.9	8.3	10.0	33.0	66.1	74.0	7.9	PASS
7250	Avg	Vert	30.4	36.9	8.3	10.0	33.0	52.6	54.0	1.4	PASS

Note:

- Peak = Peak measurement
- QP = Quasi-Peak measurement
- AVG = Average measurement


See ‘Appendix B – EUT, Peripherals, and Test Setup Photos’ for photos showing the test set-up for the highest radiated emission.

Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Spectrum Analyzer	ESU-40	Rohde & Schwarz	2017-04-20	2019-04-20	4092
BiLog Antenna	3142-E	ETS	2016-11-16	2018-11-16	4002
Horn Antenna	ATH1G18G	AR	2017-04-25	2019-04-25	4003
Biconical Antenna	EM-6913	Electro-Metrics	2017-05-02	2019-05-02	4060
Log Periodic Antenna	LPA-25	Electro-Metrics	2015-04-20	2019-04-20	4087
Horn Antenna	3116	ETS	2017-03-02	2019-03-02	4210
Attenuator 3 dB	FP-50-3	Trilithic	NCR	NCR	4028
Attenuator 10dB	4779-10	Narda	NCR	NCR	4096
LNA pre-amp	LNA-1450	RF Bay Inc.	2017-07-22	2019-07-22	4089
1-26.5GHz preamp	8449B	Agilent	2017-09-09	2019-09-09	6351
RF Cable 10m	LMR-400-10M-50OHM-MN-MN	LexTec	NCR	NCR	4025
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	NCR	NCR	4026
152in RF SMA Cable 1	Lab-Flex 335	FLORIDA RF LABS	NCR	NCR	4078
36in RF SMA Cable 2	Lab-Flex 160	FLORIDA RF LABS	NCR	NCR	4079
254mm RF SMA Cable 3	Minibend-10	Huber+ Suhner	NCR	NCR	4080
Emission software	0.1.95	Global EMC	NCR	NCR	58

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Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

**Appendix B – EUT, Peripherals, and Test Setup Photos**


Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 1 – EUT Close Up



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Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 2 – Radiated Emissions Setup  
9kHz – 30MHz






Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> <b>(x depends on firmware)</b>	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 3 – Radiated Emissions Setup  
30MHz – 1GHz




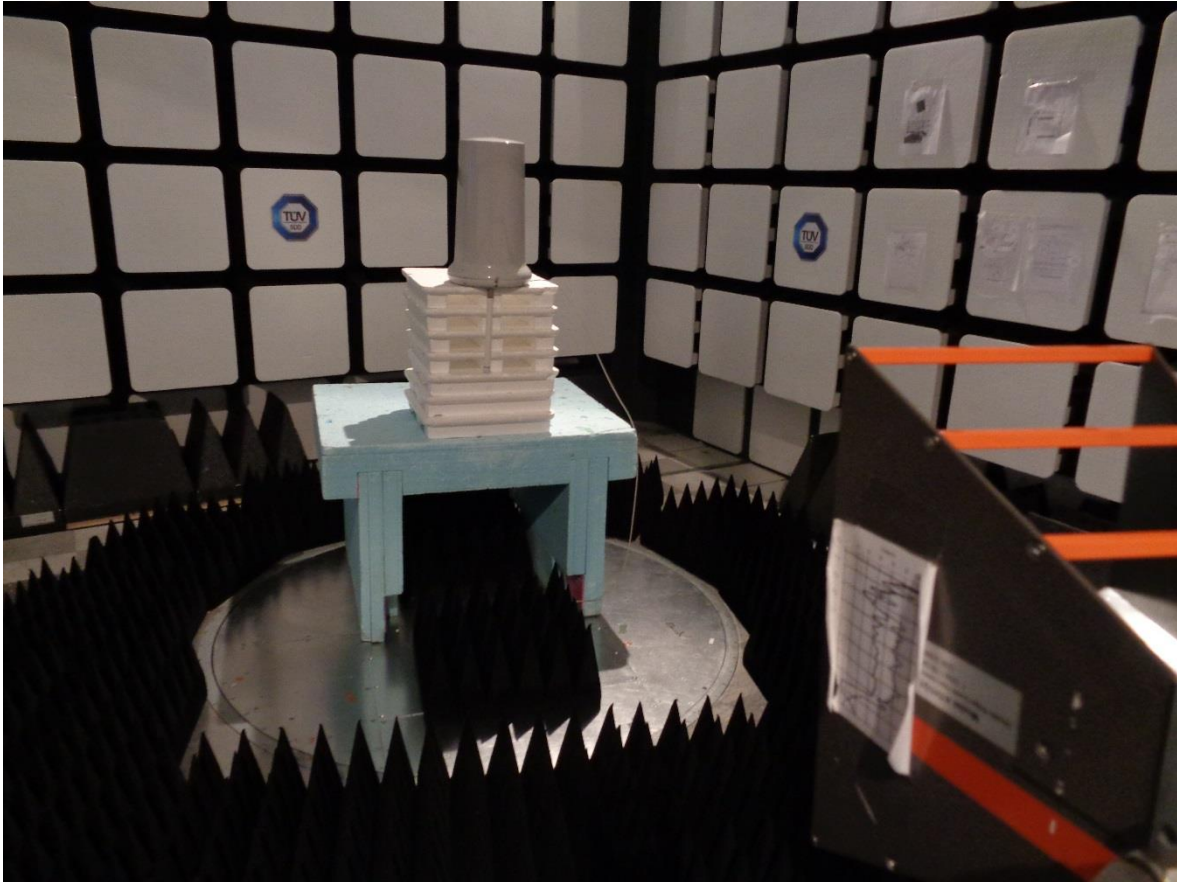
Client	<b>Trilliant Networks Inc.</b>	 Canada
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 4 – Radiated Emissions Setup  
1GHz – 3GHz




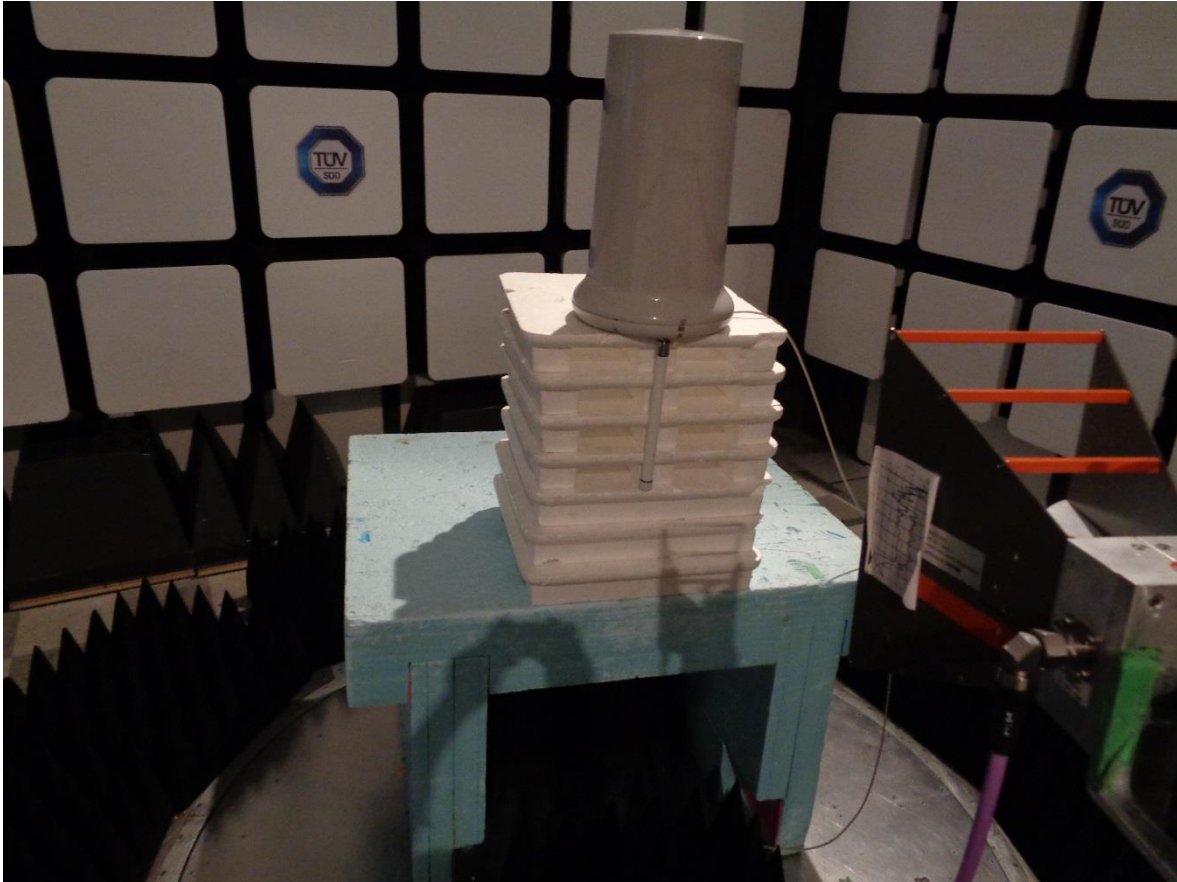
Client	<b>Trilliant Networks Inc.</b>	 Canada
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 5 – Radiated Emissions Setup  
3GHz – 18GHz




Client	<b>Trilliant Networks Inc.</b>	
Product	<b>XBRG-1140-A, XBRG-1140-x</b> (x depends on firmware)	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2016	

Figure 6 – Radiated Emissions Setup  
18GHz – 26GHz

