Excellence in Compliance Testing

Certification Test Report

FCC ID: R4N-AW5802MR
IC: 5303A-AW5802MR

FCC Rule Part: 15.247
IC Radio Standards Specification: RSS-210

ACS Report Number: 12-2135.W06.1A

Manufacturer: AvaLAN Wireless Systems
Model: AW5802MR

Test Begin Date: **October 17, 2012**
Test End Date: **December 5, 2012**

Report Issue Date: December 7, 2012

ACCREDITED TESTING

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 ACLASS, ANSI, or any agency of the Federal Government.

Project Manager:

Steve O'Steen
EMC Technician
Advanced Compliance Solutions, Inc.

Reviewed by:

Kirby Munroe
Director, Wireless Certifications
Advanced Compliance Solutions, Inc.

This report contains 45 pages

TABLE OF CONTENTS

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 and Industry Canada's Radio Standards Specification RSS-210 for a modular approval.

1.2 Product Description

This AW5802MR is a wireless module used to transmit digital data packets in the 5.8GHz ISM band. The radio module is controlled by an Ethernet based browser interface board.

Technical Information:

Band of Operation:	5728.125 MHz - 5846.909 MHz
Number of Channels:	59
Modulation Format:	FSK
Antenna Type/Gain:	Panel Antenna, 22 dBi
	Dipole Antenna, 5 dBi
Data Rates:	1.536 Mbps, 2.048 Mbps
Operating Voltage:	4.5 VDC - 48 VDC

Manufacturer Information:

AvaLAN Wireless Systems
125A Castle Dr
Madison AL 35758

Test Sample Serial Number(s): AV21142190003

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

1.3 Test Methodology and Considerations

The AW5802MR was evaluated with the Ethernet based browser interface board powered via a 12 VDC wall adapter. The unit was controlled via a remote laptop computer.

For the radiated emissions evaluation, the unit was evaluated with both a panel and a dipole antenna up to 40 GHz. Measurements were performed for the unit set three orthogonal orientations and at the two available data rates. 1.5 Mbps and 2 Mbps. Where applicable, the results are reported for the configurations leading to the highest emissions.

The RF conducted measurements were performed at both data rates up to 40 GHz.

The evaluation for the unintentional emissions is documented separately in a Verification Report.

2 TEST FACILITIES

2.1 Location

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

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 587595
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ACLASS 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.

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 floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 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:

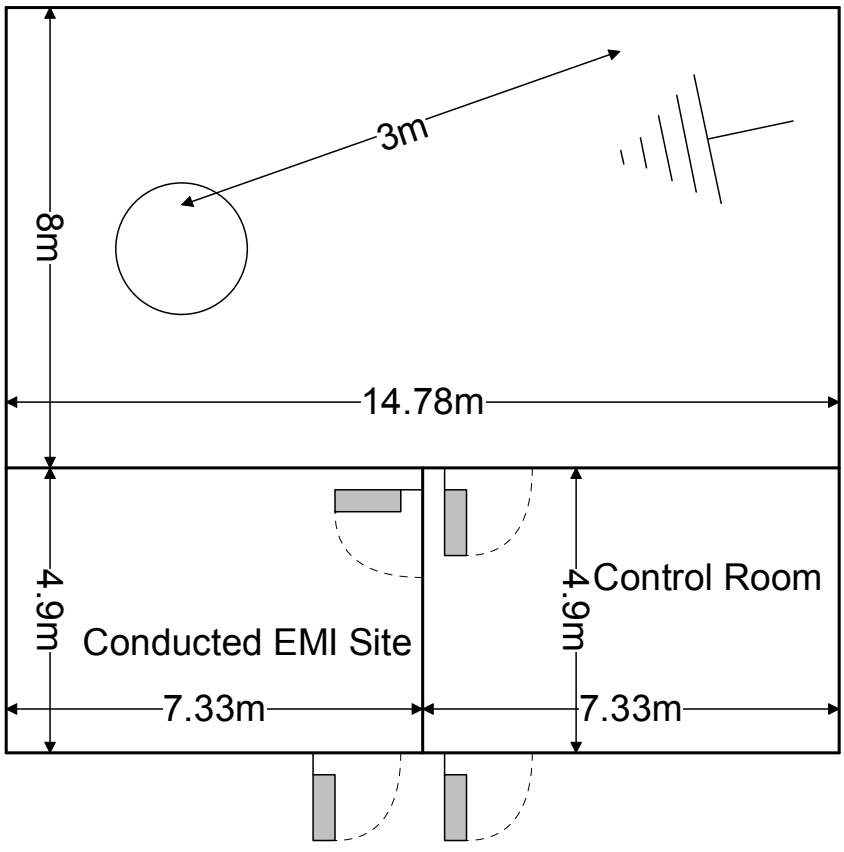

Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m^3. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω/50 µH and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

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

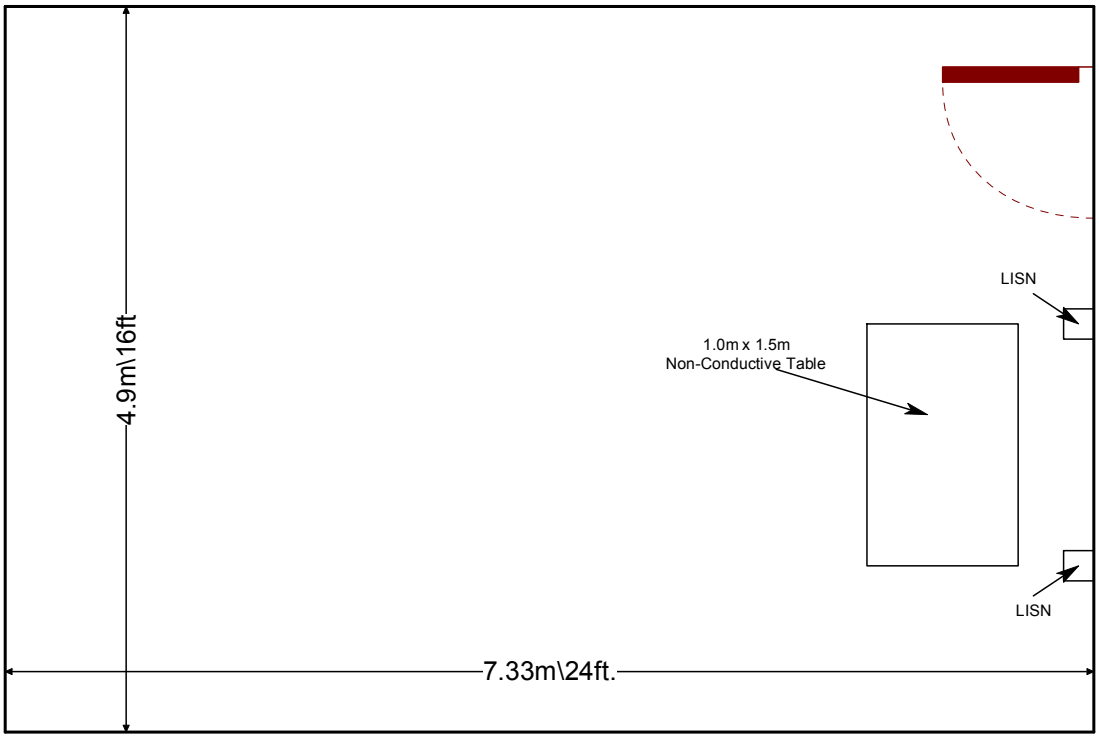

Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2012
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2012
- KDB Publication No. 558074 – Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, October 2012.
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8, December 2010.
- Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 3, December 2010.

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

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
332	Rohde & Schwarz	TS-PR40	Amplifiers	100021	2/2/2012	2/2/2014
333	Rohde&Schwarz	3160-10	Antennas	45576	11/4/2010	NCR
335	Suhner	SF-102A	Cables	882/2A	8/2/2012	8/2/2013
345	Suhner Sucoflex	102A	Cables	1077/2A	8/2/2012	8/2/2013
346	Aeroflex/Weinschel	54A-10	Attenuators	T1362	8/2/2012	8/2/2013
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/5/2011	1/5/2013
524	Chase	CBL6111	Antennas	1138	1/7/2011	1/7/2013
2001	Hewlett-Packard	11971A	Mixer	2332A01214	2/25/2011	2/25/2013
2006	EMCO	3115	Antennas	2573	3/2/2011	3/2/2013
2008	COM-Power	AH-826	Antennas	81009	NCR	NCR
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	1/2/2012	1/2/2013
2022	EMCO	LISN3825/2R	LISN	1095	8/19/2011	8/19/2013
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	1/2/2012	1/2/2013
2044	QMI	N/A	Cables	2044	1/2/2012	1/2/2013
2045	ACS Boca	Conducted Cable Set	Cable Set	2045	1/2/2012	1/2/2013
2064	CIR Q-TEL	FHT/22-10K-13/50-3A/3A	Filter	9	12/30/2011	12/30/2012
2070	Mini Circuits	VHF-8400+	Filter	2070	1/19/2012	1/19/2013
2076	Hewlett Packard	HP5061-5458	Cables	2076	1/2/2012	1/2/2013
2082	Teledyne Storm Products	90-010-048	Cables	2082	5/31/2012	5/31/2013
2086	Merrimac	FAN-6-10K	Attenuators	23148-83-1	12/30/2011	12/30/2012
2089	Agilent Technologies, Inc.	83017A	Amplifiers	3123A00214	12/22/2011	12/22/2012
2091	Agilent Technologies, Inc.	8573A	Spectrum Analyzers	2407A03233	12/12/2011	12/12/2013
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR
2096	Alpha Wire	9055B	Cables	2096	6/29/2012	6/29/2013
2099	Agilent Technologies	11970A	Mixer	2332A02313	11/27/2012	11/27/2013

Notes:

- **NCR=No Calibration Required**
- **Asset 2099 was only used during its active calibration cycle.**

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	AvaLAN Wireless	AW5802MR	AV21142190003
2	Ethernet Board	AvaLAN Wireless	V.1.4 Brutus Board	N/A
3	12 VDC Power Supply	Condor	HK-Q106-A12	0112C
4	Dipole Antenna	AvaLAN Wireless	AW5-5800	N/A
	Panel Antenna	ARC Wireless Solutions	ARC-1A5823B02	ARC-IA5823B02006516080317
5	Laptop	DELL	Latitude D610	0D4571-48643-61M-1189
6	Power Supply	DELL	LA65NS0-00	0DF263-71615-6AO-188E

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Coaxial	0.2m	Yes	EUT to Antenna
B	Power	2.52m	No	Power Supply to EUT
C	CAT5	10.97m / 3m	No	EUT to Laptop
D	Power Cable	1.8m	No	Power Supply to Laptop
E	Power Cable	0.9m	No	Power Supply to AC Mains

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

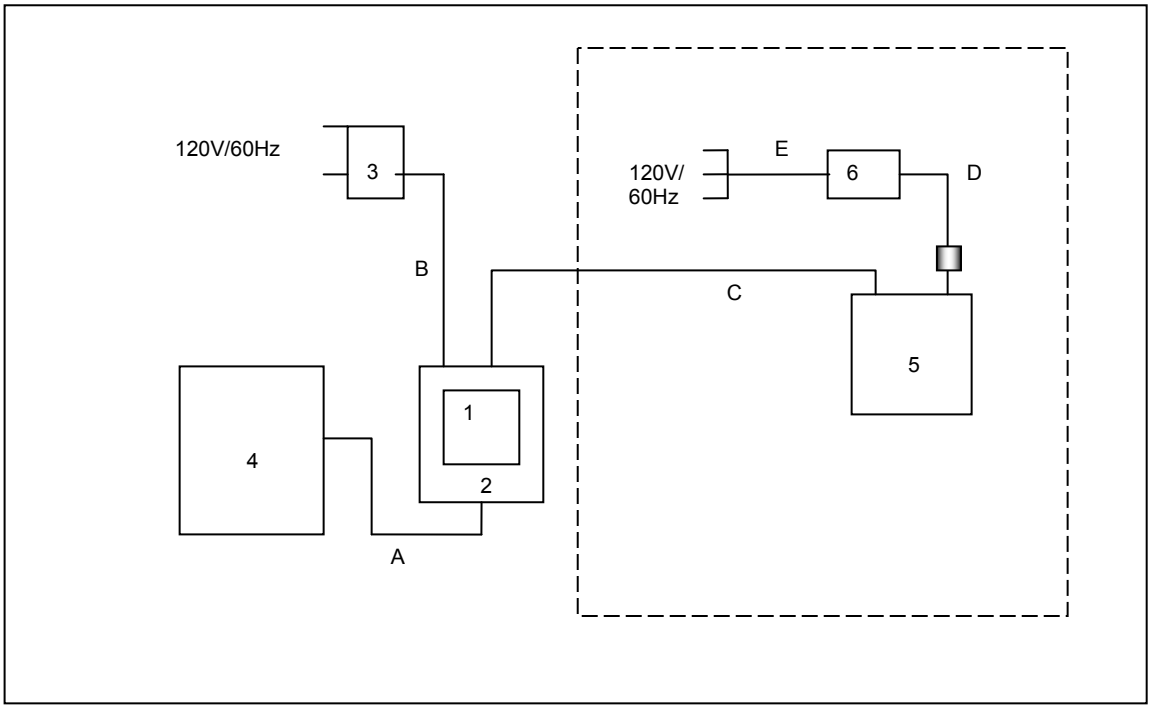

Figure 6-1: Test Setup – Radiated Emissions

Note: The laptop is a remote device and was setup outside of the 3m Semi-Anechoic chamber for the radiated emissions evaluation.

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 AWR5802MR uses a Reverse SMA connector at the antenna port, thus meeting the requirements of Section 15.203.

7.2 6 dB Bandwidth - FCC: Section 15.247(a)(2) 99% Bandwidth IC: RSS-210 A8.2(a)

7.2.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Option 1. The RBW of the spectrum analyzer was set to 30 kHz and VBW 100 kHz. Span was set large enough to capture the entire emissions and >> RBW.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission, including the emissions skirts. The RBW was to 1% of the span. The occupied 99% bandwidth was measured by using a delta marker at the lower and upper frequencies leading to 0.5% of the total power.

7.2.2 Measurement Results

Results are shown below.

Table 7.2.2-1: 6dB / 99% Bandwidth – 1.5 Mbps

Frequency [MHz]	6dB Bandwidth [kHz]	99% Bandwidth (kHz)
5728.125	1398	1840
5787.517	1470	1840
5846.909	1533	1840

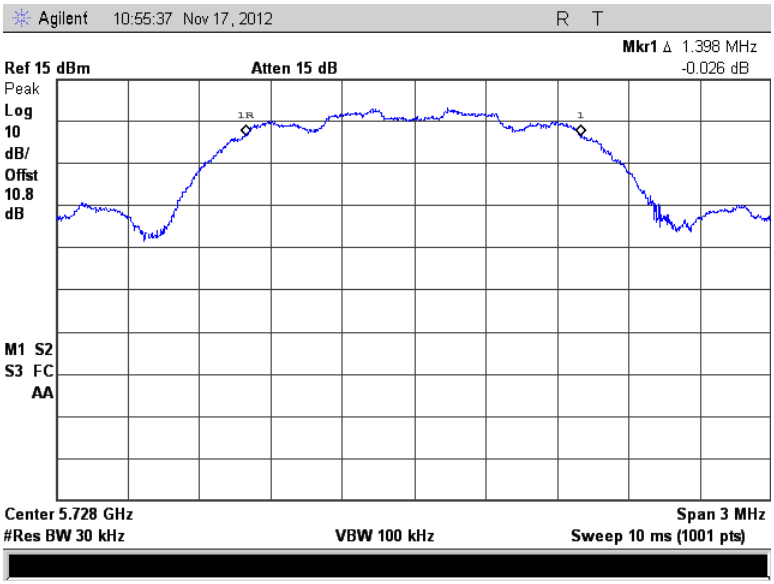

Figure 7.2.2-1: 6dB BW - Low Channel – 1.5 Mbps

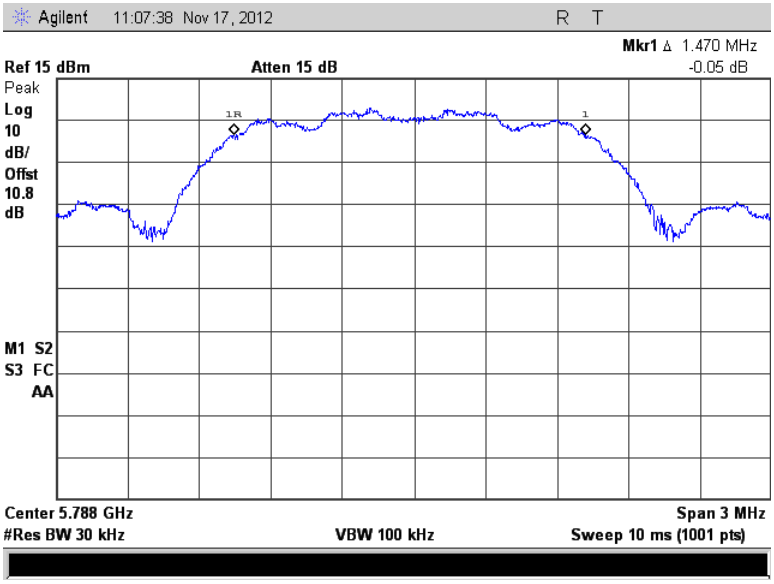

Figure 7.2.2-2: 6dB BW - Middle Channel – 1.5 Mbps

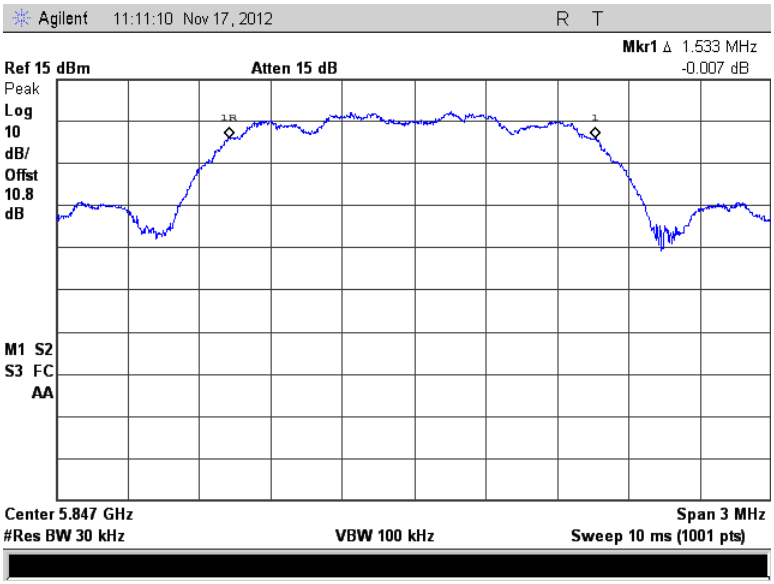

Figure 7.2.2-3: 6dB BW - High Channel – 1.5 Mbps

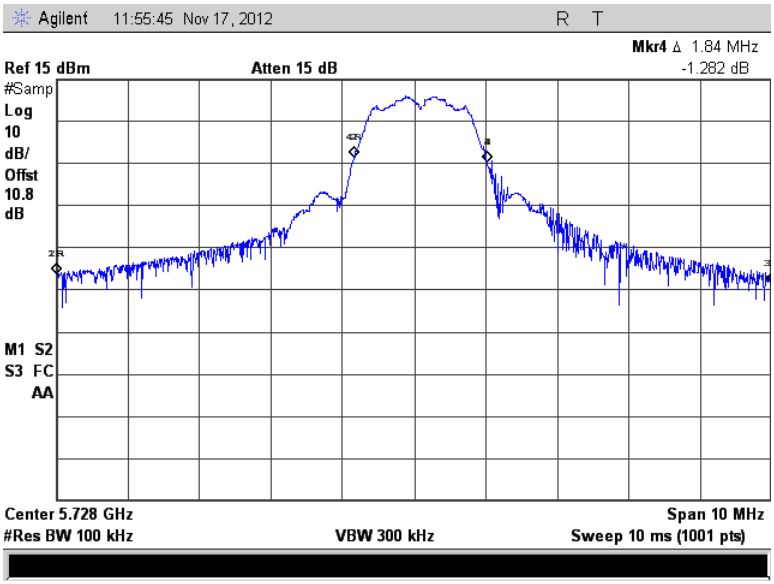

Figure 7.2.2-4: 99% OBW - Low Channel – 1.5 Mbps

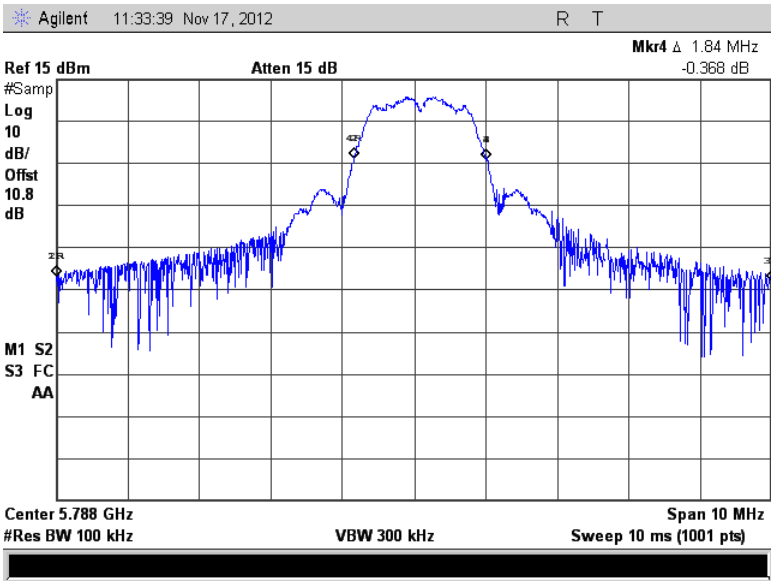

Figure 7.2.2-5: 99% OBW - Middle Channel – 1.5 Mbps

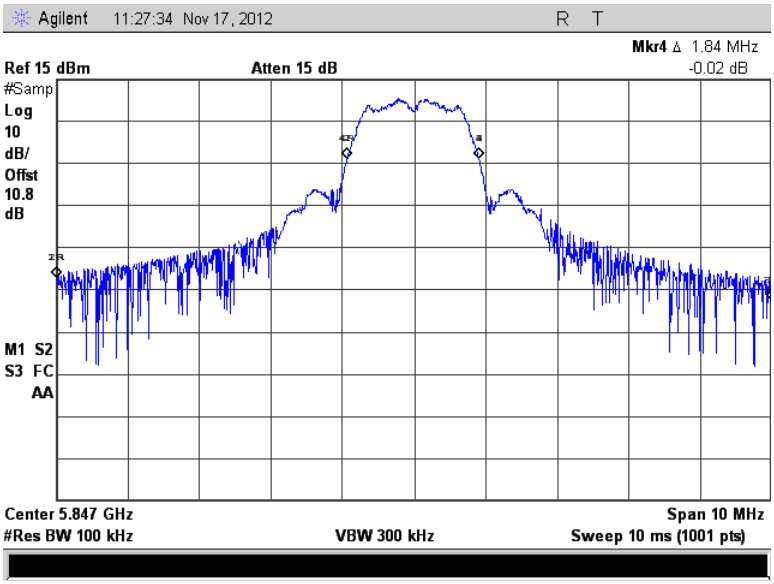

Figure 7.2.2-6: 99% OBW - High Channel – 1.5 Mbps

Table 7.2.2-2: 6dB / 99% Bandwidth –2 Mbps

Frequency [MHz]	6dB Bandwidth [kHz]	99% Bandwidth (kHz)
5728.125	1881	2350
5787.517	1953	2330
5846.909	1872	2350

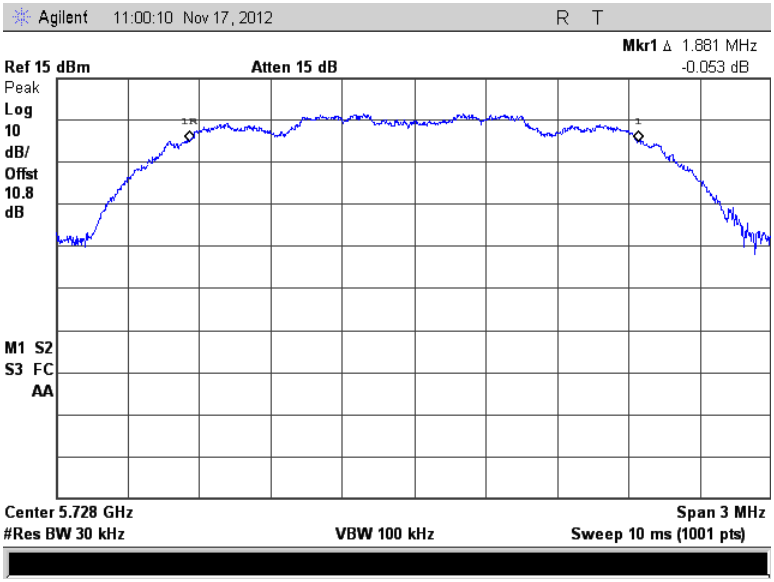

Figure 7.2.2-7: 6dB BW - Low Channel – 2 Mbps

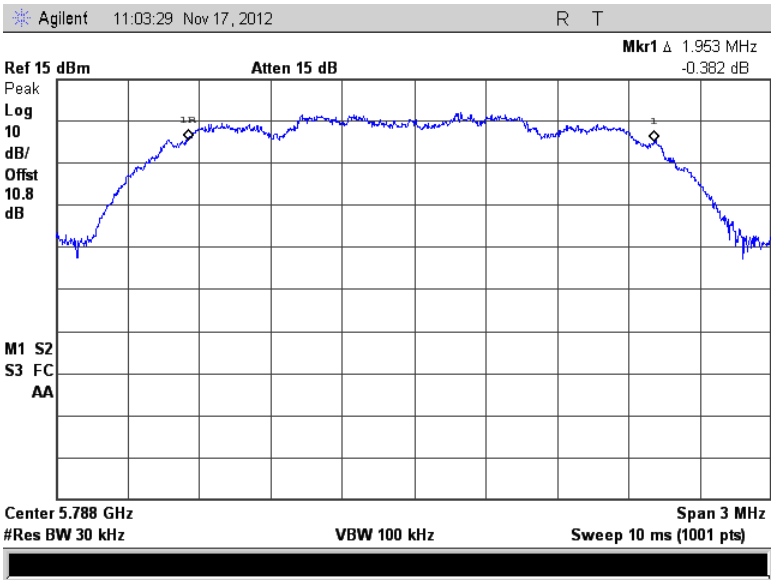

Figure 7.2.2-8: 6dB BW - Middle Channel – 2 Mbps

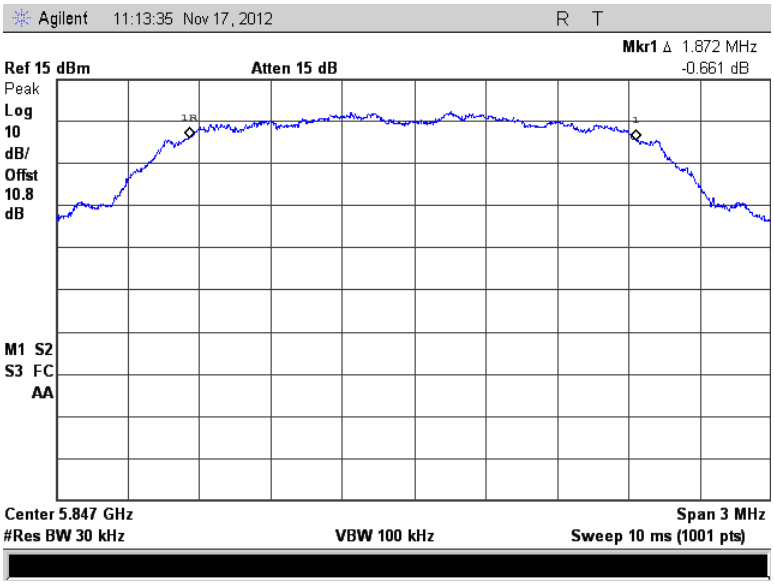

Figure 7.2.2-9: 6dB BW - High Channel – 2 Mbps

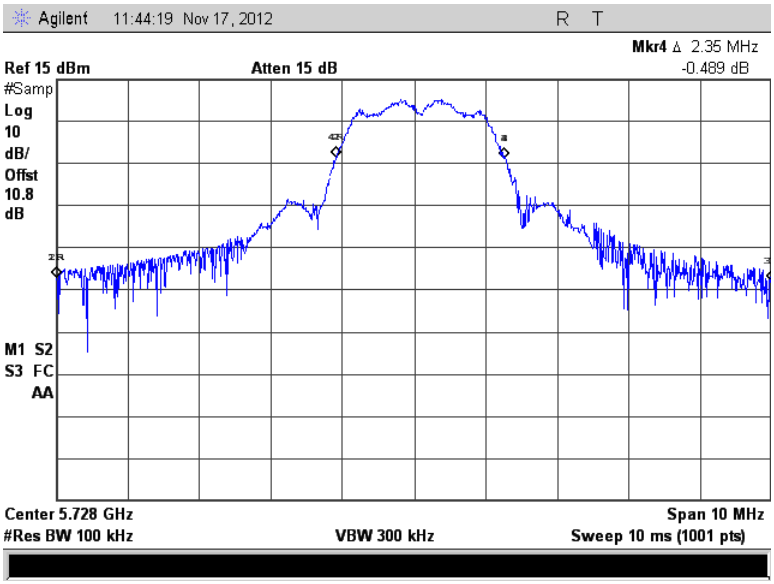

Figure 7.2.2-10: 99% OBW - Low Channel – 2 Mbps

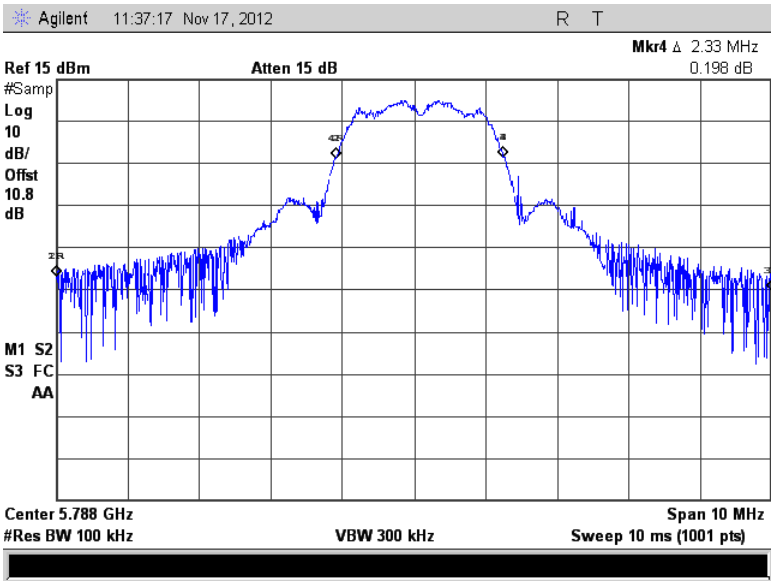

Figure 7.2.2-11: 99% OBW - Middle Channel – 2 Mbps

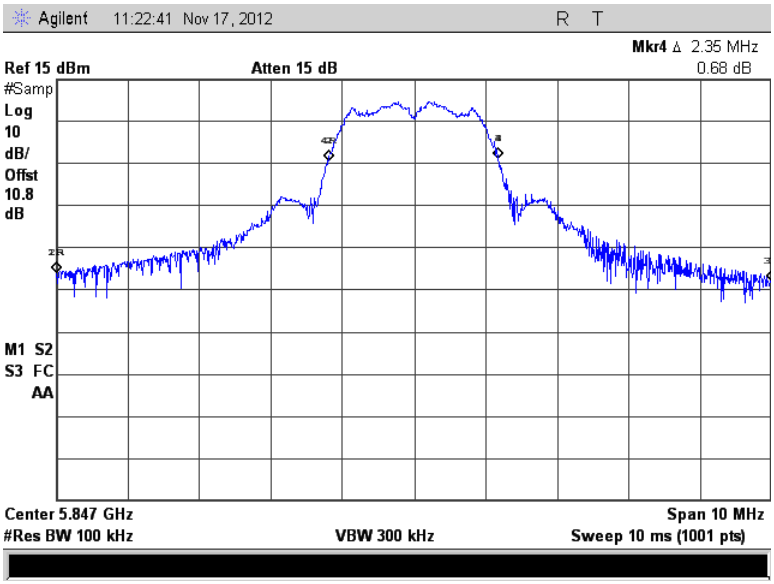

Figure 7.2.2-12: 99% OBW - High Channel – 2 Mbps

7.3 Peak Output Power - FCC Section 15.247(b)(3) IC: RSS-210 A8.4(4)

7.3.1 Measurement Procedure (Conducted Method)

The Peak Output Power was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Measurement Procedure "Maximum Peak Conducted Output Power Option1". The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through suitable attenuation. Data was collected with the EUT operating at maximum power per channelization.

7.3.2 Measurement Results

Results are shown below.

Table 7.3.2-1: RF Output Power – 1.5 Mbps

Frequency [MHz]	Level [dBm]
5728.125	13.73
5787.517	13.91
5846.909	13.65

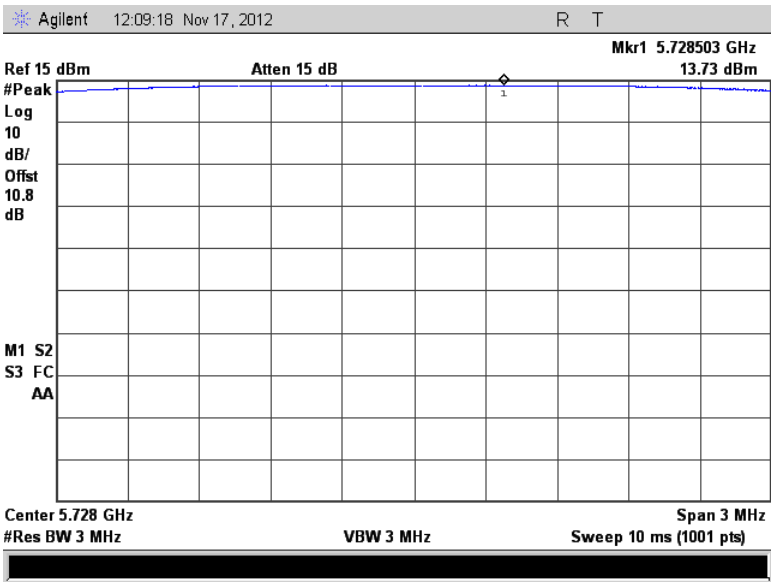

Figure 7.3.2-1: RF Output Power - Low Channel – 1.5 Mbps

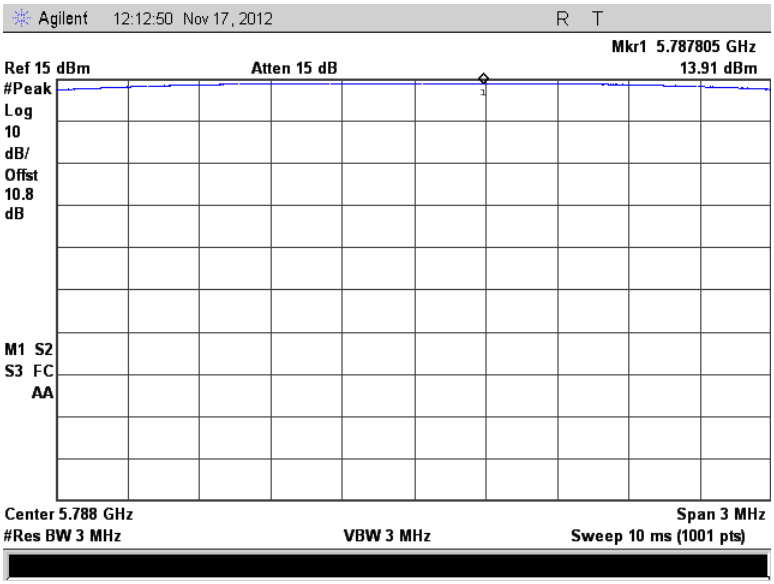

Figure 7.3.2-2: RF Output Power - Middle Channel – 1.5 Mbps

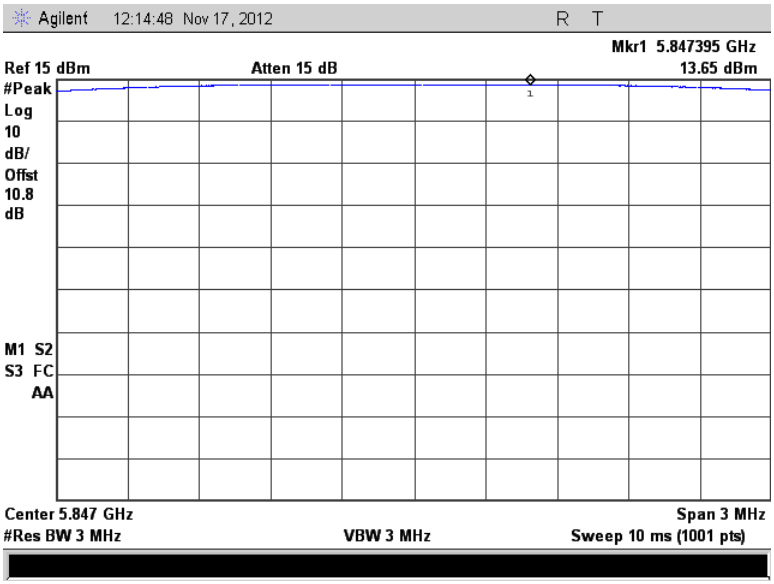

Figure 7.3.2-3: RF Output Power - High Channel – 1.5 Mbps

Table 7.3.2-2: RF Output Power – 2 Mbps

Frequency [MHz]	Level [dBm]
5728.125	13.72
5787.517	13.91
5846.909	13.67

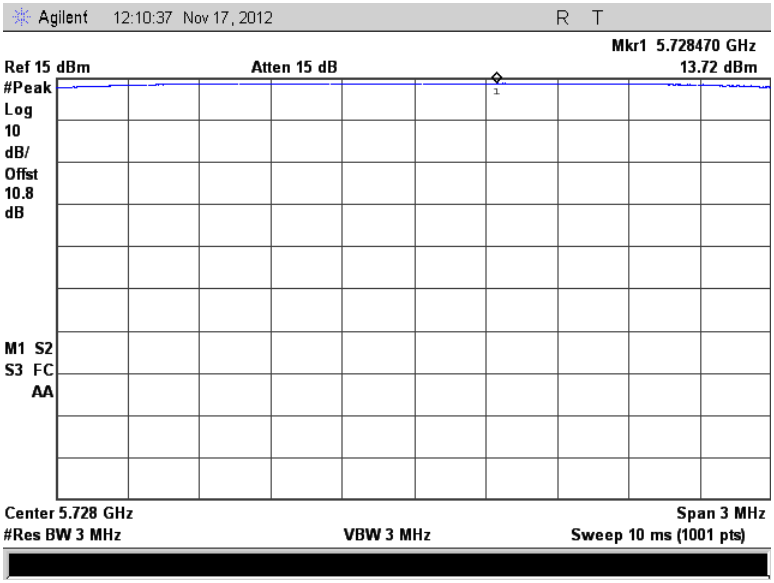

Figure 7.3.2-4: RF Output Power - Low Channel – 2 Mbps

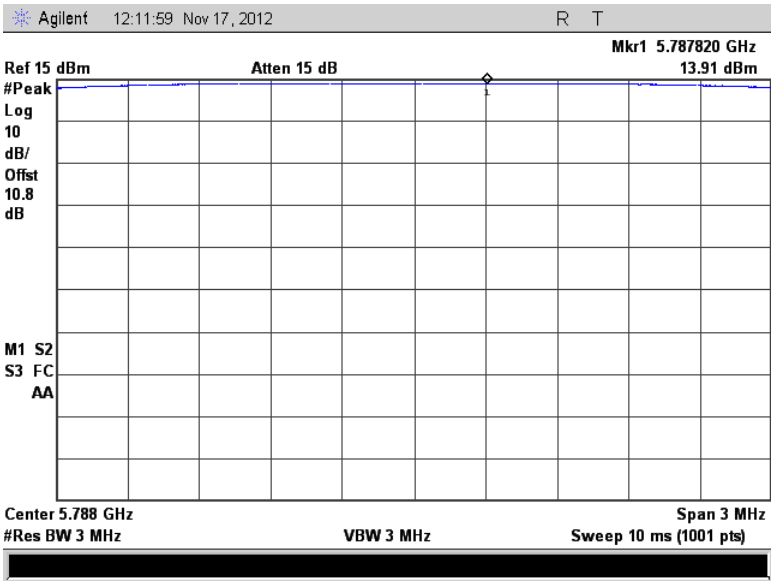

Figure 7.3.2-5: RF Output Power - Middle Channel – 2 Mbps

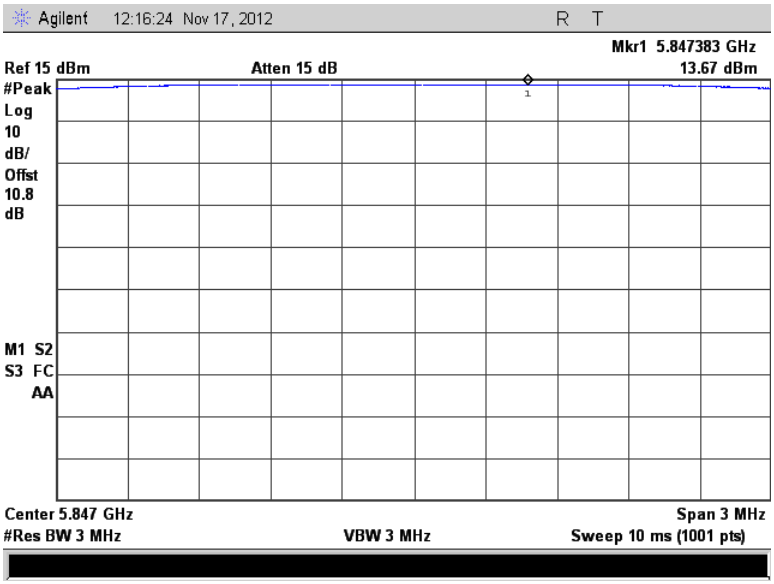

Figure 7.3.2-6: RF Output Power - High Channel – 2 Mbps

7.4 Band-Edge Compliance and Spurious Emissions-FCC 15.247(d) IC:RSS-210 A8.5

7.4.1 Band-Edge Compliance of RF Conducted Emissions

7.4.1.1 Measurement Procedure

The RF conducted band edge emissions were measured in accordance with FCC KDB 558074 D01 DTS Meas Guidance v02. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 300 kHz. Span was set to 1.5 times the DTS bandwidth. The trace was set to max hold with a peak detector active. The resulting spectrum analyzer peak level was used to determine the reference level with respect to the 20 dBc limit.

Band-edge compliance was determined using the conducted marker-delta method in which the radio frequency power that is produced by the EUT is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

7.4.1.2 Measurement Results

Results are shown below.

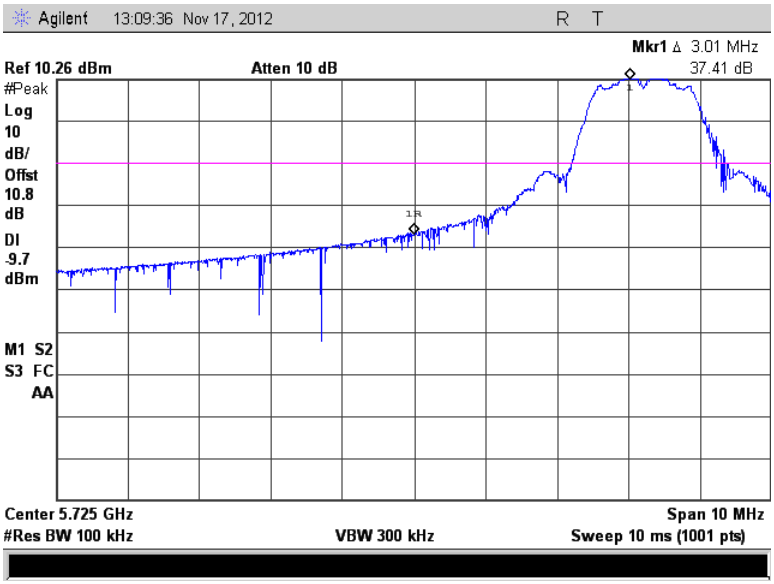

Figure 7.4.1.2-1: Lower Band-edge – 1.5 Mbps

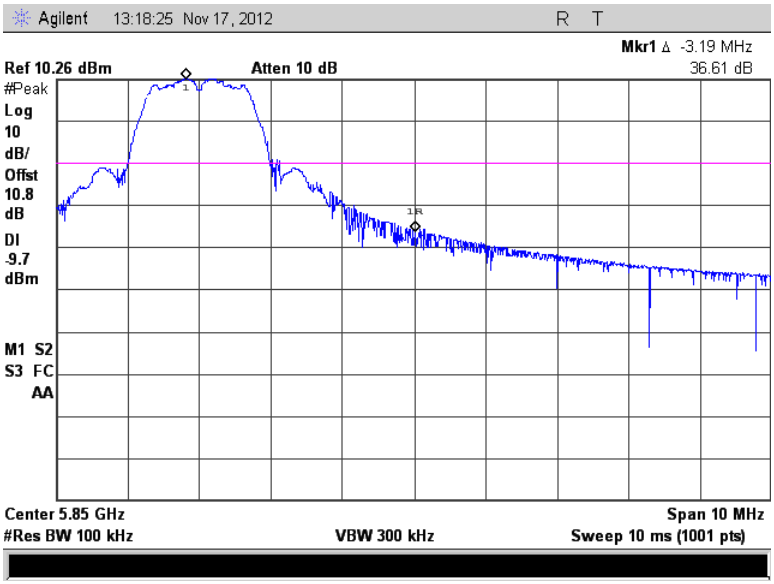

Figure 7.4.1.2-2: Upper Band-edge – 1.5 Mbps

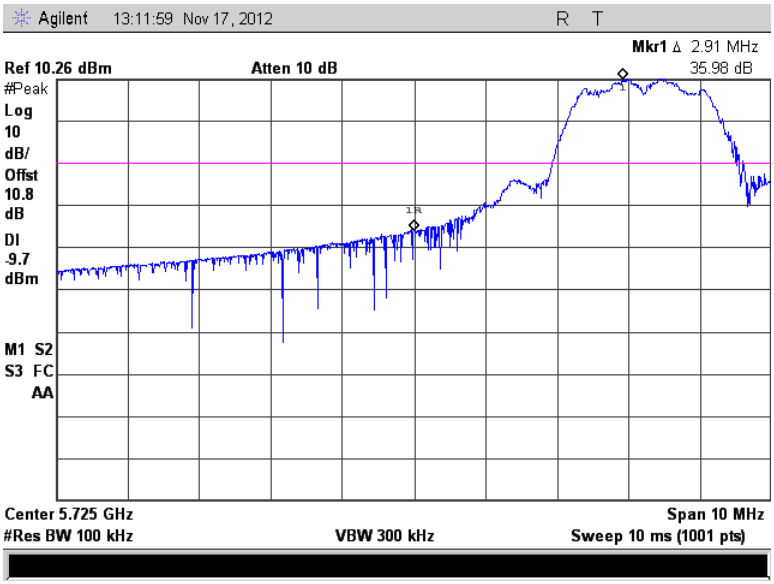

Figure 7.4.1.2-3: Lower Band-edge – 2 Mbps

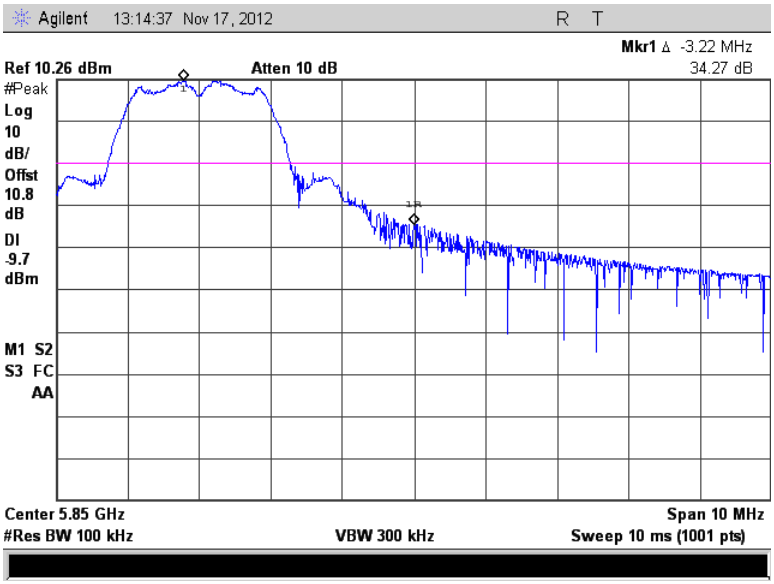

Figure 7.4.1.2-4: Upper Band-edge – 2 Mbps

7.4.2 RF Conducted Spurious Emissions

7.4.2.1 Measurement Procedure

The RF Conducted Spurious Emissions were measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)". The RF output port of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 300 kHz. Span was set to 1.5 times the DTS bandwidth. The trace was set to max hold with a peak detector active. The resulting spectrum analyzer peak level was used to determine the reference level with respect to the 20 dBc limit.

The EUT was investigated for conducted spurious emissions from 30MHz to 40 GHz. Measurements were made at the low, center and high channels of the EUT.

7.4.2.2 Measurement Results

Results are shown below.

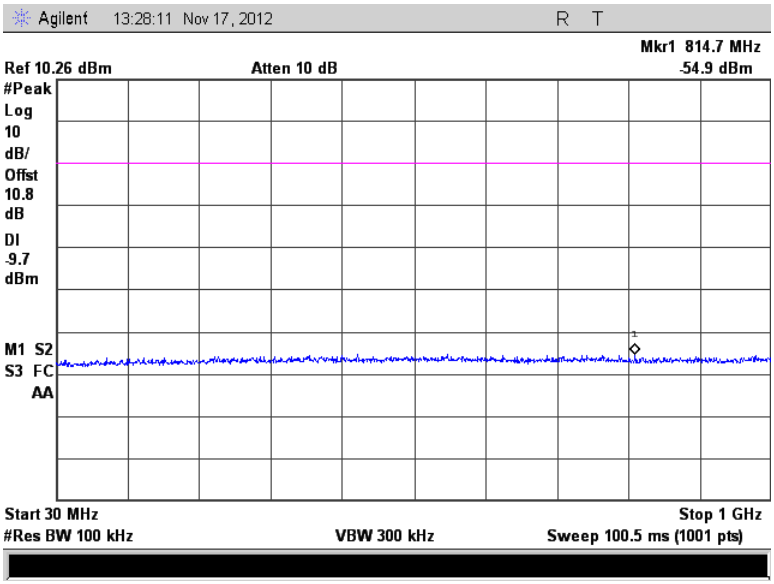

Figure 7.4.2.2-1: 30 MHz – 1 GHz – Low Channel – 1.5 Mbps

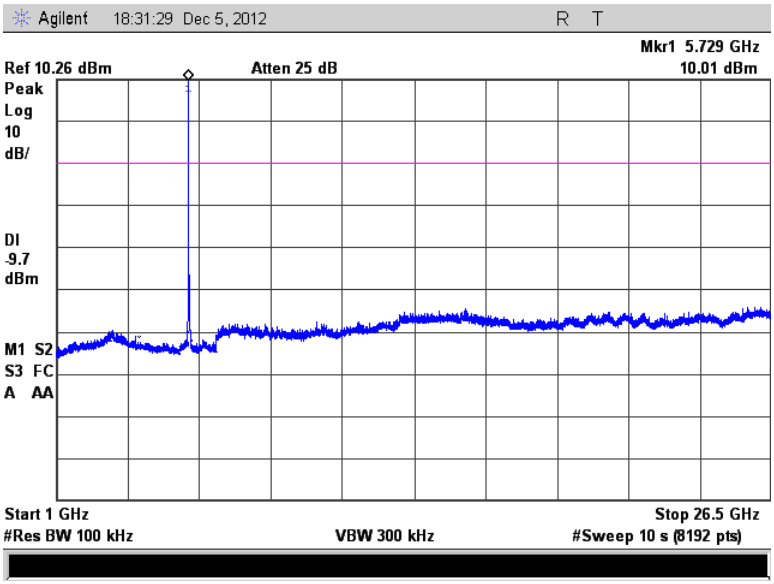

Figure 7.4.2.2-2: 1 GHz – 26.5 GHz – Low Channel – 1.5 Mbps

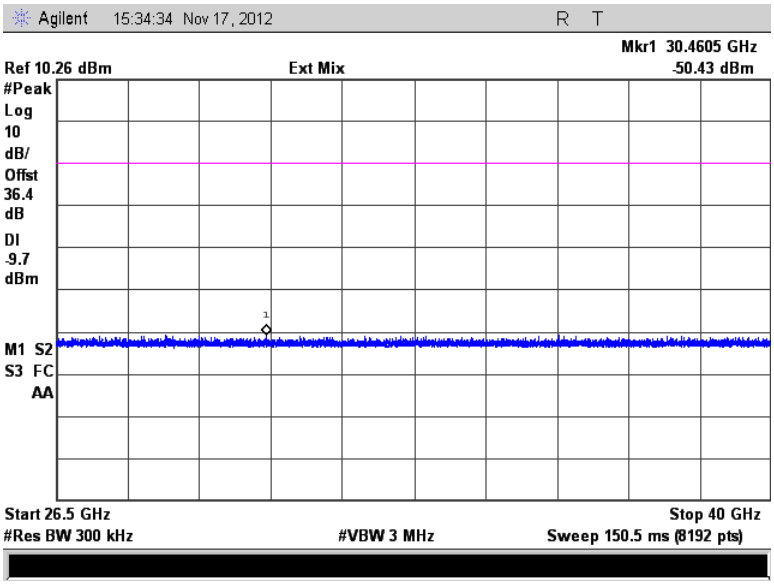

Figure 7.4.2.2-3: 26.5 GHz –40 GHz – Low Channel – 1.5 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

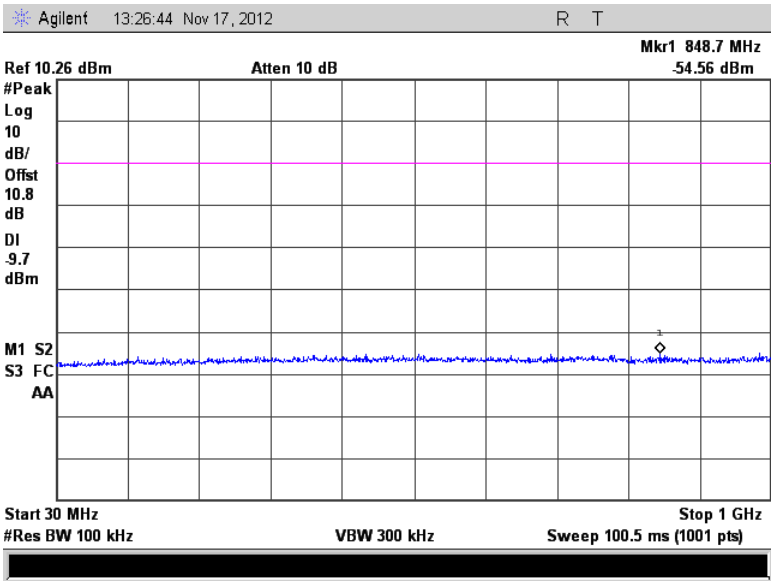

Figure 7.4.2.2-4: 30 MHz – 1 GHz –Middle Channel – 1.5 Mbps

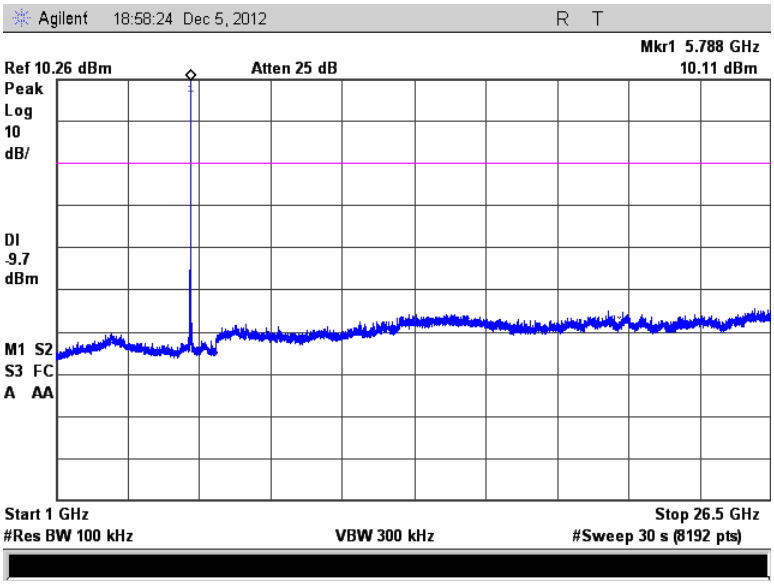

Figure 7.4.2.2-5: 1 GHz – 26.5 GHz – Middle Channel – 1.5 Mbps

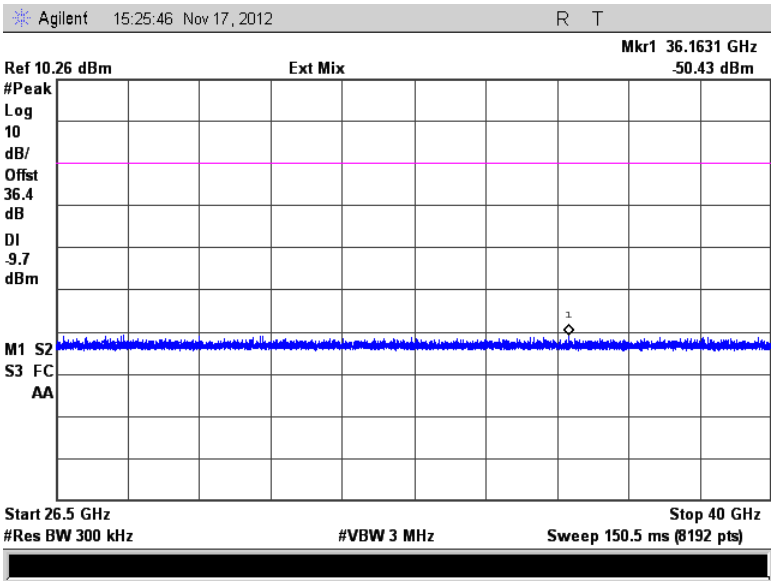

Figure 7.4.2.2-6: 26.5 GHz – 40 GHz – Middle Channel – 1.5 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

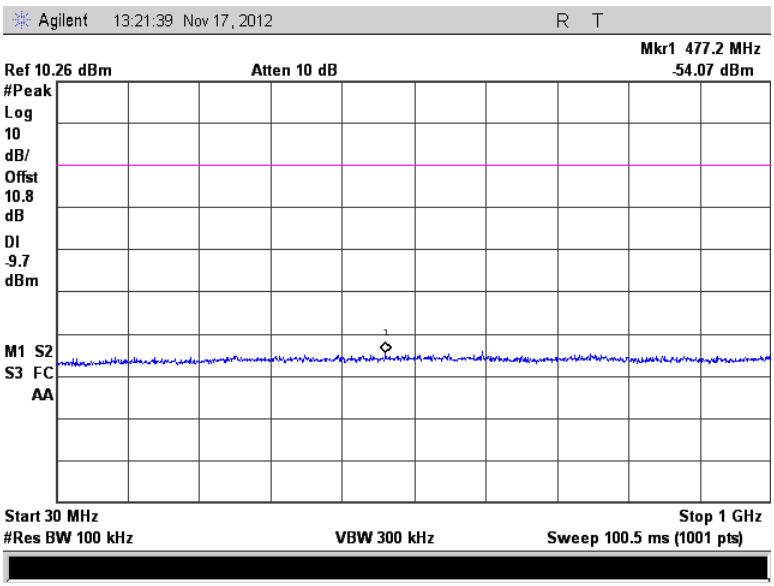

Figure 7.4.2.2-7: 30 MHz – 1 GHz – High Channel – 1.5 Mbps

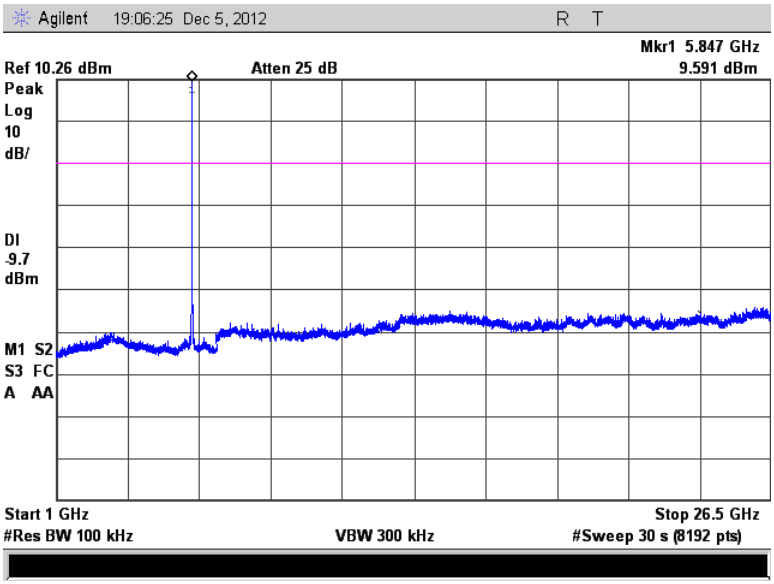

Figure 7.4.2.2-8: 1 GHz – 26.5 GHz –High Channel – 1.5 Mbps

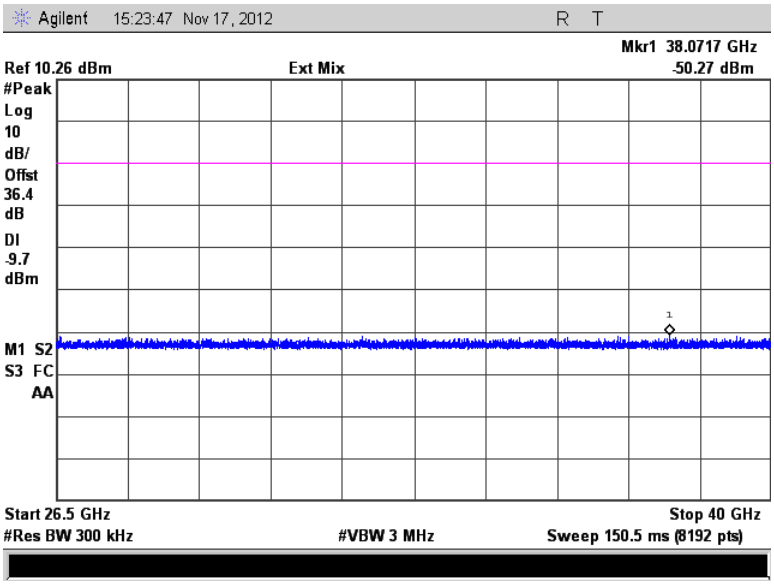

Figure 7.4.2.2-9: 26.5 GHz – 40 GHz –High Channel – 1.5 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

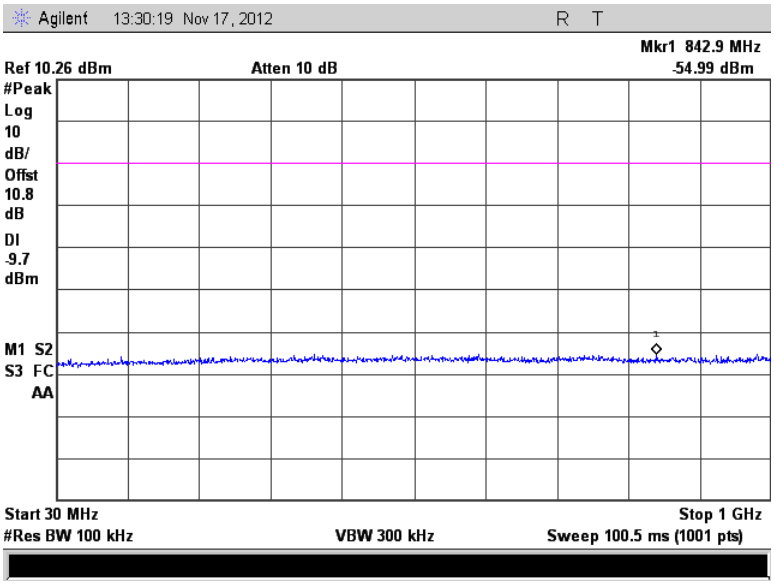

Figure 7.4.2.2-10: 30 MHz – 1 GHz – Low Channel – 2 Mbps

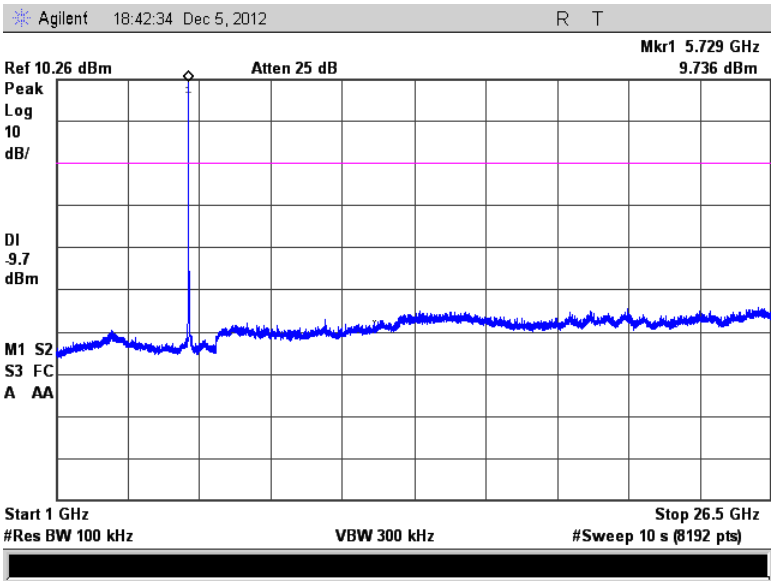

Figure 7.4.2.2-11: 1 GHz – 26.5 GHz – Low Channel – 2 Mbps

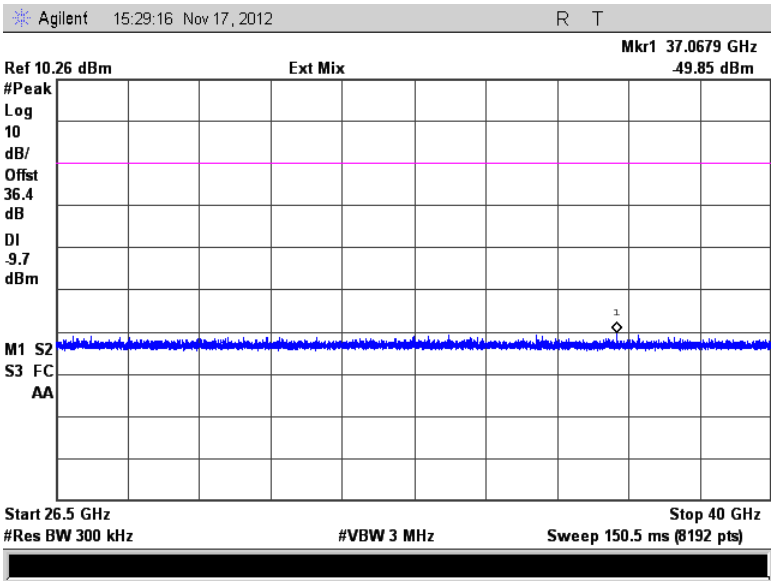

Figure 7.4.2.2-12: 26.5 GHz –40 GHz – Low Channel – 2 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

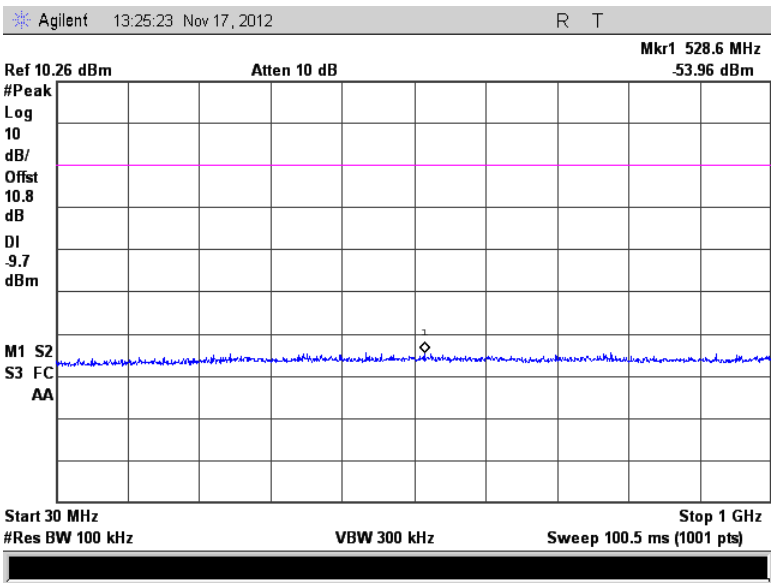

Figure 7.4.2.2-13: 30 MHz – 1 GHz –Middle Channel – 2 Mbps

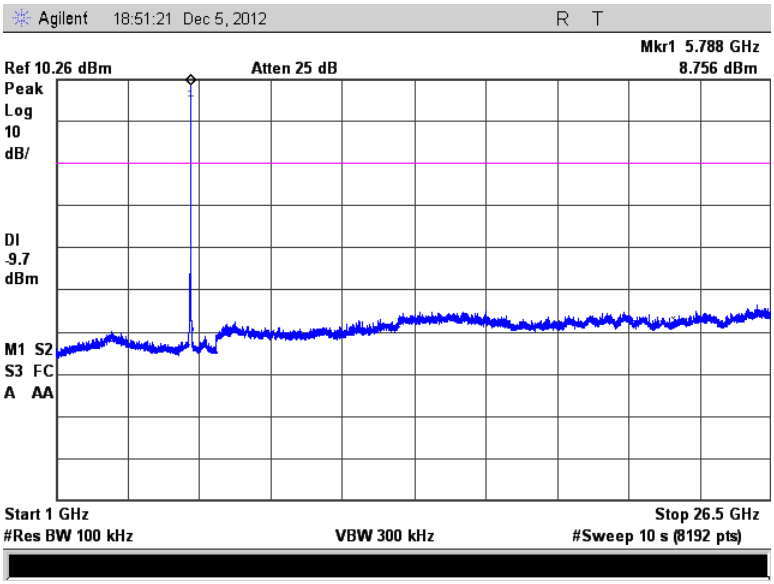

Figure 7.4.2.2-14: 1 GHz – 26.5 GHz – Middle Channel – 2 Mbps

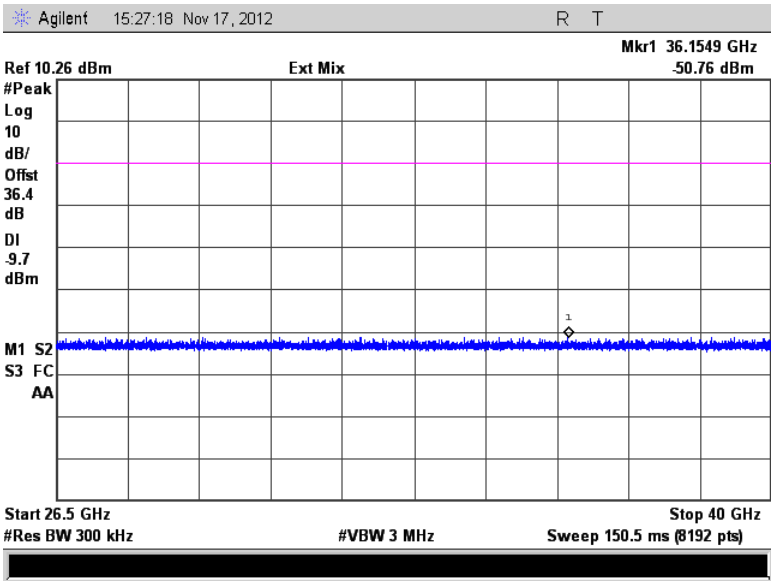

Figure 7.4.2.2-15: 26.5 GHz –40 GHz – Middle Channel – 2 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

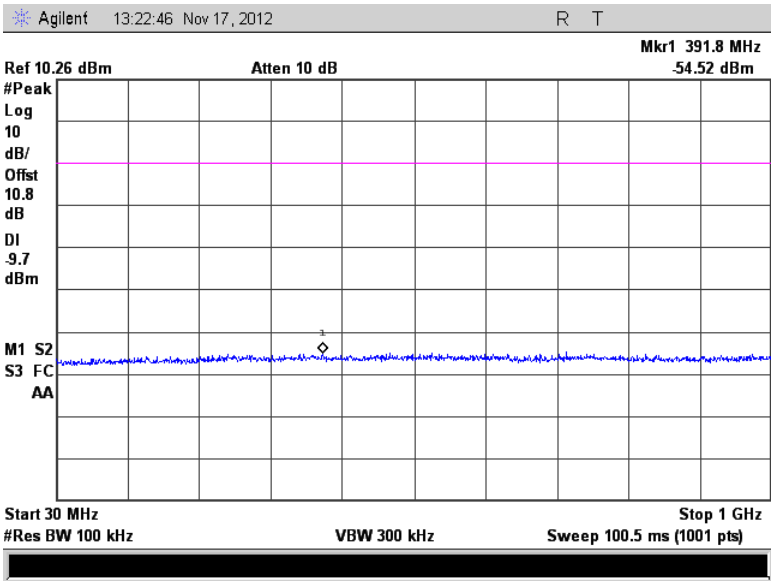

Figure 7.4.2.2-16: 30 MHz – 1 GHz – High Channel – 2 Mbps

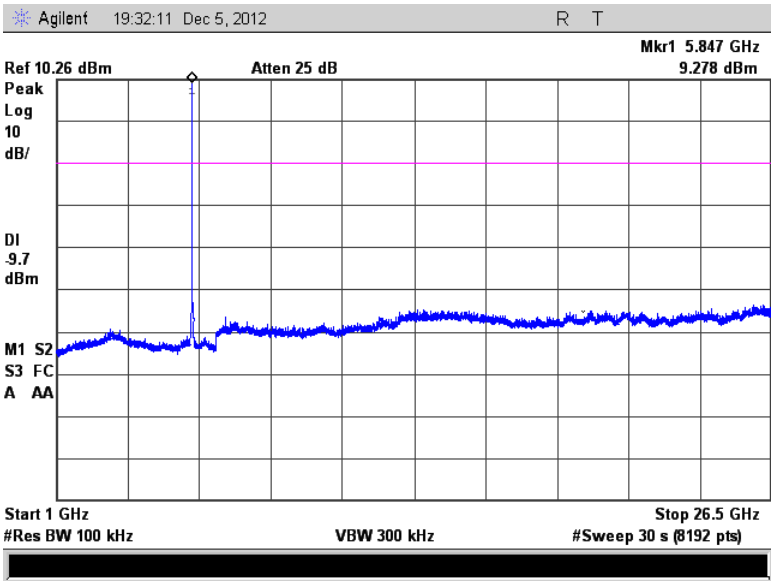

Figure 7.4.2.2-17: 1 GHz – 26.5 GHz –High Channel – 2 Mbps

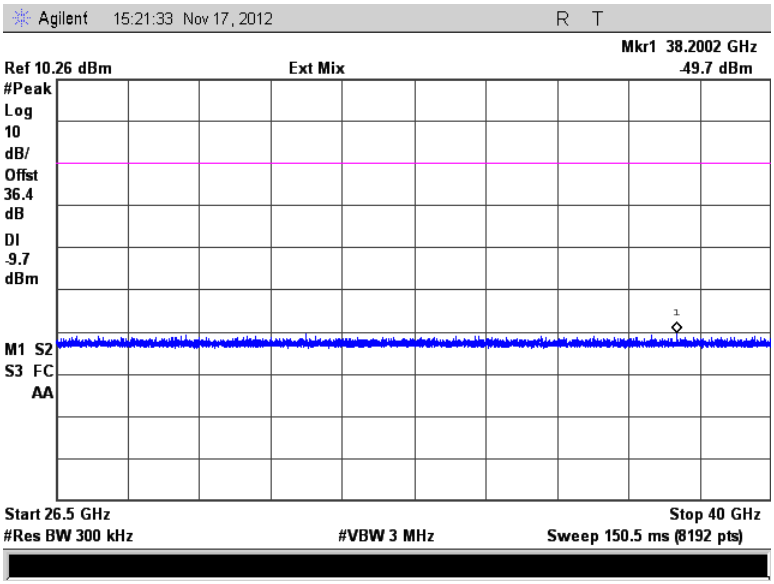

Figure 7.4.2.2-18: 26.5 GHz –40 GHz –High Channel – 2 Mbps

*Note: The measurements above 26.5 GHz were performed with and external mixer and the RBW of the SA set to 300 kHz

7.4.3 Radiated Spurious Emissions - FCC Section 15.205 IC: RSS-210 2.2, RSS-GEN 7.2.5

7.4.3.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30MHz to 40GHz.

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 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak and average measurements made with RBW of 1 MHz and VBW of 3MHz and 10 Hz respectively.

7.4.3.2 Measurement Results

Radiated spurious emissions found in the band of 30MHz to 40GHz are reported below.

Table 7.4.3.2-1: Radiated Spurious Emissions Tabulated Data – Dipole Antenna

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel (5728.125 MHz)										
11456.25	54.72	45.92	H	10.74	65.46	56.66	83.5	63.5	18.0	6.8
11456.25	52.40	43.45	V	10.74	63.14	54.19	83.5	63.5	20.4	9.3
22912.5	43.31	30.00	H	10.43	53.74	40.43	83.5	63.5	29.8	23.1
31501.5	63.97	53.60	H	1.94	65.91	55.54	83.5	63.5	17.6	8.0
31501.5	57.55	45.88	V	1.94	59.49	47.82	83.5	63.5	24.0	15.7
Middle Channel (5787.515 MHz)										
11575.03	58.40	50.77	H	10.94	69.34	61.71	83.5	63.5	14.2	1.8
11575.03	55.00	46.69	V	10.94	65.94	57.63	83.5	63.5	17.6	5.9
High Channel (5846.909 MHz)										
11693.818	57.06	49.06	H	11.12	68.18	60.18	83.5	63.5	15.30	3.30
11693.818	54.91	46.24	V	11.12	66.03	57.36	83.5	63.5	17.50	6.10

Notes:

- The emissions above 10 GHz were performed at a distance of 1m. The limits are corrected for 1m measurements using a distance factor of 20*log(1/3) = 9.45 dB.
- All emissions above 31501.5 MHz falling within the restricted bands were attenuated below the noise floor of the measurement equipment and the limits.

Table 7.4.3.2-2: Radiated Spurious Emissions Tabulated Data – Panel Antenna

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel (5728.125 MHz)										
11456.25	50.30	40.26	H	10.74	61.04	51.00	83.5	63.5	22.5	12.5
11456.25	53.18	44.58	V	10.74	63.92	55.32	83.5	63.5	19.6	8.2
22912.5	43.16	30.11	H	10.43	53.59	40.54	83.5	63.5	29.9	23.0
22912.5	44.48	33.07	V	10.43	54.91	43.50	83.5	63.5	28.6	20.0
31501.5	64.01	54.22	H	1.94	65.95	56.16	83.5	63.5	17.5	7.4
31501.5	59.47	48.55	V	1.94	61.41	50.49	83.5	63.5	22.1	13.0
Middle Channel (5787.515 MHz)										
11575.03	54.42	46.12	H	10.94	65.36	57.06	83.5	63.5	18.1	6.4
11575.03	56.94	49.26	V	10.94	67.88	60.20	83.5	63.5	15.6	3.3
High Channel (5846.909 MHz)										
11693.818	54.47	46.25	H	11.12	65.59	57.37	83.5	63.5	17.9	6.1
11693.818	57.83	50.05	V	11.12	68.95	61.17	83.5	63.5	14.6	2.3

Notes:

- The emissions above 10 GHz were performed at a distance of 1m. The limits are corrected for 1m measurements using a distance factor of 20*log(1/3) = 9.45 dB.
- All emissions above 31501.5 MHz falling within the restricted bands were attenuated below the noise floor of the measurement equipment and the limits.

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: 54.72 + 10.74 = 65.46 dBµV/m
Margin: 83.5 dBµV/m – 65.46 dBµV/m = 18.0dB

Example Calculation: Average
Corrected Level: 45.92 + 10.74 = 56.66 dBµV/m
Margin: 63.5 dBµV/m – 56.66 dBµV/m = 6.8 dB

7.5 Power Spectral Density - FCC Section 15.247(e) IC: RSS-210 A8.2(b)

7.5.1 PSD Measurement Procedure (Conducted Method)

The power spectral density was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Measurement Procedure Option1. The RF output port of the EUT was directly connected to the input of the spectrum analyzer. Offset values were input for cable and 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

Results are shown below.

Table 7.5.2-1: Power Spectral Density – 1.5 Mbps

Frequency (MHz)	PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
5728.125	2.927	8.00	5.073
5787.517	3.302	8.00	4.698
5846.909	2.709	8.00	5.291

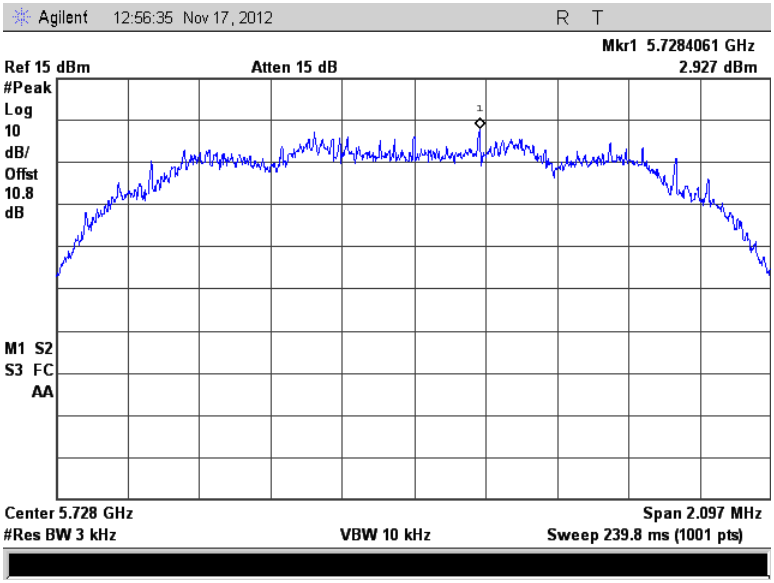

Figure 7.5.2-1: Power Spectral Density - Low Channel – 1.5 Mbps

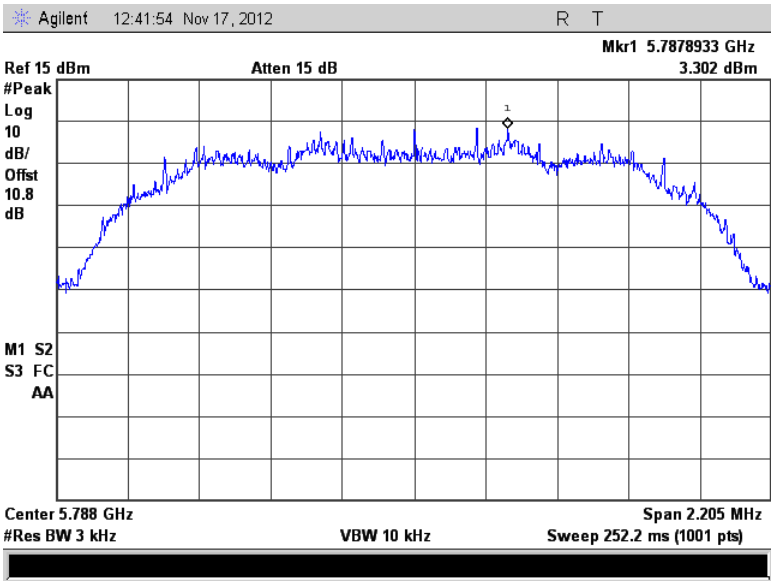

Figure 7.5.2-2: Power Spectral Density - Middle Channel – 1.5 Mbps

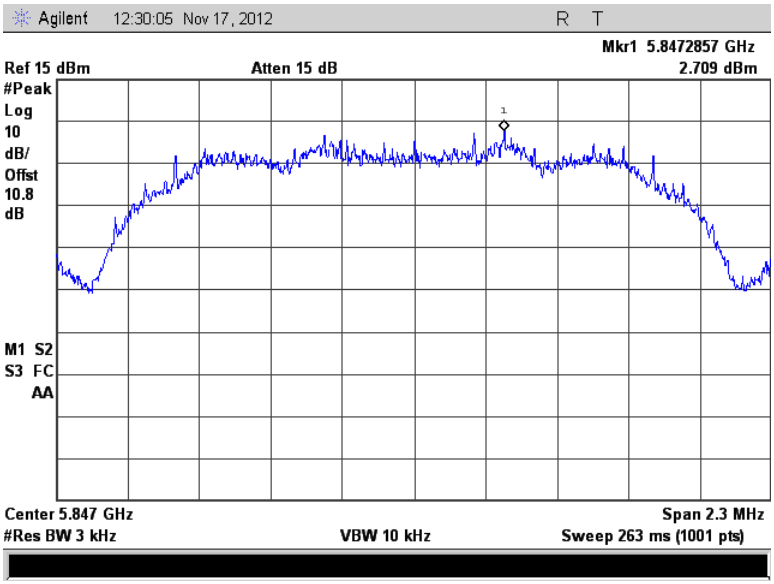

Figure 7.5.2-3: Power Spectral Density – High Channel – 1.5 Mbps

Table 7.5.2-2: Power Spectral Density – 2 Mbps

Frequency (MHz)	PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
5728.125	2.216	8.0	5.784
5787.517	3.721	8.0	4.279
5846.909	3.132	8.0	4.868

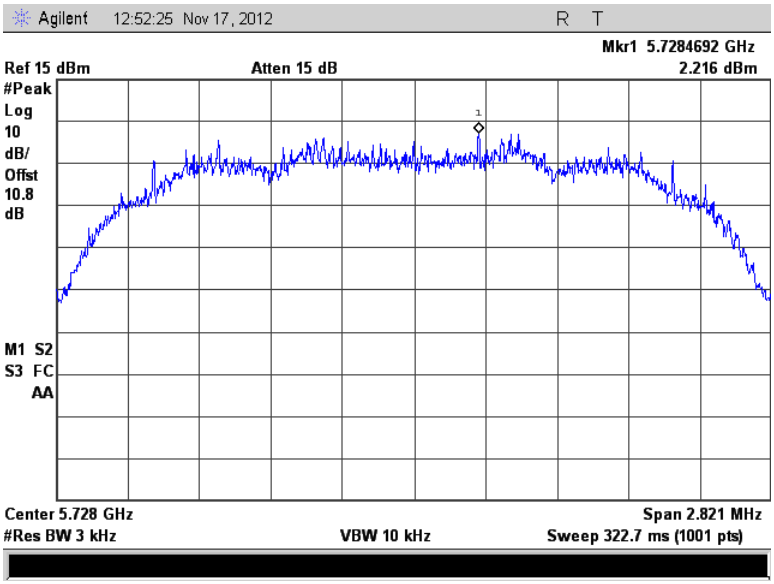

Figure 7.5.2-4: Power Spectral Density - Low Channel – 2 Mbps

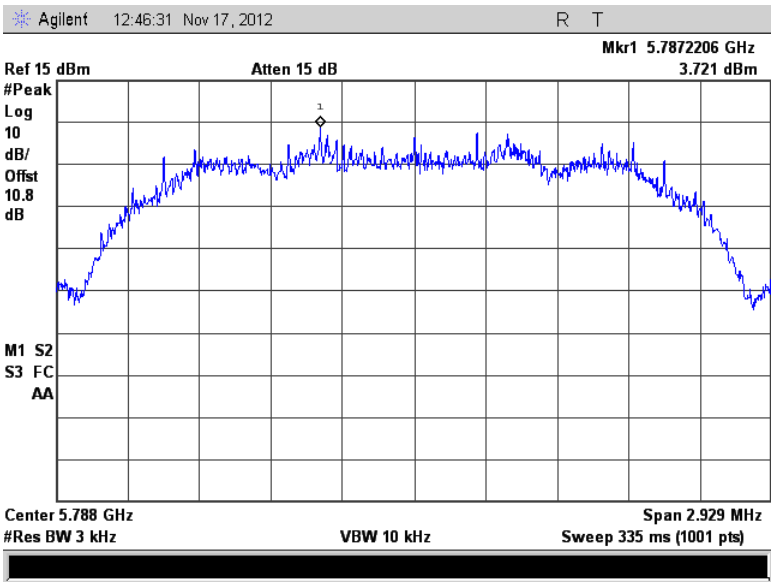

Figure 7.5.2-5: Power Spectral Density - Middle Channel – 2 Mbps

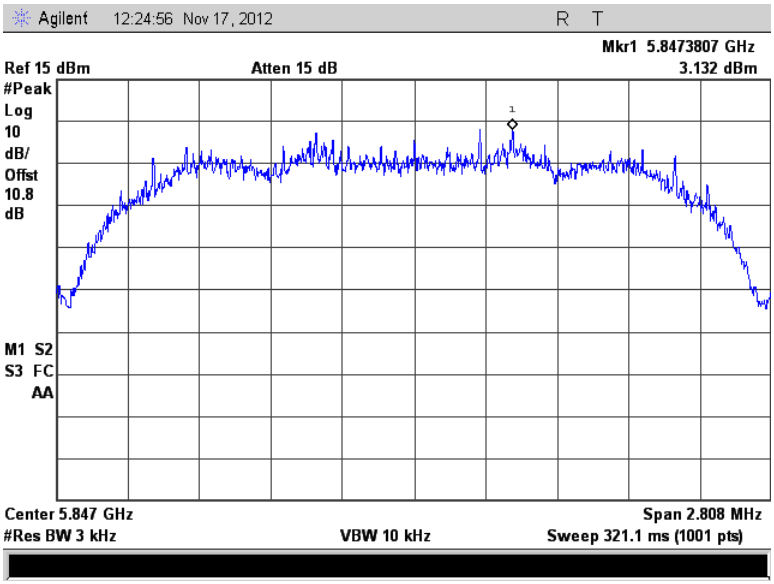

Figure 7.5.2-6: Power Spectral Density – High Channel – 2 Mbps

7.6 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 7.2.4

7.6.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents 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

Results are shown below.

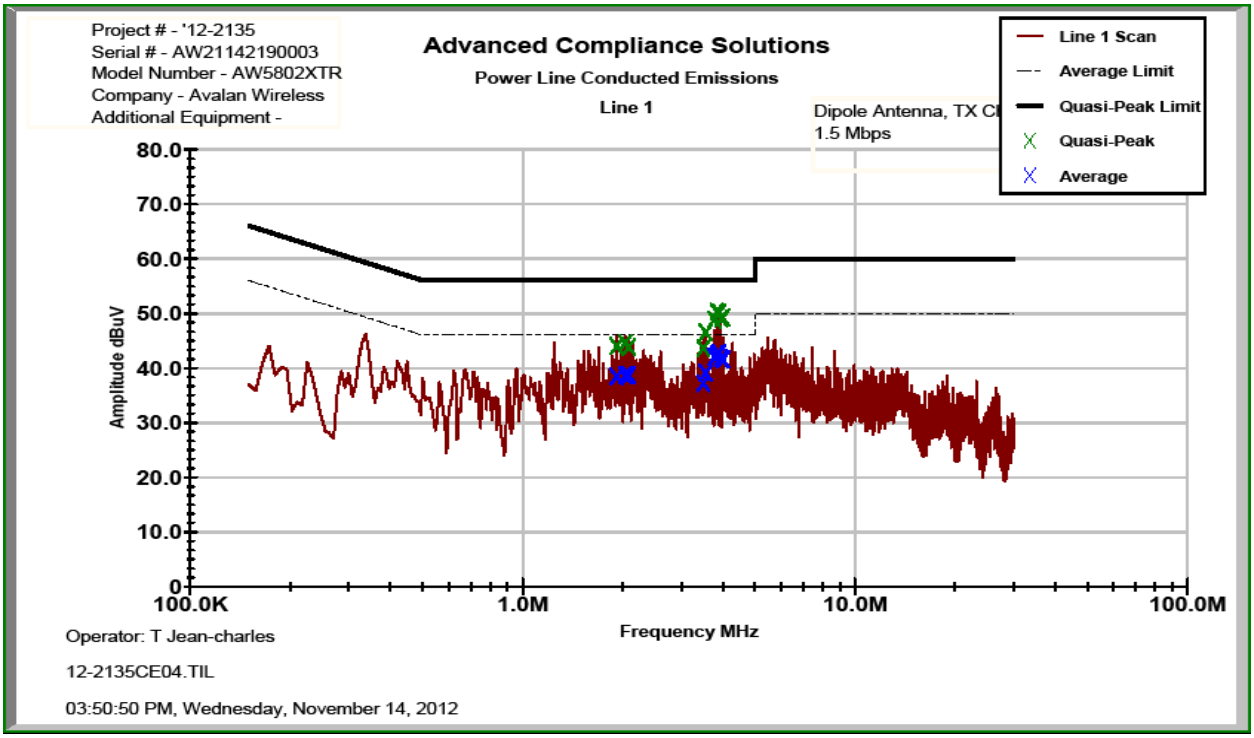

Figure 7.6.2-1: Conducted Emissions Results – Line 1

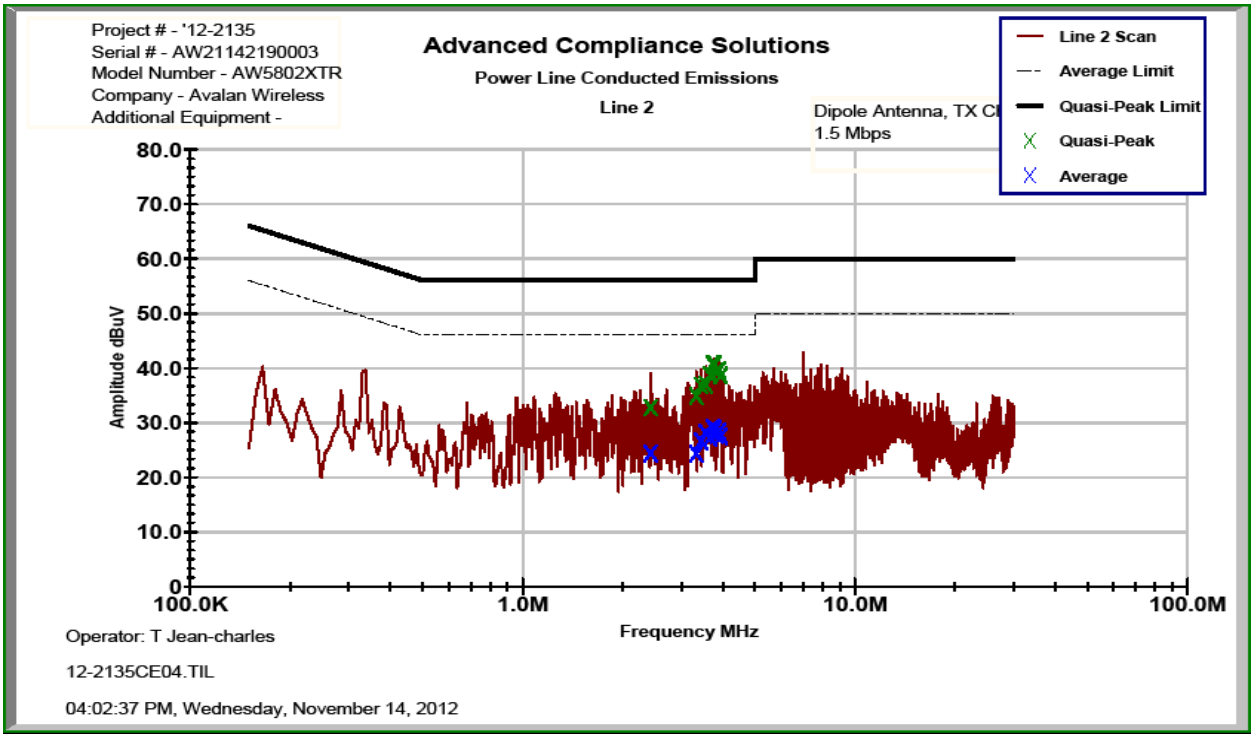

Figure 7.6.2-2: Conducted Emissions Results – Line 2

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: 12-2135CE04
Power Supply Description: 12 VDC

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
Line 1									
1.91566	43.524	37.928	0.45	43.97	38.38	56.00	46.00	12.0	7.6
2.02835	44.08	38.208	0.46	44.54	38.67	56.00	46.00	11.5	7.3
2.08509	43.399	38.151	0.46	43.86	38.61	56.00	46.00	12.1	7.4
3.4925	43.017	36.65	0.52	43.54	37.17	56.00	46.00	12.5	8.8
3.5491	45.958	38.539	0.52	46.48	39.06	56.00	46.00	9.5	6.9
3.77589	48.302	41.403	0.52	48.82	41.92	56.00	46.00	7.2	4.1
3.83153	49.711	41.925	0.52	50.23	42.44	56.00	46.00	5.8	3.6
3.8877	49.485	42.087	0.52	50.00	42.61	56.00	46.00	6.0	3.4
3.94535	48.455	41.231	0.52	48.97	41.75	56.00	46.00	7.0	4.3
3.9999	48.649	40.911	0.52	49.17	41.43	56.00	46.00	6.8	4.6
Line 2									
2.42266	32.192	23.852	0.50	32.69	24.35	56.00	46.00	23.3	21.7
3.32551	34.269	23.746	0.56	34.83	24.30	56.00	46.00	21.2	21.7
3.43721	36.189	25.971	0.56	36.75	26.53	56.00	46.00	19.3	19.5
3.54705	36.39	27.581	0.56	36.95	28.14	56.00	46.00	19.1	17.9
3.66412	38.012	26.682	0.56	38.57	27.24	56.00	46.00	17.4	18.8
3.71893	40.176	28.395	0.56	40.73	28.95	56.00	46.00	15.3	17.0
3.77471	40.07	28.186	0.56	40.63	28.74	56.00	46.00	15.4	17.3
3.83332	38.752	27.126	0.56	39.31	27.68	56.00	46.00	16.7	18.3
3.88651	38.965	27.738	0.56	39.52	28.29	56.00	46.00	16.5	17.7
3.94471	37.986	26.912	0.56	38.54	27.47	56.00	46.00	17.5	18.5

* Note: Results are reported for the EUT configuration leading to the worst case emissions.

8 CONCLUSION

In the opinion of ACS, Inc. the AW5802MR, manufactured by AvaLAN Wireless Systems meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT