



Canada

## EMC & RF Test Report

As per

**RSS-247 Issue 2:2017  
&  
FCC Part 15 Subpart 15.247:2015**

**Unlicensed Intentional Radiators**

on the

# **EDGE-MMUL**

Issued by:

**TÜV SÜD Canada Inc.**  
11 Gordon Collins Dr,  
Gormley, ON, L0H 1G0  
Canada  
Ph: (905) 883-7255

Min Xie,  
Senior EMC Project  
Engineer

Testing produced for



See Appendix A for full client &  
EUT details.



Testing Laboratory  
Certificate #2955.02



R-4023, G-506  
C-4498, T-1246



Registration #  
CA6844

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



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Client	Nuance Communication Inc.	 Canada
Product	<b>EDGE-MMUL</b>	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Report Scope

This report addresses the EMC verification testing and test results of the **EDGE-MMUL**, and is herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:

RSS-247 Issue 2:2017

FCC Part 15 Subpart C 15.247:2015

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	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Summary

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

EUT:	EDGE-MMUL
FCC Certification #, FCC ID:	Z89-EDGE-MMUL
Industry Canada Certification #, IC:	1812A-EDGE-MMUL
EUT passed all tests performed	Yes
Tests conducted by	Min Xie

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

Client	Nuance Communication Inc.	 Canada
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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
FCC 15.207 RSS-GEN (Table 3)	Power Line Conducted Emissions	QuasiPeak Average	Pass
FCC 15.209 RSS-GEN (Table 4)	Spurious Radiated Emissions	QuasiPeak Average	Pass
FCC 15.247(a)2 RSS-247 5.2(a)	6 dB Bandwidth	> 500 kHz	Pass
FCC 15.247(b)2 RSS-247 5.4(d)	Max Output Power	< 1 Watt	Pass
FCC 15.247(b)4 RSS-247 5.4(d)	Antenna Gain	< 6 dBi	Pass See Justifications
FCC 15.247(d) RSS-247 5.5	Antenna Conducted Spurious	< 20 dBc	Pass
FCC 15.247(e) RSS-247 5.2(b)	Spectral Density	< 8 dBm (3 kHz BW)	Pass
<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:

For the antenna requirement specified in FCC 15.203 (RSS-247 section 5.4(d)), the EUT has a built-in 2.4 GHz ceramic chip antenna on the Bluetooth chip and it has a peak gain of 1.0 dBi as specified by the manufacturer, which is less than the 6 dBi gain limit.

The EUT is not a hybrid system and FCC 15.247 (f) does not apply to it. However the 15.247 (d) requirement of power density were met and are detailed later in this test report.

The EUT have three co-located transmitters. The 2.4 GHz transmitter was tested for all applicable requirements by itself and simultaneous transmission of all three were investigated for radiated emissions. Other than the fundamental transmission frequency, no new emissions were found.

For the Restricted Bands of operation, the transmitter cover in this report is designed only to operate between 2400 – 2483.5 MHz.

Power line conducted emissions were performed with all three transmitters operating.

Client	Nuance Communication Inc.
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## **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)

### **Power Line Conducted Emission Test**

Margin = Limit – (Received Signal + Attenuation Factor + Cable Loss + LISN Factor)

Margin = 73.0dB $\mu$ V – (50dB $\mu$ V + 10dB + 2.5dB + 0.5dB)

Margin = 10.0 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:2015 Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators

FCC KDB 558074 v04: 2017 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 Issue 2: Digital Transmission Systems (DTSS), 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

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
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## Document Revision Status

Revision 000 - Aug 23, 2017  
Initial Release

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



## Definitions and Acronyms

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

**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 is refers to the 6 dB bandwidth.

**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.

**LISN** – Line Impedance Stabilization Network

**NCR** – No Calibration Required

**RF** – Radio Frequency

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## Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada labs near Toronto, Ontario. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on a 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.

### ***Calibrations and Accreditations***

The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, CA6844), Industry Canada (IC, 6844A-3) and Voluntary Control Council for Interference (VCCI, R-4023, G-506, C-4498, and T-1246). 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 #2555.01. 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

Date	Test	Initials	Temperature (°C)	Humidity (%)	Pressure (kPa)
2017/05/29 to 2017/06/05	Radiated Emissions	MX	20 - 25	30 - 45	99 - 101
2017/08/04	Power Line Conducted Emissions	MX	20 - 25	30 - 45	99 - 101

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## **Detailed Test Results Section**

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## 6dB Bandwidth of Digitally Modulated Systems

### Purpose

The purpose of this test is to ensure that the bandwidth occupied exceeds a stated minimum. This helps ensure the utilization of the frequency allocation is sufficiently wide. This also helps prevent corruption of data by ensuring adequate data separation to distinguish the reception of the intended information.

### Limits and Method

The limit is as specified in FCC Part 15.247(a)2 and RSS-247.

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. This should be measured with a 100 kHz RBW and a 300 kHz VBW.

The method is given in Section 8.1 of FCC KDB 558074 and ANSI C63.10.

### Results

The EUT passed. The minimum 6 dB BW measured was 759 kHz and the maximum 99% BW at full power setting was 1083 kHz.

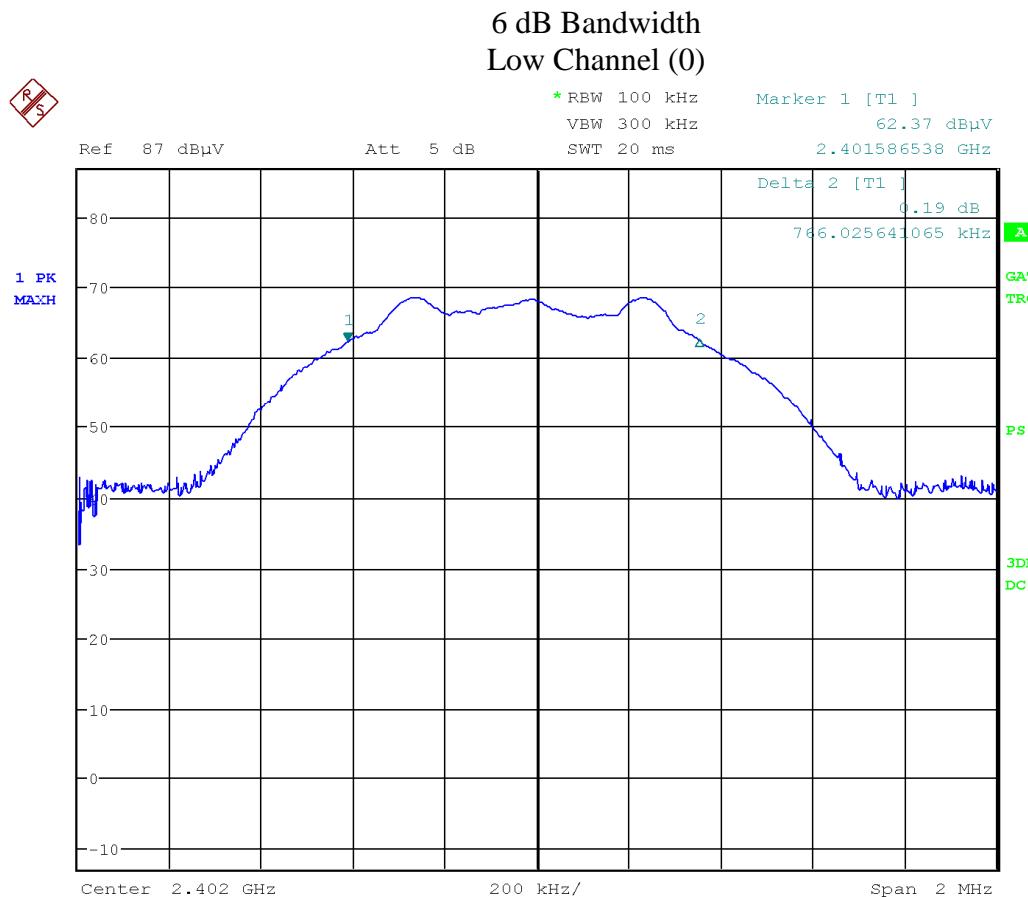
Channel	Frequency (MHz)	6 dB BW (kHz)	99% BW (kHz)	6 dB BW Limit (kHz)	Pass/Fail
Low	2402	766.00	1083.30	500	Pass
Mid	2440	759.60	1086.50	500	Pass
High	2480	766.00	1083.30	500	Pass

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## Graphs

The graphs showed below show the OBW during the operation of the device. This is measured by a max hold on the spectrum analyzer and the highest resolution bandwidth that is sufficiently low to exhibit the 6 dB bandwidth of a channel during operation of the EUT. Max hold is performed for a duration of not less than 1 minute.

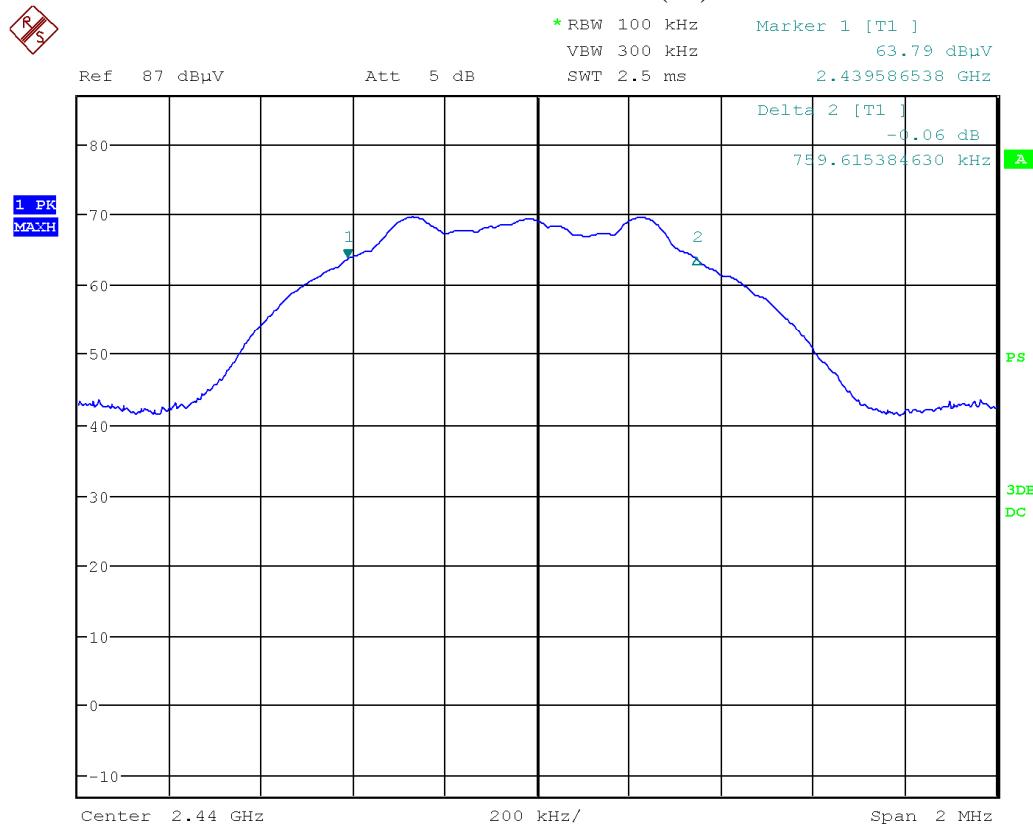


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Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### 6 dB Bandwidth Mid Channel (19)



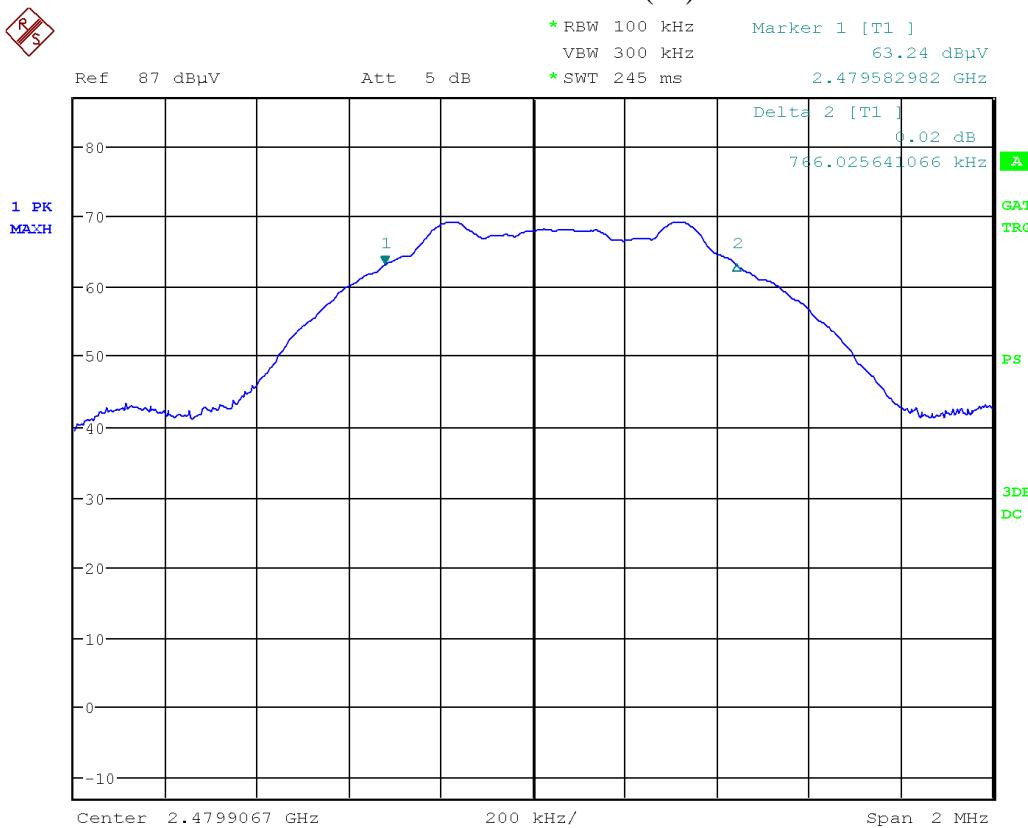
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Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### 6 dB Bandwidth Hi Channel (39)

RS



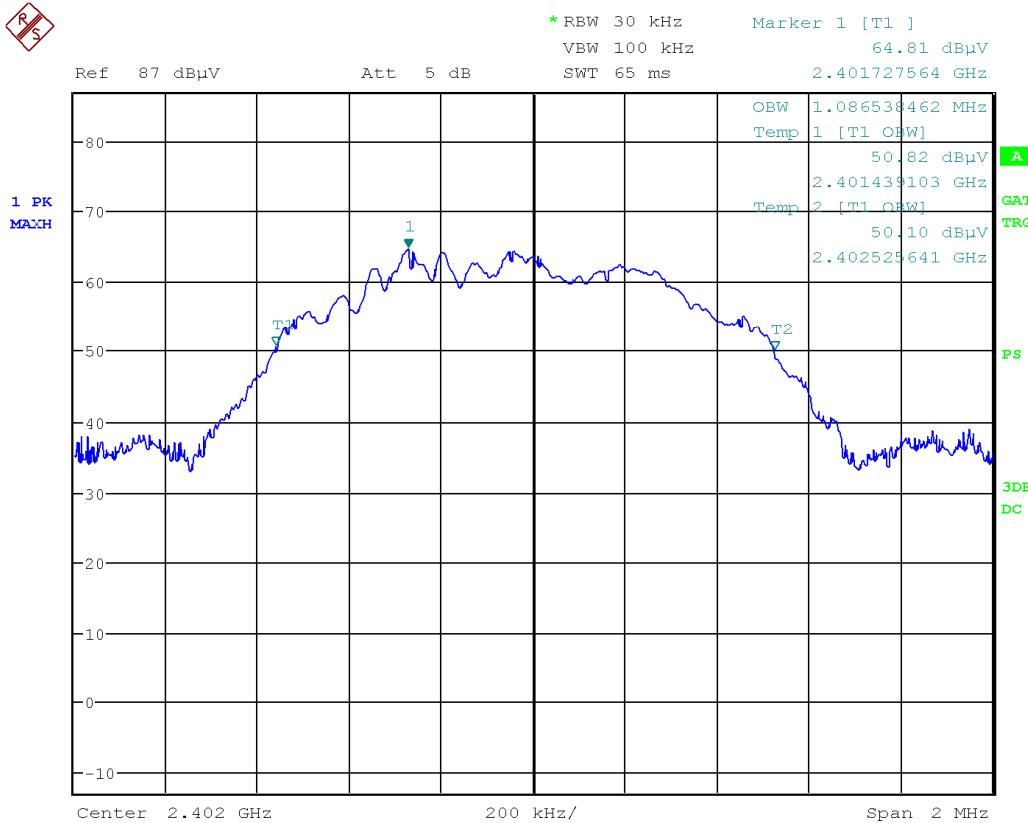
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Client	Nuance Communication Inc.	
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	



### 99% Bandwidth Low Channel (0)

RS



Date: 5.JUN.2017 15:51:05

Note: See 'Appendix B – EUT & Test Setup Photos' for photos showing the test set-up.

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## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Feb. 12, 2016	Feb. 12, 2018	GEMC 6375
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct. 12, 2016	Oct. 12, 2018	GEMC 6351
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

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## Maximum Peak Envelope Conducted Power

### Purpose

The purpose of this test is to ensure that the maximum power conducted to the radiating element does not exceed the limits specified. This ensures that if the end-user replaces the antenna, the maximum power does not exceed an amount which may create an excessive power level.

### Limits and Method

The limits are defined in FCC Part 15.247(b) and RSS-247.

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands, the peak limit is 1 watt (30 dBm).

The method is given in Section 9.1 of FCC KDB 558074 and ANSI C63.10.

### Additional Information

The EUT does not have an antenna port due to the fact that it has a built-in on chip antenna and therefore antenna-port conducted test is not possible. As per Section 3 of FCC KDB 558074 v04, radiated test method was used to demonstrate compliance to conducted emission limit.

The conducted power was calculated from the EIRP. The details are provided in this sub-section.

The EIRP was calculated from field strength using Equation 22 and guidance from Annex G of ANSI C63.10:

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$$

Where

$E_{\text{IRP}}$  is the equivalent isotropically radiated power, in dBm

$E_{\text{Meas}}$  is the field strength of the emission at the measurement distance, in dB $\mu$ V/m

$d_{\text{Meas}}$  is the measurement distance, in m

And

$E_{\text{Meas}} = \text{Received Signal (dBuV)} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amp Gain}$

$E_{\text{Meas}} = \text{Received Signal (dBuV)} + \text{Correction Factor (dB)}$

Conducted power is calculated by

$$P_{\text{Cond}} = \text{EIRP} - G_{\text{EUT}}$$

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Where

$EIRP$  is the equivalent isotropically radiated power, in dBm  
 $P_{cond}$  is the measured power at feedpoint of the EUT antenna, in dBm  
 $G_{EUT}$  is the gain of the EUT radiating element (antenna), in dBi

## Results

The EUT passed. The EUT was set to transmit at maximum power. Three channels were measured.

The following are measurement equipment factors at 2.4 GHz

Antenna	26.4 dB
Cable Loss	4.1 dB
Pre Amp Gain	36.1 dB

The resultant correction factor is -5.6 dB.

For a 3 m measurement distance

$$\begin{aligned}
 EIRP &= E_{Meas} - 95.2 \\
 EIRP &= \text{Received Signal (dBuV)} - 5.6 - 95.2 \\
 EIRP &= \text{Received Signa (dBuV)} - 100.7
 \end{aligned}$$

The built-in antenna have a specified gain of 1 dBi.

The following table show the peak power:

Channel	Frequency (MHz)	Received Signal (dBuV)	EIRP (dBm)	$P_{cond}$ (dBm)	Limit (dBm)	Pass/Fail
Low	2402	71.1	-29.6	-30.6	30	Pass
Mid	2440	71.0	-29.7	-30.7	30	Pass
High	2480	70.4	-30.3	-31.3	30	Pass

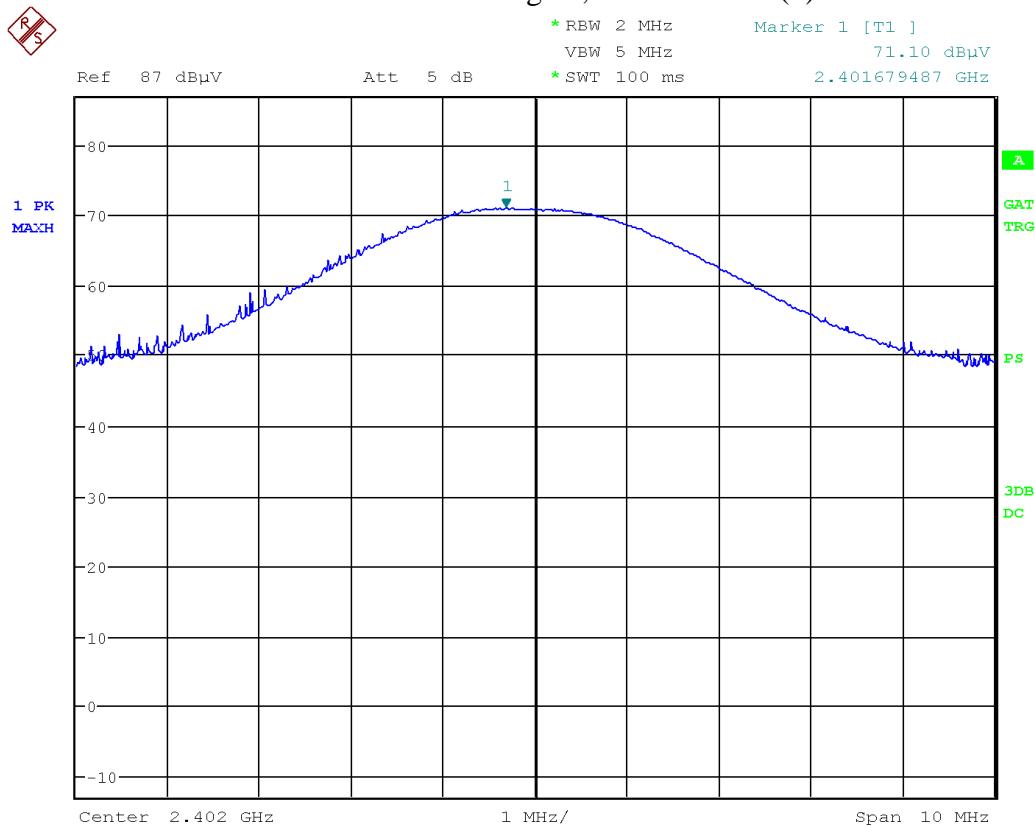
## Graphs

The graphs shown below show the Received Signal of the device. This is measured by a max hold on the spectrum analyzer using a RBW of 2 MHz. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute after the peaking process.

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### Received Signal, Low Channel (0)

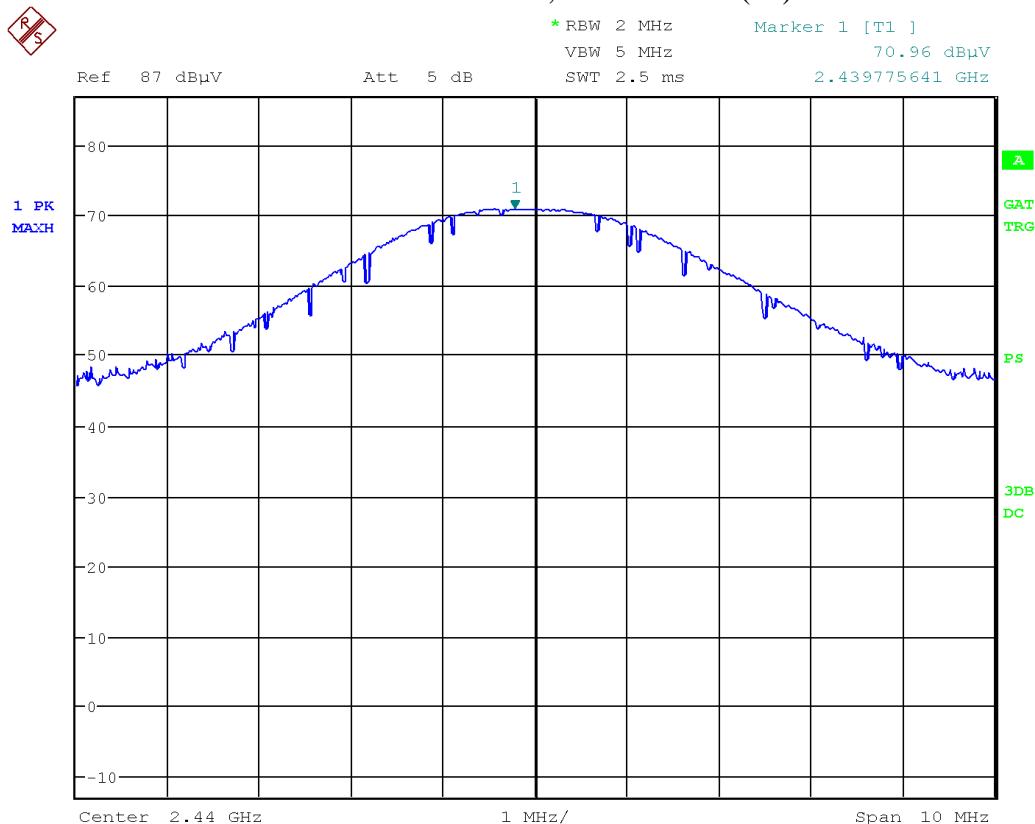


Date: 5.JUN.2017 16:55:59

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### Peak Power, Mid Channel (19)

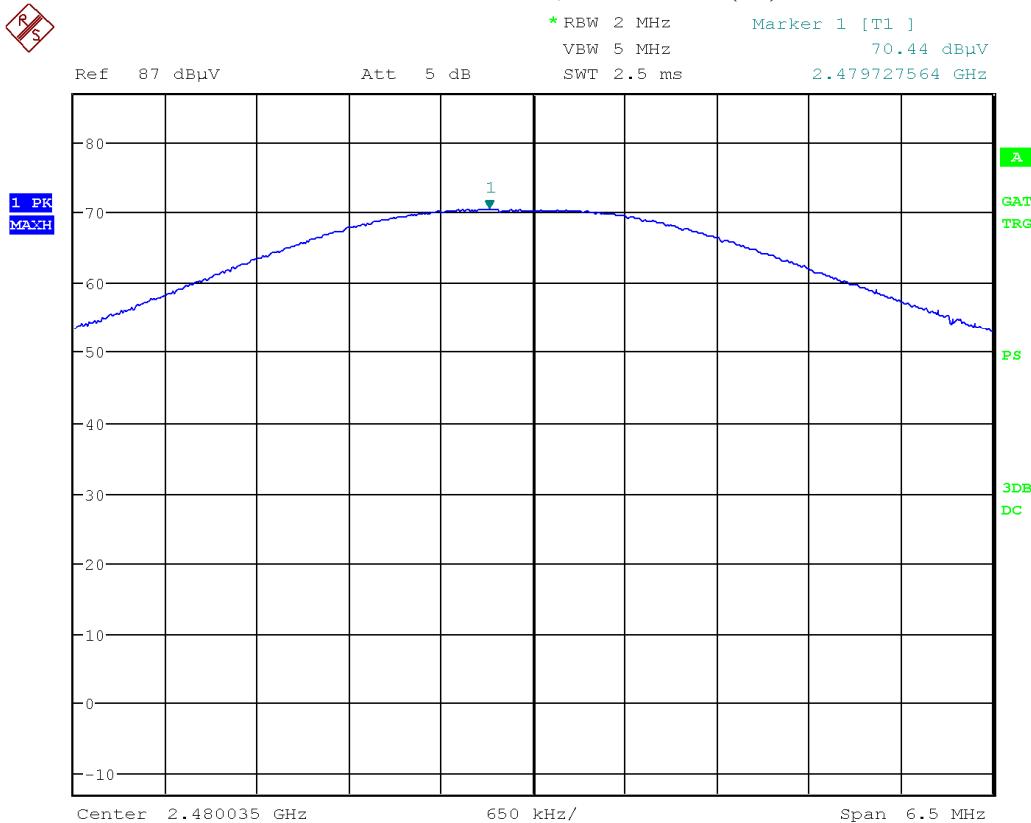


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Client	Nuance Communication Inc.		
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Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### Peak Power, Hi Channel (39)



Date: 5.JUN.2017 16:21:23

See 'Appendix B – EUT and Test Setup Photos' for photos showing the test set-up.

Client	Nuance Communication Inc.		
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Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Feb. 12, 2016	Feb. 12, 2018	GEMC 6375
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct. 12, 2016	Oct. 12, 2018	GEMC 6351
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Power Spectral Density

### Purpose

The purpose of this test is to ensure that the maximum power spectral density to the radiating element does not exceed the limits specified. This ensures that the modulation is significantly wide enough, or low enough in power that it will allow for co-operation of other wireless devices operating within this frequency allocation.

### Limits and Method

The limits are defined in 15.247(e).

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

The method is given in Section 10.2 of FCC KDB 558074 and ANSI C63.10.

### Additional Information

The EUT does not have an antenna port due to the fact that it has a built-in on chip antenna and therefore antenna-port conducted test is not possible. As per Section 3 of FCC KDB 558074 v04, radiated test method was used to demonstrate compliance to conducted emission limit.

The conducted power spectral density was calculated from the EIRP. The details are provided in this sub-section. Please note that the EIRP in this context is defined measured with the RBW defined in the referenced test method.

The EIRP was calculated from field strength using Equation 22 and guidance from Annex G of ANSI C63.10:

$$\text{EIRP} = \text{E}_{\text{Meas}} + 20\log(\text{d}_{\text{Meas}}) - 104.7$$

Where

$\text{EIRP}$  is the equivalent isotropically radiated power, in dBm  
 $\text{E}_{\text{Meas}}$  is the field strength of the emission at the measurement distance, in dB $\mu$ V/m  
 $\text{d}_{\text{Meas}}$  is the measurement distance, in m

And

$\text{E}_{\text{Meas}} = \text{Received Signal (dBuV)} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amp Gain}$   
 $\text{E}_{\text{Meas}} = \text{Received Signal (dBuV)} + \text{Correction Factor (dB)}$

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Conducted power spectral density is calculated by

$$PSD_{Cond} = EIRP - G_{EUT}$$

Where

EIRP	is the equivalent isotropically radiated power, in dBm
$PSD_{Cond}$	is the measured power spectral density at feedpoint of the EUT antenna, in dBm
$G_{EUT}$	is the gain of the EUT radiating element (antenna), in dBi

## Results

The EUT passed. The EUT was set to transmit at maximum power. Three channels were measured.

The following are measurement equipment factors at 2.4 GHz

Antenna	26.4 dB
Cable Loss	4.1 dB
Pre Amp Gain	36.1 dB

The resultant correction factor is -5.6 dB.

For a 3 m measurement distance

$$\begin{aligned} EIRP &= E_{Meas} - 95.2 \\ EIRP &= \text{Received Signal (dBuV)} - 5.6 - 95.2 \\ EIRP &= \text{Received Signa (dBuV)} - 100.7 \end{aligned}$$

The built-in antenna have a specified gain of 1 dBi.

The EIRP was measured with a RBW = 100 kHz. The following table show the peak  $PSD_{Cond}$ :

Channel	Frequency (MHz)	Received Signal (dBuV)	EIRP/100kHz (dBm)	$PSD_{Cond}$ (dBm/100 kHz)	Limit (dBm/3kHz)	Pass/Fail
Low	2402	68.7	-32.0	-33.0	8	Pass
Mid	2440	69.7	-31.0	-32.0	8	Pass
High	2480	69.6	-31.1	-32.1	8	Pass

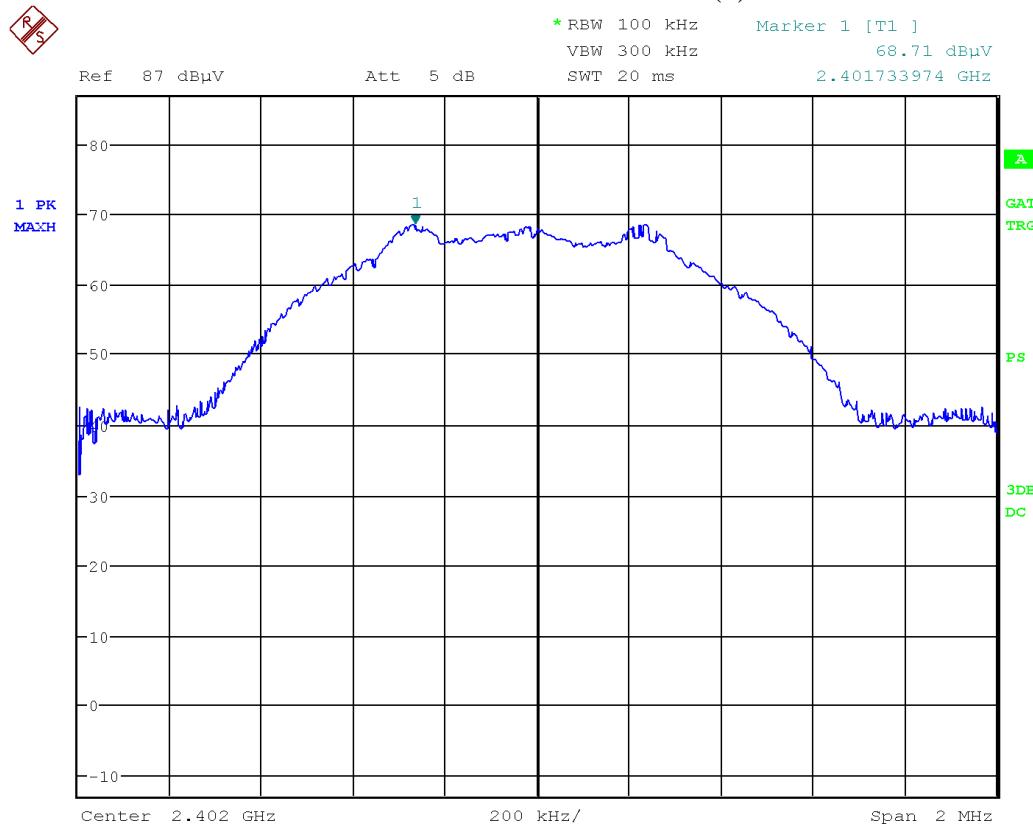
Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



## Graphs

The graphs shown below show the power spectral density of the device during the conducted measurement operation of the EUT. Low, middle, and high channel was investigated in each mode, with the worst case being presented. The external attenuator and cable loss are accounted for as reference offset in the spectrum analyzer.

PSD - Low Channel (0)

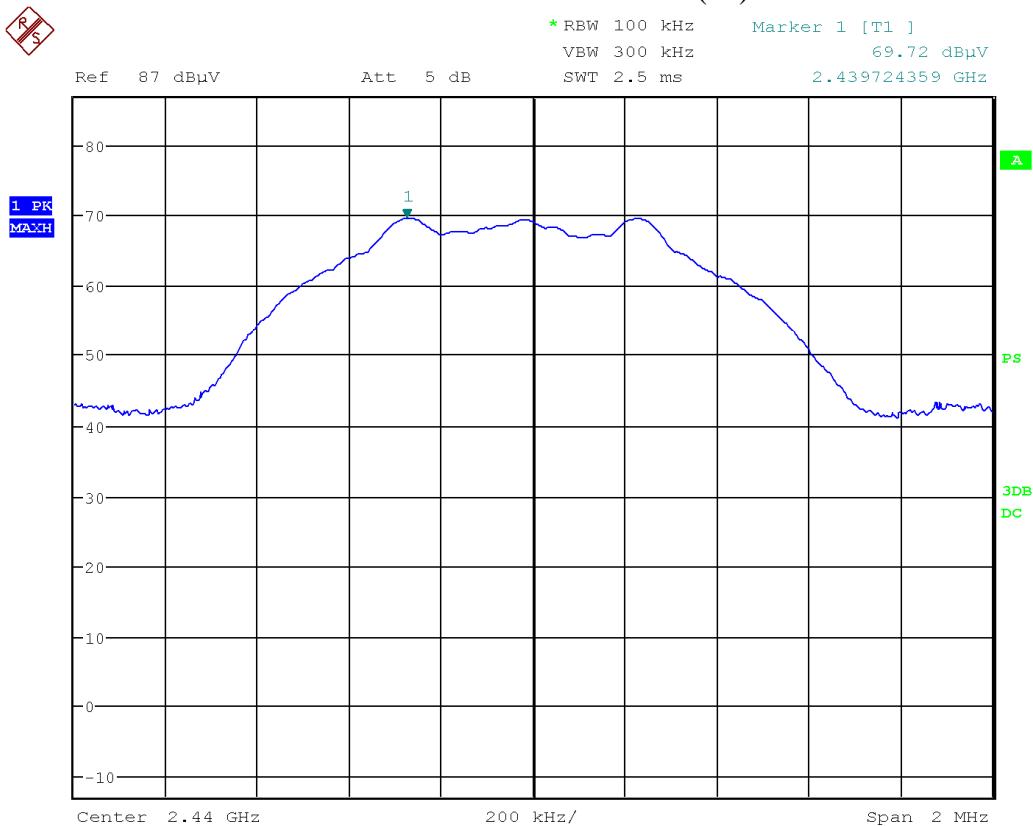


Date: 5.JUN.2017 15:47:10

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### PSD - Mid Channel (19)

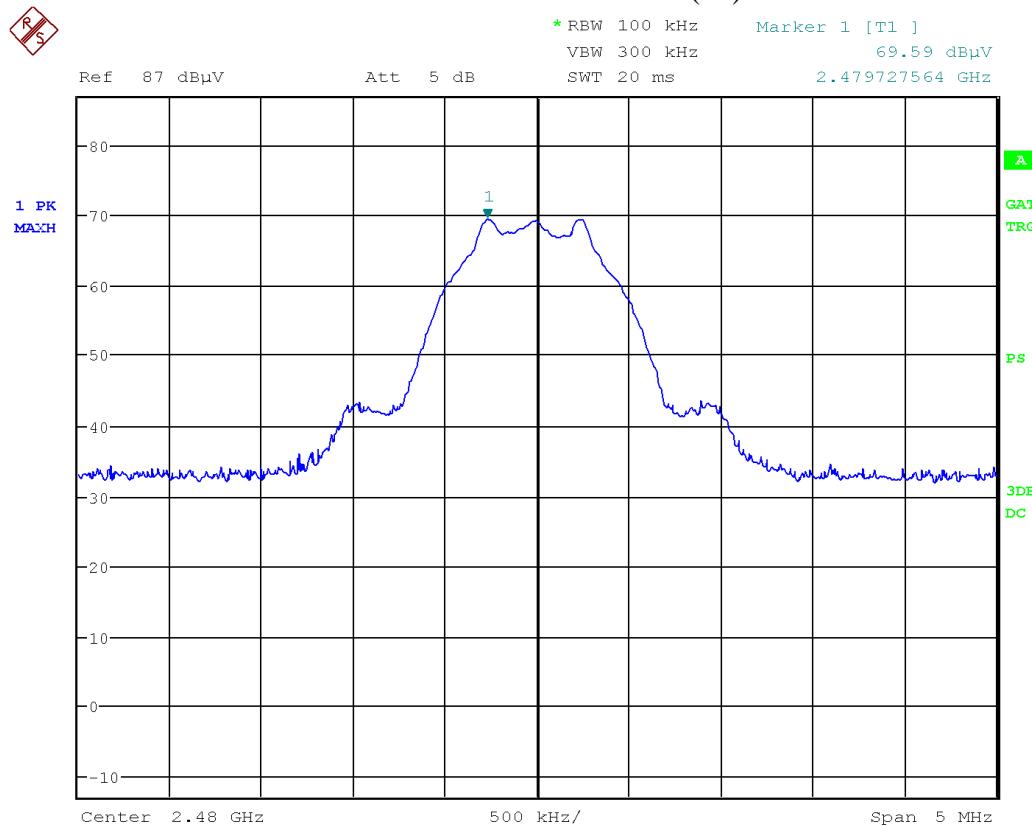


Date: 5.JUN.2017 15:17:17

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### PSD - Hi Channel (39)



Date: 5.JUN.2017 16:11:12

See 'Appendix B – EUT and Test Setup Photos' for photos showing the test set-up.

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Feb. 12, 2016	Feb. 12, 2018	GEMC 6375
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct. 12, 2016	Oct. 12, 2018	GEMC 6351
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## ***Transmitter Spurious Radiated Emissions in Restricted Bands***

### **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 12.2.7 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. See also ‘Transmitter Spurious Emissions in Unrestricted Band (-20dBc)’ for further details.

Frequency	Limit
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.

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015

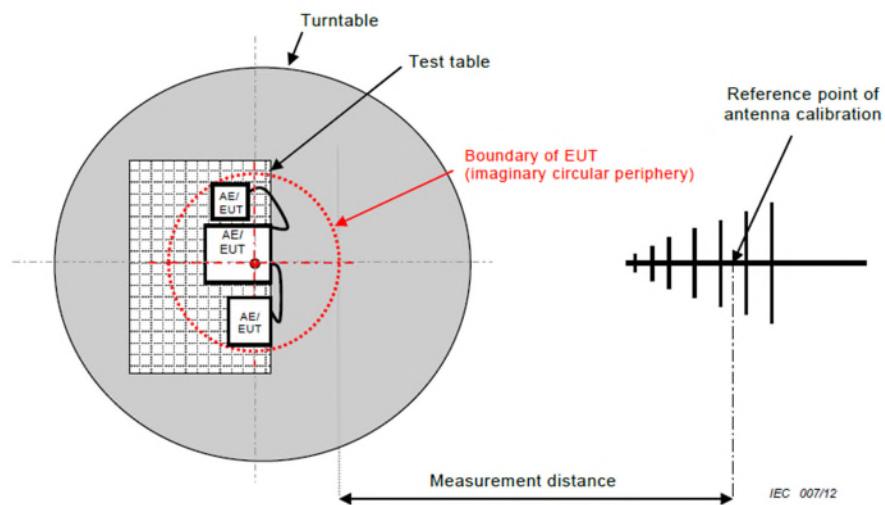


## Additional Information

The EUT does not have an antenna port due to the fact that it has a built-in on chip antenna and therefore antenna-port conducted test is not possible. As per Section 3 of FCC KDB 558074 v04, radiated test method was used to demonstrate compliance to conducted emission limit.

The EUT is a print management and an accounting device to be used in conjunction with a multifunction printer. The EUT contains Class A digital devices. As per Clause 12.2.7 of KDB 558974, "emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits." This allowance was applied between 30 MHz and 1 GHz.

## 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.

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



## 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 (a minimum of 24.835 GHz).

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.

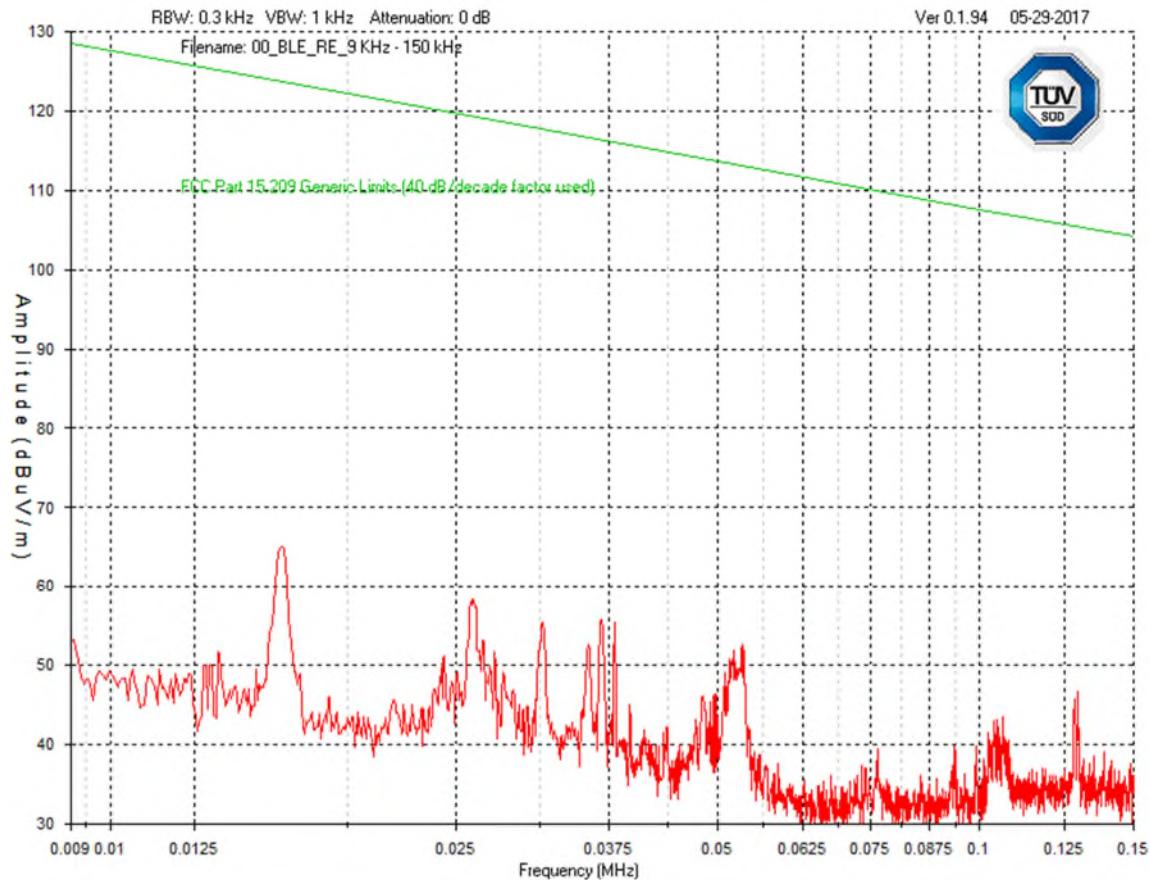
Low, middle and high channels, each in three orthogonal axis were checked. However, the worst case graphs are presented.

Band-edge measurement graphs are shown for illustration purposes. See final measurement section for all measurements.

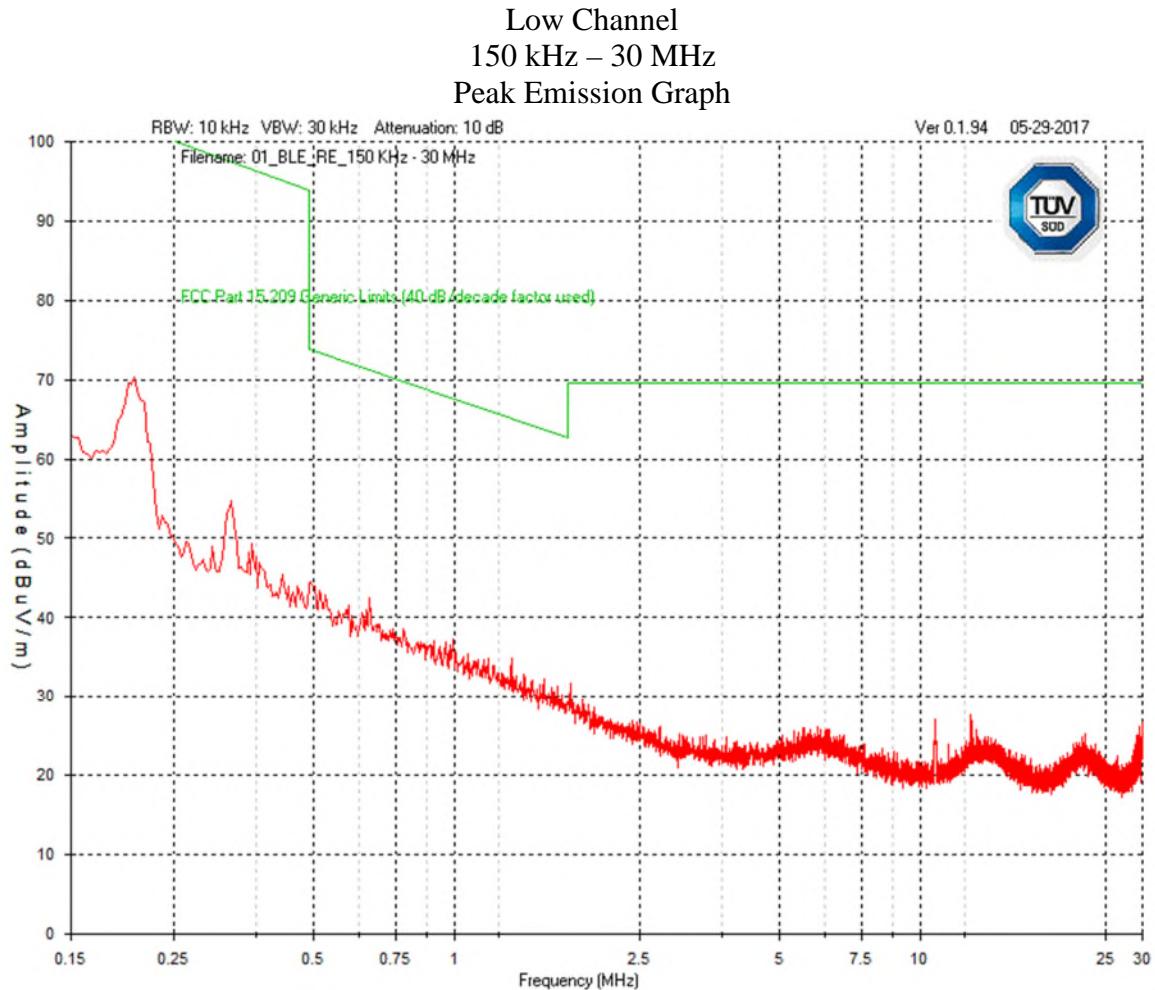
Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



Low Channel  
9 kHz – 150 kHz  
Peak Emission Graph

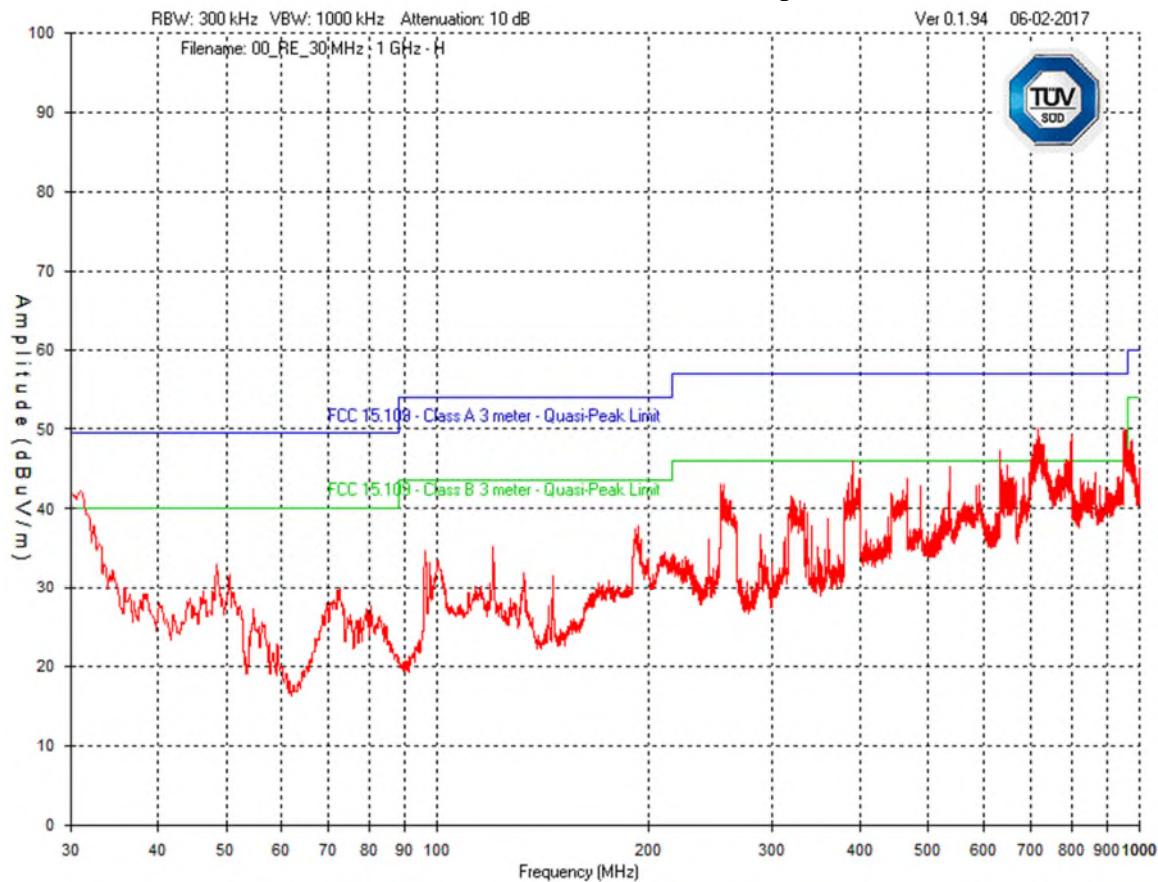


Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	



Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

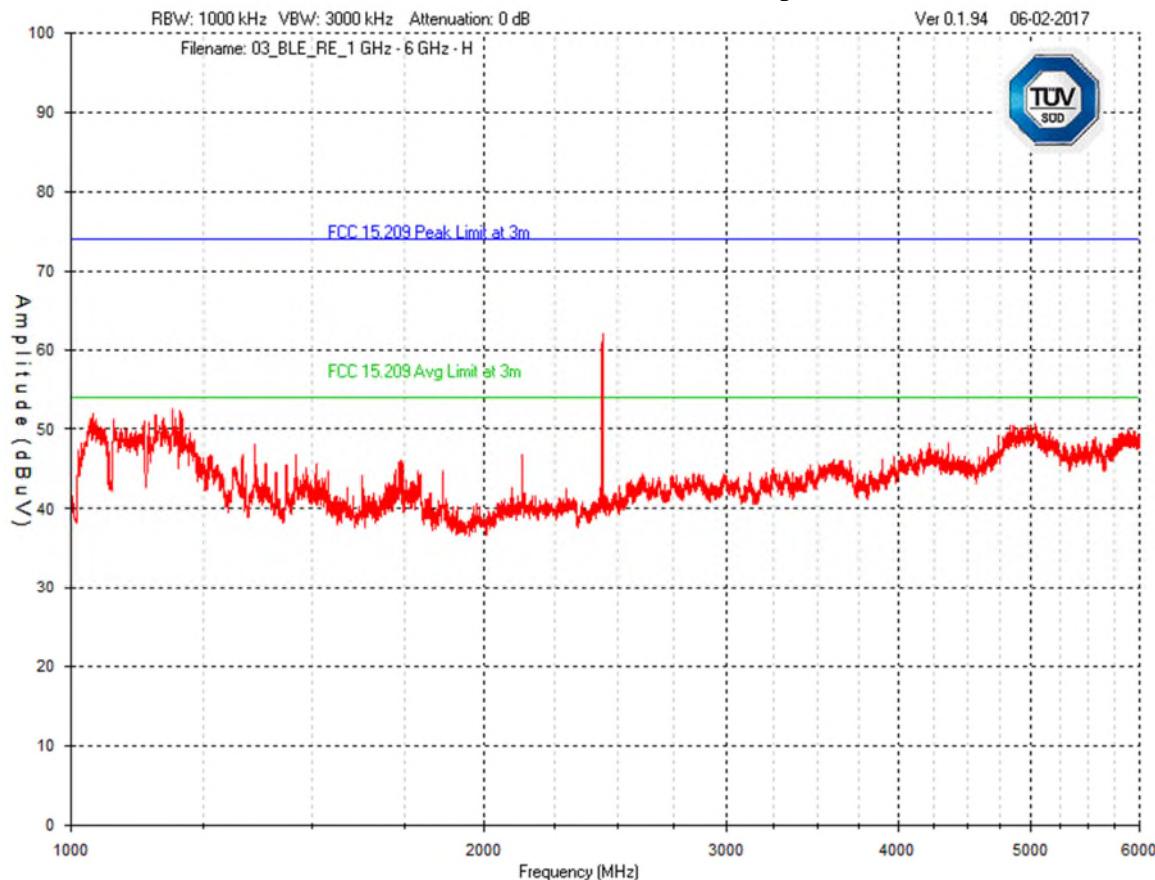
### Low Channel – 30 MHz – 1 GHz Horizontal - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



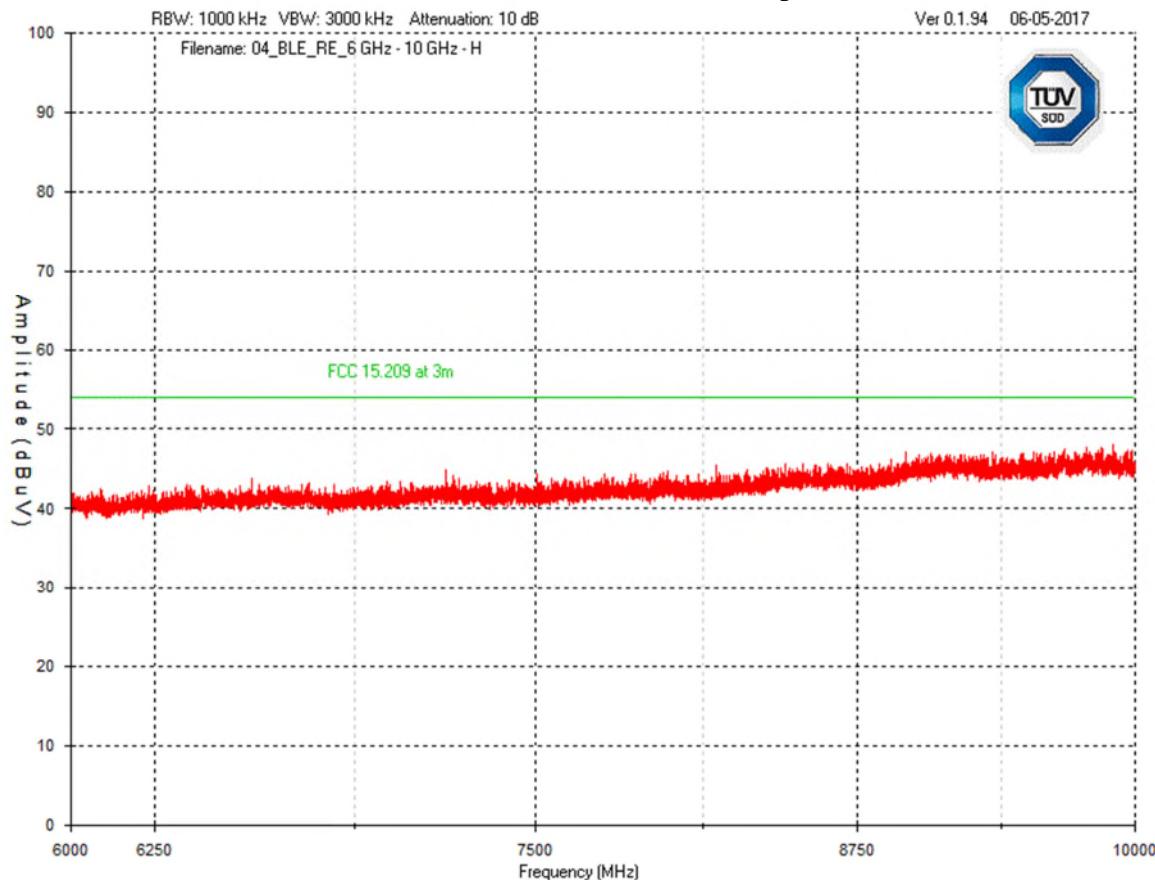
### Low Channel – 1 GHz – 6 GHz Horizontal - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



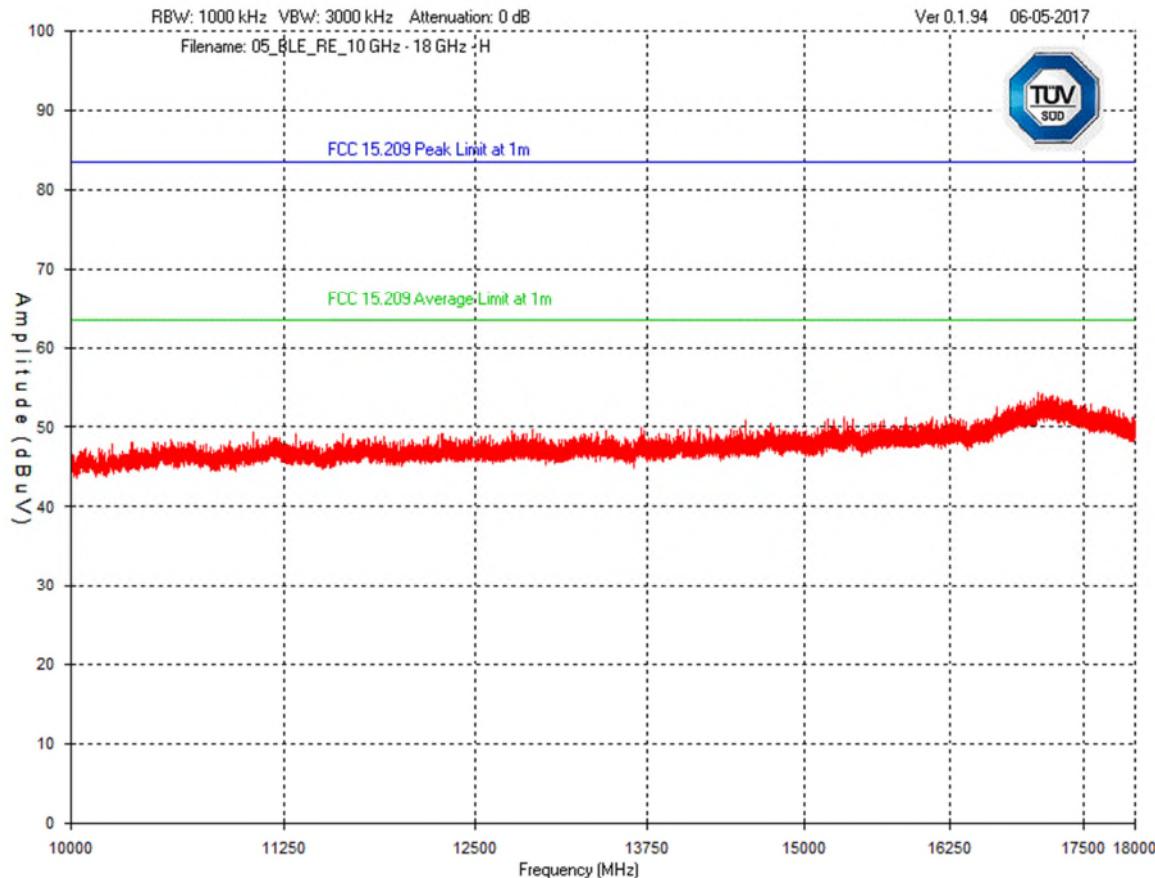
### Low Channel – 6 GHz – 10 GHz Horizontal - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



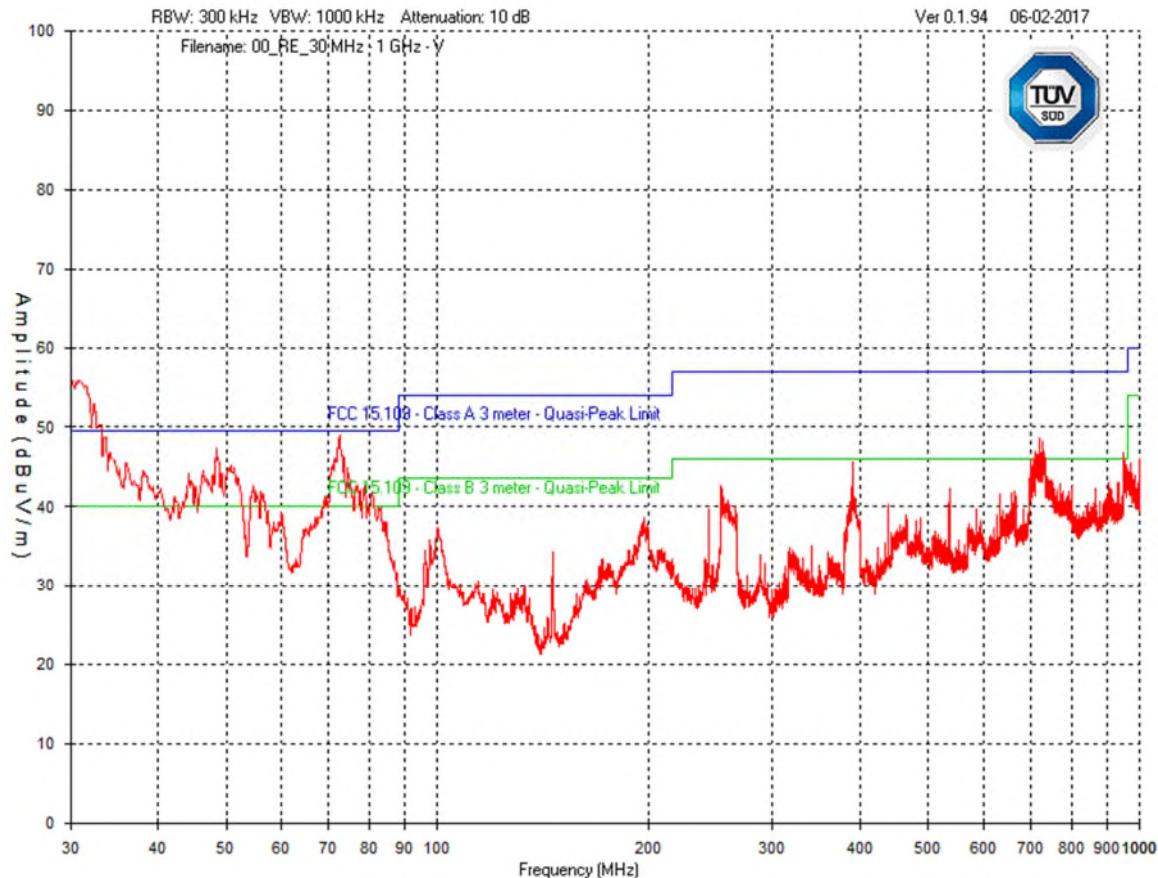
### Low Channel – 10 GHz – 18 GHz Horizontal - Peak Emission Graph



Plot was taken at a 1 meter distance. All emissions were noise floor of measurement instrument. No emissions were found in this frequency range.

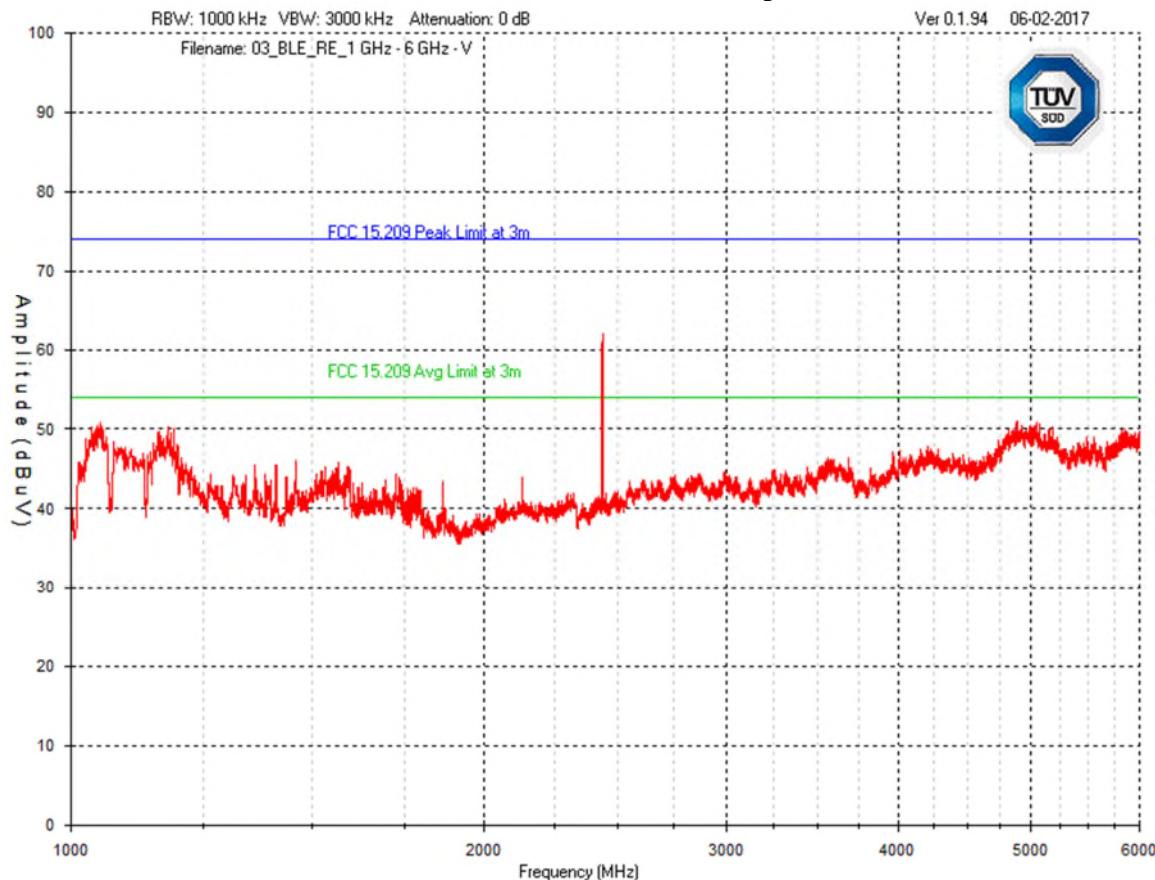
Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

Low Channel – 30 MHz – 1 GHz  
Vertical - Peak Emission Graph



Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

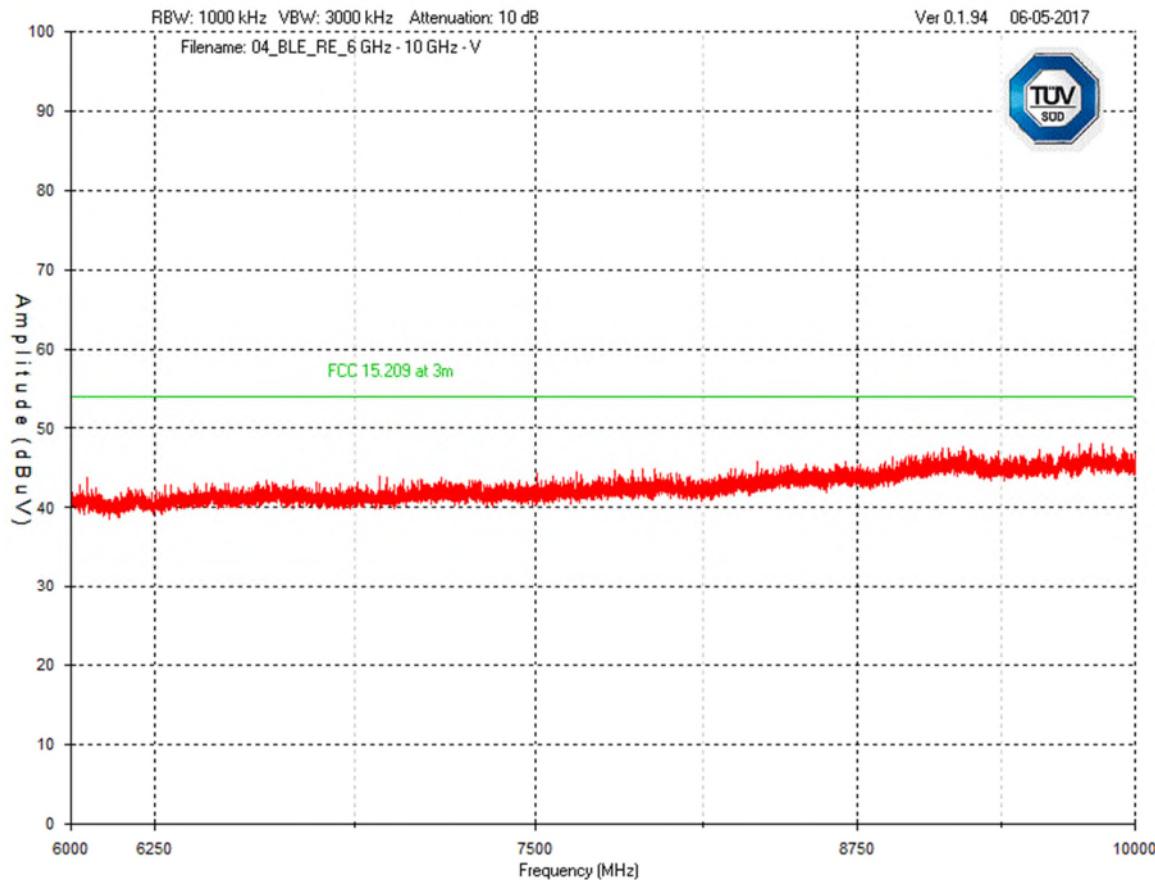
Low Channel – 1 GHz – 6 GHz  
Vertical - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



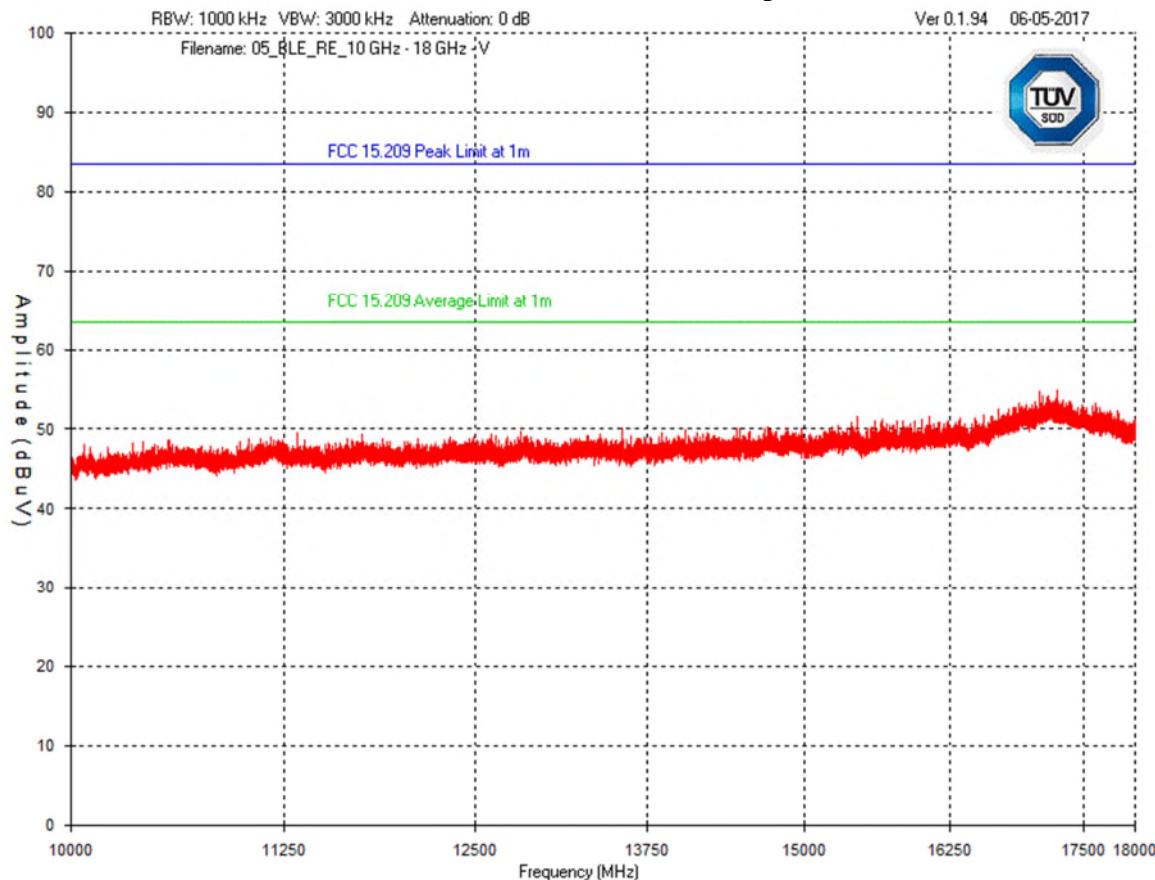
Low Channel – 6 GHz – 10 GHz  
Vertical - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### Low Channel – 10 GHz – 18 GHz Vertical - Peak Emission Graph



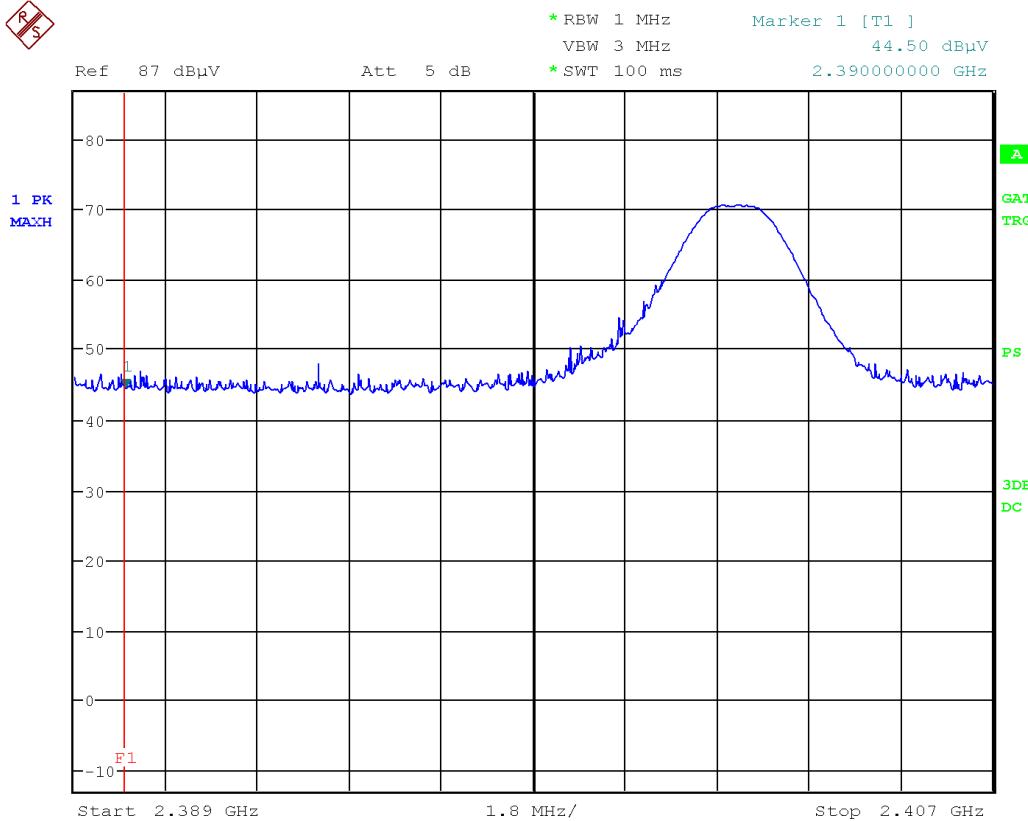
Plot was taken at a 1 meter distance. All emissions were noise floor of measurement instrument. No emissions were found in this frequency range.

Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### Band Edge, Low Channel Horizontal - Peak Emission

RS



Date: 5.JUN.2017 17:07:51

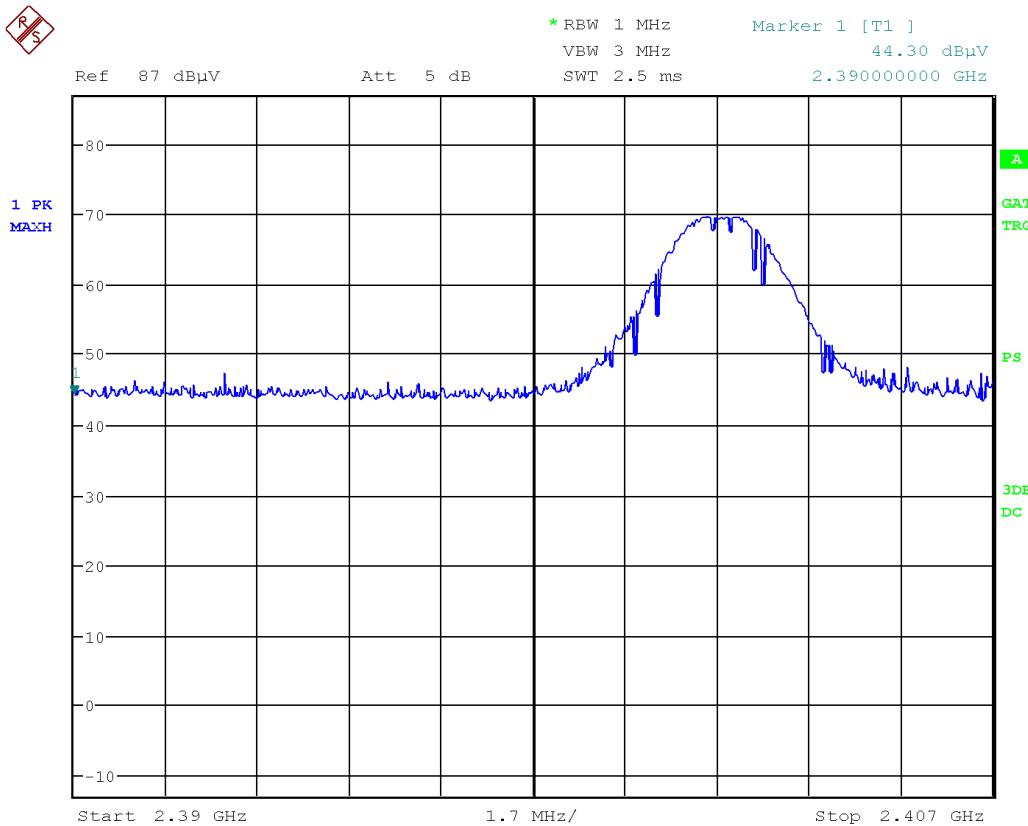
Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.

Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### Band Edge, Low Channel Vertical - Peak Emission

RS



Date: 5.JUN.2017 15:58:09

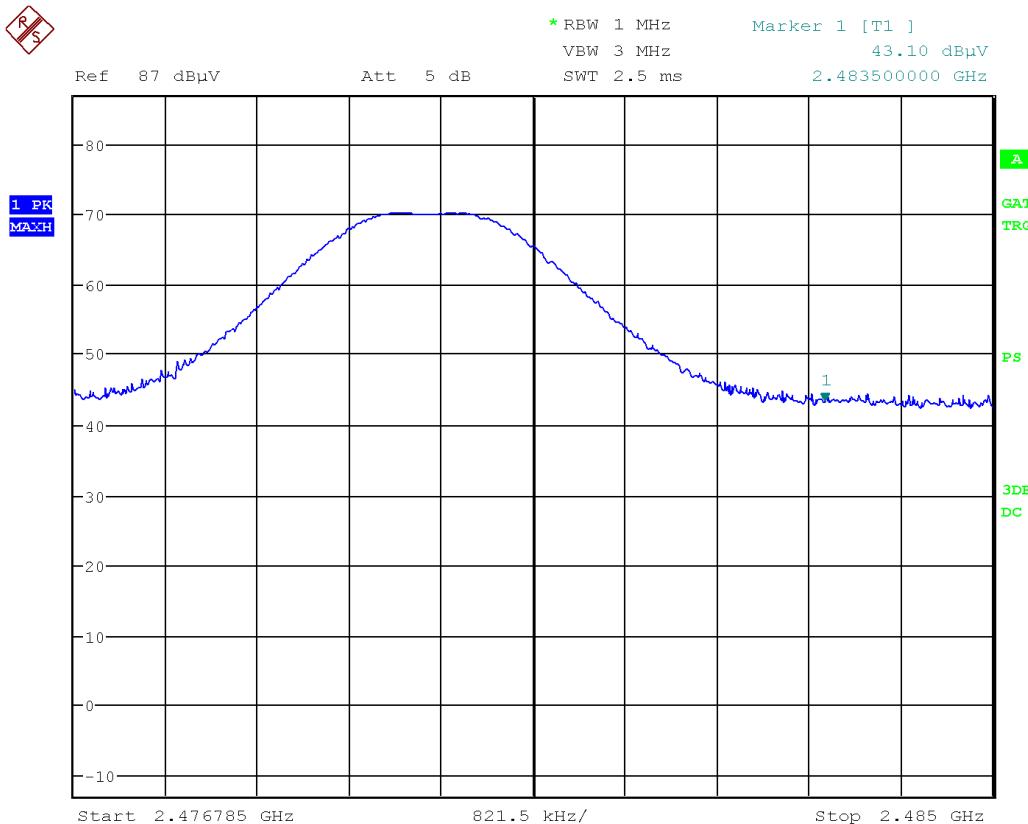
Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.

Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### Band Edge, Hi Channel Horizontal - Peak Emission

RS



Date: 5.JUN.2017 16:23:45

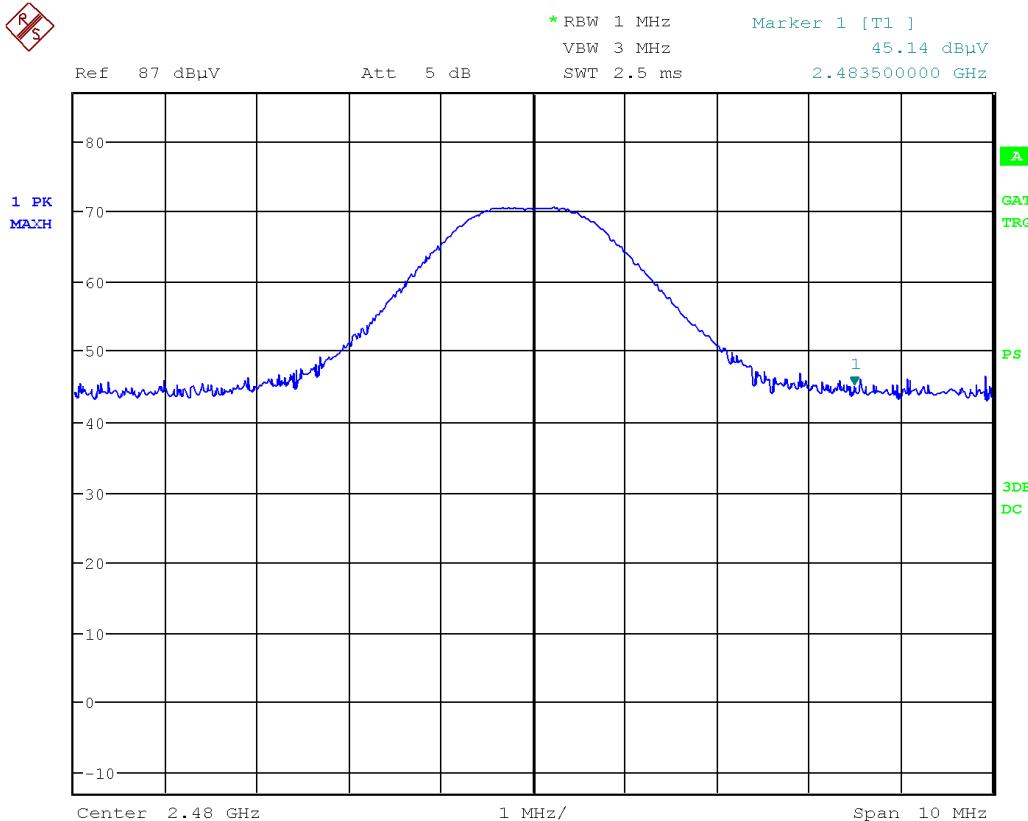
Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



### Band Edge, Hi Channel Vertical - Peak Emission

RS

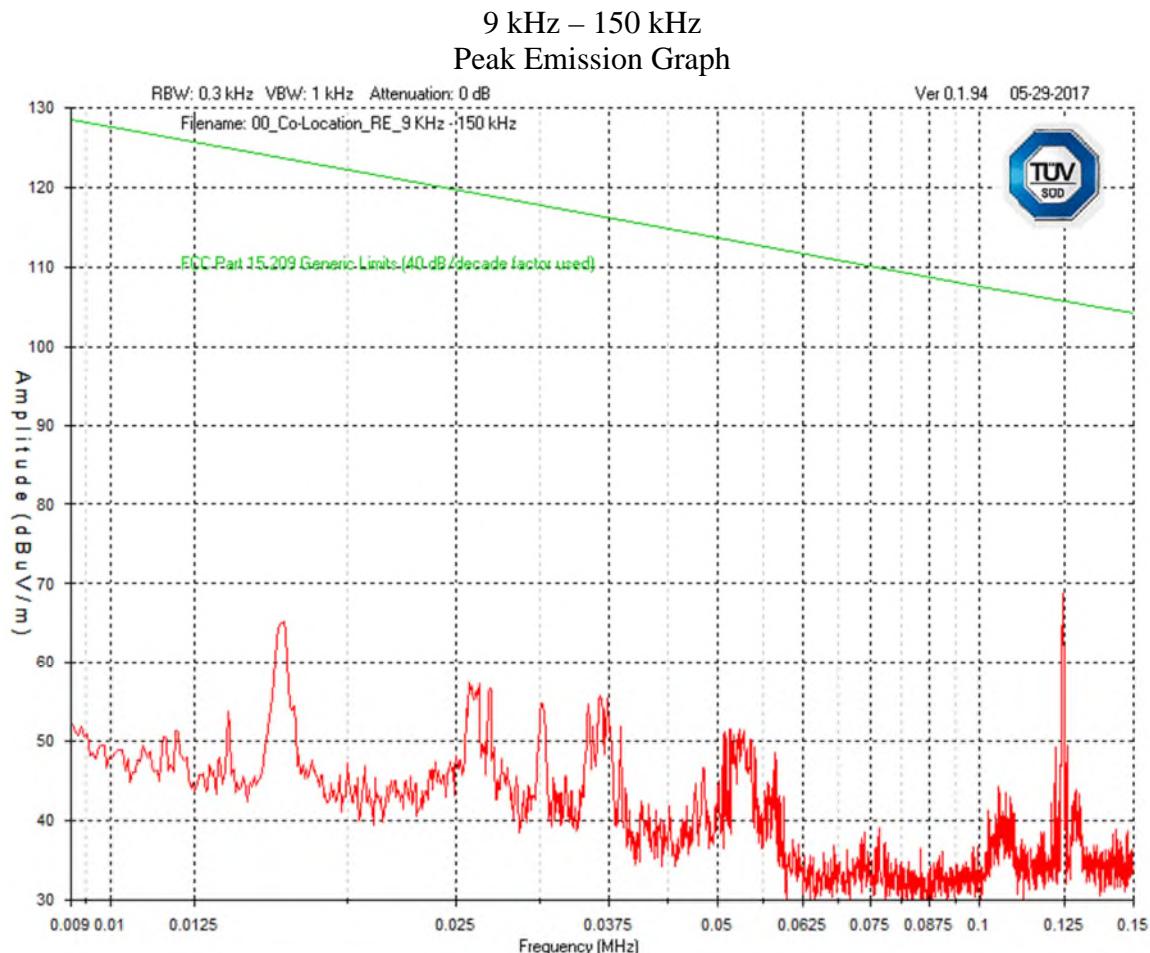


Date: 5.JUN.2017 16:07:27

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	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

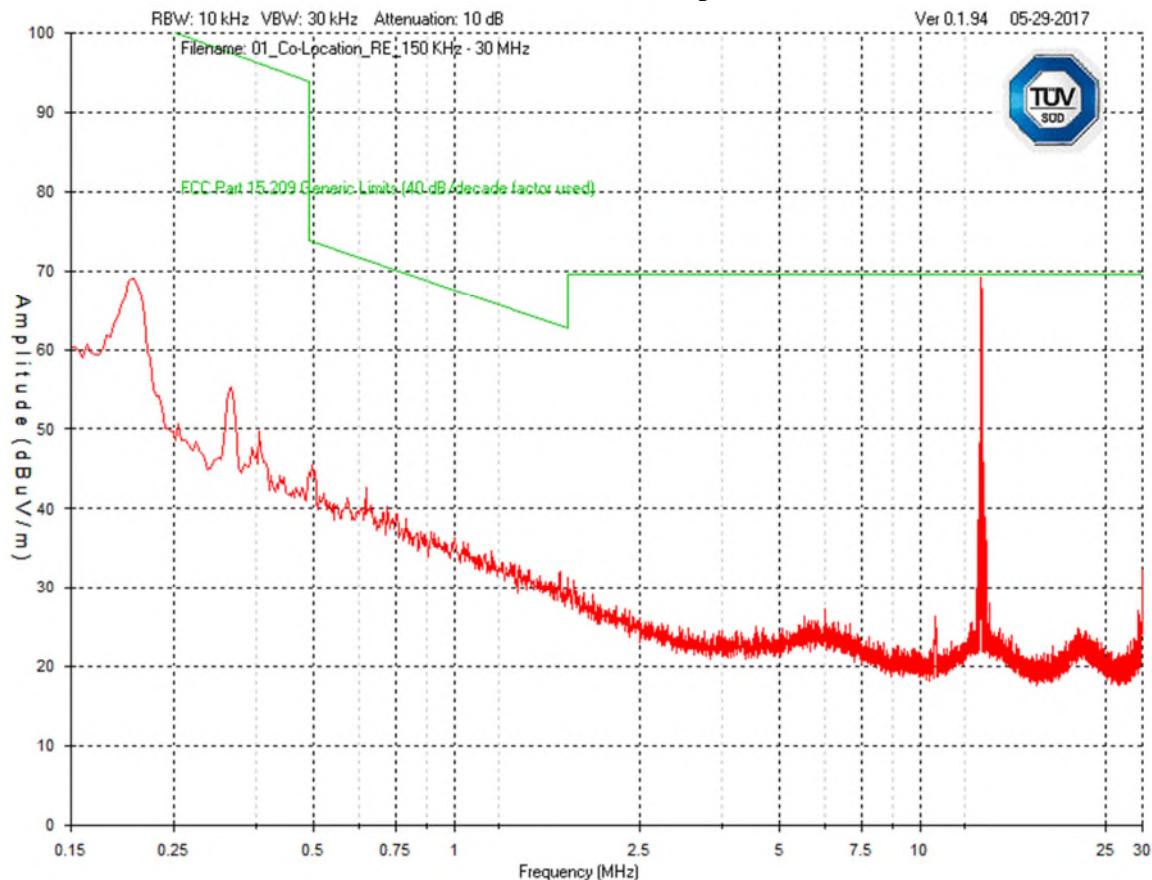
## Antenna Co-location



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015

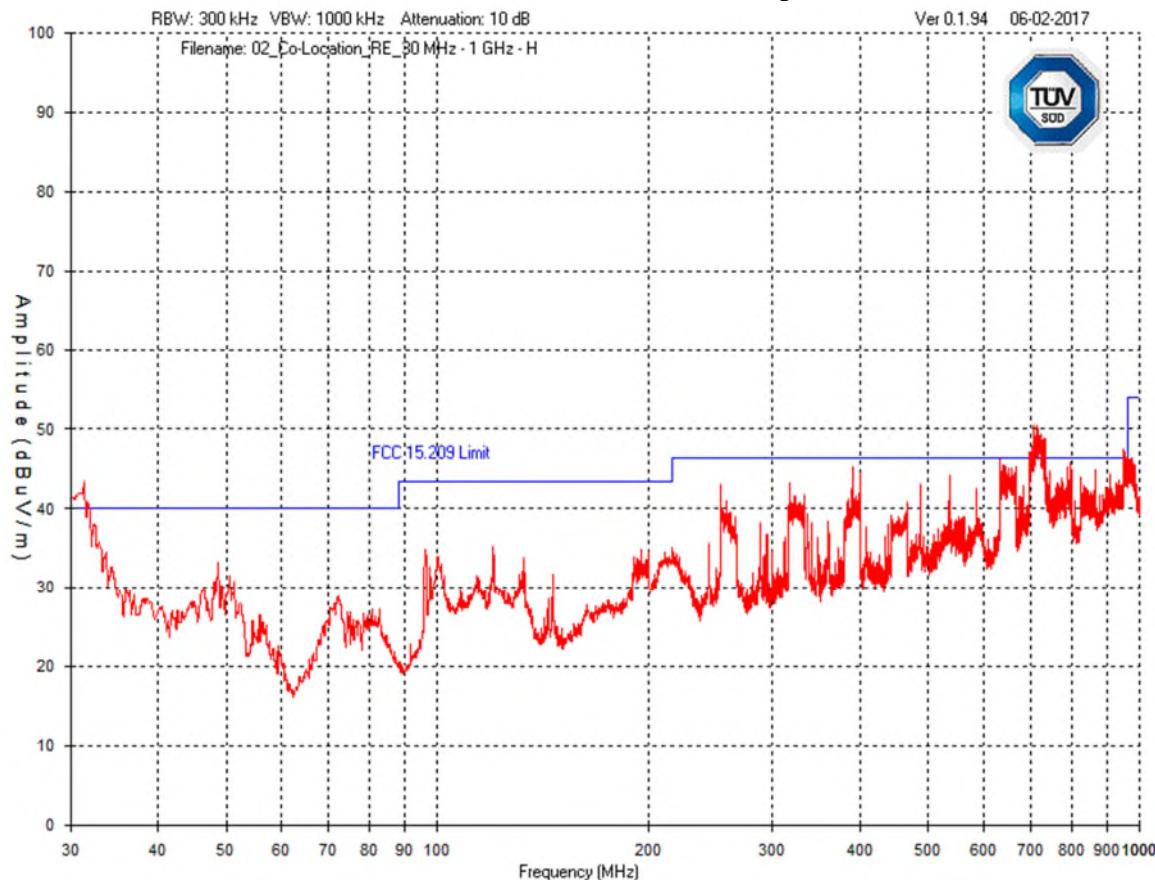


### 150 kHz – 30 MHz Peak Emission Graph

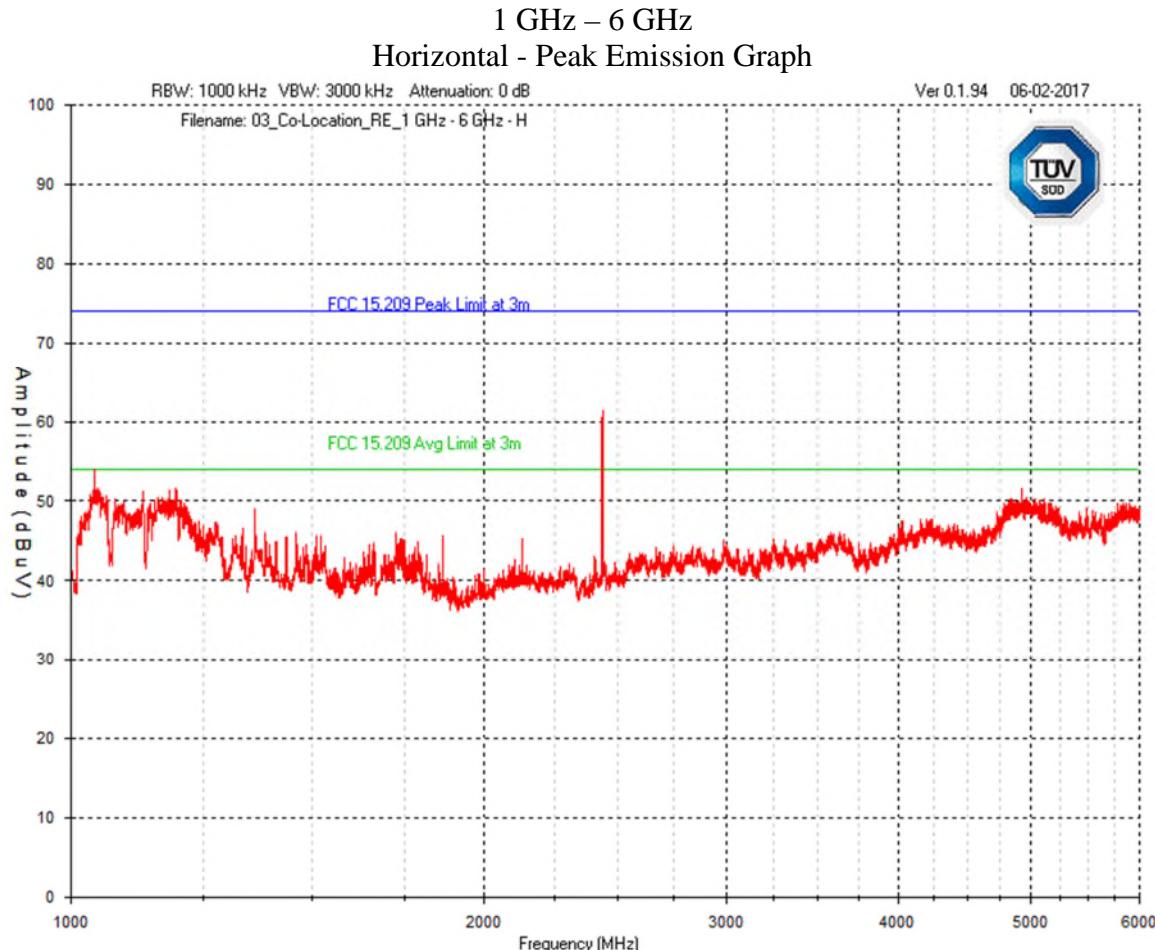


Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

30 MHz – 1 GHz  
Horizontal - Peak Emission Graph



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015

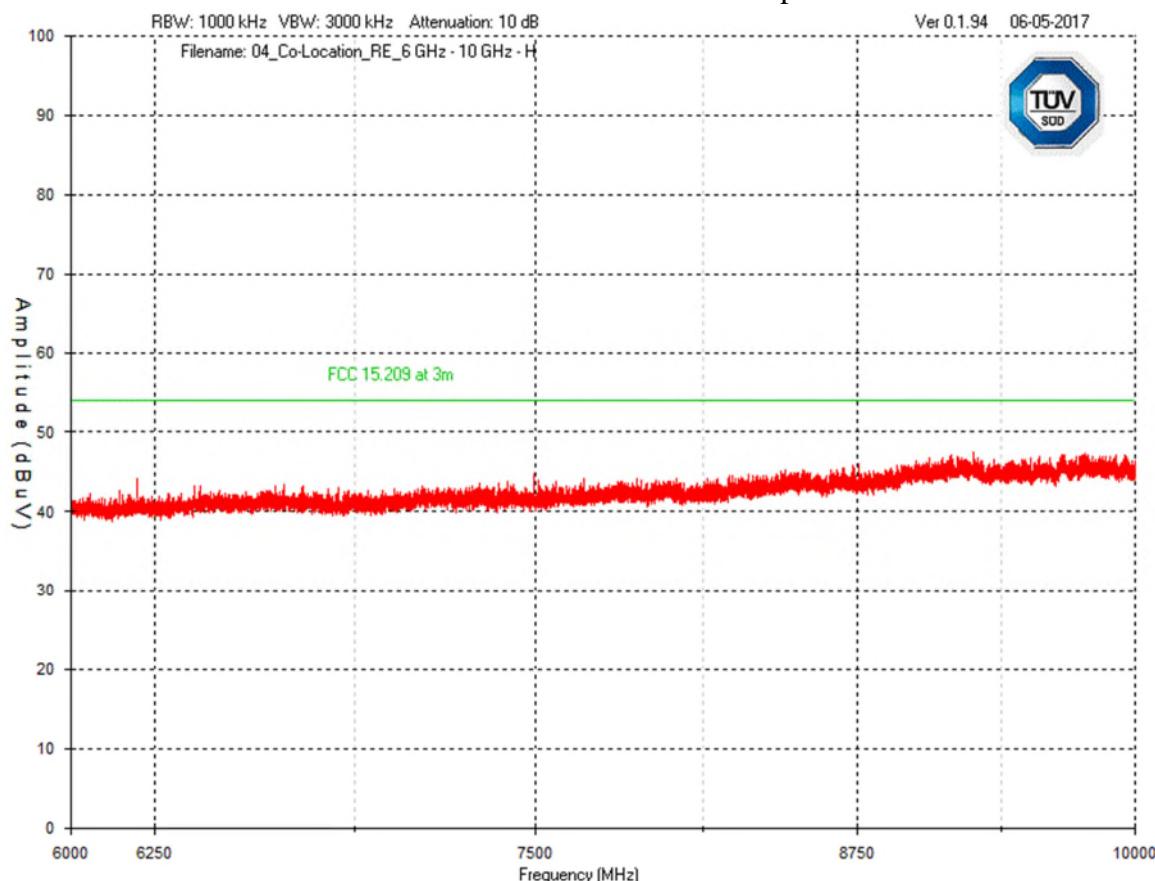


Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



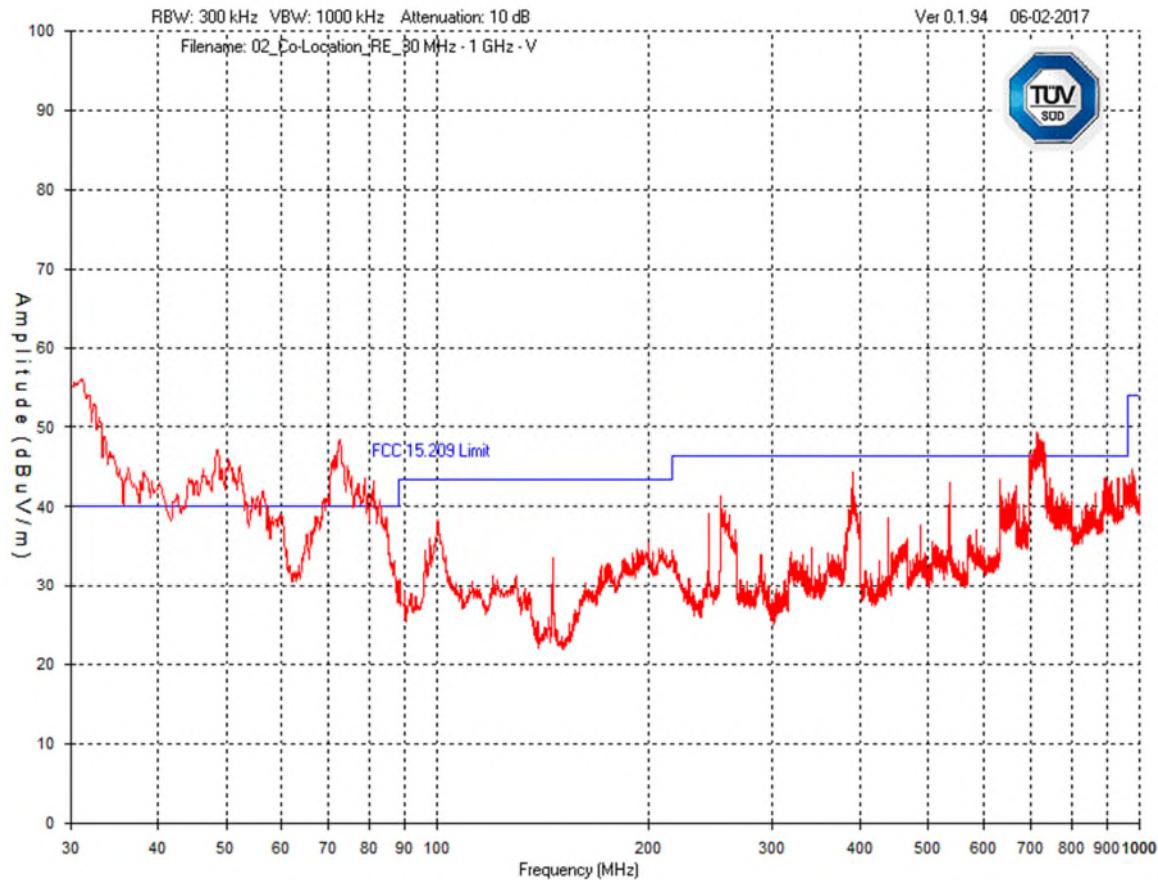
### 6 GHz – 10 GHz

#### Horizontal - Peak Emission Graph



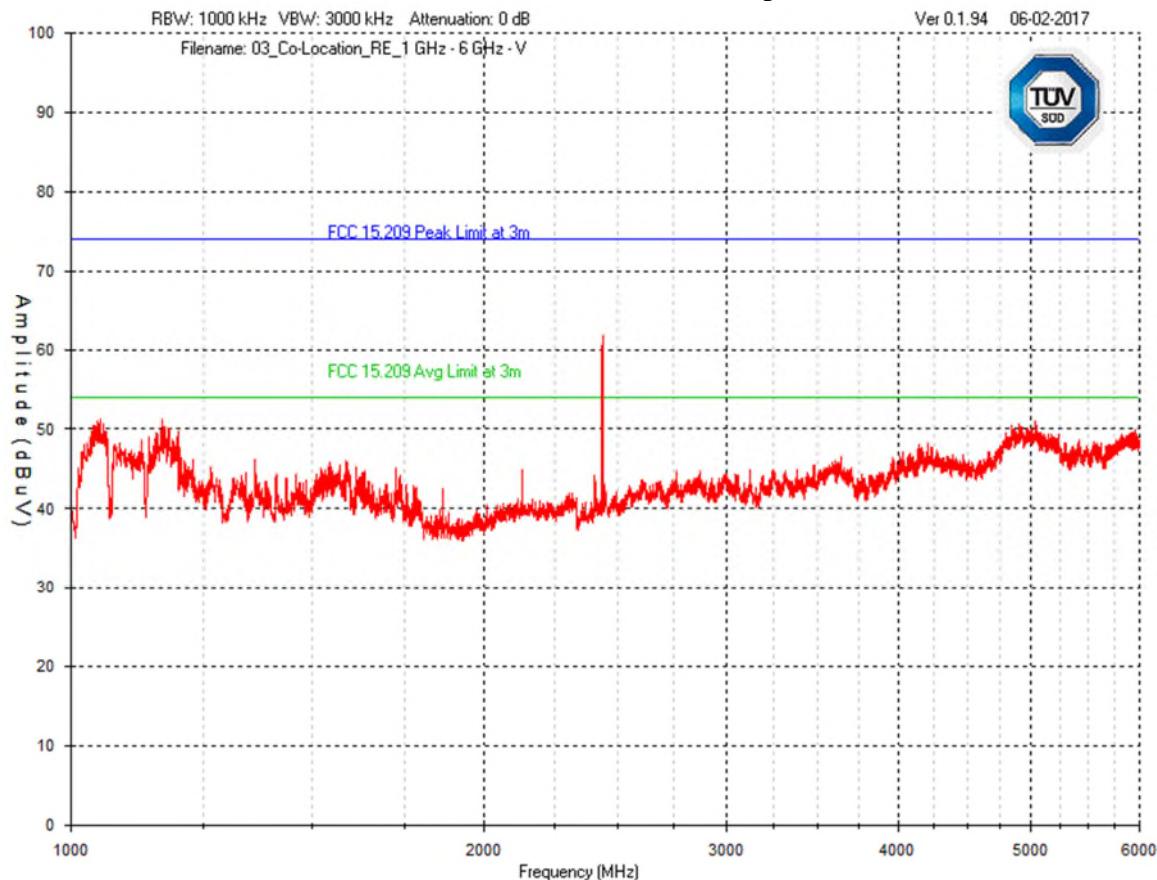
Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

30 MHz – 1 GHz  
Vertical - Peak Emission Graph



Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

1 GHz – 6 GHz  
Vertical - Peak Emission Graph

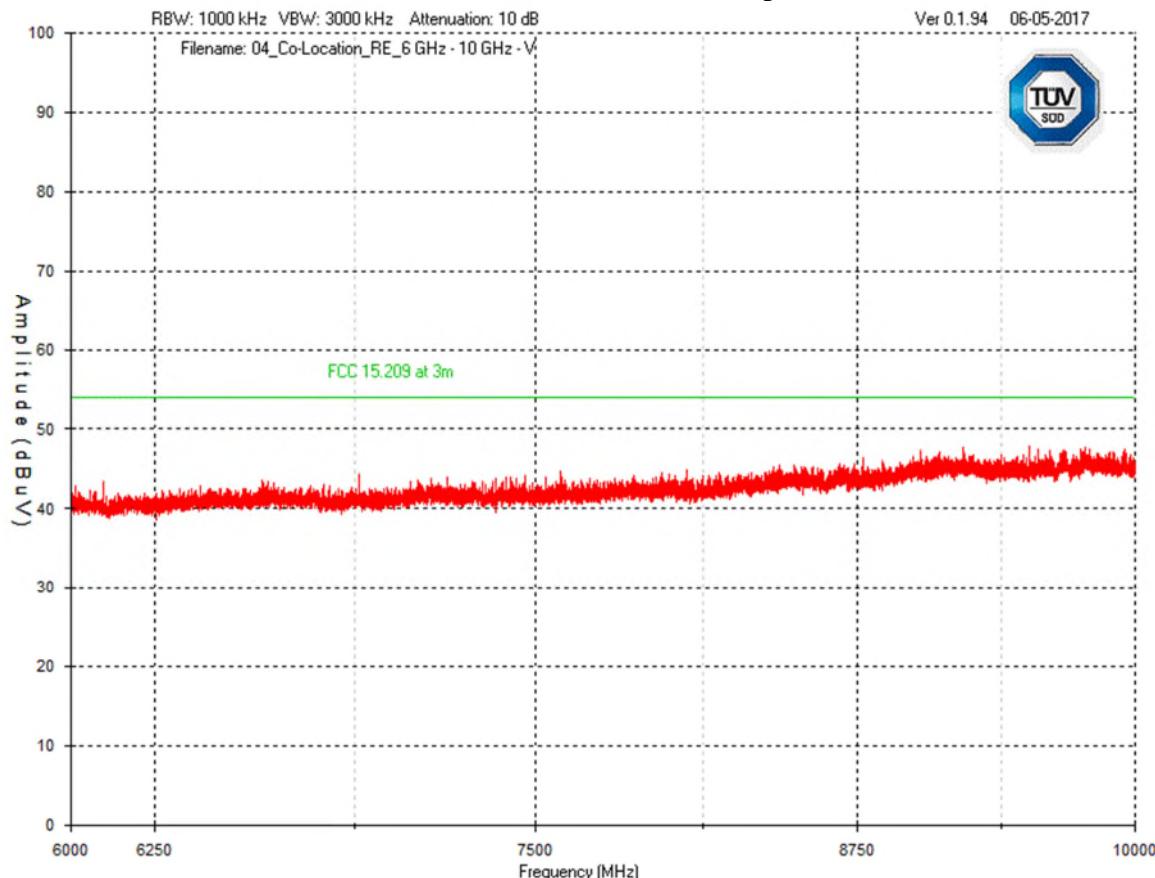


Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### 6 GHz – 10 GHz

#### Vertical - Peak Emission Graph



Client	Nuance Communication Inc.	
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	TÜV SÜD Canada

## Final Measurements and Results

The EUT passed. Low, middle, and high bands were measured.

In accordance with 15.247(d), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205 need to be verified with a final detector. Emissions outside the restricted bands were measured for informational purposes.

The measurements were maximized by rotating the turn table over a full 0-360 rotation and the antenna height was varied from 1 m to 4 m.

Product Category		FCC 15.109 Class A					
Supply		120 Vac 60 Hz					
Vertical Emission Table							
Frequency (MHz)	Detector	Raw (dBuV)	Correction Factors (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
30.097	QP	55.1	-10.3	44.8	49.6	4.8	Pass
72.486	QP	60.8	-21.6	39.2	49.6	10.4	Pass
48.43	QP	63.6	-19.3	44.3	49.6	5.3	Pass
54.638	QP	54.4	-20.5	33.9	49.6	15.7	Pass
37.5	QP	44.2	-14.6	29.6	49.6	20	Pass
73.0	QP	59.2	-21.7	37.5	49.6	12.1	Pass
Horizontal Emission Table							
717.633	PEAK	52.9	-2.8	50.1	56.9	6.8	Pass
954.895	PEAK	47.6	2.4	50.0	56.9	6.9	Pass
30.97	PEAK	53.2	-11.1	42.1	49.6	7.5	Pass
798.725	PEAK	50.2	-1.1	49.1	56.9	7.8	Pass
633.146	PEAK	52.3	-5.0	47.3	56.9	9.6	Pass
389.482	PEAK	56.9	-10.9	46.0	56.9	10.9	Pass
960	PEAK	42.3	2.4	44.7	60.0	15.3	Pass

## Spurious Emission Measurements

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

Test Frequency (MHz)	Detection mode	Antenna polarity (Horz/Vert)	Raw signal dB(µV)	Antenna factor dB	Cable loss dB + Presel ector		Atten uator dB	Pre-Amp Gain dB	Received signal dB(µV/m)	Emission limit dB(µV/m)	Margin dB(µV)	Result
					loss dB	Presel ector						
Low Channel (1)												
2390	Peak	Horz	44.5	26.4	4.1	0.0	36.1	38.9	74.0	35.1	PASS	
2390	Avg	Horz	44.5	26.4	4.1	0.0	36.1	38.9	54.0	15.1	PASS	
2390	Peak	Vert	44.3	26.4	4.1	0.0	36.1	38.7	74.0	35.3	PASS	
2390	Avg	Vert	44.3	26.4	4.1	0.0	36.1	38.7	54.0	15.3	PASS	
High Channel (11)												
2483.5	Peak	Horz	43.1	26.4	4.1	0.0	36.1	37.5	74.0	36.5	PASS	
2483.5	Avg	Horz	43.1	26.4	4.1	0.0	36.1	37.5	54.0	16.5	PASS	
2483.5	Peak	Vert	45.1	26.4	4.1	0.0	36.1	39.5	74.0	34.5	PASS	
2483.5	Avg	Vert	45.1	26.4	4.1	0.0	36.1	39.5	54.0	14.5	PASS	

### Peak Power and Band Edge Measurements

Note: All Band Edge peak emissions were below Average limit; thus, compliance to Average requirement was met with peak emissions. Emissions above 18 GHz are all noise floor.

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		 Canada

## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct. 12, 2016	Oct. 12, 2018	GEMC 6351
Pre-Amp 9 kHz – 1 GHz	CPA9231A	Chase	Oct. 12, 2016	Oct. 12, 2018	GEMC 6403
Loop Antenna	EM 6871	Electro-Metrics	Feb. 13, 2017	Feb. 13, 2019	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb. 13, 2017	Feb. 13, 2019	GEMC 71
BiLog Antenna	3142-C	ETS	Feb. 22, 2017	Feb. 22, 2019	GEMC 137
Double Ridge Guide Horn Antenna 1-18 GHz	AH-118	Com-Power Corporation	Jul-01, 2015	Jul-01, 2017	GEMC 214
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Feb. 12, 2016	Feb. 12, 2018	GEMC 6375
Horn Antenna 18 – 26.5 GHz	SAS-572	A.H. Systems	Oct. 11, 2016	Oct. 11, 2018	GEMC 6371
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272
Emissions Software	0.1.94	Global EMC	NCR	NCR	GEMC 58

FCC - 15.209 -Radiated Emissions\_Rev1

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## ***Transmitter Spurious Emissions in Unrestricted Band (-20 dBc Requirement)***

### **Purpose**

The purpose of this test is to ensure that the maximum power conducted to the radiating element at frequencies outside of the authorized spectrum does not exceed the limits specified. This ensures that the only the intended signal is delivered to the radiating element.

### **Limits and Method**

The limits are defined in 15.247(d). In any 100 kHz band, the peak spurious harmonics emissions must be at least 20 dB below the fundamental. Spurious Conducted emissions are to be evaluated up to the 10<sup>th</sup> harmonic. This -20 dBc requirement also applies at the 'band edge' or 2.4 GHz and 2.4835 GHz.

The method is given in Section 11 of FCC KDB 558074 and ANSI C63.10

### **Additional Information**

The EUT does not have an antenna port due to the fact that it has a built-in on chip antenna and therefore antenna-port conducted test is not possible. As per Section 3 of FCC KDB 558074 v04, radiated test method was used to demonstrate compliance to conducted emission limit.

The emission limit for the requirement is a relative limit. Compliance to this rule part are described below:

- For above 1 GHz, a relative measurement from peak emission was performed;
- For 30 MHz to 1 GHz, the radiated emission limit was first derived and then this limit was applied to the emission. The highest emission,  $E_{Meas}$ , in the allowed band, measured with a RBW = 100 kHz, is  $69.7 \text{ dBuV/m} - 5.6 \text{ dB} = 64.1 \text{ dBuV/m}$  at 3 m. The radiated emission limit is therefore 44.1 dBuV/m at 3m. See Power Spectral Density section for additional details.

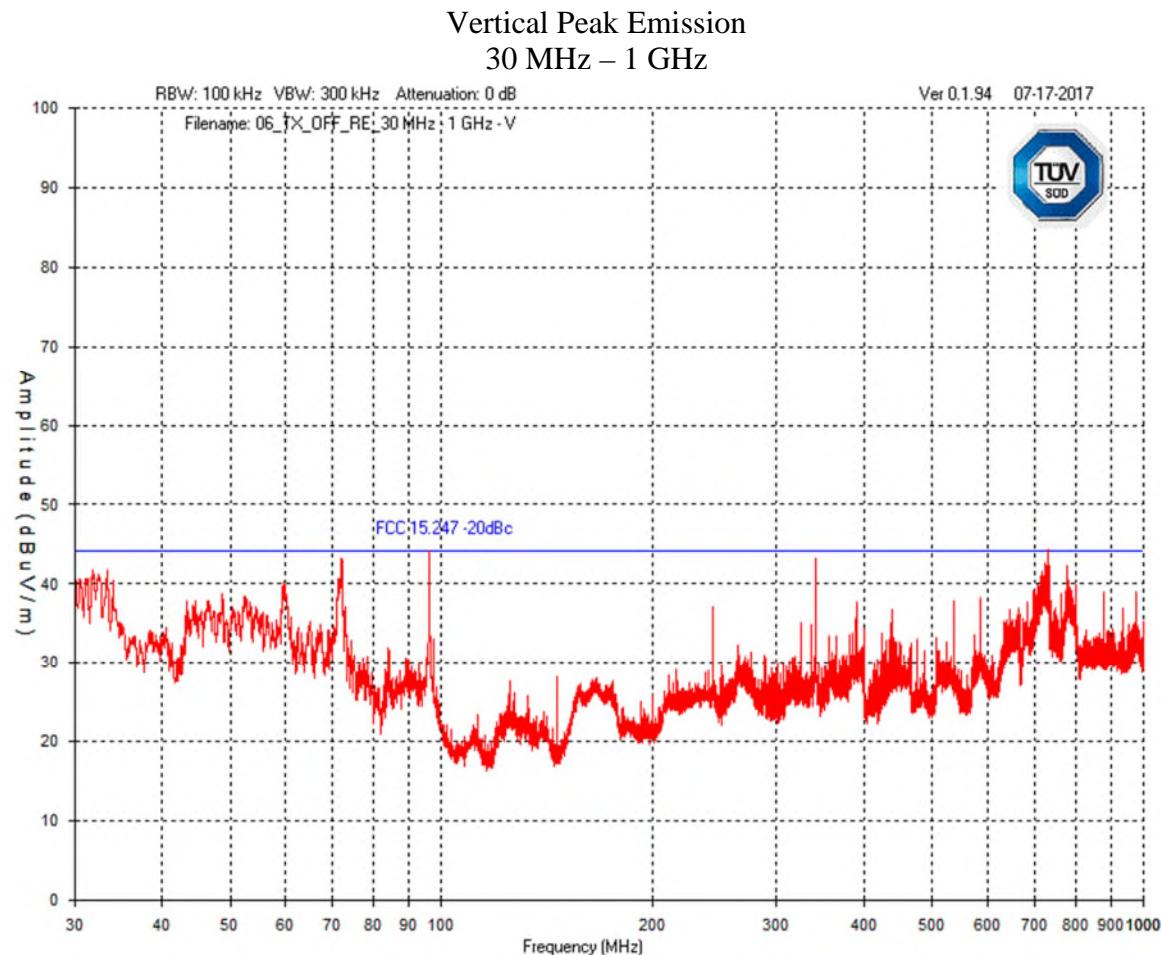
During radiated emission in restricted band measurement, it was found that the Class A digital devices from the EUT emits a considerable amount of RF noise between 30 MHz to 1 GHz. These radiated frequencies were identified (with the transmitter turned off) and were excluded from compliance considerations.

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Results

The EUT passed. Low, middle and high bands were measured. The worst case is presented as a graph for the spectrum. The -20 dBc requirement is shown for the lower band edge at 2.4 GHz in the low band and also for the higher band edge at 2.4835 GHz in the high band.

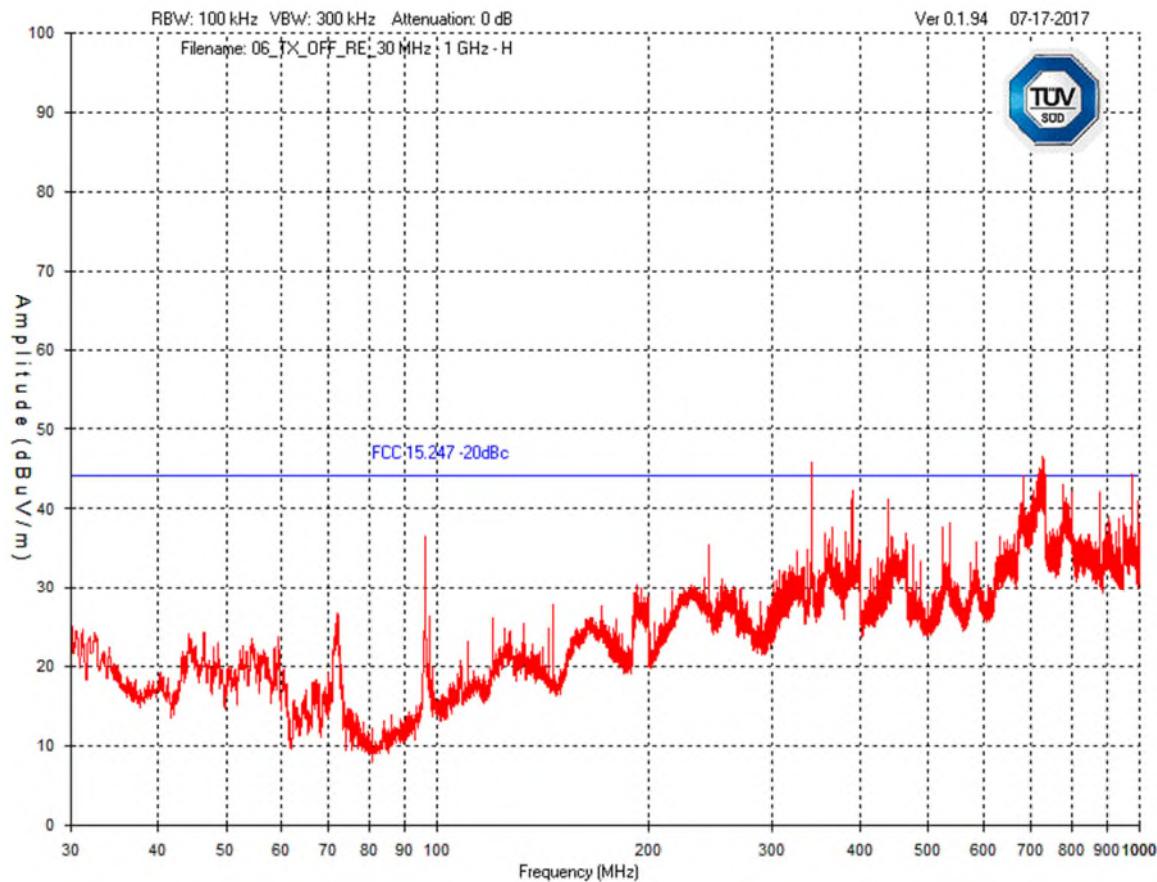
### Pre-Scan for Digital Device Emission



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



Horizontal Peak Emission  
30 MHz – 1 GHz

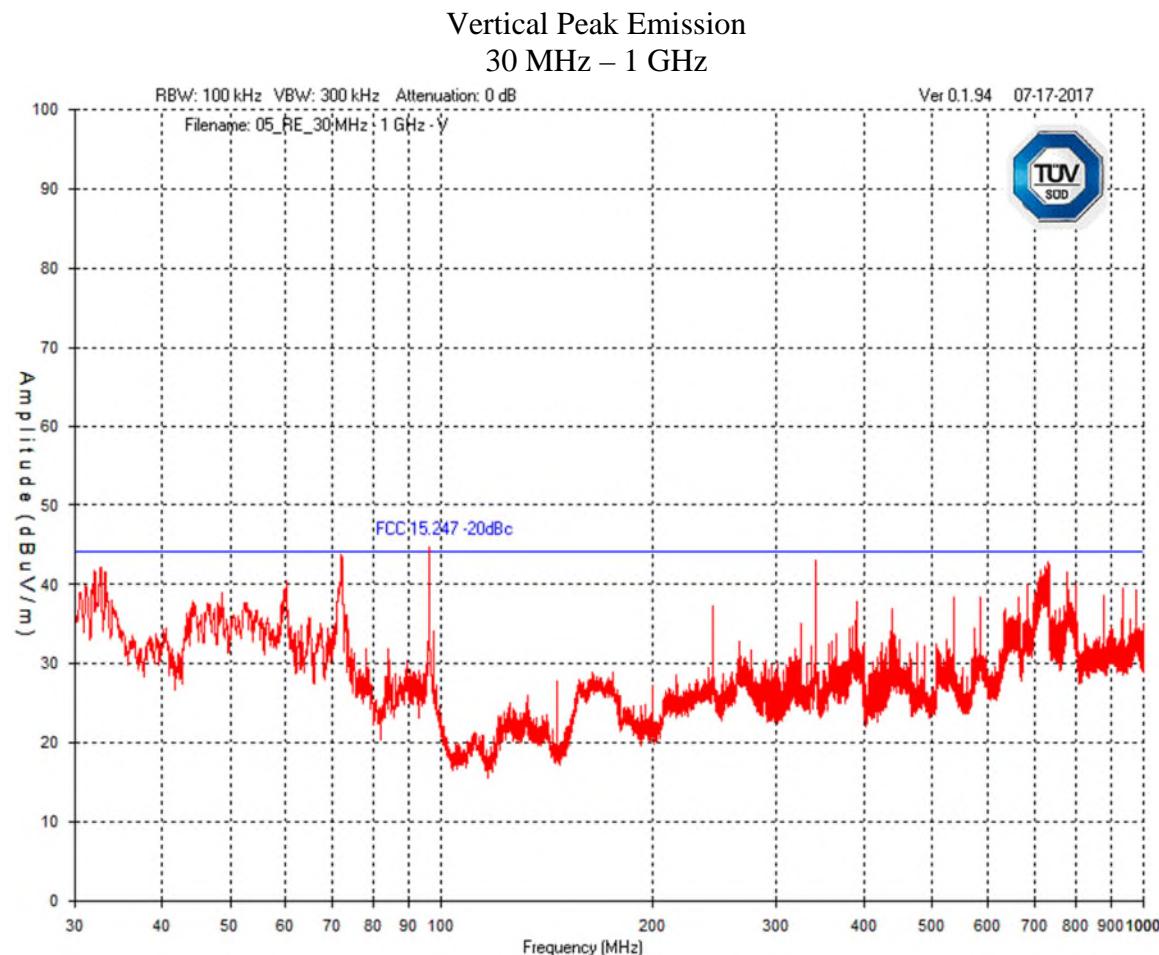


Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



## Graphs

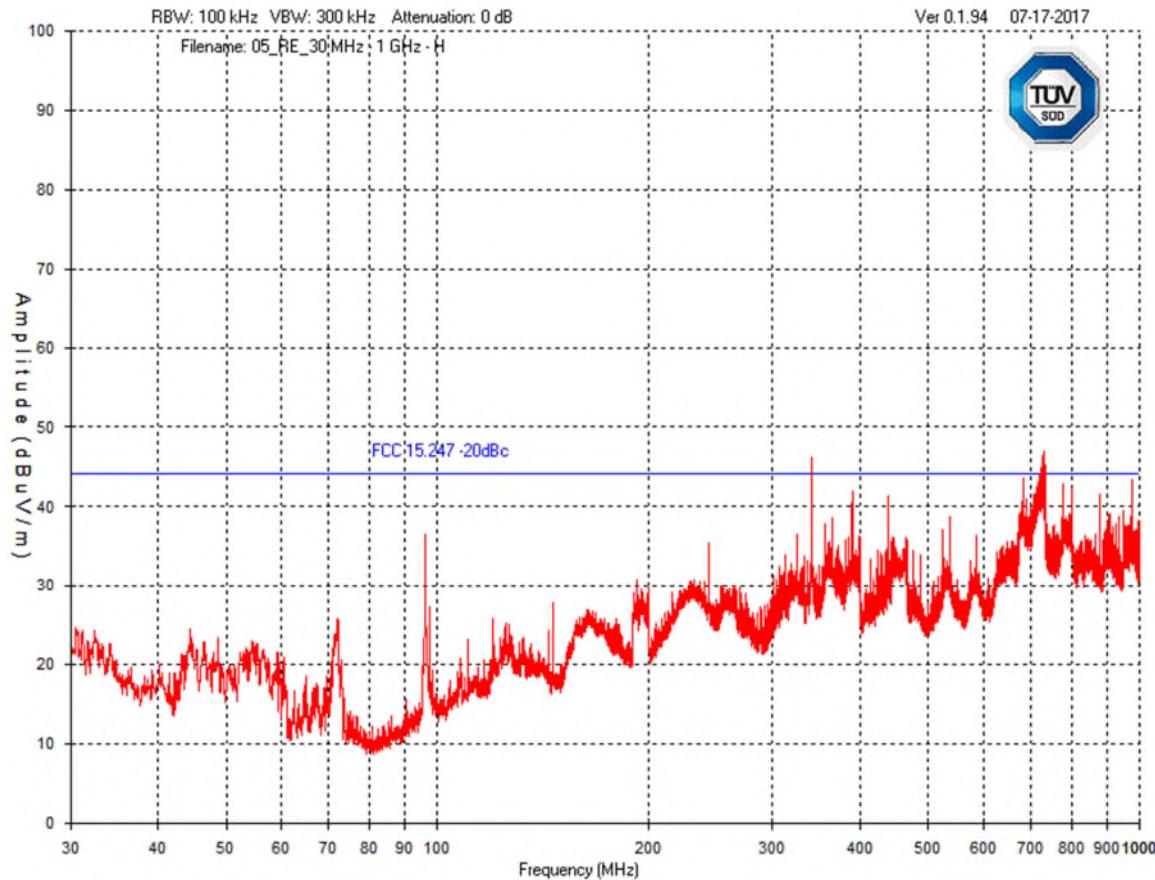
The graphs shown below show the peak power output of the device during the antenna conducted measurement during transmit operation of the EUT.



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



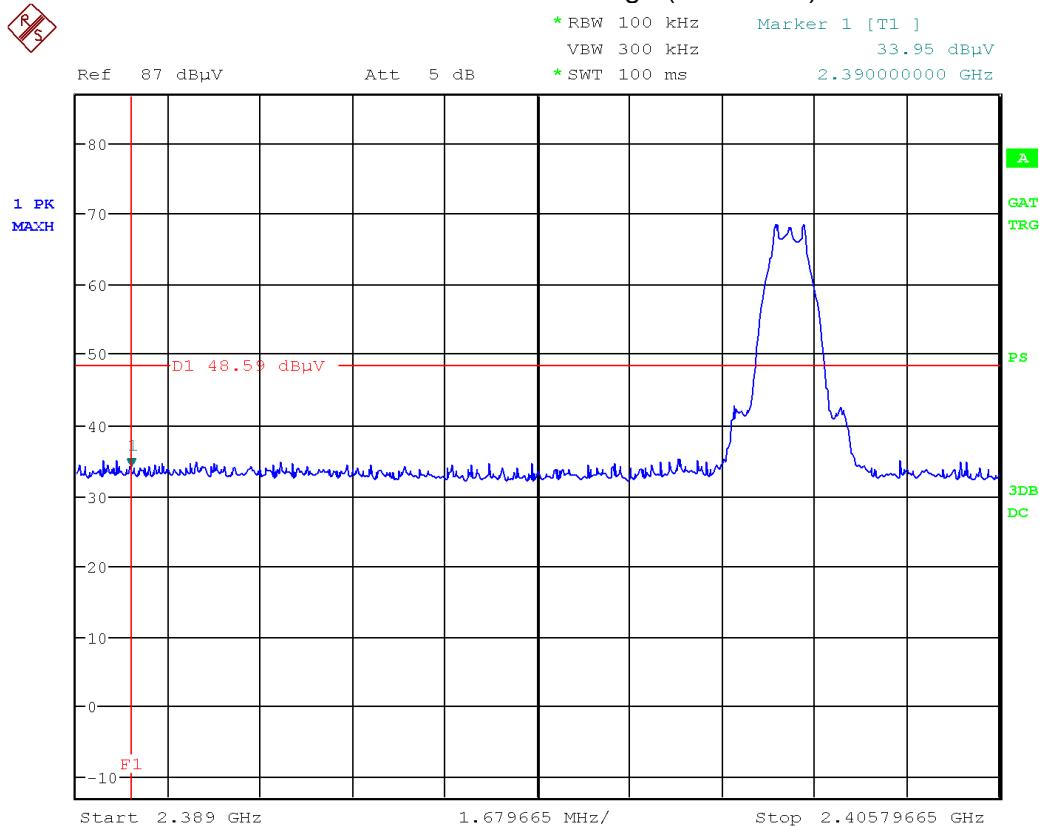
Horizontal Peak Emission  
30 MHz – 1 GHz



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### 2400 MHz Band Edge (Channel 0)

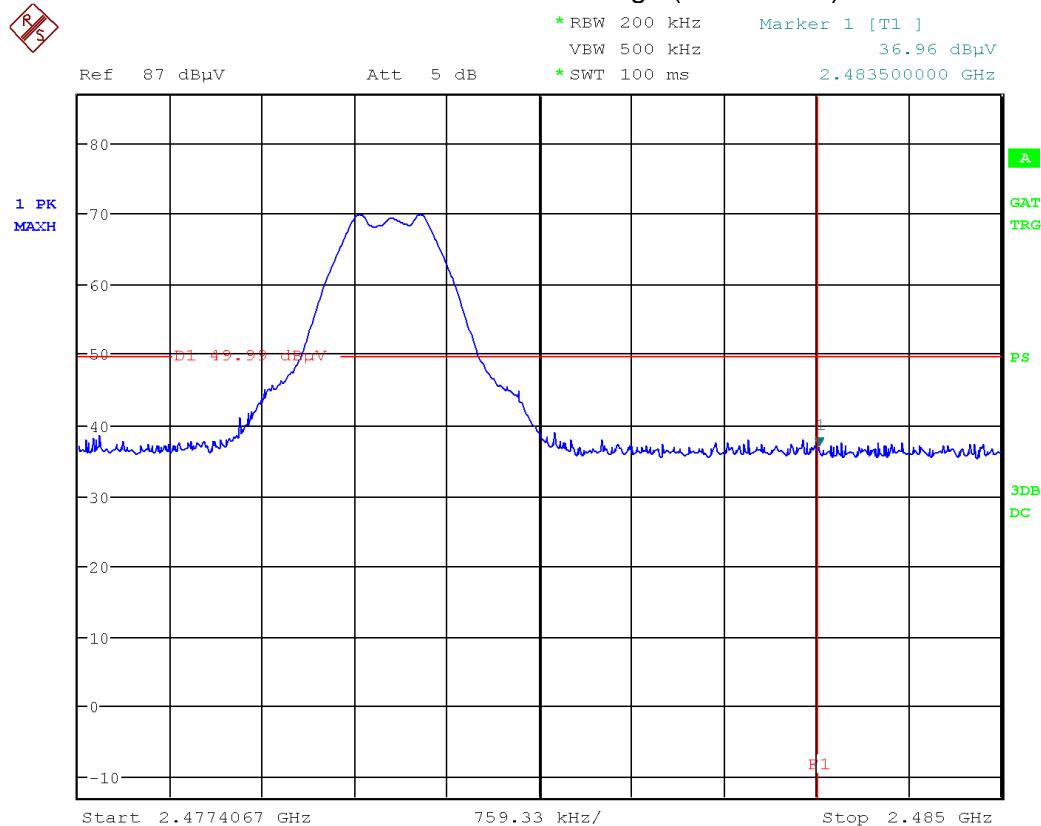


Date: 5.JUN.2017 16:47:38

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		

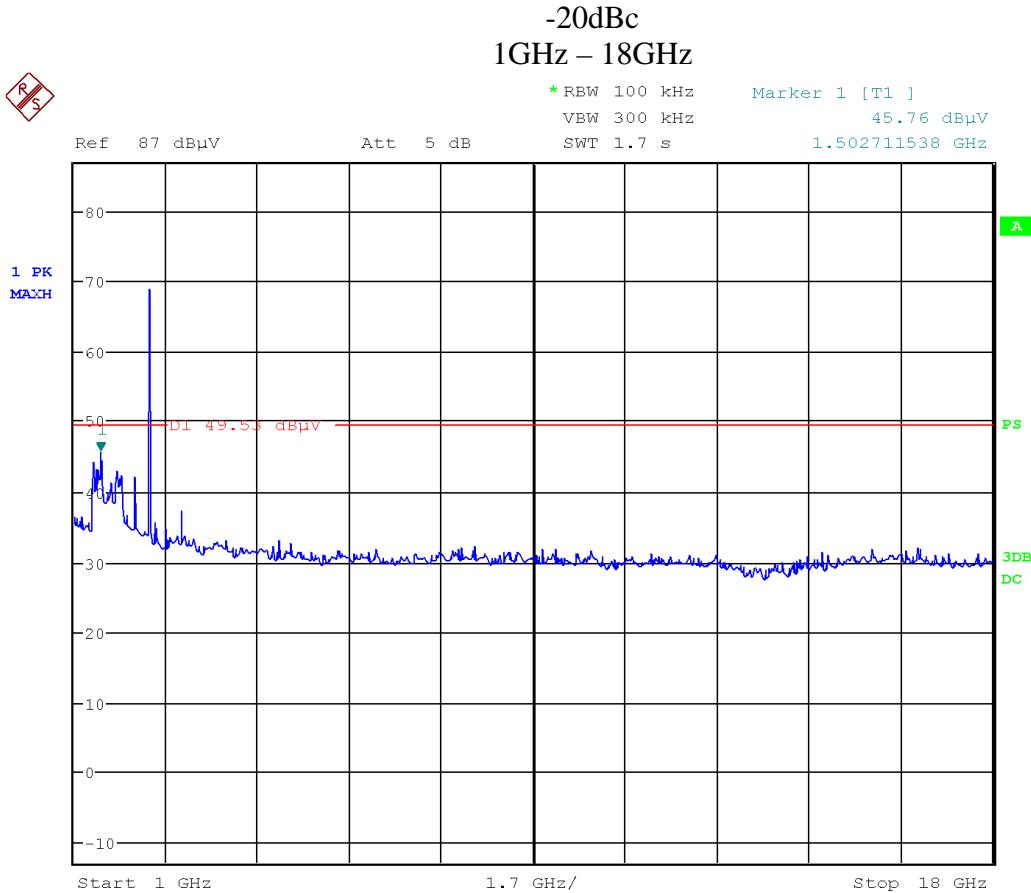


### 2483.5 MHz Band Edge (Channel 39)



Date: 5.JUN.2017 16:42:39

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



Date: 5.JUN.2017 17:34:51

Note: Emission above 18 GHz were all noise floor.

See 'Appendix B – EUT and Test Setup Photos' for photos showing the test set-up.

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Feb. 12, 2016	Feb. 12, 2018	GEMC 6375
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct. 12, 2016	Oct. 12, 2018	GEMC 6351
Horn Antenna 18 – 26.5 GHz	SAS-572	A.H. Systems	Oct. 11, 2016	Oct. 11, 2018	GEMC 6371
Pre-Amp 9 kHz – 1 GHz	CPA9231A	Chase	Oct. 12, 2016	Oct. 12, 2018	GEMC 6403
Loop Antenna	EM 6871	Electro-Metrics	Feb. 13, 2017	Feb. 13, 2019	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb. 13, 2017	Feb. 13, 2019	GEMC 71
BiLog Antenna	3142-C	ETS	Feb. 22, 2017	Feb. 22, 2019	GEMC 137
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272
Emissions Software	0.1.94	Global EMC	NCR	NCR	GEMC 58

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Power Line Conducted Emissions

### Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT's power line does not exceed the limits listed below as defined in the applicable test standard, as measured from a LISN. This helps protect lower frequency radio services such as AM radio, shortwave radio, amateur radio operators, maritime radio, CB radio, and so on, from unwanted interference.

### Limits and Method

The limits are as defined in 47 CFR FCC Part 15 Section 15.207

Method is as defined in ANSI C63.4

Average Limits		Quasi-Peak Limits	
150 kHz – 500 kHz	56 to 46* dB $\mu$ V	150 kHz – 500 kHz	66 to 56* dB $\mu$ V
500 kHz – 5 MHz	46 dB $\mu$ V	500 kHz – 5 MHz	56 dB $\mu$ V
5 MHz – 30 MHz	50 dB $\mu$ V	5 MHz – 30 MHz	60 dB $\mu$ V

\* Decreases linearly with the logarithm of the frequency

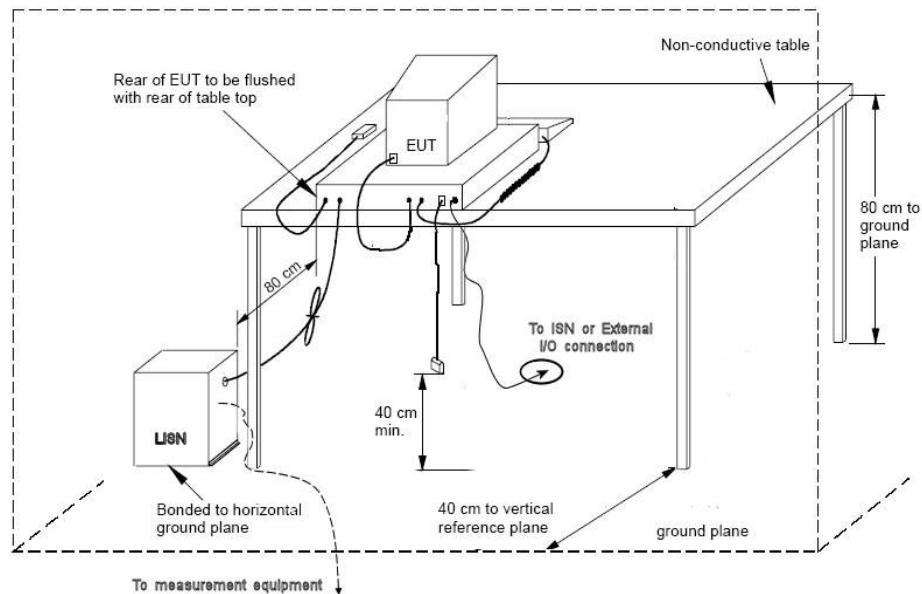
Both Quasi-Peak and Average limits are applicable and each is specified as being measured with a resolution bandwidth of 9 kHz. For Quasi-Peak, a video bandwidth at least three times greater than the resolution bandwidth is used.

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

Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



### Typical Setup Diagram



### Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is  $\pm 2.91\text{dB}$  with a 'k=2' coverage factor and a 95% confidence level.

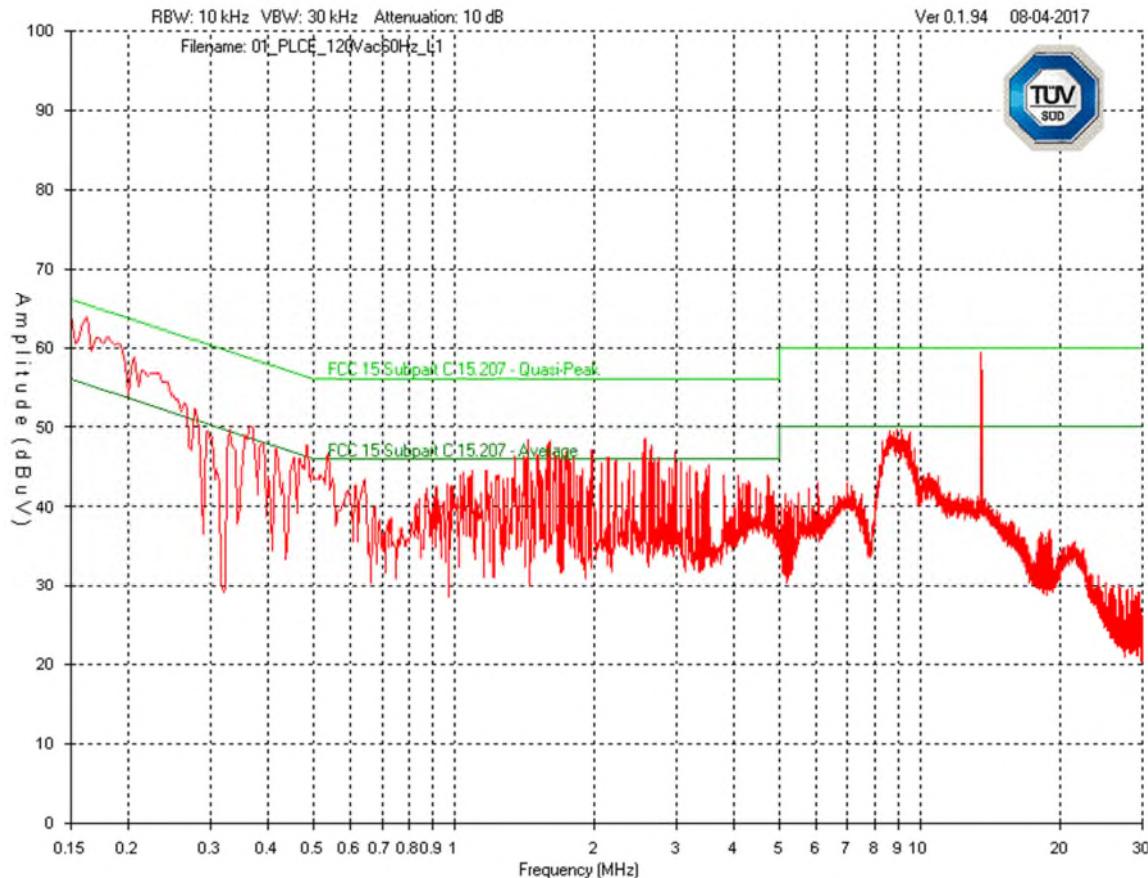
### Preliminary Graphs

The graphs shown below are maximized peak measurement graphs measured with a resolution bandwidth greater than or equal to the final required detector. 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.

Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



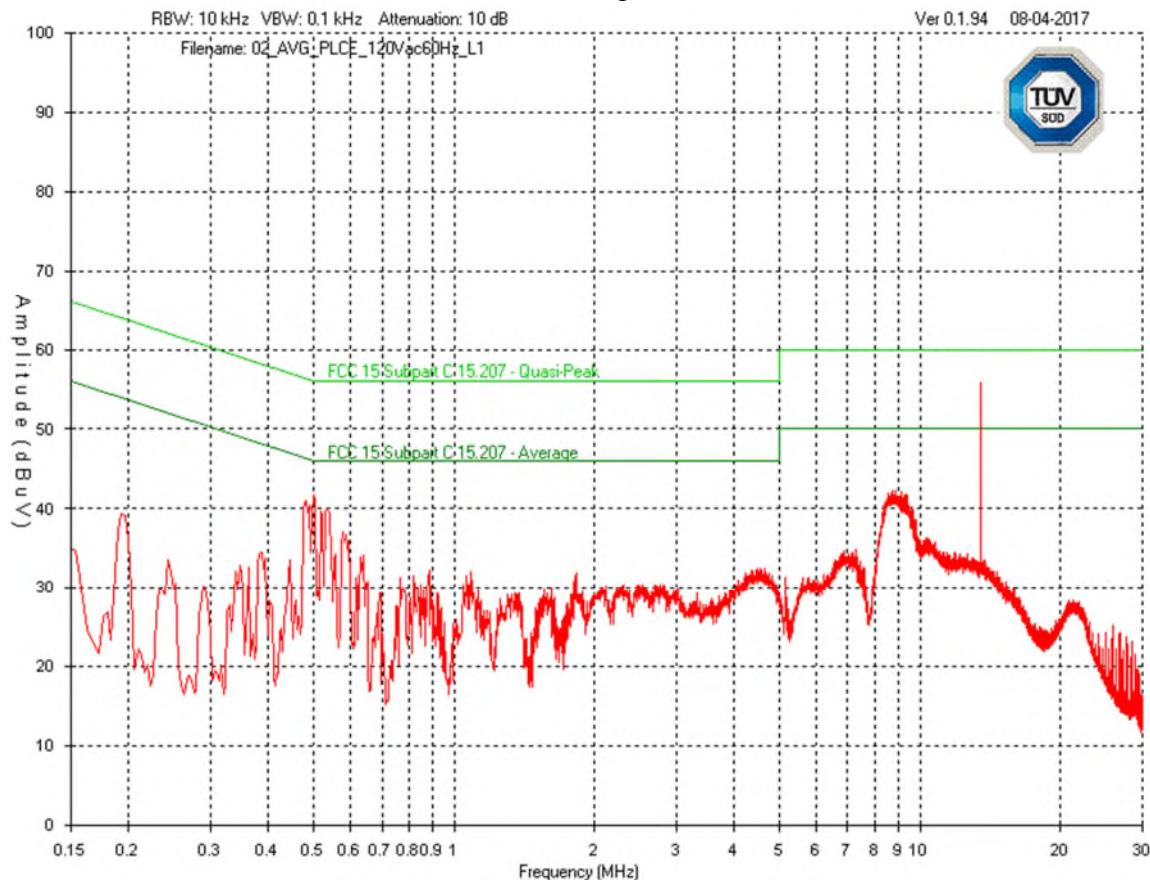
Line 1 (L1) – 120Vac 60Hz  
Peak



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



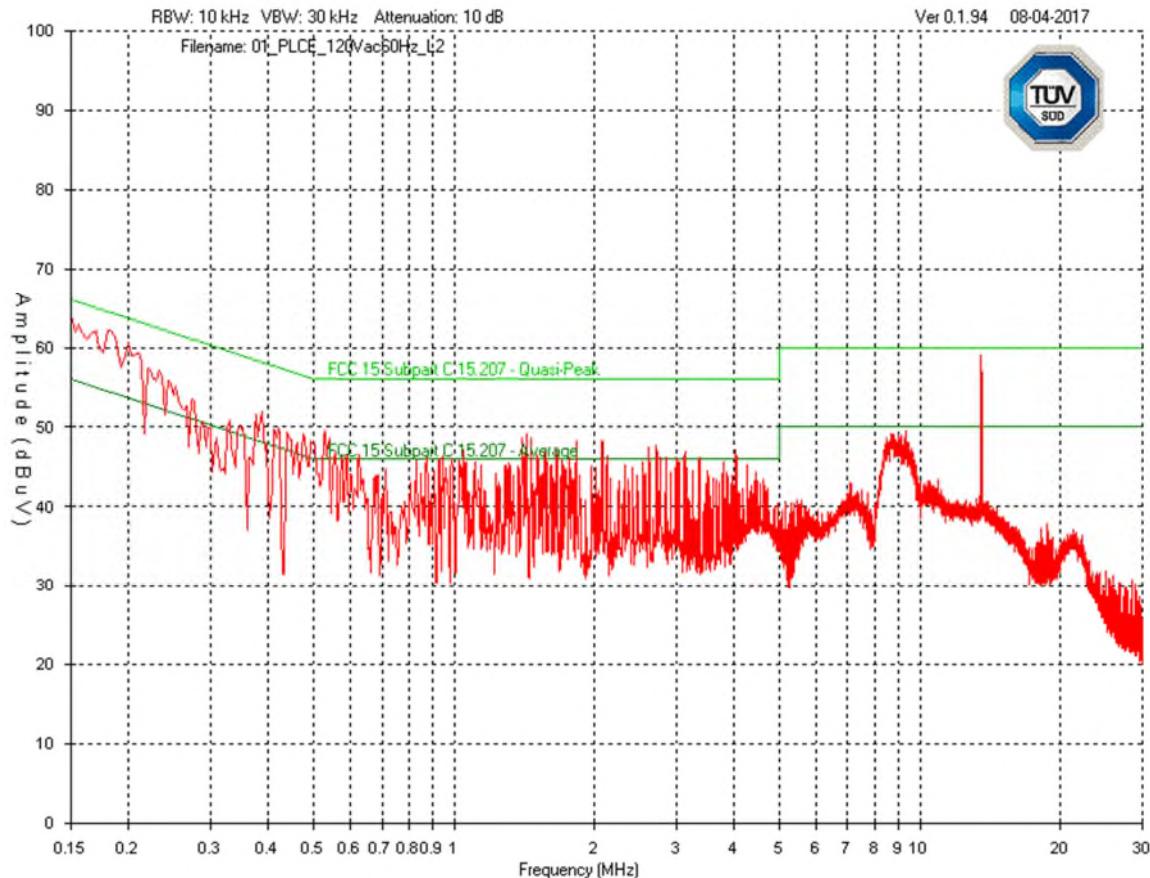
Line 1 (L1) – 120Vac 60Hz  
Average



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



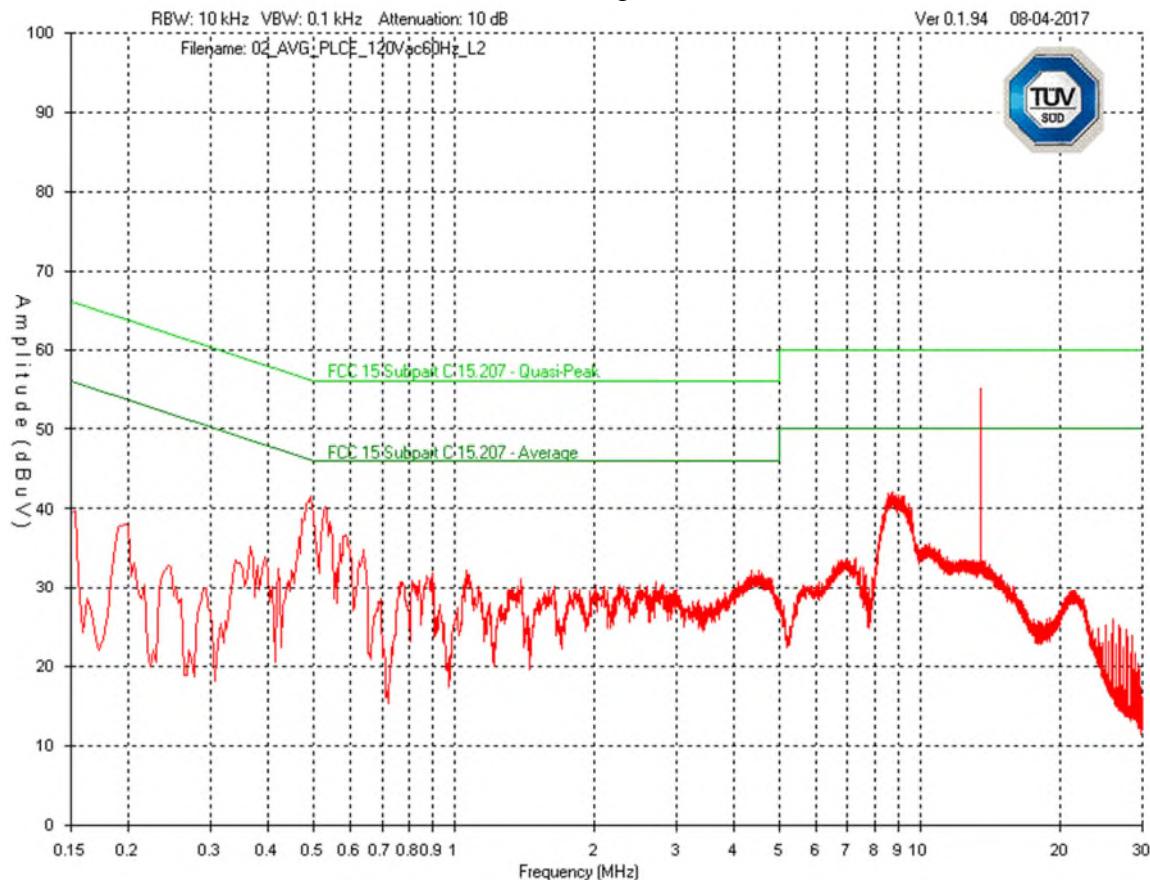
Line 2 (L2) – 120Vac 60Hz  
Peak



Client	Nuance Communication Inc.
Product	EDGE-MMUL
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



Line 2 (L2) – 120Vac 60Hz  
Average



Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## Final Measurements

Supply		120 Vac 60 Hz					
Line Emission Table							
Frequency (MHz)	Detector	Raw (dBuV)	Factors (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Pass/Fail
13.5596	PEAK	49.1	10.2	59.3	60.0	0.7	Pass
0.1633	PEAK	53.5	10.2	63.7	65.3	1.6	Pass
2.5727	PEAK	38.4	10.2	48.6	56.0	7.4	Pass
1.4428	PEAK	38.1	10.2	48.3	56.0	7.7	Pass
1.6056	PEAK	38.0	10.2	48.2	56.0	7.8	Pass
2.6491	PEAK	37.5	10.2	47.7	56.0	8.3	Pass
13.5529	AVG	29.4	10.2	39.6	50.0	10.4	Pass
0.499	AVG	31.6	10.2	41.8	46.0	4.2	Pass
0.4823	AVG	30.8	10.2	41.0	46.3	5.3	Pass
0.5322	AVG	29.9	10.2	40.1	46.0	5.9	Pass
0.5189	AVG	29.6	10.2	39.8	46.0	6.2	Pass
Neutral Emission Table							
13.5596	PEAK	48.8	10.2	59.0	60.0	1.0	Pass
0.1567	PEAK	52.7	10.2	62.9	65.6	2.7	Pass
0.2198	PEAK	47.1	10.1	57.2	62.8	5.6	Pass
0.386	PEAK	41.8	10.2	52.0	58.1	6.1	Pass
0.5289	PEAK	39.4	10.2	49.6	56.0	6.4	Pass
1.4295	PEAK	38.9	10.2	49.1	56.0	6.9	Pass
13.5529	AVG	27.1	10.2	37.3	50.0	12.7	Pass
0.4923	AVG	31.3	10.2	41.5	46.1	4.6	Pass
0.5289	AVG	30.0	10.2	40.2	46.0	5.8	Pass
8.7707	AVG	32.0	10.2	42.2	50.0	7.8	Pass
0.5854	AVG	26.5	10.2	36.7	46.0	9.3	Pass
0.6385	AVG	24.6	10.2	34.8	46.0	11.2	Pass

Note:

Peak = Peak measurement

AVG = Average measurement

QP = Quasi-Peak measurement

Client	Nuance Communication Inc.		
Product	EDGE-MMUL		
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015		



Average emission at 13.56 MHz was measured with a CISPR Average detector and emissions at other frequencies were measured with reduced VBW.

See 'Appendix B – EUT, Peripherals and Test Setup Photos' for photos showing the test set-up for the highest line conducted emission

## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESL 6	Rohde & Schwarz	Nov. 25, 2015	Nov. 25, 2017	GEMC 160
100A LISN	FCC-LISN-50-100-1-02-MS461F	FCC	Feb 5, 2016	Feb 5, 2018	GEMC 121
100A LISN	FCC-LISN-50-100-1-02-MS461F	FCC	Feb 5, 2016	Feb 5, 2018	GEMC 122
RF Cable 3m	LMR-400-3M-50Ω-MN-MN	LexTec	Feb 20, 2017	Feb 20, 2018	GEMC 276
Attenuator 10 dB	612-10-1	Meca Electronics, Inc	Feb 20, 2017	Feb 20, 2018	GEMC 223
Emissions Software	0.1.94	Global EMC	NCR	NCR	GEMC 58

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Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015

  
Canada

## Appendix A – EUT Summary

Client	Nuance Communication Inc.	 Canada
Product	EDGE-MMUL	
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015	

## General EUT Description

Client Details	
Organization / Address	460 Philip Street Waterloo, ON, N2L5J2
Contact	Dan Hooper
Phone	519-880-7441
Email	daniel.hooper@nuance.com
EUT (Equipment Under Test) Details	
EUT Name (for report title)	Nuance Edge for Copitrak
EUT Model / SN (if known)	EDGE, EDGE-MMUL
Equipment category	ITE/Radio
EUT is powered using	<a href="#">Click here...</a>
Input voltage range(s) (V)	100-240
Frequency range(s) (Hz)	50/60Hz
Rated input current (A)	1.7A
Nominal power consumption (W)	60W
Number of power supplies in EUT	1
Transmits RF energy? (describe)	Yes 125kHz and 13.56MHz for RFID applications 2.4 GHz Bluetooth Low Energy
Basic EUT functionality description	Print management and an accounting device to be used in conjunction with a multifunction printer.
Frequency of all clocks present in EUT	1.6GHz, 100MHz, 48MHz, 25MHz, 20MHz, 14.318MHz 12MHz, 6Mhz, 65kHz
Available connectors on EUT	5 USB, 2 Ethernet, 2 Display port Custom USB/
Method of monitoring EUT and description of failure for immunity.	Onscreen burn-in suite software, with cmd window pinging <a href="http://www.nuance.com">www.nuance.com</a> , external jig for copy interface.

Note: The EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see 'Appendix B – EUT and Test Setup Photos'.

Client	<b>Nuance Communication Inc.</b>
Product	<b>EDGE-MMUL</b>
Standard(s)	RSS-247 Issue 2:2017 FCC Part 15 Subpart 15.247:2015



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## **Appendix B – EUT and Test Setup Photos**

Refer to Test Setup exhibit for EUT and Test Setup photos.