



CERTIFICATION TEST REPORT

Report Number. : 12518840-E2V7

Applicant : LYTX INC
9785 TOWNE CENTRE DR
SAN DIEGO, CA, 92121

Model : DC-6000-030

FCC ID : UO3UN1DK-D

IC : 6778A-UN1DKD

EUT Description : BATTERY POWERED EVENT RECORDER PLACED
ON THE VEHICLE WINDSHIELD WITH WIFI MODULE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

Date Of Issue:
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	1/15/2019	Initial Issue	Eric Y
V2	2/5/2019	Update Antenna Gain Ch 1	Jose M
V3	2/20/2019	Addressed TCB comments	Tri P
V4	2/21/2019	Addressed TCB comments	Tri P
V5	3/1/2019	Revised Output Power section for 5.2 GHz band Revised Worst-Case configuration and mode section Revised Maximum Output Power section	F. Ibrahim
V6	04/16/2019	Updated Antenna gain	E.Yu
V7	5/15/2019	Removed UNII-1 data	Tri P

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LYTX INC
9785 TOWNE CENTRE DR
SAN DIEGO, CA, 92121

EUT DESCRIPTION: BATTERY POWERED EVENT RECORDER PLACED ON THE
VEHICLE WINDSHIELD WITH WiFi MODULE

MODEL: DC-6000-030

SERIAL NUMBER: 1968488 (Conducted)
1968487 (Radiated)

DATE TESTED: October 05, 2018 – April 16, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v02/D03 v01r02/D06 v02, FCC KDB 789033 D02 v02r01, FCC KDB 644545 D03 v01, ANSI C63.10-2013, FCC 06-96, FCC KDB 905462 D02 and D03, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
<input checked="" type="checkbox"/> Chamber A (ISED:2324B-1)	<input type="checkbox"/> Chamber D (ISED:22541-1)	<input type="checkbox"/> Chamber I (ISED:2324A-5)
<input type="checkbox"/> Chamber B (ISED:2324B-2)	<input type="checkbox"/> Chamber E (ISED:22541-2)	<input checked="" type="checkbox"/> Chamber J (ISED:2324A-6)
<input type="checkbox"/> Chamber C (ISED:2324B-3)	<input type="checkbox"/> Chamber F (ISED:22541-3)	<input checked="" type="checkbox"/> Chamber K (ISED:2324A-1)
	<input type="checkbox"/> Chamber G (ISED:22541-4)	<input checked="" type="checkbox"/> Chamber L (ISED:2324A-3)
	<input type="checkbox"/> Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable} \\ &\text{Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Final Voltage (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \\ &\text{LISN Insertion Loss.} \\ 36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} &= 46.6 \text{ dBuV} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

Battery powered event recorder placed on the vehicle windshield with Wi-Fi module

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.8 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 2TX			
5745-5825	802.11n HT20 CDD	13.36	21.68
5755-5795	802.11n HT40 CDD	13.55	22.65
5775	802.11ac VHT80 CDD	11.49	14.09

5.8 GHz BAND (IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 2TX			
5745-5825	802.11n HT20 CDD	13.36	21.68
5755-5795	802.11n HT40 CDD	13.55	22.65
5775	802.11ac VHT80 CDD	11.49	14.09

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of:

Frequency (GHz)	Peak Antenna Gain (dBi)	
	Main (Antenna 1)	Sub (Antenna 2)
5725-5850	4.50	3.50

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was FW build 109

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT was used in only standalone orientation; therefore, all final radiated testing was performed with the EUT in standalone orientation.

Worst-case data rates as provided by the client were:

802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT80 mode: MCS0

802.11a is covered by 802.11n-HT20, 802.11ac-VHT20 is covered by 802.11n-HT20, and 802.11ac-VHT40 is covered by 802.11n-HT40.

The power per chain for 2TX configuration is the same power SISO configuration. Therefore, 2TX configuration data in this report covers SISO configuration.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	20B7S0A200	PC015REW	NA
AC Adapter	SONY	UCH12	4016W40310044	NA
DC Power Supply	Ametek	XT 20-3	T451	N/A

I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

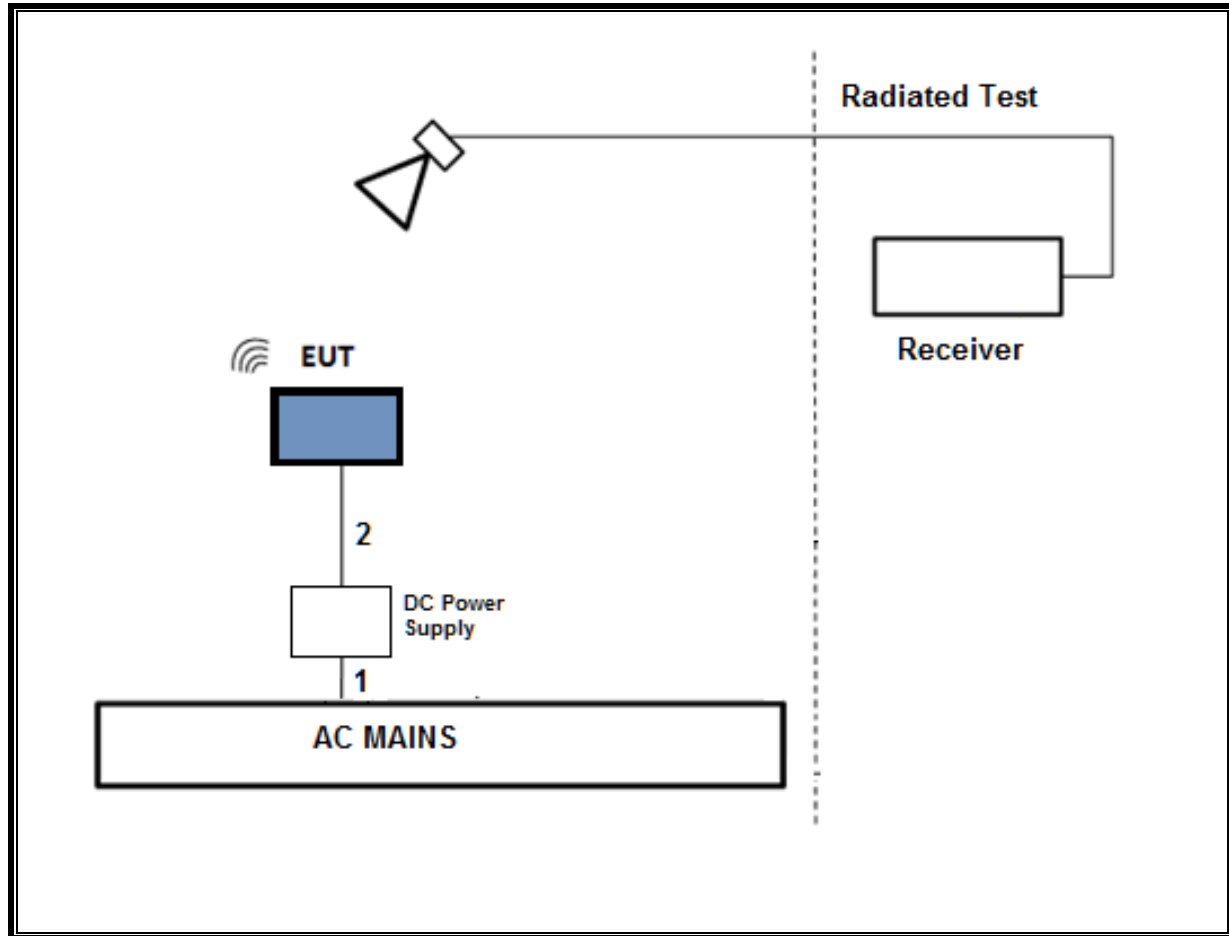
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Shielded	1	N/A
2	DC	1	DC	Shielded	3	N/A

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Shielded	1	N/A
2	DC	1	DC	Shielded	3	N/A
3	USB	1	USB	Shielded	0.2	USB-DB9
4	AC	1	AC	Shielded	1	N/A
5	DC	1	DC	Shielded	1.5	N/A
6	Antenna	1	RF	Shielded	0.1	To Spectrum Analyzer

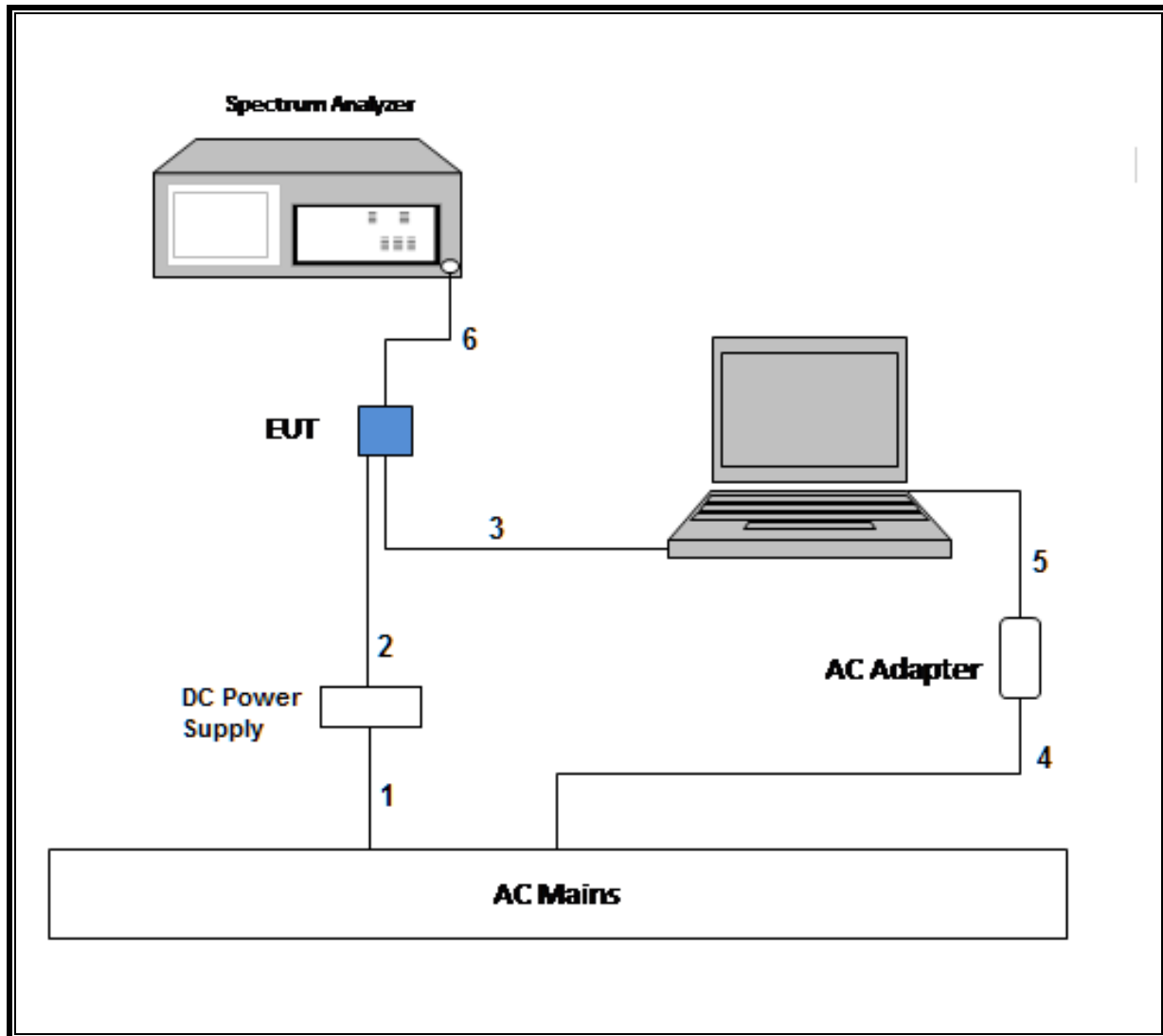
TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR CONDUCTED TESTS



6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and KDB 789033 D02 v02r01, Section E.2.b (Method SA-1)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	PRE0165308	12/13/2018	12/13/2017
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	T130	10/16/2018	10/16/2017
Amplifier, 100KHz-1GHz, 32dB	Agilent (keysight) Technologies	8447D	T15	08/15/2019	08/15/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	04/30/2019	04/30/2018
RF Amplifier, 1-18GHz, 35dB	AMPLICAL	AMP1G18-35	T1509	06/03/2019	06/03/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	EMC4294	04/30/2019	04/30/2018
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	T1568	06/21/2019	06/21/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	AT0067	03/26/2019	03/26/2018
RF Amplifier, 1-18GHz	AMPLICAL	AMP1G18-35	T1571	07/30/2019	07/30/2018
Antenna Horn 18-26.5GHz	ARA	MWH-1826/B	T448	03/13/2019	03/13/2018
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/09/2019	03/09/2018
Horn Antenna 26.5 - 40 GHz	ARA	MWH-2640/B	T446	08/09/2019	08/09/2018
Pre-Amp 26-40GHz	MITEQ	NSTTA2640-35-HG	T1864	03/09/2019	03/09/2018
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1271	07/26/2019	07/26/2018
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T1224	10/09/2019	10/09/2018
EMI Receiver	Rohde & Schwarz	ESW44	PRE0179375	05/08/2019	05/8/2018
EMI Receiver	Rohde & Schwarz	ESW44	PRE0179522	05/11/2019	05/11/2018
EMI Receiver	Rohde & Schwarz	ESW44	PRE0179372	05/04/2019	05/04/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019	04/16/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019	01/08/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1113	12/21/2018	12/21/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T200	01/28/2020	01/28/2020
DC Power Supply	AMETEK	XT20-3	T415	NA	NA

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016
Antenna Port Software	UL	UL RF	Ver 9.3, Dec 06, 2018

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

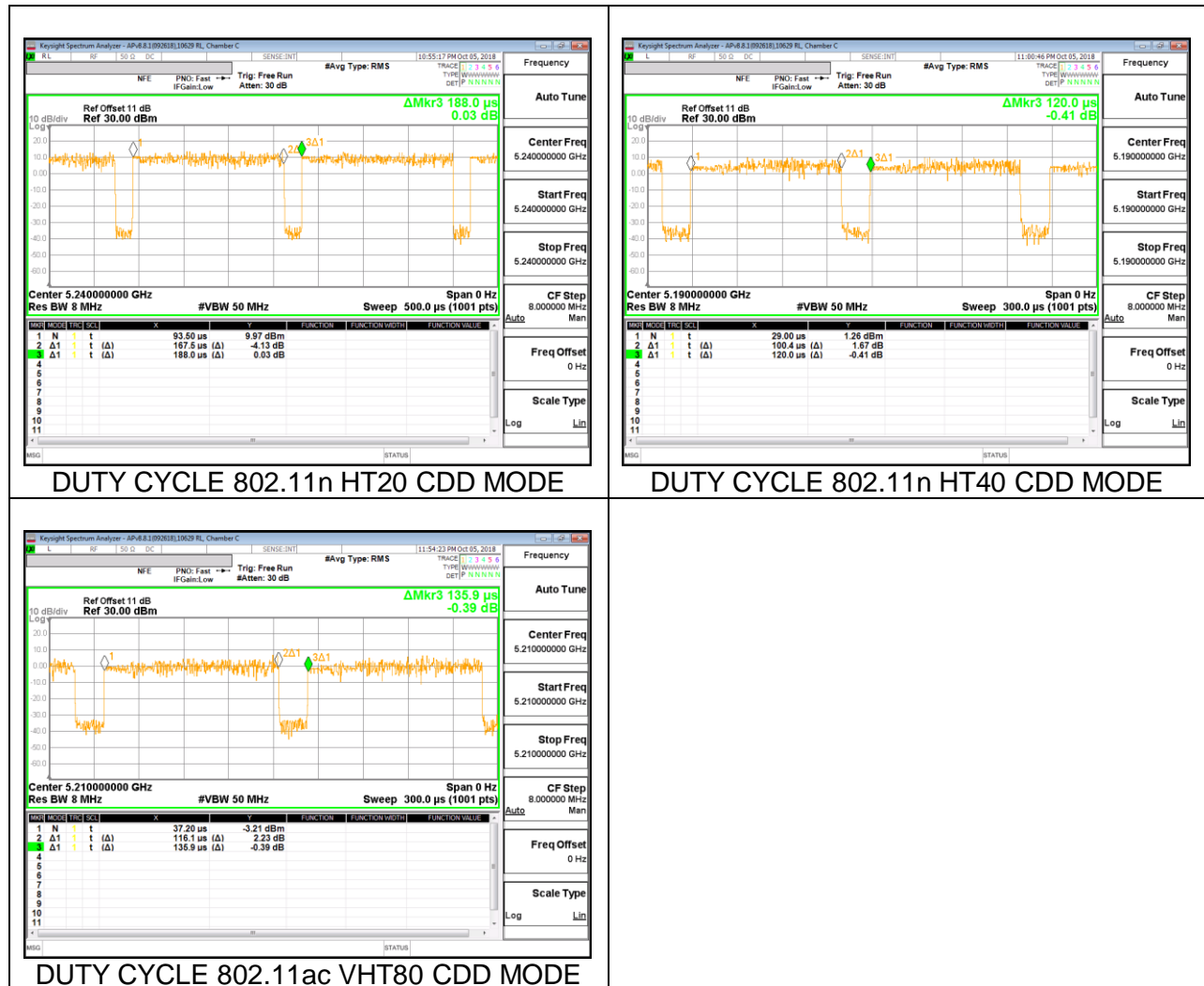
None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11n HT20 CDD	0.168	0.188	0.891	89.10%	0.50	5.970
802.11ac VHT80 CDD	0.100	0.120	0.837	83.67%	0.77	9.960
802.11ac VHT80 SDM	0.116	0.136	0.854	85.43%	0.68	8.613



8.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

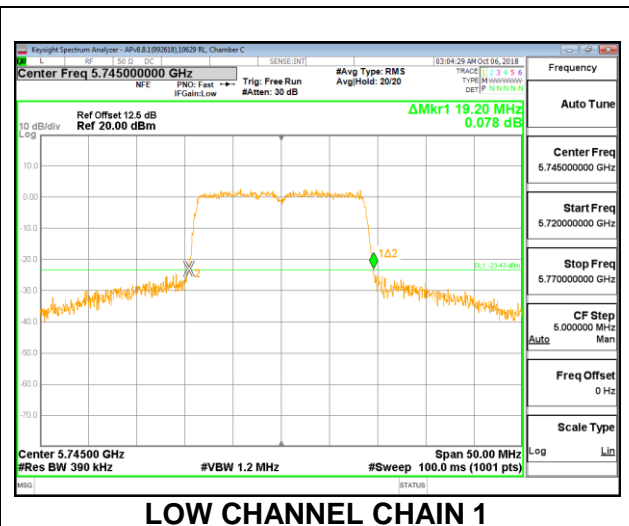
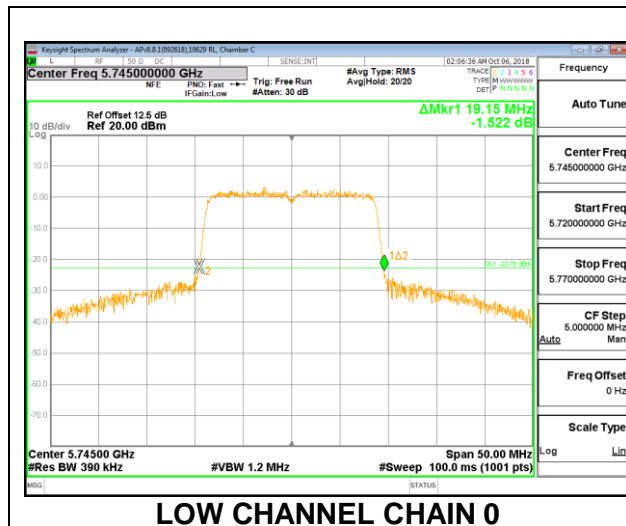
RESULTS

8.2.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

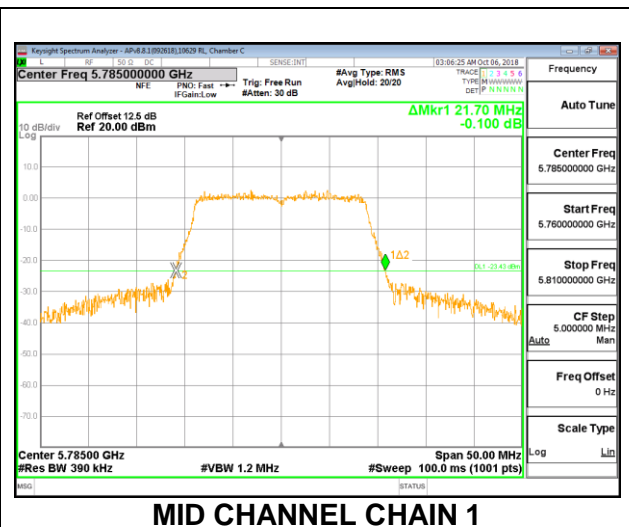
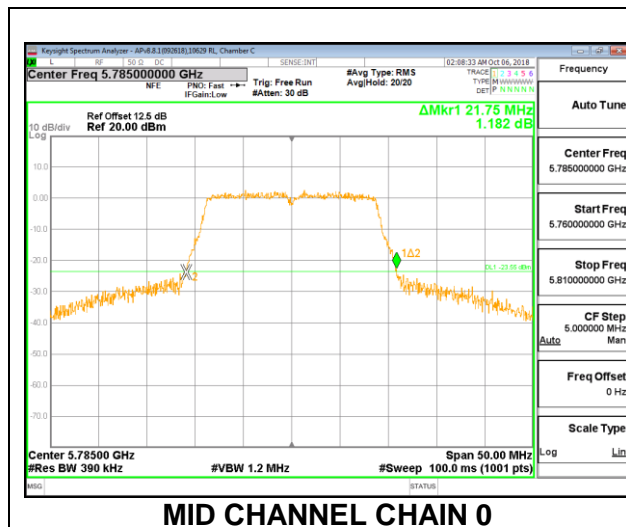
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5745	19.15	19.20
Mid	5785	21.75	21.70
High	5825	22.35	21.90

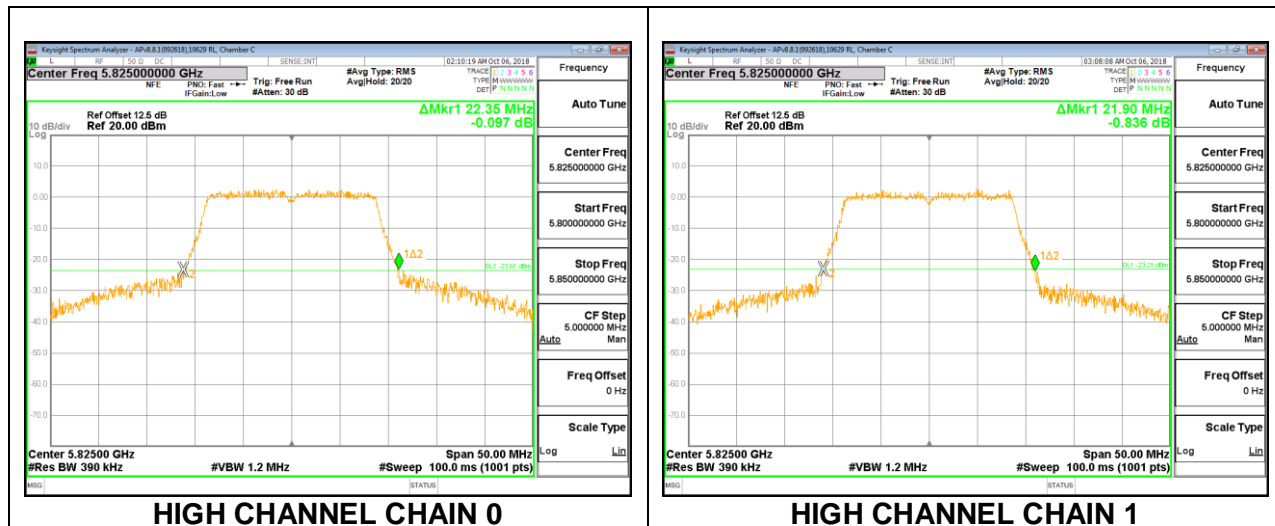
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

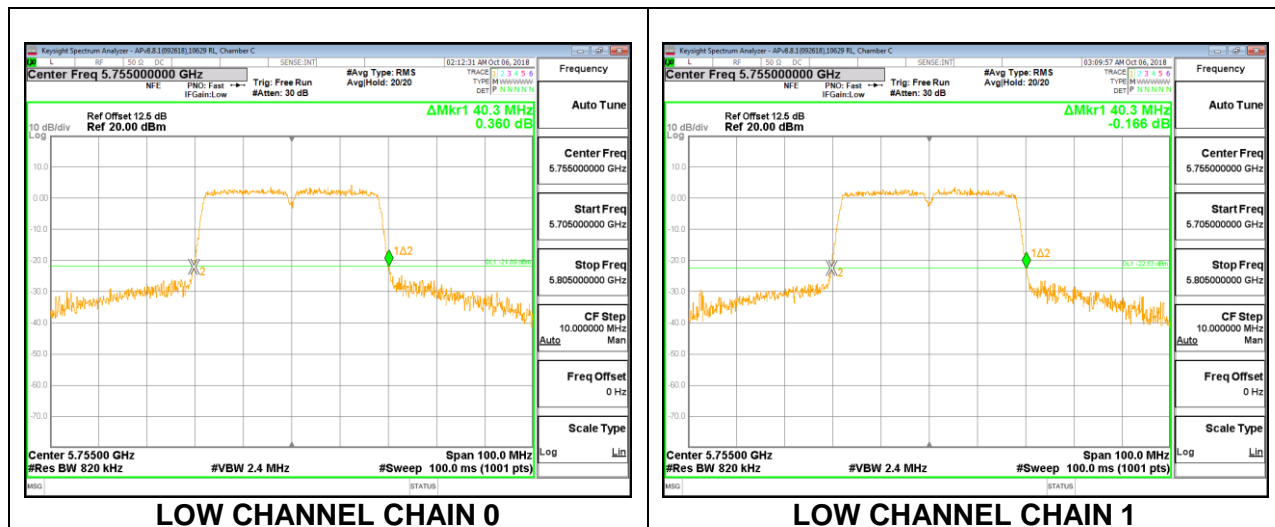


8.2.2. 802.11n HT40 MODE IN THE 5.8 GHz BAND

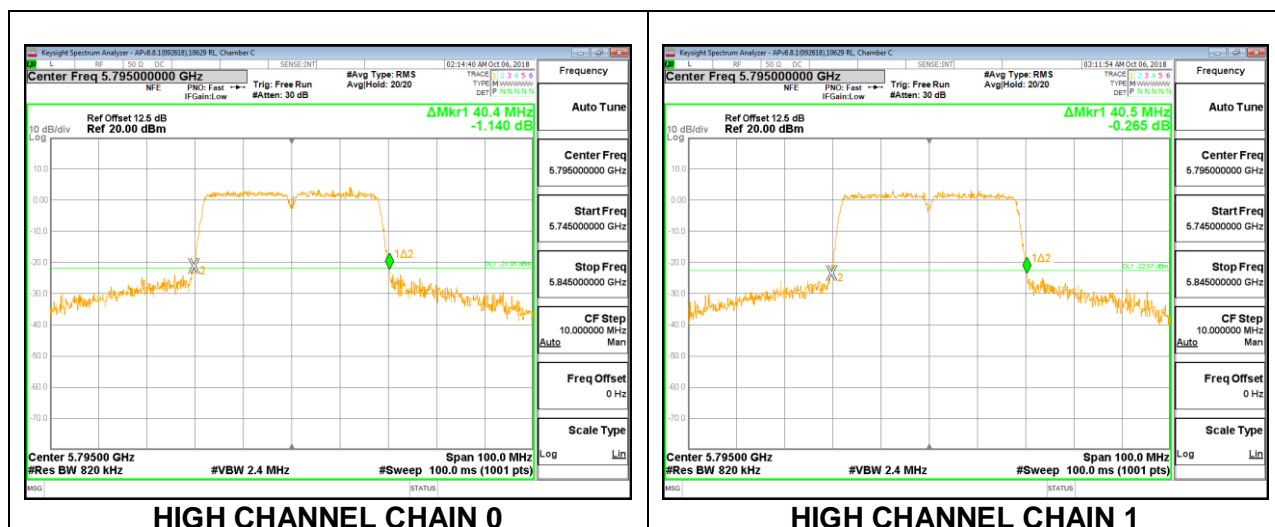
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5755	40.30	40.30
High	5795	40.40	40.50

LOW CHANNEL



HIGH CHANNEL

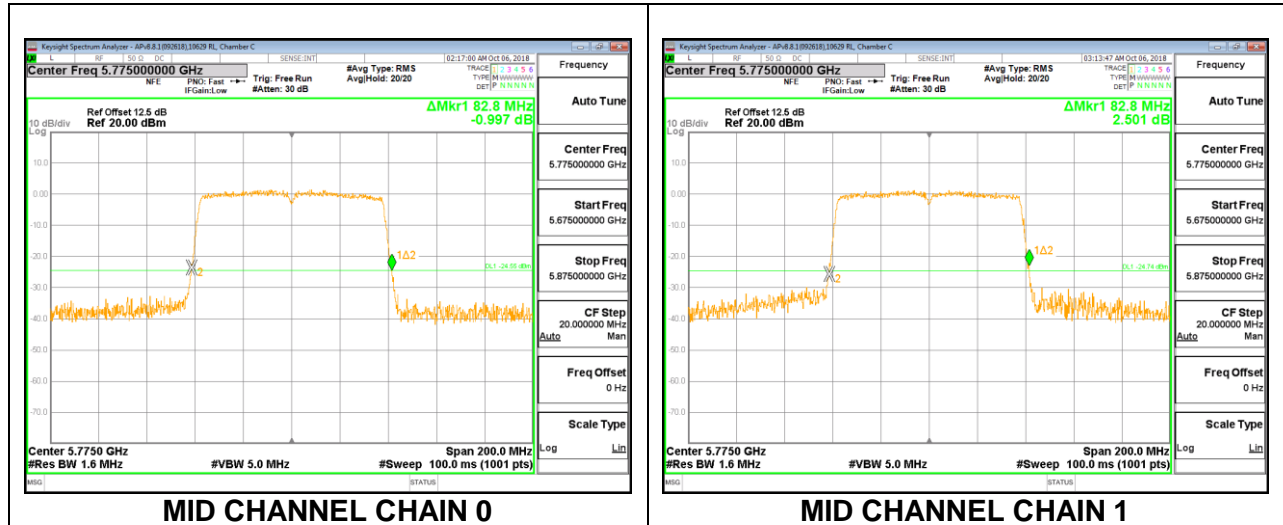


8.2.3. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5775	82.80	82.80

MID CHANNEL



8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

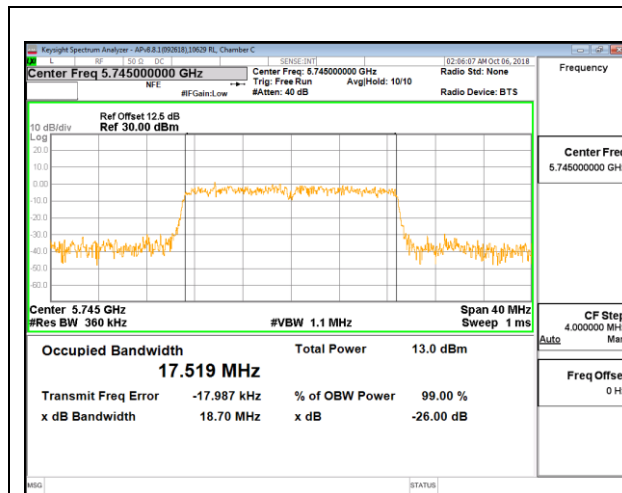
RESULTS

8.3.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

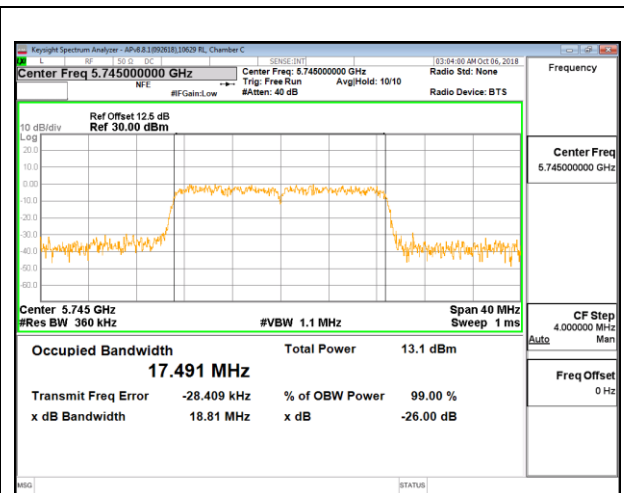
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5745	17.519	17.491
Mid	5785	17.874	17.953
High	5825	17.890	17.951

LOW CHANNEL

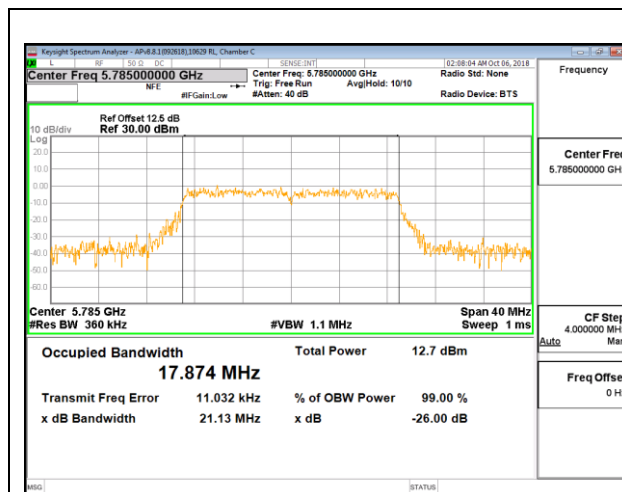


LOW CHANNEL CHAIN 0

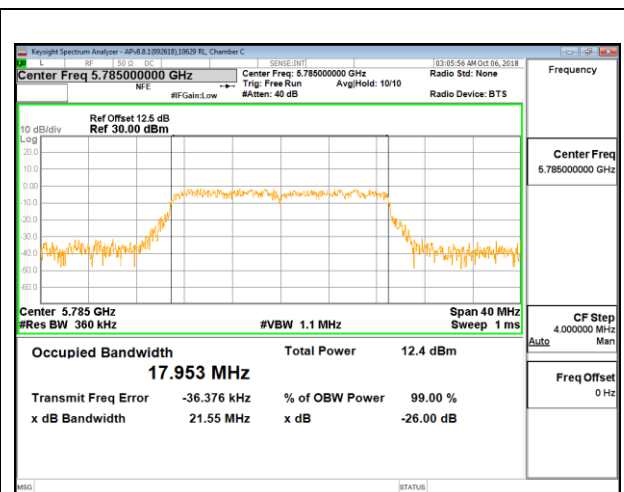


LOW CHANNEL CHAIN 1

MID CHANNEL

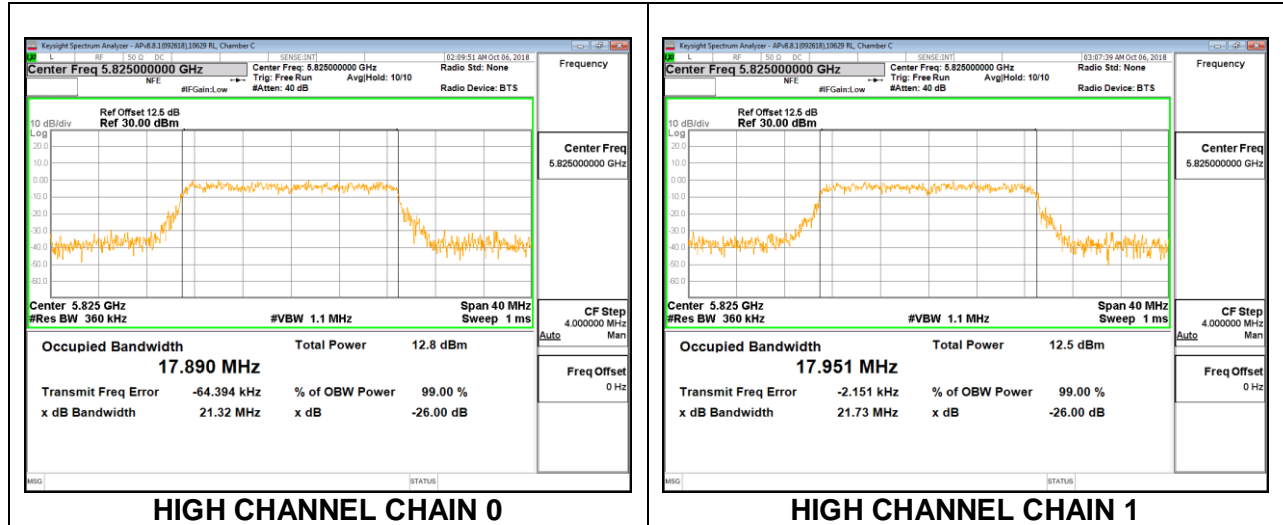


MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

HIGH CHANNEL

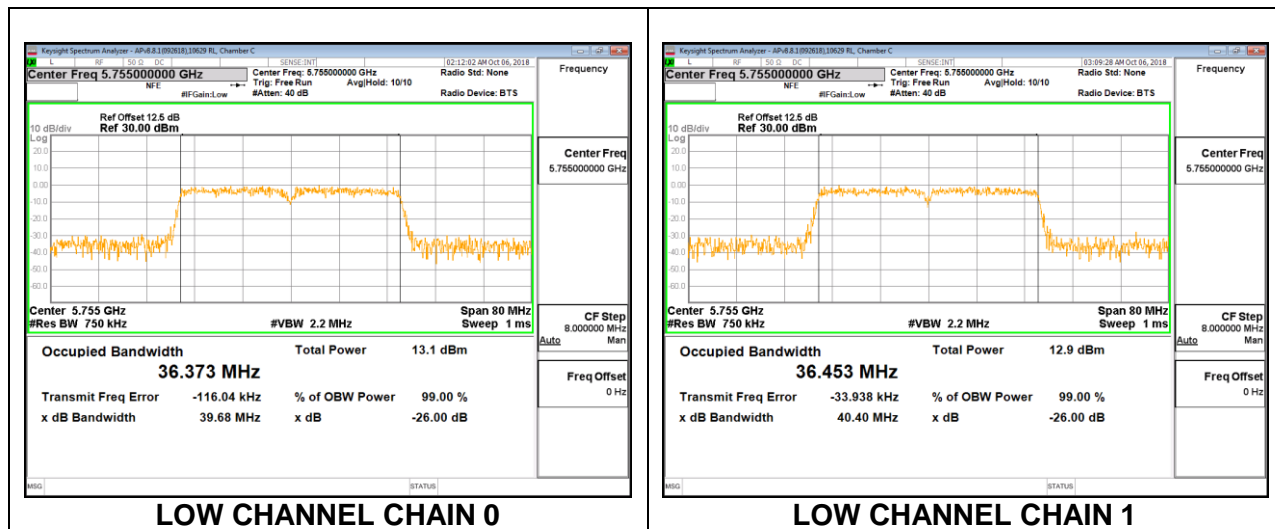


8.3.2. 802.11n HT40 MODE IN THE 5.8 GHz BAND

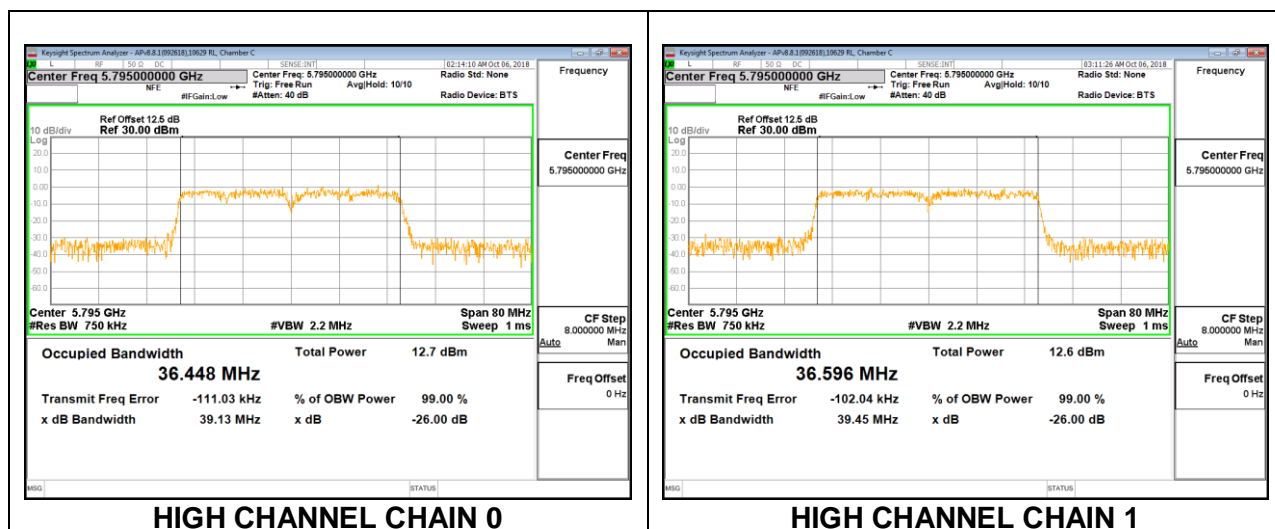
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5755	36.373	36.453
High	5795	36.448	36.596

LOW CHANNEL



HIGH CHANNEL

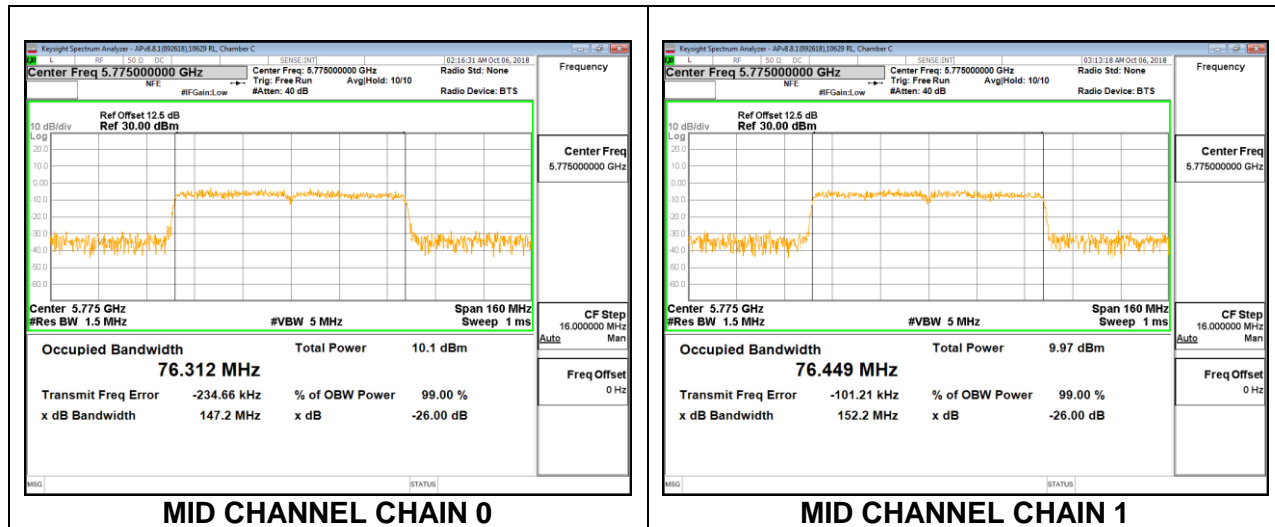


8.3.3. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid	5775	76.312	76.449

MID CHANNEL



8.4. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

RSS-247 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

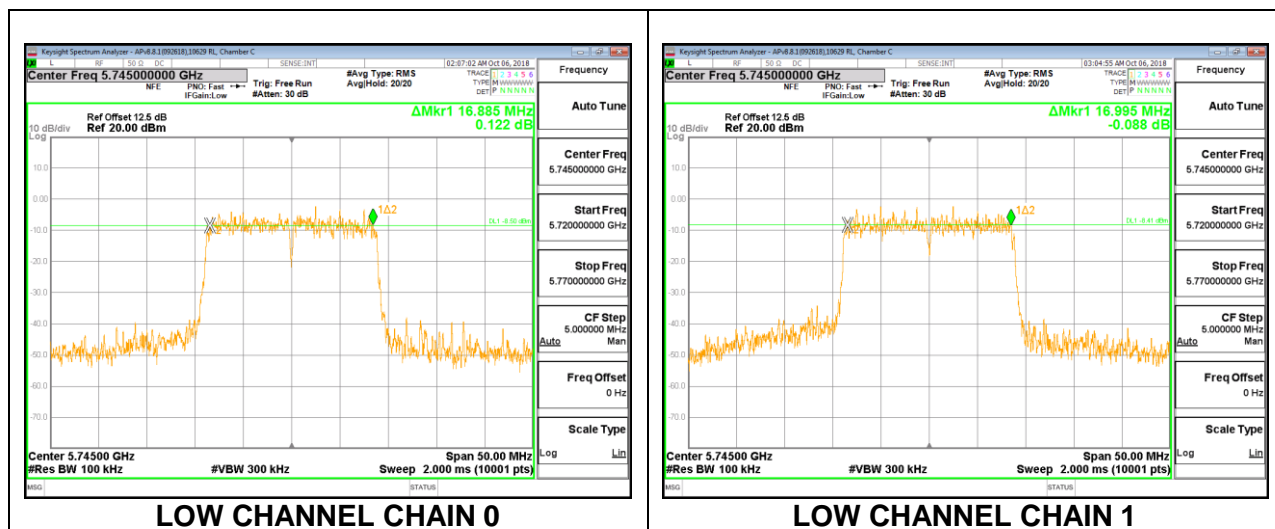
RESULTS

8.4.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

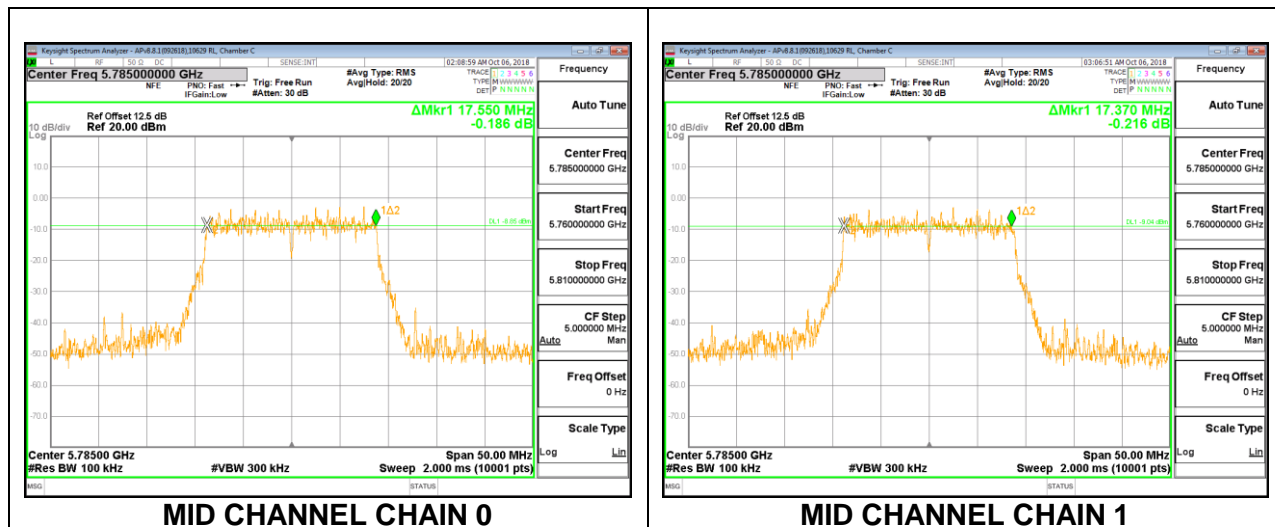
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	16.885	16.995	0.5
Mid	5785	17.550	17.370	0.5
High	5825	17.630	17.240	0.5

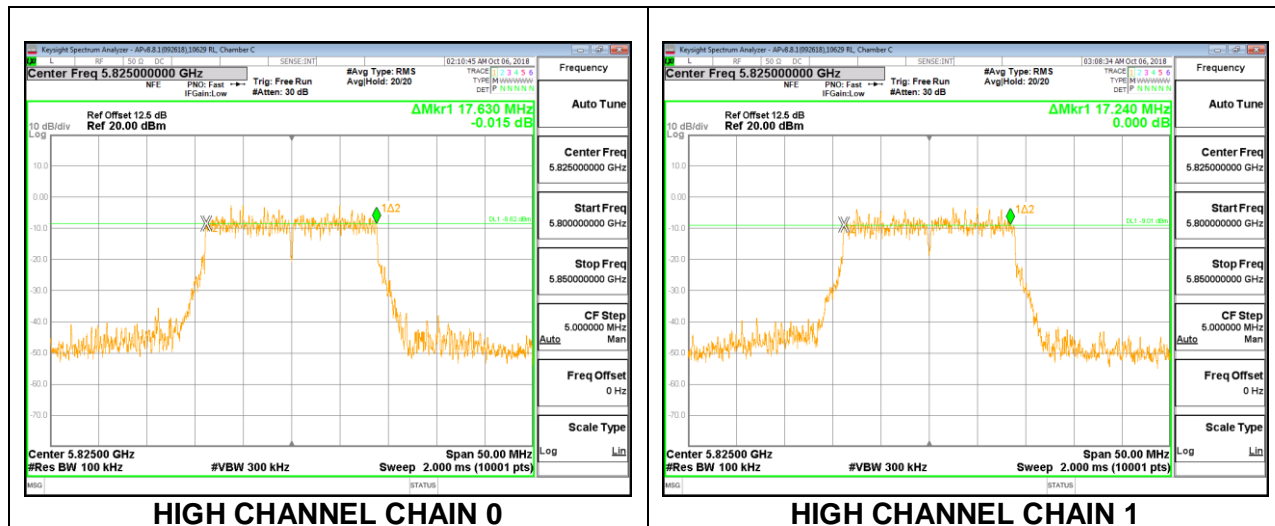
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

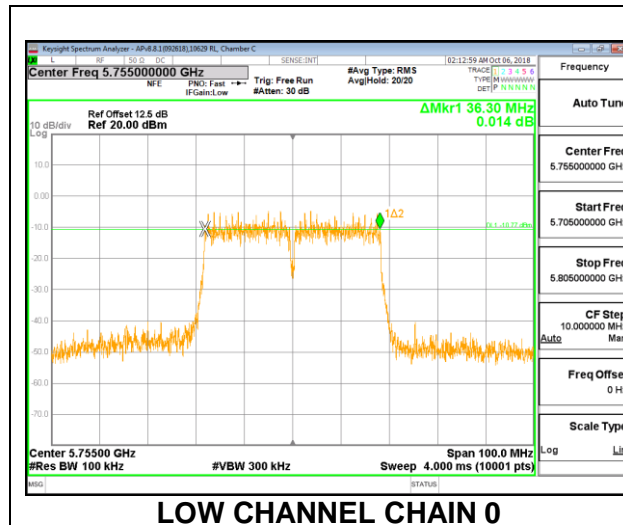


8.4.2. 802.11n HT40 MODE IN THE 5.8 GHz BAND

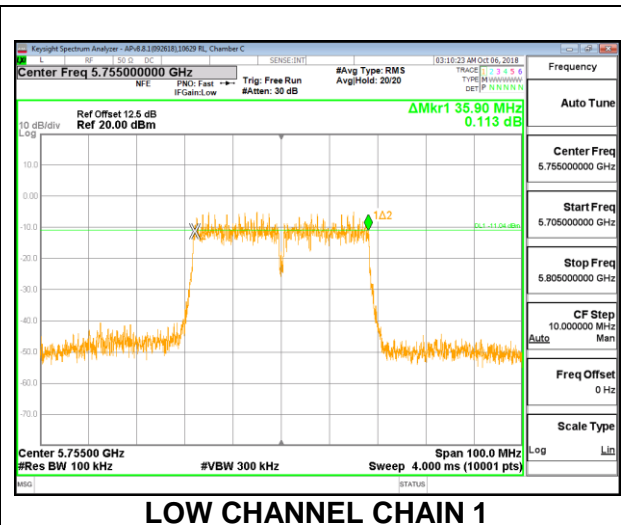
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.300	35.900	0.5
High	5795	35.720	35.960	0.5

LOW CHANNEL

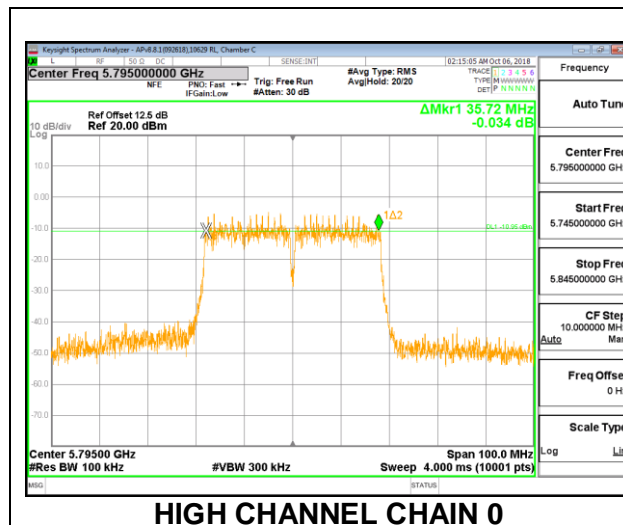


LOW CHANNEL CHAIN 0

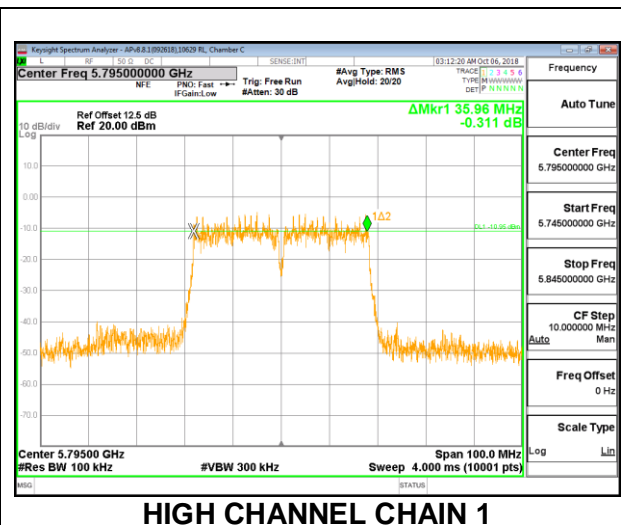


LOW CHANNEL CHAIN 1

HIGH CHANNEL



HIGH CHANNEL CHAIN 0



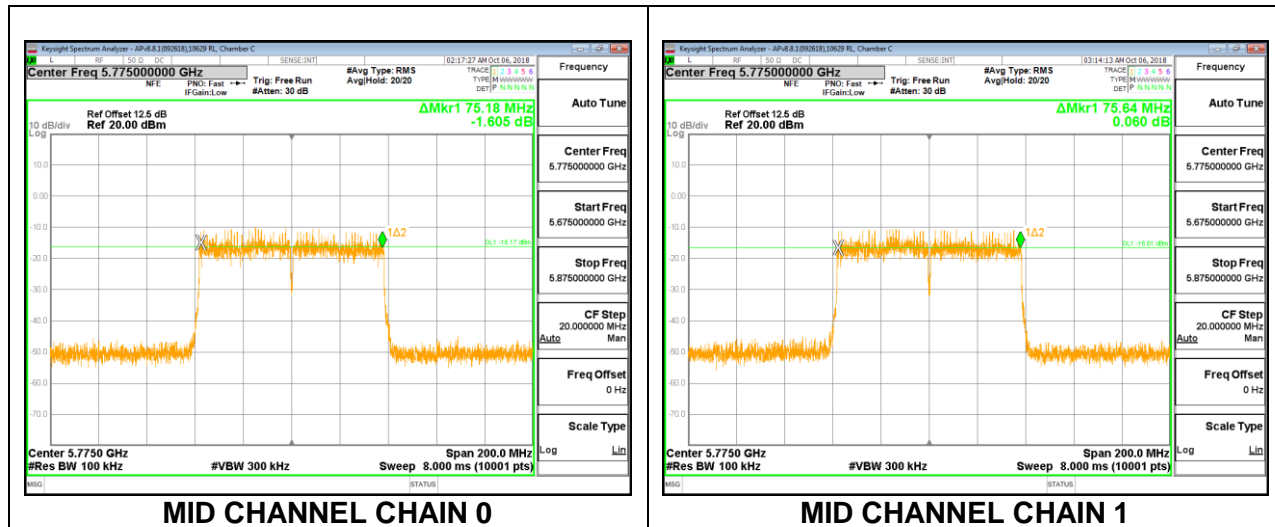
HIGH CHANNEL CHAIN 1

8.4.3. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Mid	5775	75.180	75.640	0.5

MID CHANNEL



8.5. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.725-5.85 GHz

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

RSS-247

Band 5.725-5.85 GHz

The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and for straddles channels KDB 789033 D02 v02r01, Section E.2.b (Method SA-1) was used.

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

DIRECTIONAL ANTENNA GAIN

For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5.8	4.5	3.5	4.03	7.02

RESULTS

8.5.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE (FCC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Direction Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.03	7.02	30.00	28.98
Mid	5785	4.03	7.02	30.00	28.98
High	5825	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.50	Included in Calculations of PSD
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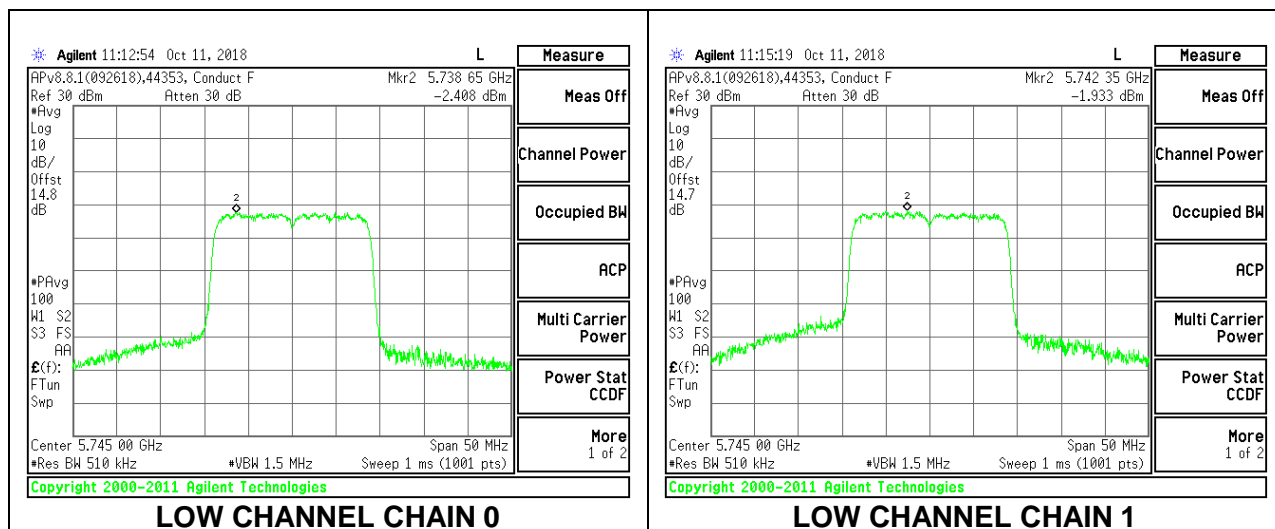
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	10.09	10.60	13.36	30.00	-16.64
Mid	5785	10.10	10.08	13.10	30.00	-16.90
High	5825	10.04	10.01	13.04	30.00	-16.96

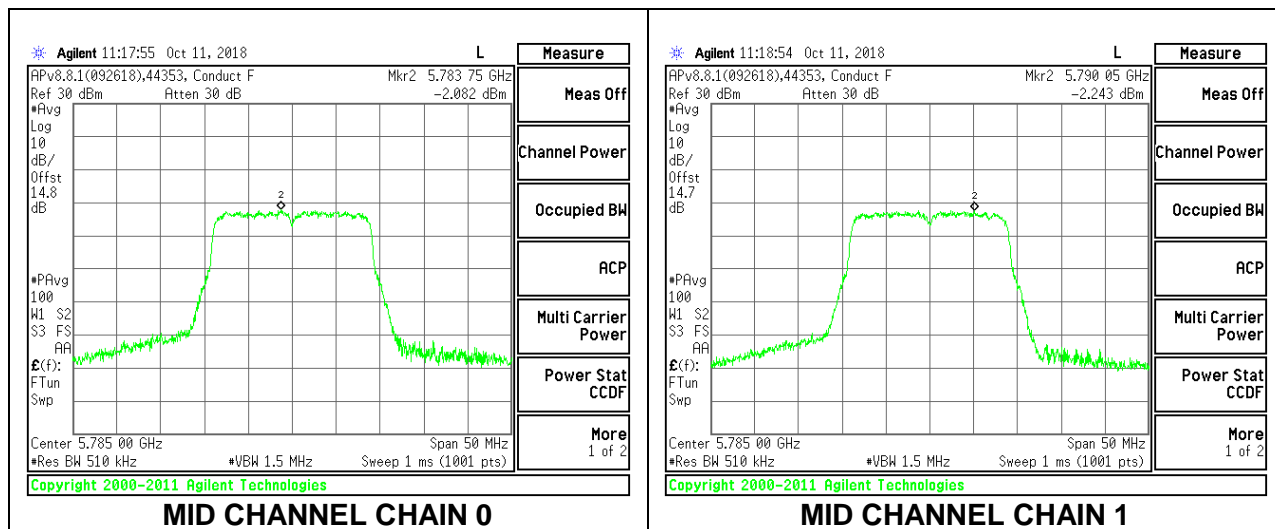
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/500 KHz)	Chain 1 Meas PSD (dBm/500 KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	-2.41	-1.93	1.35	28.98	-27.63
Mid	5785	-2.08	-2.24	1.35	28.98	-27.63
High	5825	-2.20	-2.60	1.11	28.98	-27.87

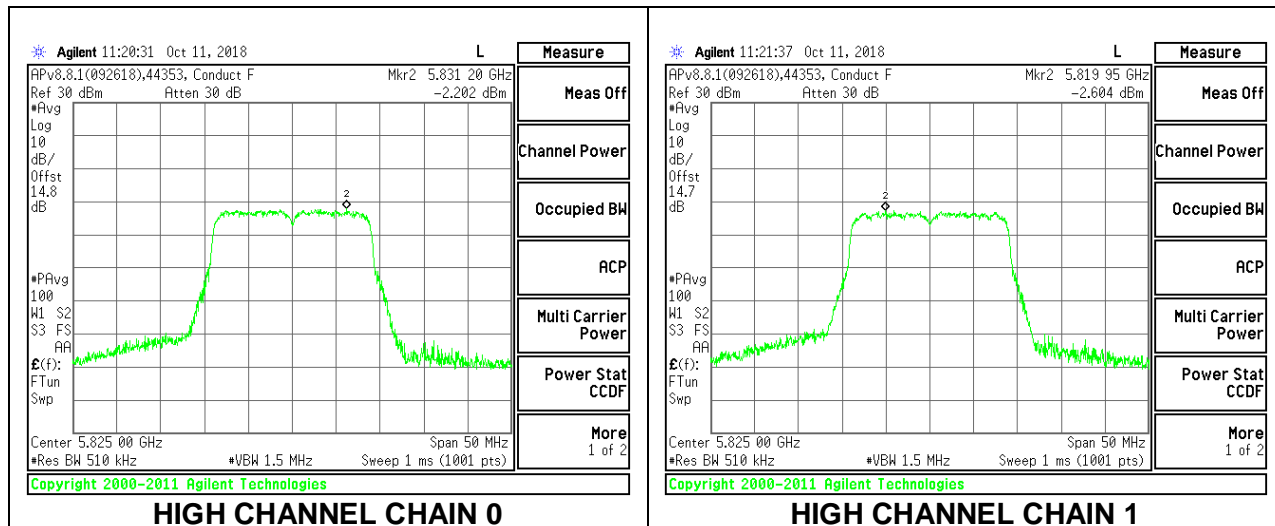
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



2TX Antenna 1 + Antenna 2 CDD MODE (IC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Direction Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.03	7.02	30.00	28.98
Mid	5785	4.03	7.02	30.00	28.98
High	5825	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.50	Included in Calculations of Corr'd PSD
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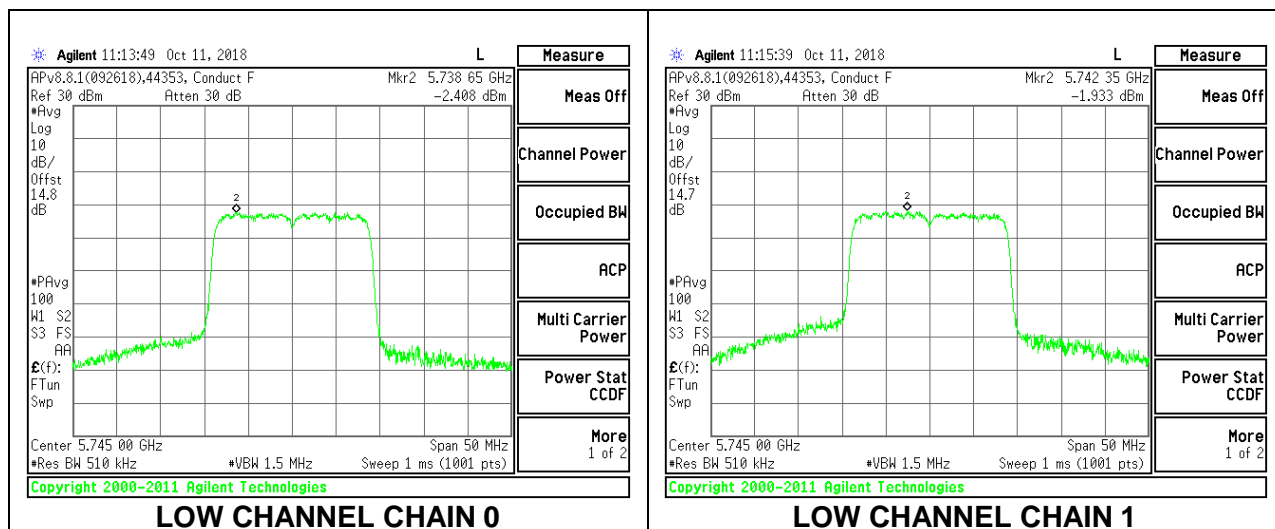
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	10.09	10.60	13.36	30.00	-16.64
Mid	5785	10.10	10.08	13.10	30.00	-16.90
High	5825	10.04	10.01	13.04	30.00	-16.96

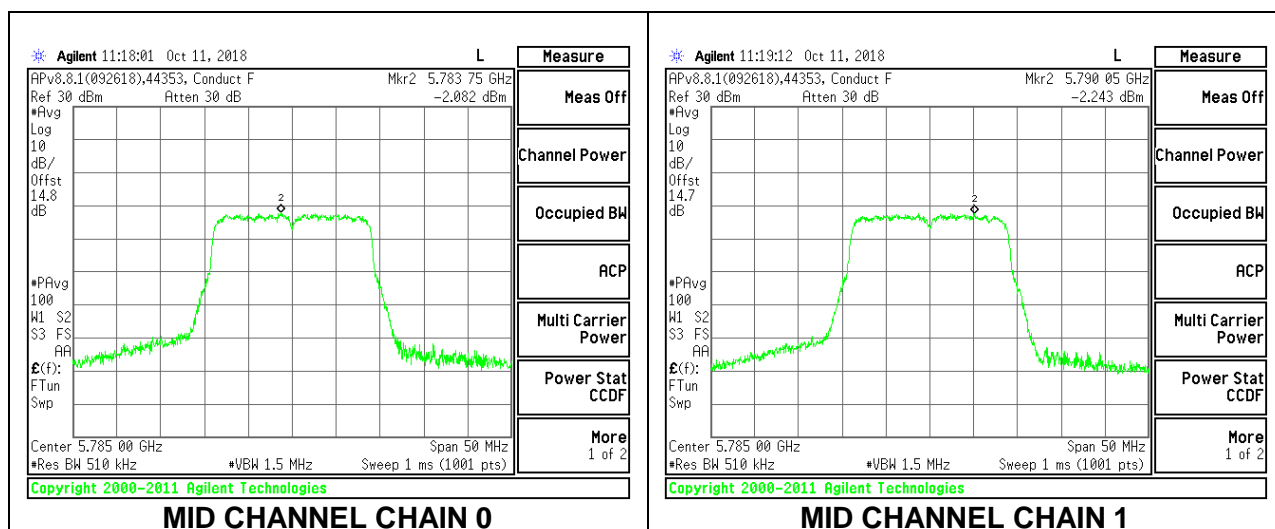
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/500 KHz)	Chain 1 Meas PSD (dBm/500 KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	-2.41	-1.93	1.35	28.98	-27.63
Mid	5785	-2.08	-2.24	1.35	28.98	-27.63
High	5825	-2.20	-2.60	1.11	28.98	-27.87

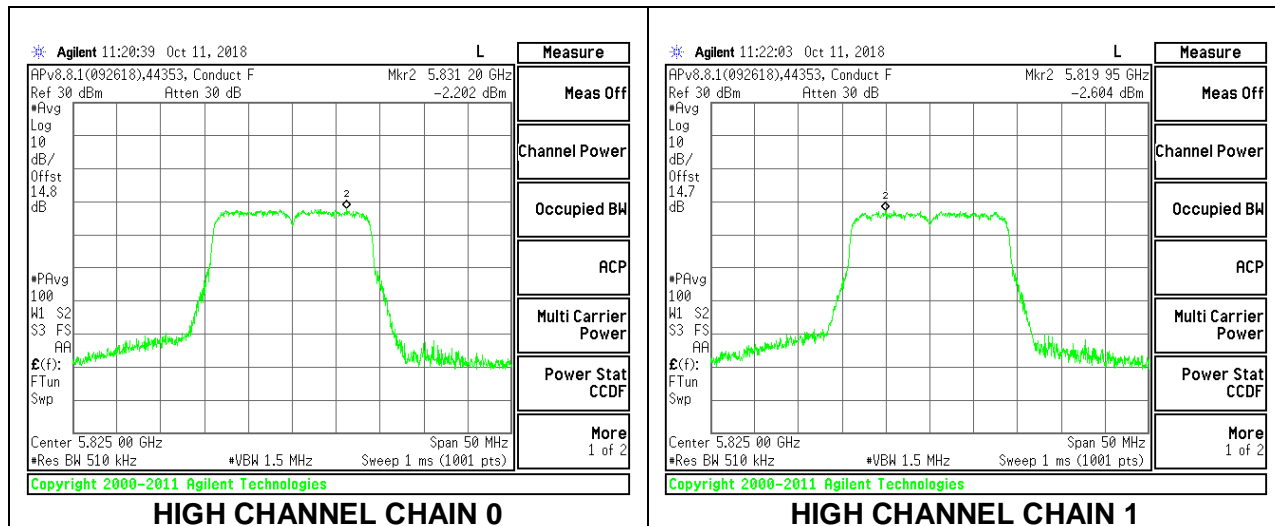
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.5.2. 802.11n HT40 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE (FCC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5755	4.03	7.02	30.00	28.98
High	5795	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.77	Included in Calculations of PSD
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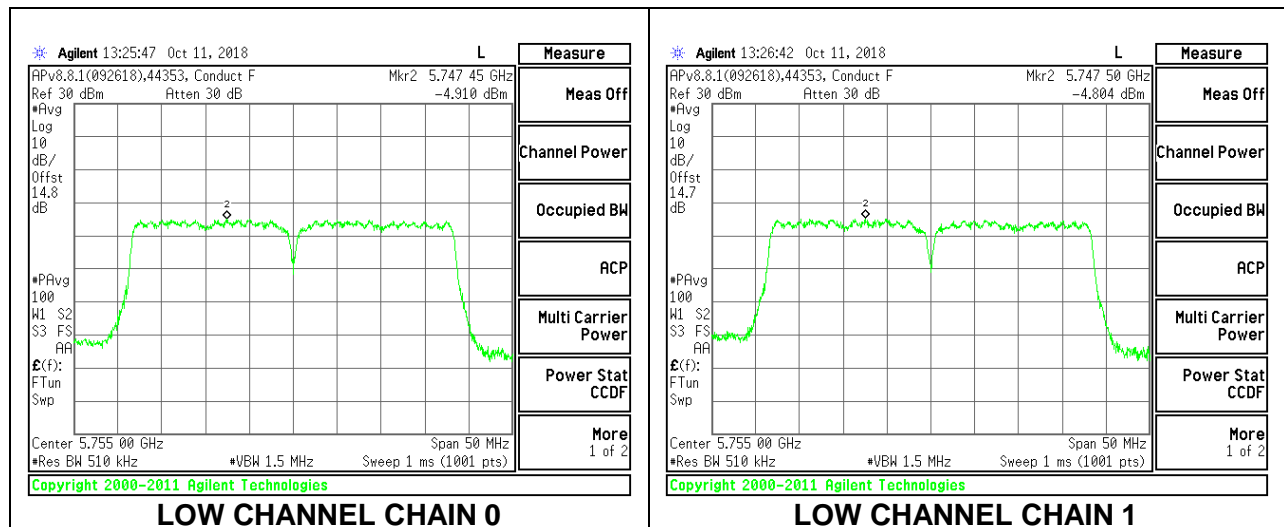
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	10.45	10.63	13.55	30.00	-16.45
High	5795	10.31	10.76	13.55	30.00	-16.45

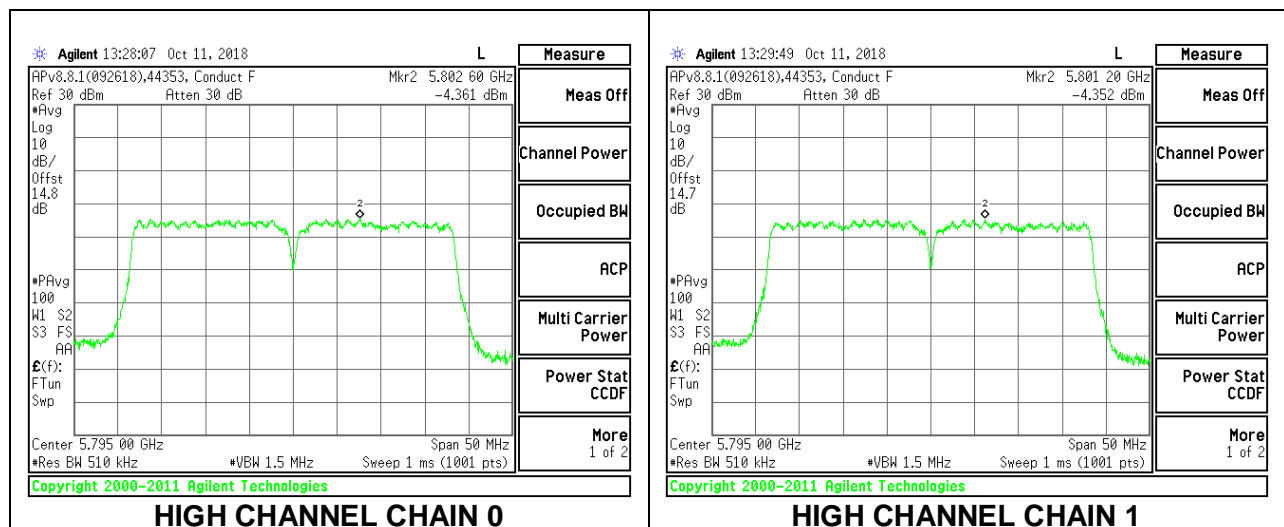
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/ 1MHz)	Chain 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5755	-4.91	-4.80	-1.08	28.98	-30.06
High	5795	-4.36	-4.35	-0.58	28.98	-29.56

LOW CHANNEL



HIGH CHANNEL



2TX Antenna 1 + Antenna 2 CDD MODE (IC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5755	4.03	7.02	30.00	28.98
High	5795	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.77	Included in Calculations of PSD
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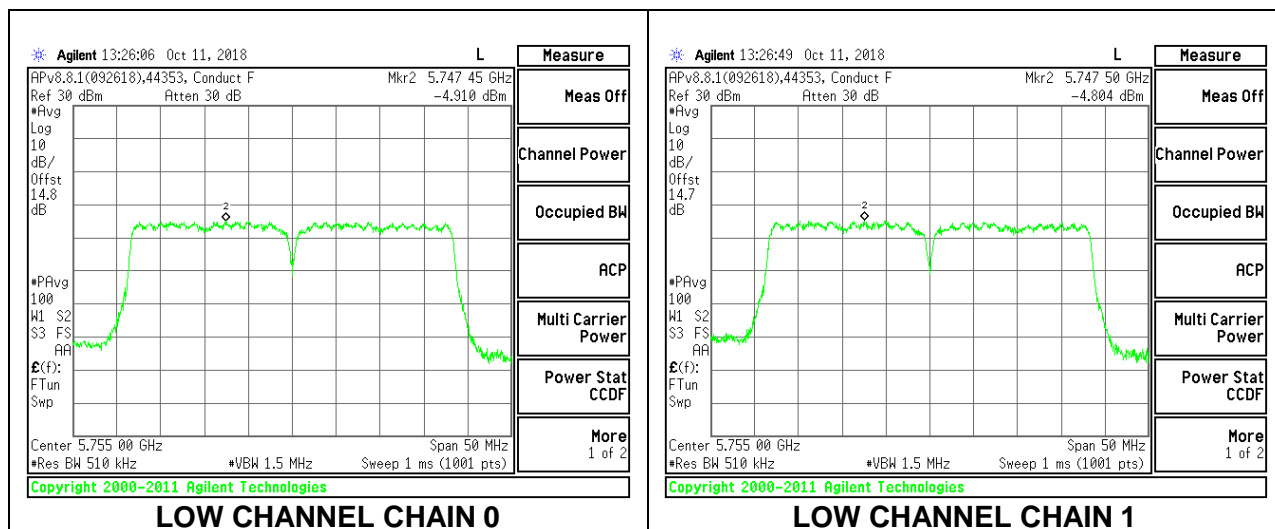
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	10.45	10.63	13.55	30.00	-16.45
High	5795	10.31	10.76	13.55	30.00	-16.45

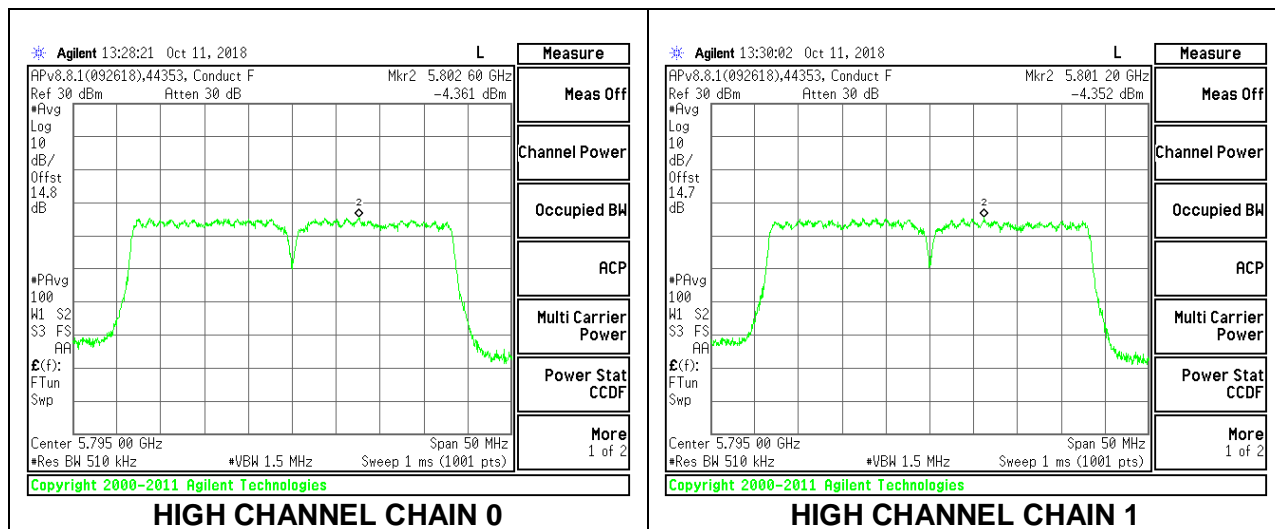
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/ 1MHz)	Chain 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5755	-4.91	-4.80	-1.08	28.98	-30.06
High	5795	-4.36	-4.35	-0.58	28.98	-29.56

LOW CHANNEL



HIGH CHANNEL



8.5.3. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE (FCC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5755	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.68	Included in Calculations of PSD
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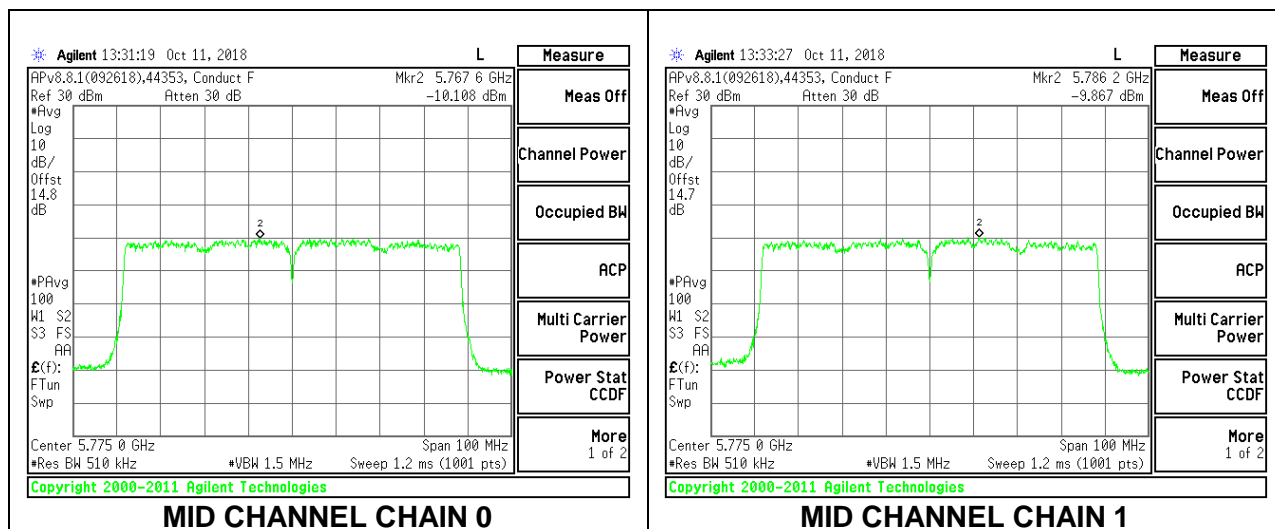
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5755	8.11	8.82	11.49	30.00	-18.51

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/ 1MHz)	Chain 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5775	-10.11	-9.87	-6.30	28.98	-35.28

MID CHANNEL



2TX Antenna 1 + Antenna 2 CDD MODE (IC)

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5755	4.03	7.02	30.00	28.98

Duty Cycle CF (dB)	0.68	Included in Calculations of PSD
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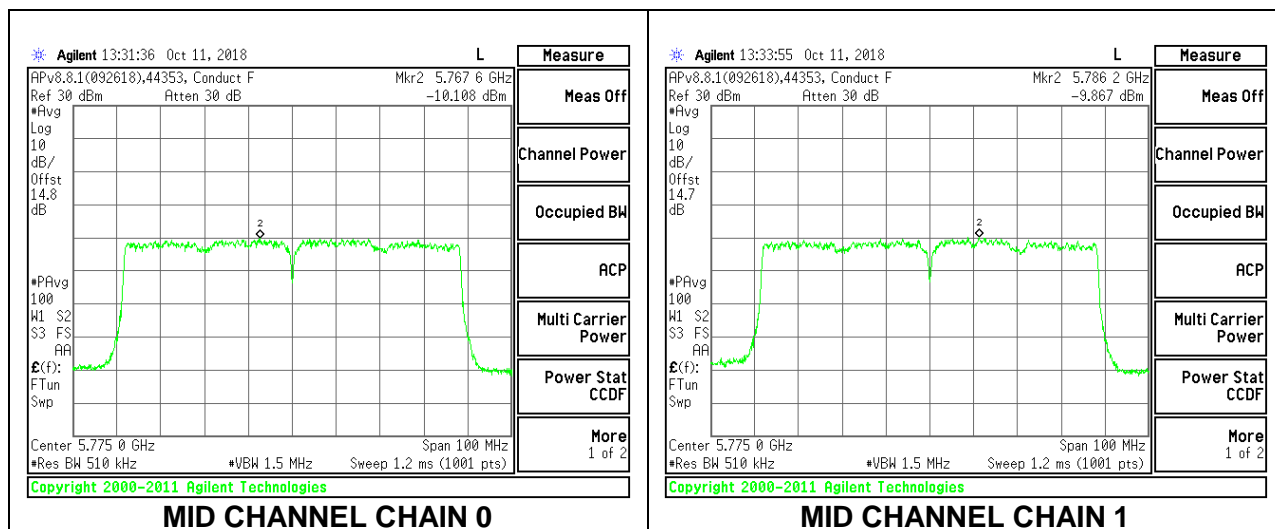
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5755	8.11	8.82	11.49	30.00	-18.51

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm/ 1MHz)	Chain 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5775	-10.11	-9.87	-6.30	28.98	-35.28

MID CHANNEL



9. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209 -Restricted bands

FCC §15.407(b)(1-3) -Un-Restricted bands

After January 01, 2019 for Outside of the Restricted Bands Emissions

RSS 247 Issue 2 Sections

6.2.1.2 (for 5150-5250 MHz band)

6.2.2.2 (for 5250-5350 MHz band)

6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands)

6.2.4.2 (for 5725-5850 MHz band)

NCC LP0002 §2.7 and §2.8

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

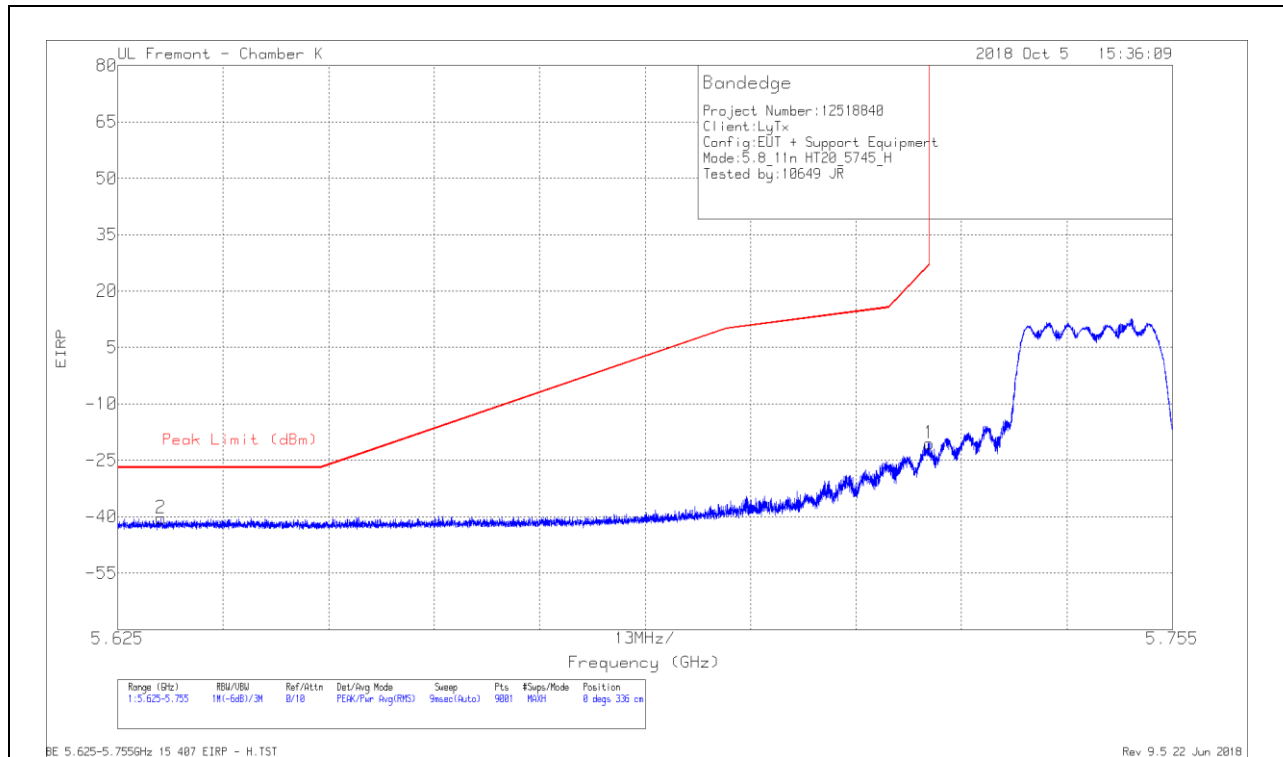
9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

BANDEDGE (LOW CHANNEL)

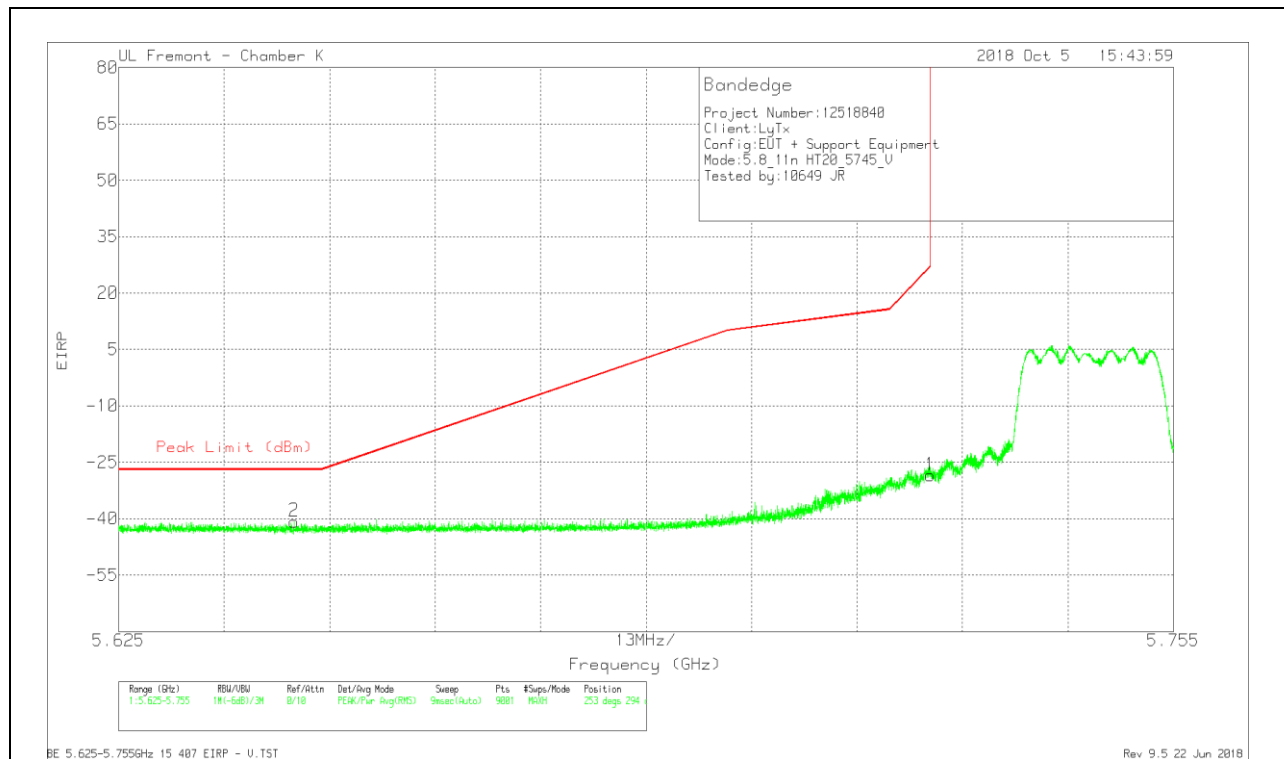
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Filt/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-48.16	Pk	34.9	-19	11.8	-20.46	26.99	-47.45	0	336	H
2	5.63	-67.36	Pk	34.6	-19.5	11.8	-40.46	-27	-13.46	0	336	H

Pk - Peak detector

VERTICAL RESULT

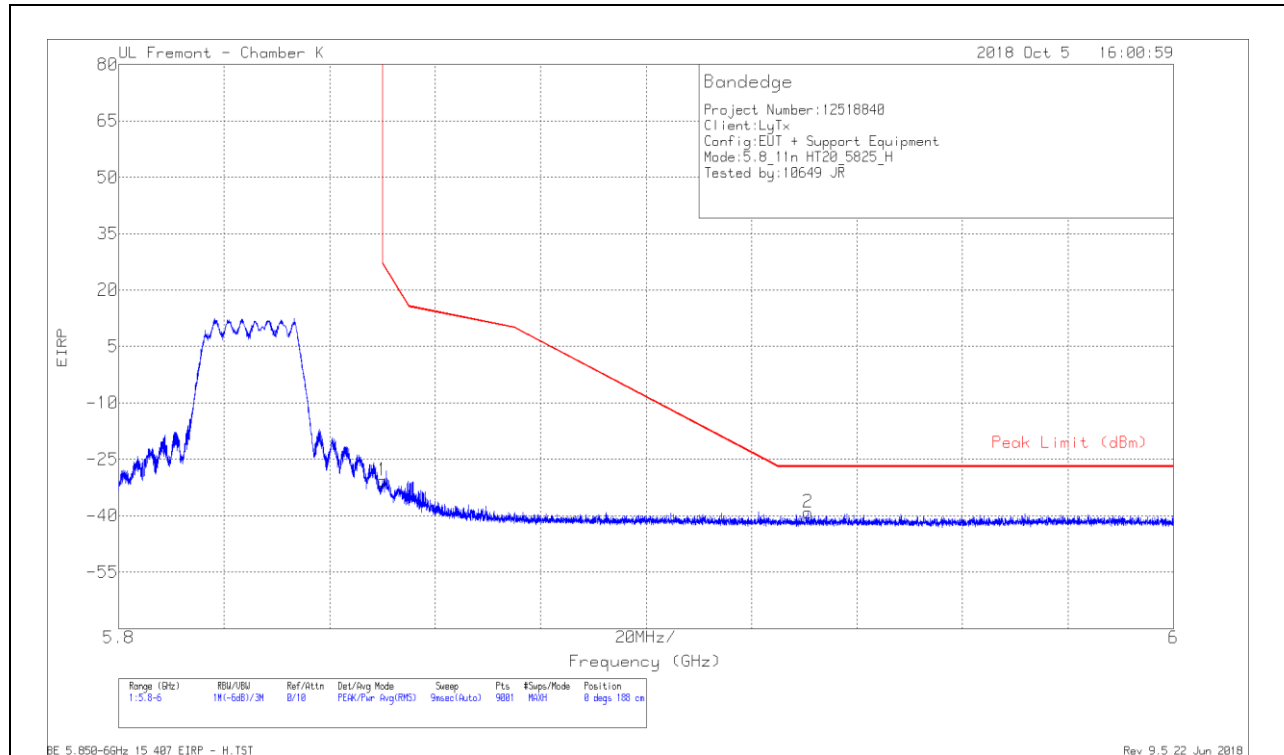


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Filt/P ad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-56.14	Pk	34.9	-19	11.8	-28.44	26.99	-55.43	253	294	V
2	5.647	-67.71	Pk	34.6	-19.4	11.8	-40.71	-27	-13.71	253	294	V

Pk - Peak detector

BANDEDGE (HIGH CHANNEL)

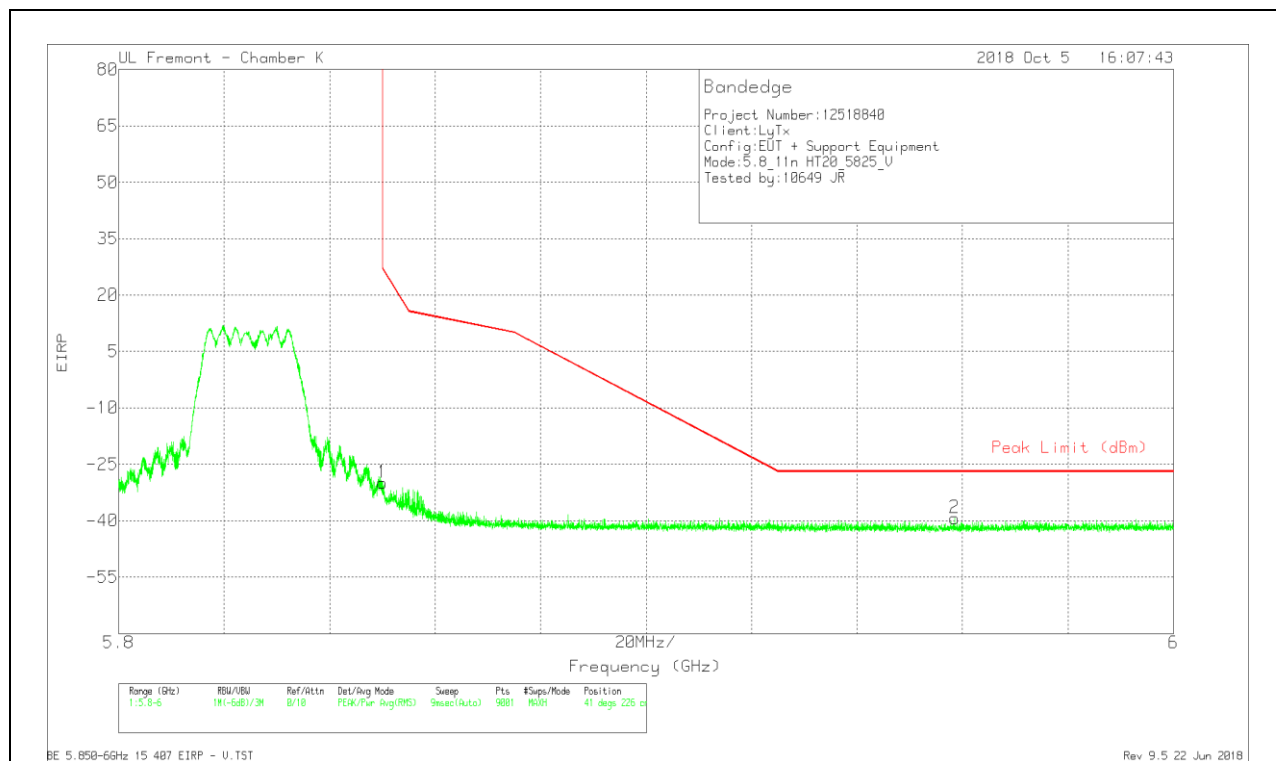
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Fitr/P ad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-58.62	Pk	35	-18.9	11.8	-30.72	26.95	-57.67	0	188	H
2	5.931	-67.17	Pk	35.1	-18.8	11.8	-39.07	-27	-12.07	0	188	H

Pk - Peak detector

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl/Filt/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-57.75	Pk	35	-18.9	11.8	-29.85	26.95	-56.8	41	226	V
2	5.959	-67.55	Pk	35.1	-18.7	11.8	-39.35	-27	-12.35	41	226	V

Pk - Peak detector