



## **Certification Test Report**

**FCC ID: YKD-25STW4100-029**

**FCC Rule Part: 15.247**

**Report Number: BO72126853.101**

**Applicant: L-3 Communications CyTerra Corporation**

**Model(s): HF-A11-SMT-0**

**Test Begin Date: April 26, 2017**

**Test End Date: August 21, 2017**

**Report Issue Date: October 5, 2017**



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ANAB, ANSI, or any agency of the Federal Government.

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**This report contains 32 pages**

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## 1 GENERAL

### 1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations.

### 1.2 Applicant Information

L-3 Communications CyTerra Corporation  
7558 Southland Blvd, Suite 130  
Orlando, FL 32809

### 1.3 Product Description

The EUT is a WLAN transceiver module configured to operate in the IEEE 802.11g mode. The module was evaluated when integrated within the Range-R 2D Link host device.

#### Technical Details

Mode of Operation:	WLAN IEEE 802.11g
Frequency Range:	2412MHz - 2462 MHz
Number of Channels:	11
Channel Separation:	5 MHz
Modulations:	OFDM
Data Rates:	6, 9, 12, 18, 24, 36, 48, 54 Mbps
Antenna Type/Gain:	Flexible PCB Antenna/4 dBi
Input Power:	12 VDC Battery/Power Supply from host device

Model Number: HF-A11-SMT-0

Test Sample Serial Number(s): N/A

Test Sample Condition: The unit was in good physical condition with no visible damages.

### 1.4 Test Methodology and Considerations

The EUT was operating at 100% duty cycle using the 14 dBm output power configuration on the configuration software tool.

The RF conducted measurements were performed on the module set on an evaluation board. A limited evaluation was performed on all the data rates to determine the worst-case configuration. The 6 Mbps data rate led to the highest output power and was used for all the remaining measurements.

The EUT was installed within the Range-R 2D Link (FCC ID: YKD-25STW4100-019) for radiated and power line conducted emissions measurements. The host was set in the orientation of typical use.

For radiated emissions, preliminary measurements were performed for the host device powered using internal battery and with the external power supply. No significant differences were observed between the two configurations. The final measurements are reported for the EUT powered with the external power supply. The device was also evaluated for radiated intermodulation products of the stepped-frequency radar transmitting simultaneously with the WLAN transceiver. All intermodulation products were found to be in compliance with the general radiated limits of FCC 15.209.

The device was also evaluated for unintentional emissions while installed within the Range-R2D Link host device. For the system to meet the requirements, TDK ZCAT1730-0730 ferrites were used on the host power supply cable. The results and ferrite configurations are documented in a verification test report.

## 2 TEST FACILITIES

### 2.1 Location

The radiated and conducted emissions test sites are located at the following address:

TÜV SÜD America, Inc.  
3998 FAU Blvd, Suite 310  
Boca Raton, Florida 33431  
Phone: (561) 961-5585  
Fax: (561) 961-5587  
<http://www.tuv-sud-america.com>

### 2.2 Laboratory Accreditations/Recognitions/Certifications

TÜV SÜD AMERICA, INC. is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ANAB program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

FCC Test Firm Registration #: 475089  
Innovation, Science and Economic Development Canada Lab Code: 4175C

**2.3 Radiated & Conducted Emissions Test Site Description**

**2.3.1 Semi-Anechoic Chamber Test Site**

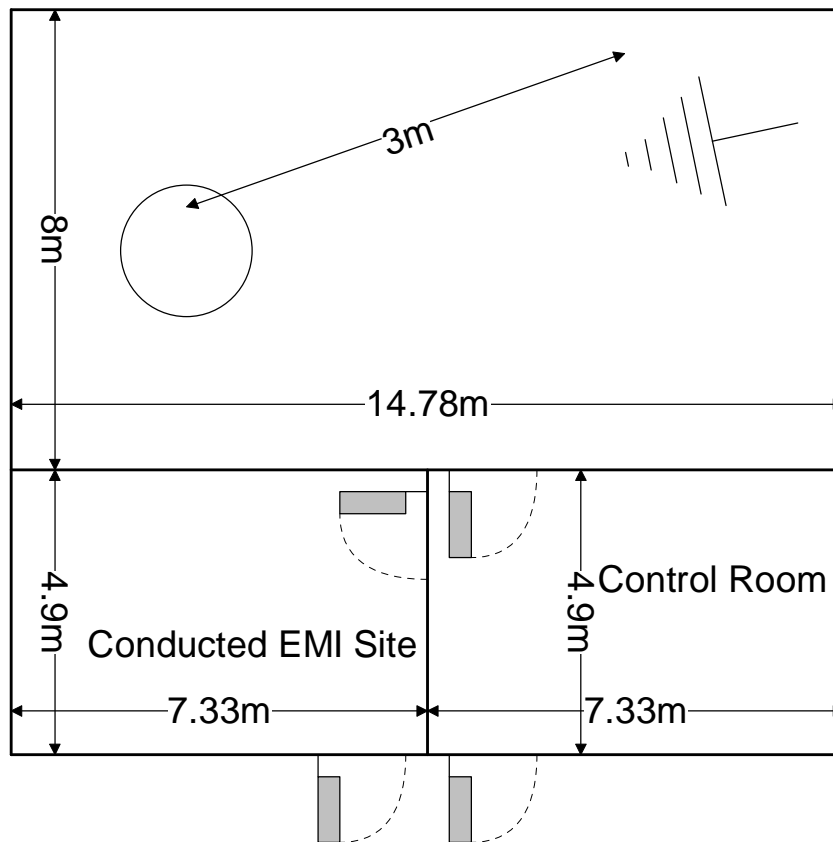
The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl flooring.

The turntable is driven by pneumatic motor, which can support a 2000 lb. load. The turntable is flush with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1060 Multi-device controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

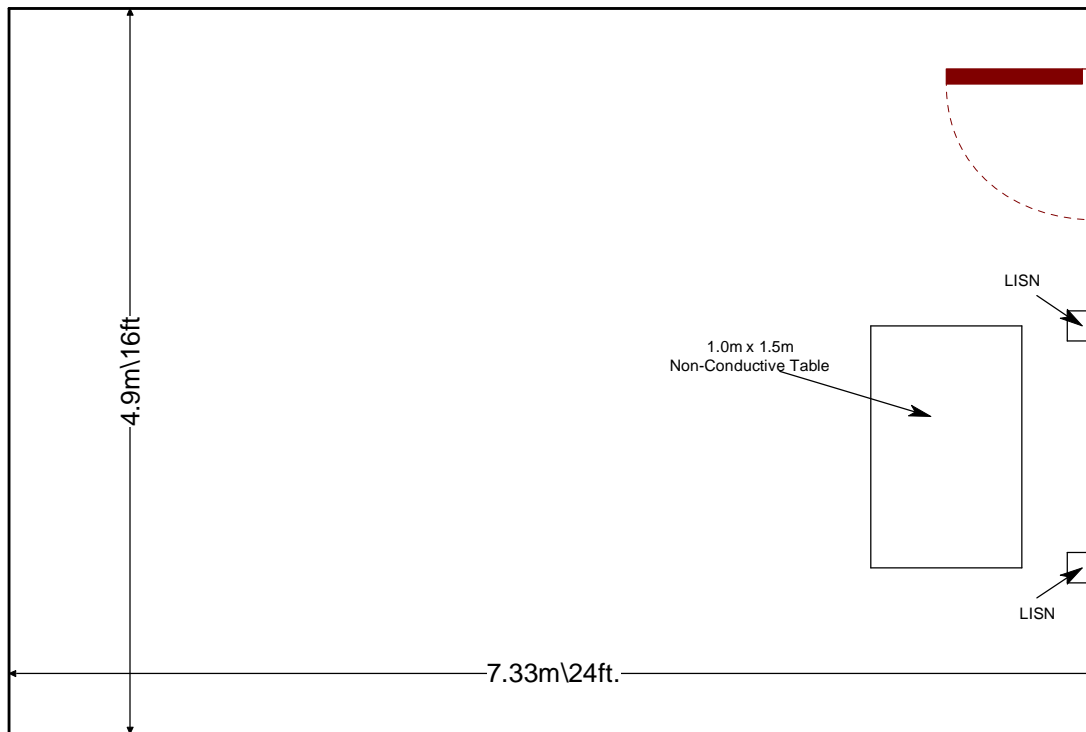


**Figure 2.3.1-1: Semi-Anechoic Chamber Test Site**

**2.3.2 Conducted Emissions Test Site Description**

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m<sup>3</sup>. The power line conducted emission site includes two LISNs: a Solar Model 8028-50 50 Ω/50 μH and an EMCO Model 3825/2R, which are installed as shown in the figure below. For evaluations requiring 230 V, 50 Hz AC input, a Polarad LISN (S/N 879341/048) is used in conjunction with a California Instruments signal generator Model 2001RP-OP1.

A diagram of the room is shown below in figure 2.3.2-1:



**Figure 2.3.2-1: AC Mains Conducted EMI Site**

### **3 APPLICABLE STANDARD REFERENCES**

The following standards were used:

- ❖ ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2017.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2017
- ❖ FCC KDB 558074 D01 DTS Meas Guidance v04 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, April 5, 2017.

#### 4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

**Table 4-1: Test Equipment List**

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
78	EMCO	6502	Antennas	9104-2608	5/11/2016	5/11/2018
282	Microwave Circuits	H2G020G4	Filters	74541	5/25/2016	5/25/2017
282	Microwave Circuits	H2G020G4	Filters	74541	5/23/2017	5/23/2018
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	7/21/2016	7/21/2018
523	Agilent	E7405	Spectrum Analyzers	MY45103293	12/9/2016	12/9/2018
653	Suhner	SF-102A	Cables	0944/2A	9/6/2016	9/6/2017
2002	EMCO	3108	Antennas	2147	11/19/2015	11/19/2017
2004	EMCO	3146	Antennas	1385	11/19/2015	11/19/2017
2006	EMCO	3115	Antennas	2573	4/7/2017	4/7/2019
2008	COM-Power	AH-826	Antennas	81009	NCR	NCR
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	11/2/2016	11/2/2017
2022	EMCO	LISN3825/2R	LISN	1095	9/14/2015	9/14/2017
2045	ACS Boca	Conducted Cable Set	Cable Set	2045	10/31/2016	10/31/2017
2082	Teledyne Storm Products	90-010-048	Cables	2082	4/7/2017	4/7/2018
2086	Merrimac	FAN-6-10K	Attenuators	23148-83-1	11/2/2016	11/2/2017
2089	Agilent Technologies, Inc.	83017A	Amplifiers	3123A00214	12/2/2016	12/2/2017
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR
2111	Aeroflex Inmet	40AH2W-20	Attenuator	2111	7/20/2016	7/20/2017
2111	Aeroflex Inmet	40AH2W-20	Attenuator	2111	7/20/2017	7/20/2018
2121	ACS Boca	Radiated Cable Set	Cable Set	2121	8/1/2016	8/1/2017
2121	ACS Boca	Radiated Cable Set	Cable Set	2121	7/31/2017	7/31/2018
3004	Teseq	CFL 9206A	Attenuators	34720	9/14/2016	9/14/2017
3008	Rohde & Schwarz	NRP2	Meter	103131	2/6/2017	2/6/2018
3009	Rohde & Schwarz	NRP-Z81	Meter	102397	2/6/2017	2/6/2018

**Note:**

**NCR=No Calibration Required**

**The assets calibration information is provided to cover the entire test period.**



## 5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment Description

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	L-3 Communications CyTerra Corporation	HF-A11-SMT-0	N/A
2	Host	L-3 Communications CyTerra Corporation	Range-R 2D Link	5
3	Ferrite	TDK	ZCAT1730-0730	N/A
4	Power Supply	Power Stream	CW1204000	N/A

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Power/Ethernet Adapter	0.07m	No	EUT to Power Supply Cable
B	Power	1.18 m	No	Power/Ethernet Adapter to Power Supply
C	Power	1.78 m	No	Power Supply to Extension Cord
D	Extension Cord	2.7 m	No	Power Cord to AC Mains

## Notes:

- The Power/Ethernet Adapter was used for programming purposes for the WLAN radio.
- The extension Cord was used for the radiated emissions evaluation only. For the power line conducted emissions evaluation, the power supply AC cable was connected directly to the LISN.

## 6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

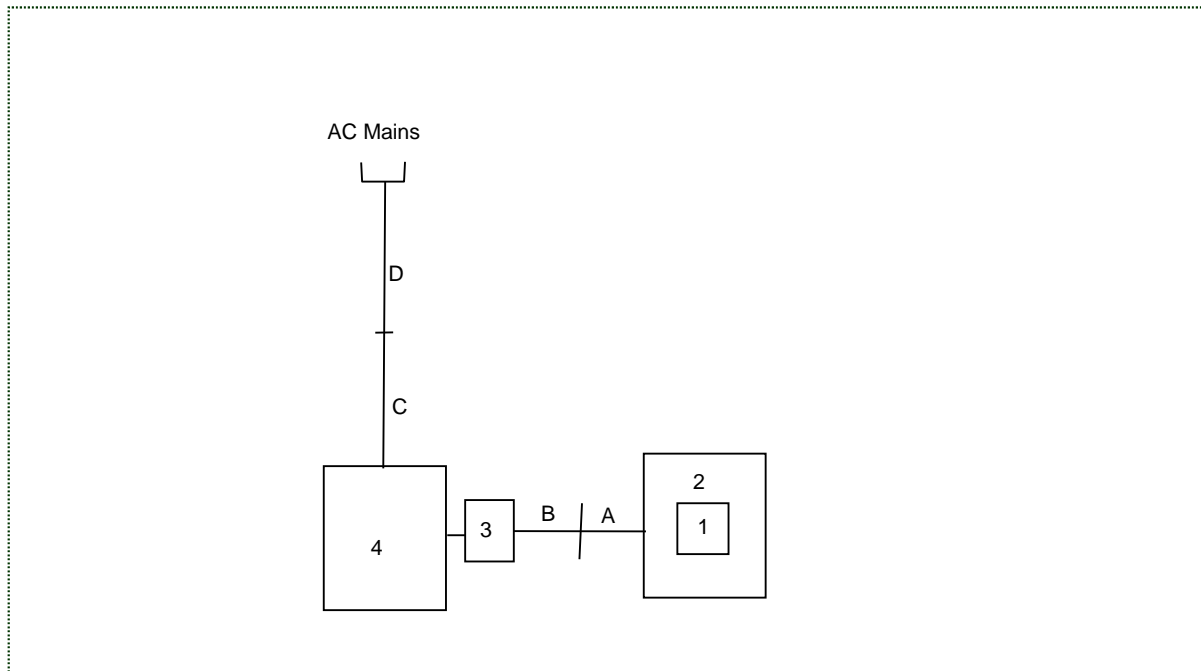


Figure 6-1: EUT Test Setup

## Notes:

- The Power/Ethernet Adapter was used for programming purposes for the WLAN radio.
- The extension Cord was used for the radiated emissions evaluation only. For the power line conducted emissions evaluation, the power supply AC cable was connected directly to the LISN.

## 7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

### 7.1 Antenna Requirement – FCC: Section 15.203

The WLAN module uses a 4 dBi Flexible PCB antenna which uses an IPEX MHF I connector (u. Fl. compatible). The device meets the requirements of FCC Section 15.203.

### 7.2 6 dB Bandwidth - FCC: Section 15.247(a)(2); 99% Bandwidth

#### 7.2.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v04 Section 8.1 Option 1. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the emissions and >> RBW. A peak detector was used for the measurements.

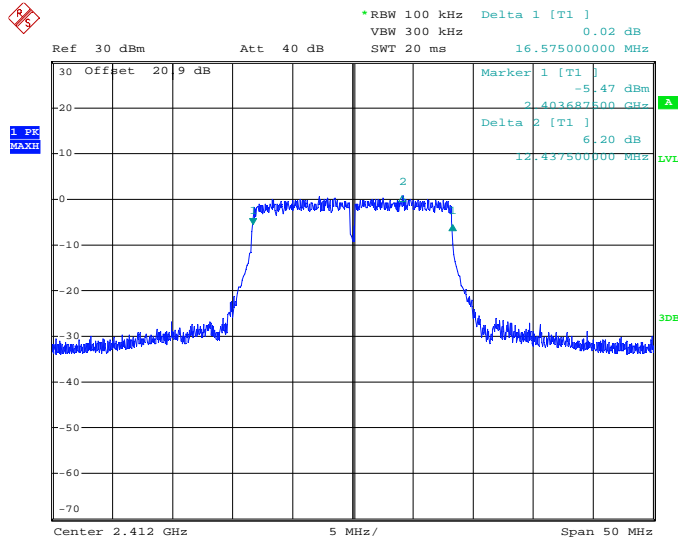
The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission. The RBW was set to 1% to 5% of the approximated bandwidth. The occupied 99% bandwidth was measured by using 99% bandwidth equipment function of the spectrum analyzer using a peak detector.

#### 7.2.2 Measurement Results

Performed by: Thierry Jean-Charles

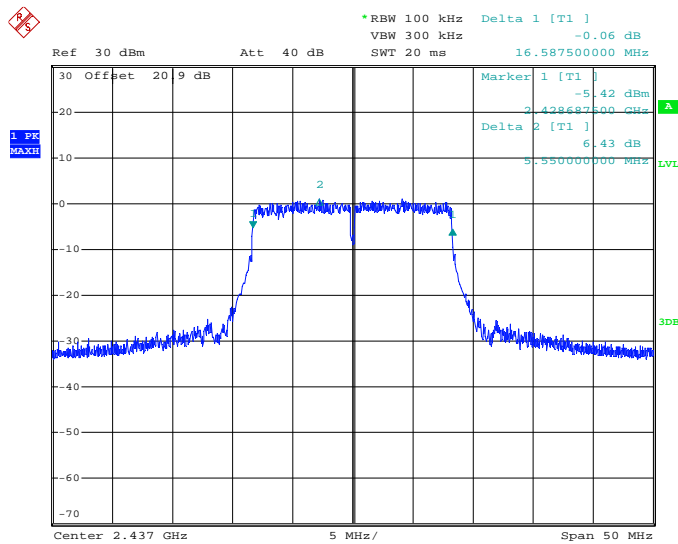
**Table 7.2.2-1: 6dB / 99% Bandwidth – 802.11g**

Frequency [MHz]	6dB Bandwidth [MHz]	99% Bandwidth [MHz]
2412	16.5750	17.2000
2437	16.5875	17.2000
2462	16.5875	17.1000



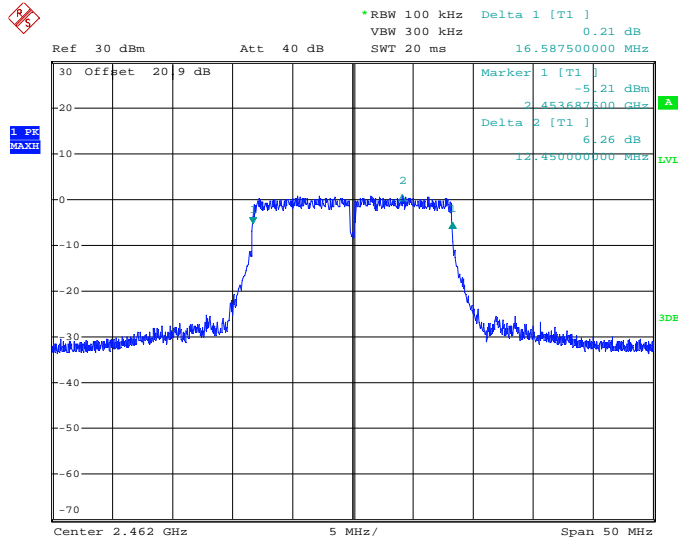
Date: 8.AUG.2017 17:51:12

Figure 7.2.2-1: 6dB BW - Low Channel – 802.11g



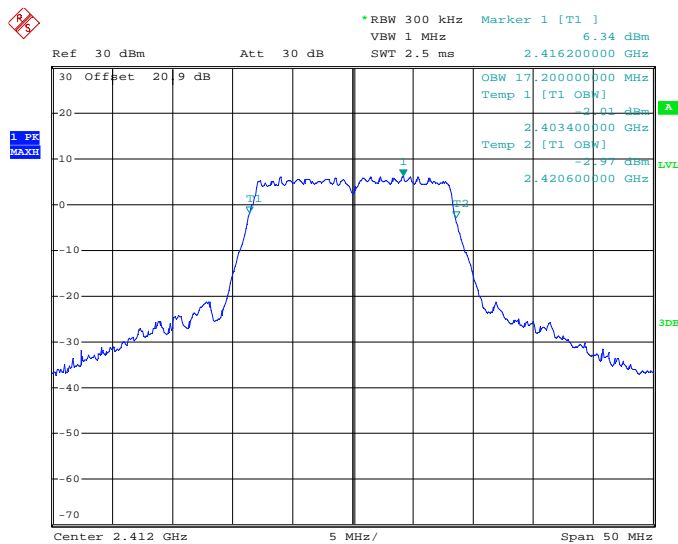
Date: 8.AUG.2017 17:45:13

Figure 7.2.2-2: 6dB BW - Middle Channel – 802.11g



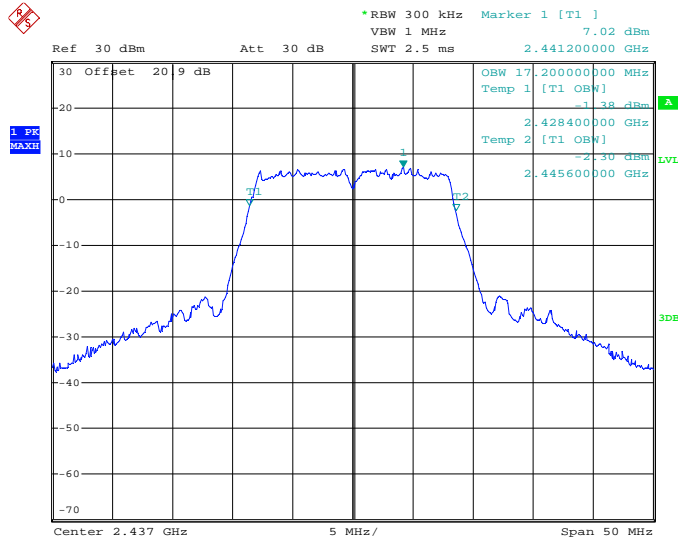
Date: 8.AUG.2017 17:38:15

Figure 7.2.2-3: 6dB BW - High Channel – 802.11g



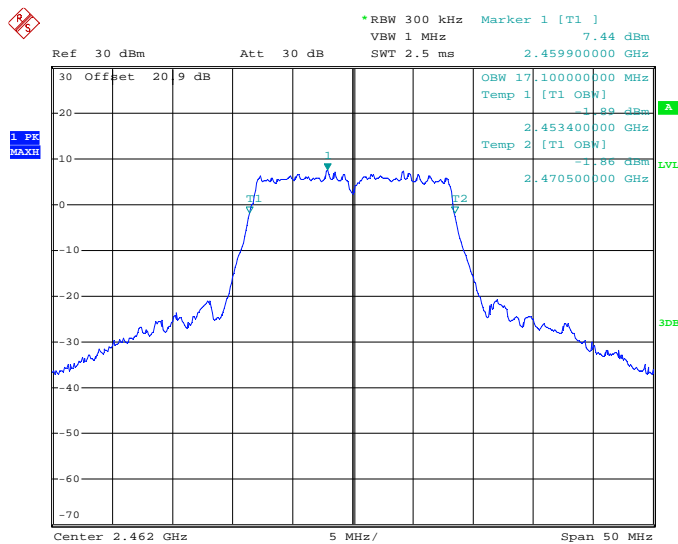
Date: 8.AUG.2017 17:25:08

Figure 7.2.2-4: 99% OBW - Low Channel – 802.11g



Date: 8.AUG.2017 16:49:36

Figure 7.2.2-5: 99% OBW - Middle Channel – 802.11g



Date: 8.AUG.2017 17:28:44

Figure 7.2.2-6: 99% OBW - High Channel – 802.11g

### 7.3 Peak Output Power – FCC: Section 15.247(b)(3)

#### 7.3.1 Measurement Procedure (Conducted Method)

The fundamental emission peak output power was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v04 Section 9.1.3 PKPM1 Peak-reading power meter method. The RF output of the equipment under test was directly connected to the input of the power meter through suitable attenuation.

The average output power measurements were performed for reference only. The fundamental average output power was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v04 Section 9.2.2.2 AVGSA-1 (trace averaging with the EUT transmitting at full power throughout each sweep) method. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer through suitable attenuation.

#### 7.3.2 Measurement Results

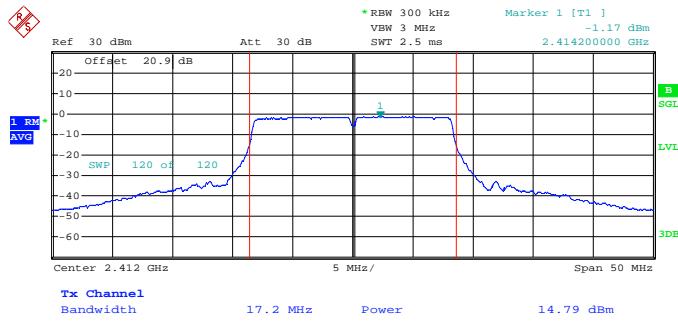
Performed by: Thierry Jean-Charles

**Table 7.3.2-1: RF Peak Output Power – 802.11g**

Frequency [MHz]	Level [dBm]
2412	24.20
2437	25.50
2462	24.77

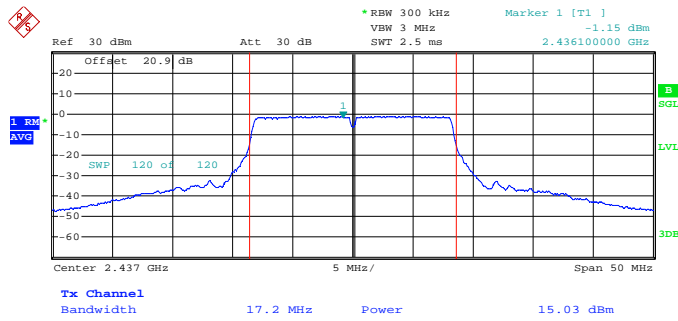
**Table 7.3.2-2: RF Average Output Power – 802.11g**

Frequency [MHz]	Level [dBm]
2412	14.79
2437	15.03
2462	15.17



Date: 8.AUG.2017 17:26:45

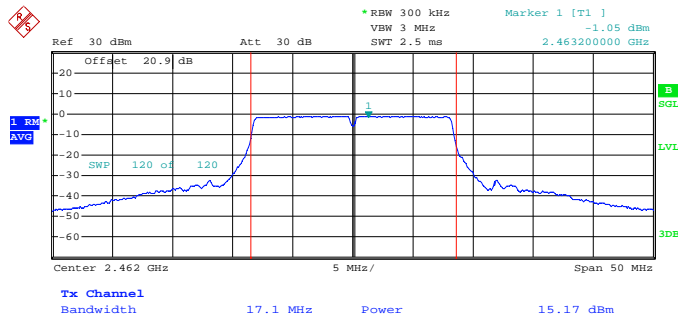
Figure 7.3.2-1: RF Average Output Power - Low Channel – 802.11g



Date: 8.AUG.2017 16:50:16

Figure 7.3.2-2: RF Average Output Power - Middle Channel – 802.11g





Date: 8.AUG.2017 17:29:49

Figure 7.3.2-3: RF Average Output Power - High Channel – 802.11g

### 7.4 Band-Edge and Spurious Emissions

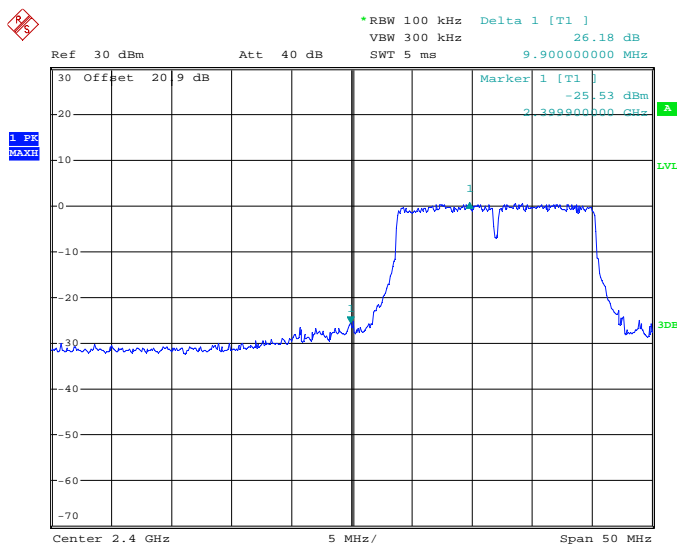
#### 7.4.1 Band-Edge Compliance of RF Conducted Emissions – FCC: Section 15.247(d)

##### 7.4.1.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer via suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement, the spectrum analyzer's RBW was set to 100 kHz, and the VBW was set to 300 kHz.

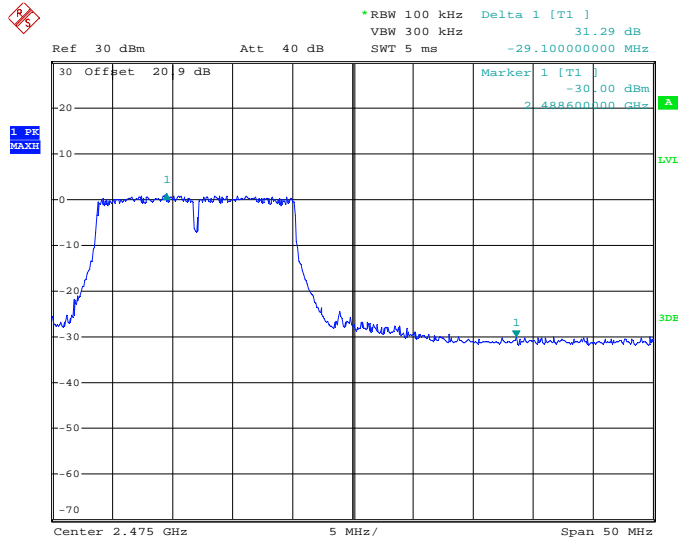
##### 7.4.1.2 Measurement Results

Performed by: Thierry Jean-Charles



Date: 21.AUG.2017 18:11:45

Figure 7.4.1.2-1: Lower Band-edge – 802.11g



Date: 21.AUG.2017 18:32:17

Figure 7.4.1.2-2: Upper Band-edge – 802.11g

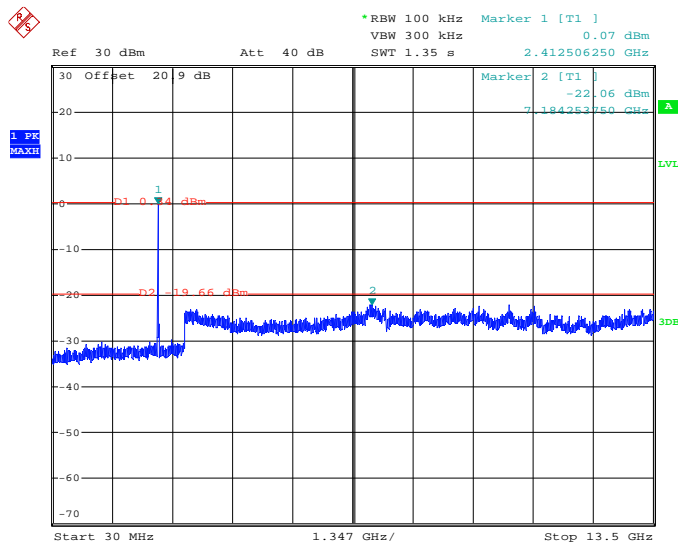
7.4.2 RF Conducted Spurious Emissions – FCC: Section 15.247(d)

7.4.2.1 Measurement Procedure

The RF Conducted Spurious Emissions were measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v04 Section 11.3 Emission level measurement. The RF output port of the equipment under test was directly connected to the input of the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30 MHz to 26 GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer’s RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak Max Hold function of the analyzer was utilized. The reference level was determined by measuring the Peak PSD level in any 100-kHz bandwidth within the DTS channel bandwidth.

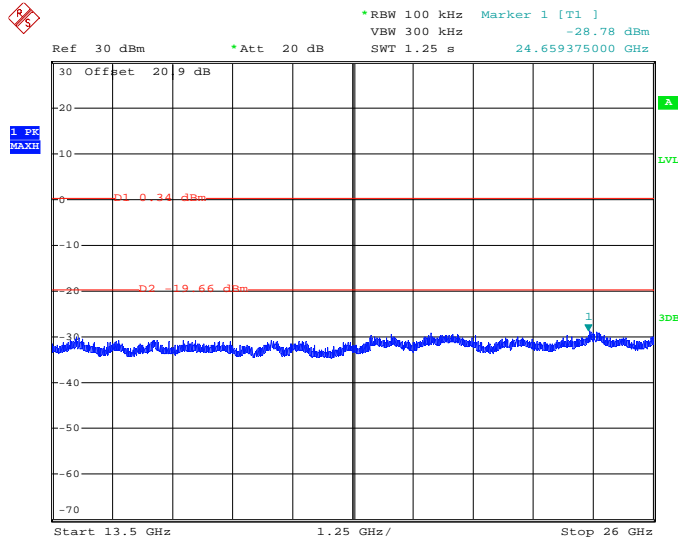
7.4.2.2 Measurement Results

Performed by: Thierry Jean-Charles



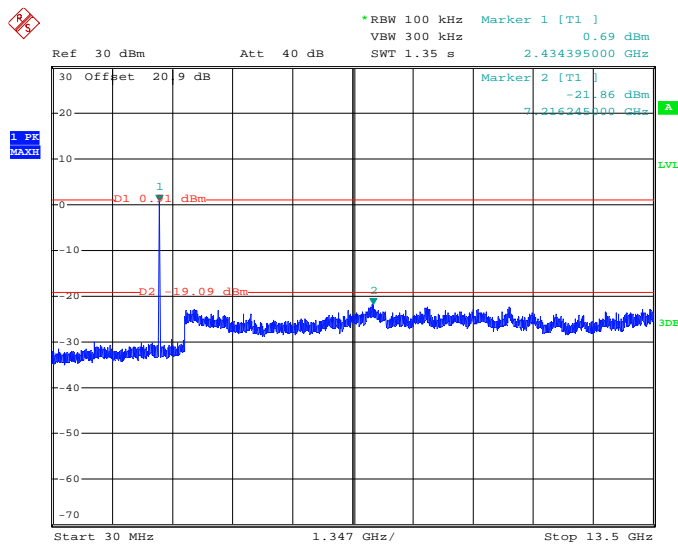
Date: 21.AUG.2017 19:02:29

Figure 7.4.2.2-1: 30 MHz – 13.5 GHz – Low Channel – 802.11g



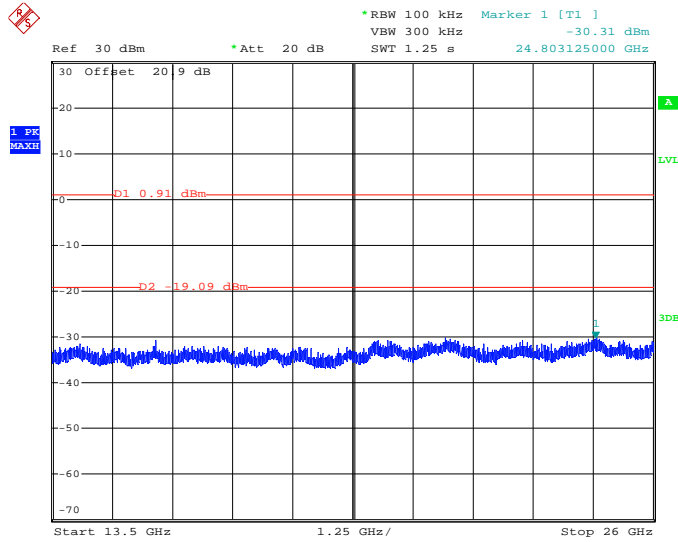
Date: 21.AUG.2017 22:32:55

Figure 7.4.2.2-2: 13.5 GHz –26 GHz – Low Channel – 802.11g



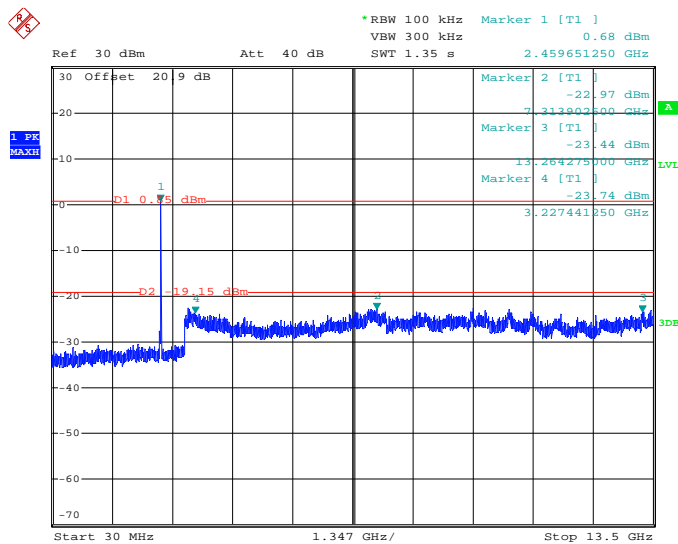
Date: 21.AUG.2017 18:55:07

Figure 7.4.2.2-3: 30 MHz – 13.5 GHz –Middle Channel – 802.11g



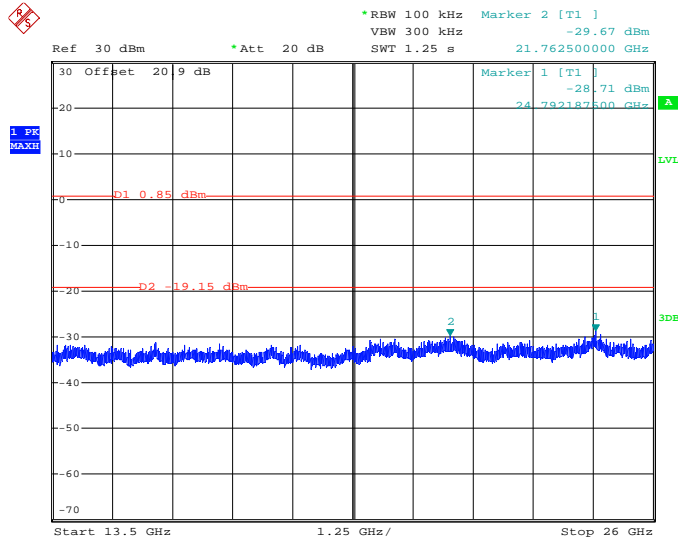
Date: 21.AUG.2017 18:47:19

Figure 7.4.2.2-4: 13.5 GHz –26 GHz – Middle Channel – 802.11g



Date: 21.AUG.2017 18:39:15

Figure 7.4.2.2-5: 30 MHz – 13.5 GHz – High Channel – 802.11g



Date: 21.AUG.2017 18:42:55

Figure 7.4.2.2-6: 13.5 GHz –26 GHz –High Channel – 802.11g

**7.4.3 Radiated Spurious Emissions into Restricted Frequency Bands – FCC: Sections 15.205, 15.209****7.4.3.1 Measurement Procedure**

Radiated emissions tests were made over the frequency range of 9 kHz to 26 GHz, 10 times the highest fundamental frequency. Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in Section 15.209.

For measurements below 30 MHz, the receive antenna height was set to 1m and the EUT was rotated through 360 degrees. The resolution bandwidth was set to 200 Hz below 150 kHz and to 9 kHz above 150 kHz.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000 MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak measurements are made with RBW of 1 MHz and VBW of 3 MHz. Average measurements are performed in the linear scale using VBW of 30 Hz.

**7.4.3.2 Measurement Results**

Performed by: Thierry Jean-Charles

Radiated band-edge and spurious emissions found in the restricted frequency bands of 9 kHz to 26 GHz are reported in the tables below.



Table 7.4.3.2-1: Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg			pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
<b>Low Channel</b>										
2390	64.57	47.98	H	-5.36	59.21	42.62	74.0	54.0	14.8	11.4
2390	66.59	49.52	V	-5.36	61.23	44.16	74.0	54.0	12.8	9.8
4824	46.47	33.10	H	3.59	50.06	36.69	74.0	54.0	23.9	17.3
4824	48.80	35.91	V	3.59	52.39	39.50	74.0	54.0	21.6	14.5
<b>Middle Channel</b>										
4874	46.10	32.68	H	3.81	49.91	36.49	74.0	54.0	24.1	17.5
4874	47.38	34.08	V	3.81	51.19	37.89	74.0	54.0	22.8	16.1
7311	46.58	31.51	H	9.24	55.82	40.75	74.0	54.0	18.2	13.2
7311	43.82	30.48	V	9.24	53.06	39.72	74.0	54.0	20.9	14.3
<b>High Channel</b>										
2483.5	59.18	45.25	H	-4.97	54.21	40.28	74.0	54.0	19.8	13.7
2483.5	58.54	44.40	V	-4.97	53.57	39.43	74.0	54.0	20.4	14.6
4924	45.29	32.14	H	4.04	49.33	36.18	74.0	54.0	24.7	17.8
4924	46.21	33.21	V	4.04	50.25	37.25	74.0	54.0	23.8	16.8
7386	44.18	31.01	H	9.36	53.54	40.37	74.0	54.0	20.5	13.6
7386	44.00	30.70	V	9.36	53.36	40.06	74.0	54.0	20.6	13.9

Note: All the emissions above 7.386 GHz were attenuated below the limits and the noise floor of the measurement equipment.

### 7.4.3.3 Sample Calculation:

$$R_c = R_u + CF_T$$

Where:

$CF_T$	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
$R_u$	=	Uncorrected Reading
$R_c$	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

#### Example Calculation: Peak

Corrected Level:  $64.57 + (-5.36) = 59.21$  dB $\mu$ V/m

Margin:  $74$  dB $\mu$ V/m –  $59.21$  dB $\mu$ V/m =  $14.8$  dB

#### Example Calculation: Average

Corrected Level:  $47.98 + (-5.36) = 42.62$  dB $\mu$ V/m

Margin:  $54$  dB $\mu$ V/m –  $42.62$  dB $\mu$ V/m =  $11.4$  dB

**7.5 Power Spectral Density – FCC: Section 15.247(e); ISED Canada: RSS-247 5.2(b)**

**7.5.1 PSD Measurement Procedure (Conducted Method)**

The power spectral density was measured in accordance with the FCC KDB 558074 D01 DTS Meas Guidance v04 Section 10.2 Method PKPSD (peak PSD). The RF output port of the EUT was directly connected to the input of the spectrum analyzer. Offset values were input for cable and external attenuation. The spectrum analyzer RBW was set to 3 kHz and VBW 10 kHz. Span was adjusted to 1.5 times the 6-dB bandwidth and the sweep time was set to auto.

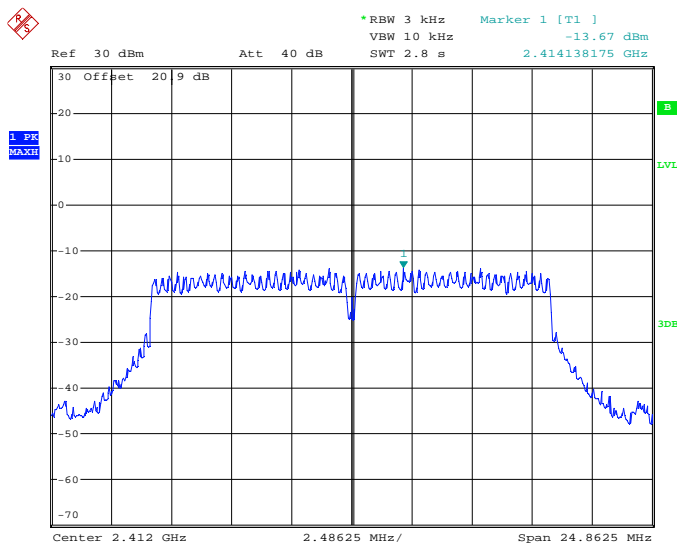
**7.5.2 Measurement Results**

Performed by: Thierry Jean-Charles

Results are shown below.

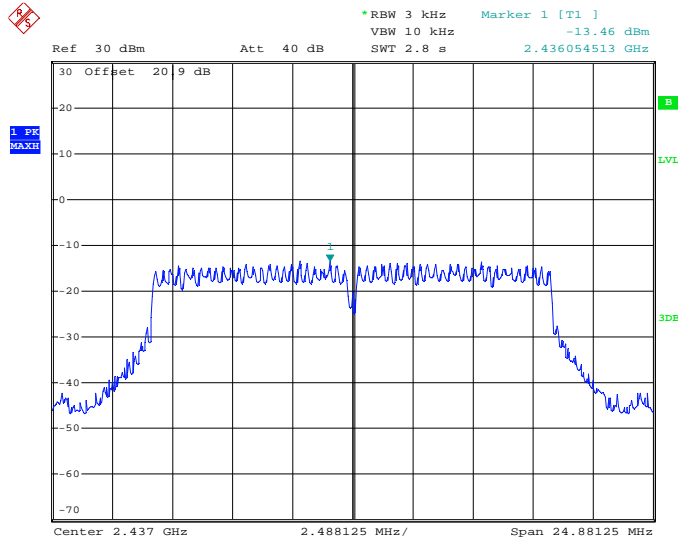
**Table 7.5.2-1: Power Spectral Density – 802.11g**

Frequency [MHz]	PSD [dBm]	Limit [dBm]	Margin [dB]
2412	-13.67	8.0	21.67
2437	-13.46	8.0	21.46
2462	-13.10	8.0	21.10



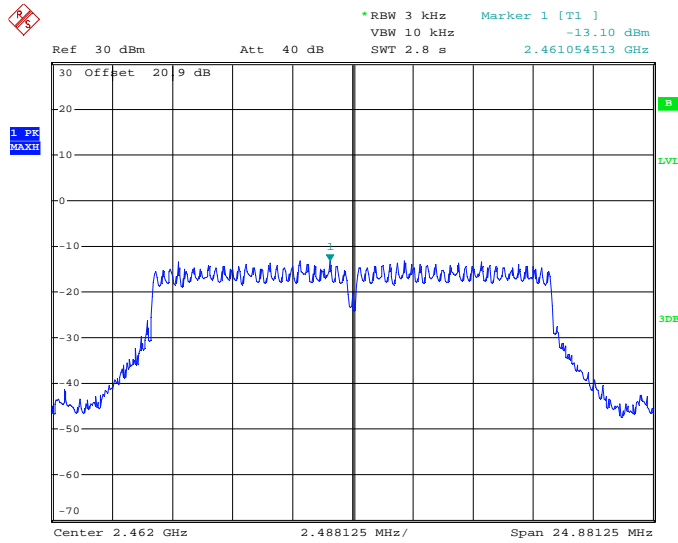
Date: 8.AUG.2017 17:59:36

**Figure 7.5.2-1: Power Spectral Density - Low Channel – 802.11g**



Date: 8.AUG.2017 17:46:37

Figure 7.5.2-2: Power Spectral Density - Middle Channel – 802.11g



Date: 8.AUG.2017 17:41:54

Figure 7.5.2-3: Power Spectral Density – High Channel – 802.11g

7.6 Power Line Conducted Emissions – FCC: Section 15.207; ISED Canada: RSS-Gen 8.8

7.6.1 Measurement Procedure

ANSI C63.10 section 6.2 was the guiding document for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz with the spectrum analyzer’s resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

**Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss**  
**Margin = Applicable Limit - Corrected Reading**

7.6.2 Measurement Results

Performed by: Thierry Jean-Charles

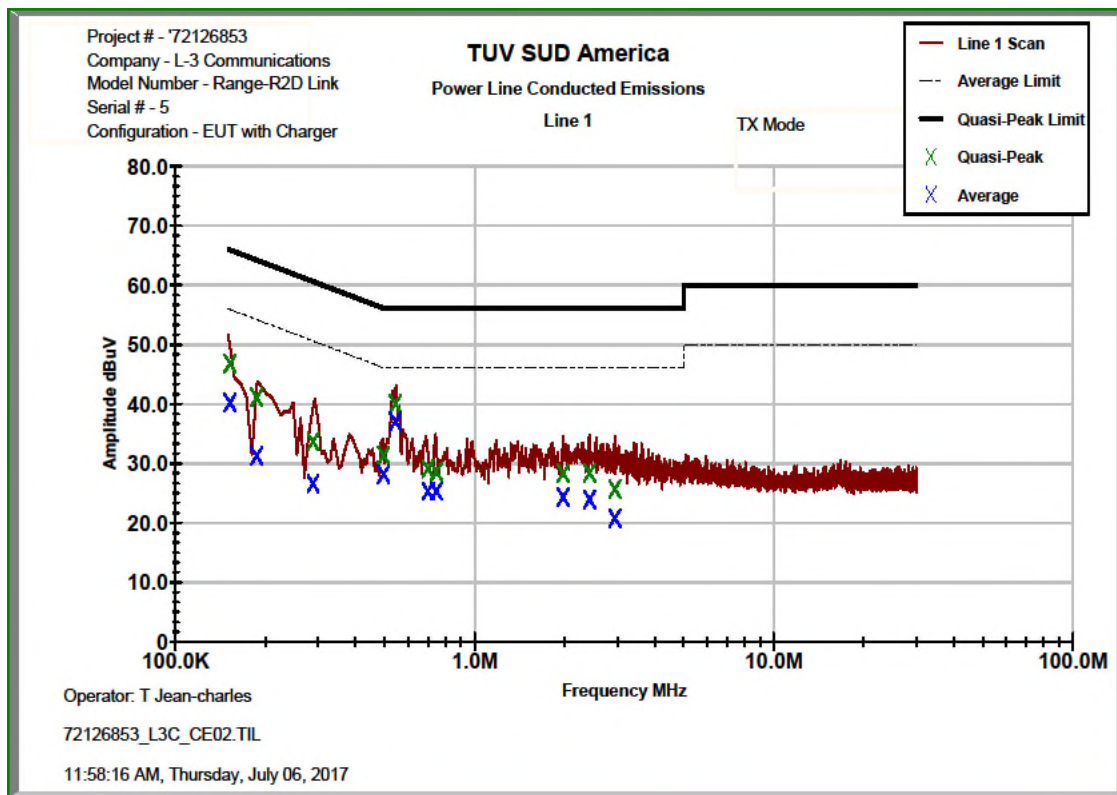


Figure 7.6.2-1: Conducted Emissions Results – Line 1

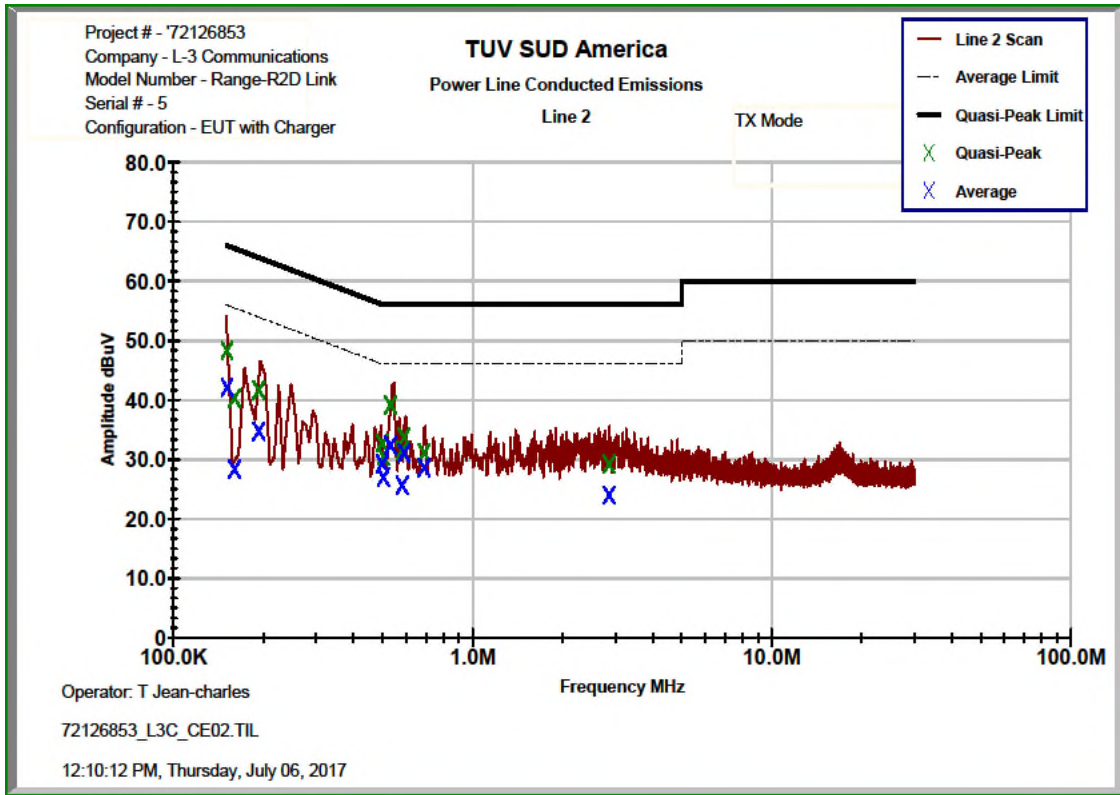


Figure 7.6.2-2: Conducted Emissions Results – Line 2

Table 7.6.2-1: Conducted EMI Results

Line 1    Line 2    Line 3  
 Line 4  
 To Ground    Floating  
 Telecom Port \_\_\_\_\_  
 dBµV    dBµA

**Plot Number:**  
 72126853 L3C CE02  
**Power Supply Description:** 12  
 VDC CW1204000 Power Supply

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
<b>Line 1</b>									
0.151992	36.517	29.908	10.26	46.78	40.17	65.89	55.89	19.1	15.7
0.186562	30.79	20.968	10.25	41.04	31.21	64.19	54.19	23.2	23.0
0.287788	23.369	16.347	10.26	33.63	26.61	60.59	50.59	27.0	24.0
0.49585	21.115	17.92	10.28	31.40	28.20	56.07	46.07	24.7	17.9
0.542662	29.722	26.778	10.26	39.98	37.04	56.00	46.00	16.0	9.0
0.6975	18.836	15.063	10.27	29.10	25.33	56.00	46.00	26.9	20.7
0.744538	18.306	15.056	10.27	28.57	25.32	56.00	46.00	27.4	20.7
1.97401	17.883	13.924	10.29	28.17	24.21	56.00	46.00	27.8	21.8
2.42055	17.998	13.542	10.39	28.39	23.93	56.00	46.00	27.6	22.1
2.94039	15.225	10.347	10.39	25.62	20.74	56.00	46.00	30.4	25.3
<b>Line 2</b>									
0.150759	38.1	31.883	10.21	48.31	42.09	65.96	55.96	17.7	13.9
0.159787	30.043	18.11	10.21	40.25	28.32	65.48	55.48	25.2	27.2
0.192525	31.433	24.521	10.20	41.63	34.72	63.93	53.93	22.3	19.2
0.498175	22.509	19.064	10.23	32.74	29.29	56.03	46.03	23.3	16.7
0.5021	20.291	16.753	10.21	30.50	26.96	56.00	46.00	25.5	19.0
0.531362	28.954	22.141	10.21	39.16	32.35	56.00	46.00	16.8	13.6
0.57995	21.226	15.405	10.21	31.44	25.62	56.00	46.00	24.6	20.4
0.58965	23.501	20.823	10.22	33.72	31.04	56.00	46.00	22.3	15.0
0.687862	20.896	18.389	10.22	31.12	28.61	56.00	46.00	24.9	17.4
2.85795	18.754	13.569	10.35	29.11	23.92	56.00	46.00	26.9	22.1

## 8 MEASUREMENT UNCERTAINTIES

The expanded laboratory measurement uncertainty figures ( $U_{\text{Lab}}$ ) provided below correspond to an expansion factor (coverage factor)  $k = 1.96$  which provide confidence levels of 95%.

Parameter	$U_{\text{lab}}$
Occupied Channel Bandwidth	$\pm 0.009 \%$
RF Conducted Output Power	$\pm 0.349 \text{ dB}$
Power Spectral Density	$\pm 0.372 \text{ dB}$
Antenna Port Conducted Emissions	$\pm 1.264 \text{ dB}$
Radiated Emissions $\leq 1\text{GHz}$	$\pm 3.93 \text{ dB}$
Radiated Emissions $> 1\text{GHz}$	$\pm 5.814 \text{ dB}$
Temperature	$\pm 0.860 \text{ }^\circ\text{C}$
Radio Frequency	$\pm 2.832 \times 10^{-8}$
AC Power Line Conducted Emissions	$\pm 2.93 \text{ dB}$

## **9 CONCLUSION**

In the opinion of TÜV SÜD America, Inc. the model HF-A11-SMT-0, manufactured by L-3 Communications CyTerra Corporation, meet the requirements of FCC 15.247 for the tests documented herein.

**END REPORT**