Prüfbericht-Nr.: *Test Report No.:*	**50058588 002**	**Auftrags-Nr.:** *Order No.:*	114054306	**Seite 1 von 112** *Page 1 of 112*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	25-Jul-2016	
Auftraggeber: *Client:*	Lenovo (Beijing) Limited, No.6 Chuang Ye Road, Shangdi Information Industry Base, Haidian District, Beijing, China100085			
Prüfgegenstand: *Test item:*	ThinkPad Stack Mobile Projector			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	M123			
Auftrags-Inhalt: *Order content:*	FCC Part15E & RSS-247			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart E Section 15.407 RSS-247 (05-2015)			

Wareneingangsdatum: *Date of receipt:*	9-Aug-2016
Prüfmuster-Nr.: *Test sample No.:*	A000406107-001
Prüfzeitraum: *Testing period:*	25-Aug-2016 - 28-Nov-2016
Ort der Prüfung: *Place of testing:*	EMC/RF Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von / *tested by:*

2016-11-30	Amy S.R.Hsu /Engineer	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by:*

2016-11-30	Rene Charton/Senior Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:* — Prüfmuster vollständig und unbeschädigt / *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 26 DB BANDWIDTH AND 99% BANDWIDTH
RESULT: Passed

5.1.3 6 DB BANDWIDTH (5745-5850MHZ)
RESULT: Passed

5.1.4 TRANSMIT OUTPUT POWER
RESULT: Passed

5.1.5 POWER SPECTRAL DENSITY
RESULT: Passed

5.1.6 SPURIOUS EMISSION
RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS
RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: Photo Documentation internal view
(File Name: 50058588APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 50058588APPENDIX D)

Test Specifications

The following standards were applied:

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15 Subpart E
RSS-247 Issue 1, May 2015
RSS-Gen, Issue 4, November 2014
ANSI C63.10:2013
FCC KDB-789033
FCC KDB-662911 D01
FCC KDB-644545

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taichung Branch Office

No.9, Lane 36, Minsheng Rd., Sec. 3, Daya District,
Taichung City 428
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.
Taipei Office

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC RegistrationNo.: 365730
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th

Testing Laboratory
0759

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Test Software	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
Spectrum Analyzer	R&S	FSV 40	100921	2016/04/21	2017/04/21
Spectrum Analyzer	Agilent	N9010A	MY53470241	2016/04/25	2017/04/24
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2016/07/29	2017/07/29
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2015/12/19	2016/12/19
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	060558	2015/12/19	2016/12/19
Bilog Antenna	TESEQ	CBL6111D	29804	2016/06/23	2017/06/23
Horn Antenna	ETS-Lindgren	3117	138160	2016/05/03	2017/05/03
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	2015/12/02	2016/12/02
EMI Test Receiver	R&S	ESCI7	100797	2015/12/28	2016/12/27
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	2015/07/13	2017/07/12
LISN (1 phase)	R&S	ENV216	101243	2016/06/02	2017/06/02
LISN	R&S	ENV216	101262	2016/06/16	2017/06/16
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Software	Agilent	300328 testsystem	V1.9.1	N/A	N/A
Power sensor	Agilent	U2021XA	MY53480013	2016/03/11	2017/03/10

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are:.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-7}
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 40 GHz	± 6 dB
Radiated emission of receiver, valid up to 40 GHz	± 6 dB
Temperature	± 2 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Mobile Projector. It contains a WiFi and Bluetooth compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	ThinkPad Stack Mobile Projector
FCC ID	A5MM123
Canada ID	5903G-M123
Canada HVIN	M123
Type Designation	M123
Operating Frequency band	5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz, 5.745 ~ 5.825GHz
Operation Voltage	Power Adapter: Input:100-240v 1.5A；Output: 20V 3.25A
Modulation	802.11a: OFDM 802.11n HT20 MHz Mode: OFDM 802.11n HT40 MHz Mode: OFDM 802.11ac (VHT80) Mode OFDM
Antenna gain	5.7 dBi max@5G Main ANT 5.36 dBi max@5G Aux ANT
Antenna Type	PCB antennas (2*2 MIMO)

Table 5: Operating Frequency Channel number information

	Mode	Frequency Range (MHz)	Number of Channels
UNII Band I	IEEE 802.11a	5180 – 5240	4 Channels
	IEEE 802.11n HT 20 mode	5180 – 5240	4 Channels
	IEEE 802.11n HT 40 mode	5190 ~ 5230	2 Channels
	IEEE 802.11ac VHT80 mode	5210	1 Channels
UNII Band II	IEEE 802.11a	5260 - 5320	4 Channels
	IEEE 802.11n HT 20 mode	5260 - 5320	4 Channels
	IEEE 802.11n HT 40 mode	5270 - 5310	2 Channels
	IEEE 802.11ac VHT80 mode	5290	1 Channels
UNII Band III	IEEE 802.11a	5500 – 5720	12 Channels
	IEEE 802.11n HT 20 mode	5500 – 5720	12 Channels
	IEEE 802.11n HT 40 mode	5510 – 5710	6 Channels
	IEEE 802.11ac VHT80 mode	5530 – 5690	3 Channels
UNII Band IV	IEEE 802.11a	5745 – 5825	5 Channels
	IEEE 802.11n HT 20 mode	5745 – 5825	5 Channels
	IEEE 802.11n HT 40 mode	5755 ~5795	2 Channels
	IEEE 802.11ac VHT80 mode	5775	1 Channels

3.3 Independent Operation Modes

The basic operation modes are:

A. Transmitting
    1. Low channel
    2. Middle channel
    3. High channel
B. Receiving
C. Standby
D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB to RJ45 interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate. The samples were used as follows:

Conducted: A000406107-001
Radiation: A000406107-001

Full test was applied on all test modes, but only worst case was shown.

TX1 stands for Main Antenna

TX2 stands for Aux Antenna

U-NII-1:

IEEE 802.11a for 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5200MHz) and Channel High (5220MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz for 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5200MHz) and Channel High (5220MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz Channel for 5190 ~ 5230MHz:

Low (5190MHz) and Channel High (5230MHz) with 27Mbps data rate were chosen for full testing.

IEEE 802.11n HT 80 MHz Channel for 5190 ~ 5230MHz:

Channel (5210MHz) with 58.5Mbps data rate were chosen for full testing.

U-NII-2A:

IEEE 802.11a for 5260 ~ 5320MHz:

Channel Low (5280MHz), Channel Mid (5300MHz) and Channel High (5320MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz for 5260 ~ 5320MHz:

Channel Low (5280MHz), Channel Mid (5300MHz) and Channel High (5320MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz for 5270 ~ 5310MHz:

Channel (5310MHz) with 27Mbps data rate were chosen for full testing.

IEEE 802.11n HT 80 MHz for 5270 ~ 5310MHz:

Channel (5290MHz) a) with 58.5Mbps data rate were chosen for full testing.

U-NII-2C:

IEEE 802.11a for 5500 ~ 5720MHz:

Channel Low (5500MHz), Channel Mid (5560MHz) and Channel Mid (5700MHz) and High (5720MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz for 5500 ~ 5720MHz:

Channel Low (5500MHz), Channel Mid (5560MHz) and Channel Mid (5700MHz) and High (5720MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz for 5510 ~ 5710MHz:

Channel Low (5510MHz) and Channel Mid (5670MHz) and High (5710MHz) with 27Mbps data rate were chosen for full testing.

IEEE 802.11n HT 80 MHz for 5530 ~ 5690MHz:

Channel Low (5530MHz), Channel High (5690MHz) with 58.5Mbps data rate were chosen for full testing.

U-NII-3:

IEEE 802.11a mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 mode:

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 mode:

Channel Low(5755MHz) and Channel High(5795MHz) with 27Mbps data rate were chosen for full testing.

IEEE 802.11n HT 80 mode:

Channel Low(5775MHz) with 58.5Mbps data rate were chosen for full testing.

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

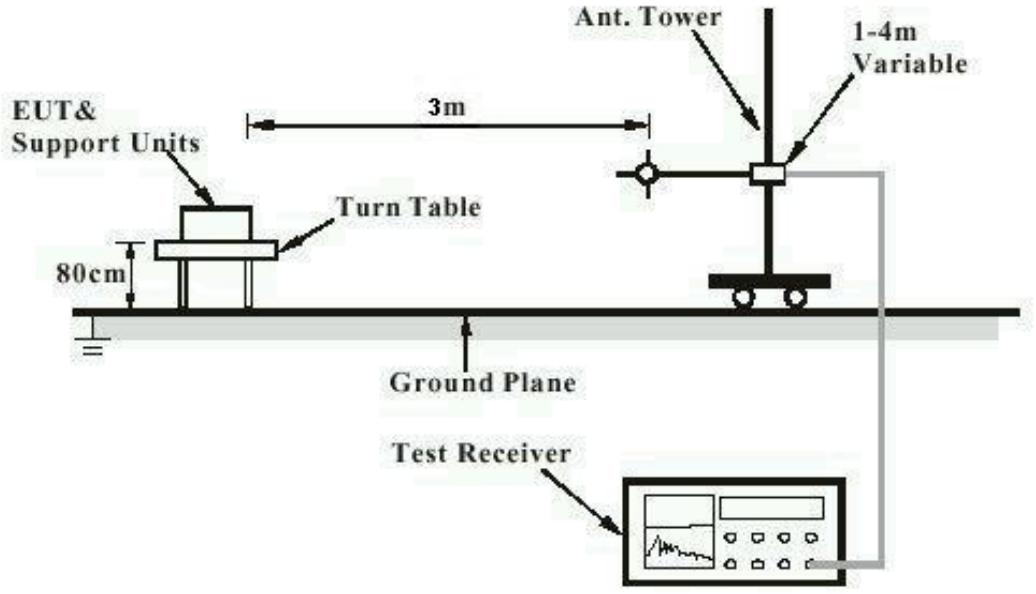
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement

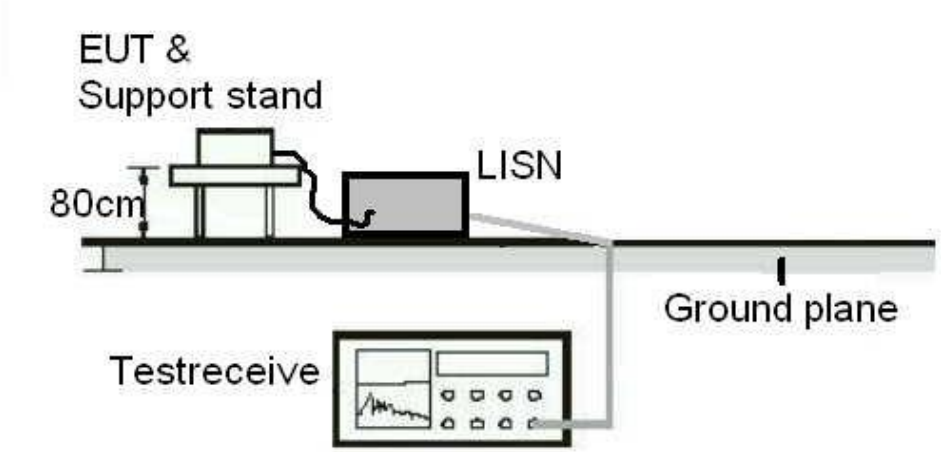
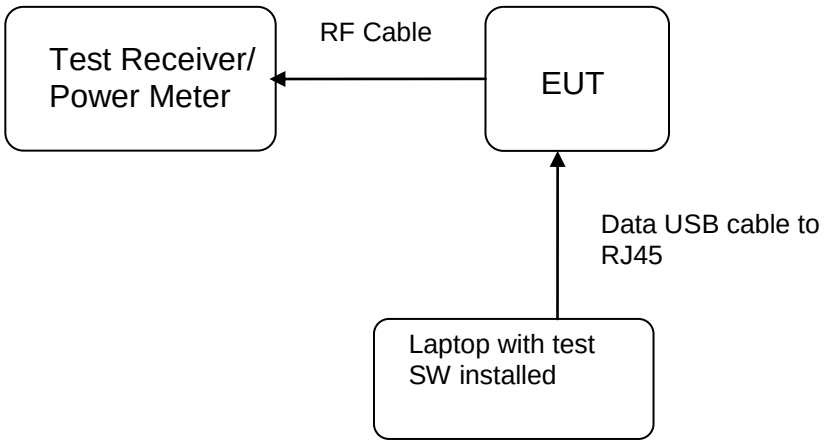


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Antenna Port Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test standard	:	LP0002(2016): 3.10.1, (3) FCC Part 15.407(a), Part 15.203 and RSS-Gen 7.1.4
	:	

According to the manufacturer declaration, the EUT has an antenna with a directional gain of of Main ANT:5.7dBi；Aux ANT: 5.36 dBiThe antenna is a printed PCB trace with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 26 dB Bandwidth and 99% Bandwidth

RESULT: **Passed**

Test standard	:	FCC Part 15.407(a), RSS-247 6.2.1
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

UNII Band I (5150~5250MHz)

Table 6: Test result of 26dB/99% Bandwidth (802.11a)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5180	21.28	17.827
Mid Channel	5200	21.27	17.815
High Channel	5220	21.25	17.820

Table 7: Test result of 26dB/99% Bandwidth (802.11n HT20)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5180	21.16	17.790
Mid Channel	5200	21.43	17.802
High Channel	5220	21.20	17.760

Table 8: Test result of 26dB/99% Bandwidth (802.11n HT40)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5190	39.73	36.445
High Channel	5230	52.56	36.423

Table 9: Test result of 26dB/99% Bandwidth (802.11ac VHT80)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5210	81.14	75.833

UNII Band II (5250~5350MHz)

Table 10: Test result of 26dB/99% Bandwidth (802.11a)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5280	21.35	17.785
Mid Channel	5300	21.30	17.778
High Channel	5320	21.33	17.814

Table 11: Test result of 26dB/99% Bandwidth (802.11n HT20)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5280	20.95	17.820
Mid Channel	5300	21.10	17.779
High Channel	5320	21.38	17.806

Table 12: Test result of 26dB/99% Bandwidth (802.11n HT40)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5310	39.43	36.422

Table 13: Test result of 26dB/99% Bandwidth (802.11ac VHT80)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5290	81.23	75.774

UNII Band III (5470~5725MHz)

Table 14: Test result of 26dB/99% Bandwidth (802.11a)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5500	21.17	17.783
Mid Channel	5560	21.52	17.809
High Channel	5700	21.38	17.777

Table 15: Test result of 26dB/99% Bandwidth (802.11n HT20)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5500	21.52	17.824
Mid Channel	5560	21.03	17.798
High Channel	5700	21.45	17.813

Table 16: Test result of 26dB/99% Bandwidth (802.11n HT40)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5510	39.54	36.338
High Channel	5670	39.55	36.386

Table 17: Test result of 26dB/99% Bandwidth (802.11ac VHT80)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	5530	81.13	75.789

Table 18: Test result of 26dB/99% Bandwidth (802.11a)

Band	Channel Frequency (MHz)	26dB Bandwidth (MHz)
UNII2C	5720	15.6
UNII3	5720	5.56

Table 19: Test result of 26dB Bandwidth (802.11n HT20)

Band	Channel Frequency (MHz)	26dB Bandwidth (MHz)
UNII2C	5720	15.68
UNII3	5720	5.4

Table 20: Test result of 26dB Bandwidth (802.11n HT40)

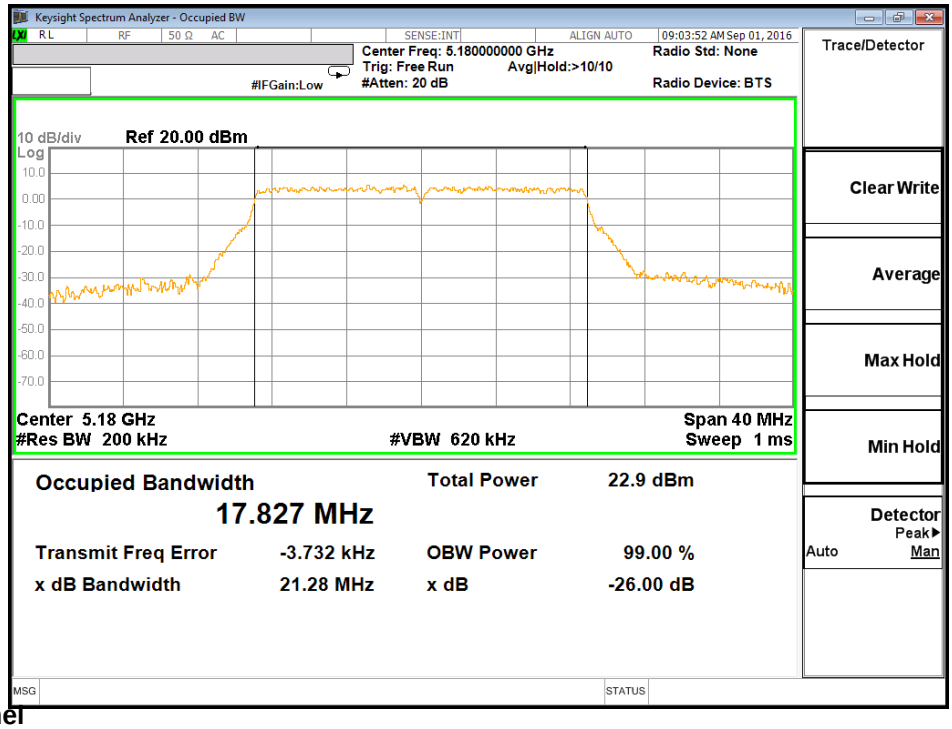
Band	Channel Frequency (MHz)	26dB Bandwidth (MHz)
UNII2C	5710	34.76
UNII3	5710	4.92

Table 21: Test result of 26dB Bandwidth (802.11ac VHT80)

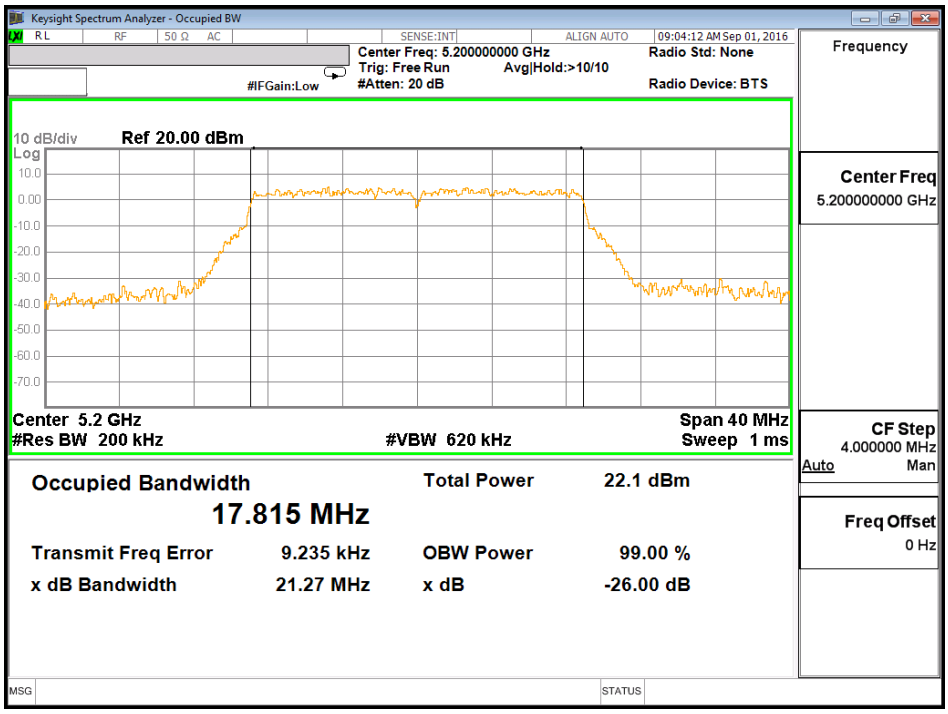
Band	Channel Frequency (MHz)	26dB Bandwidth (MHz)
UNII2C	5690	75.52
UNII3	5690	5.32

Test Plot of 26dB Bandwidth (11a) ; (5150~5250MHz)

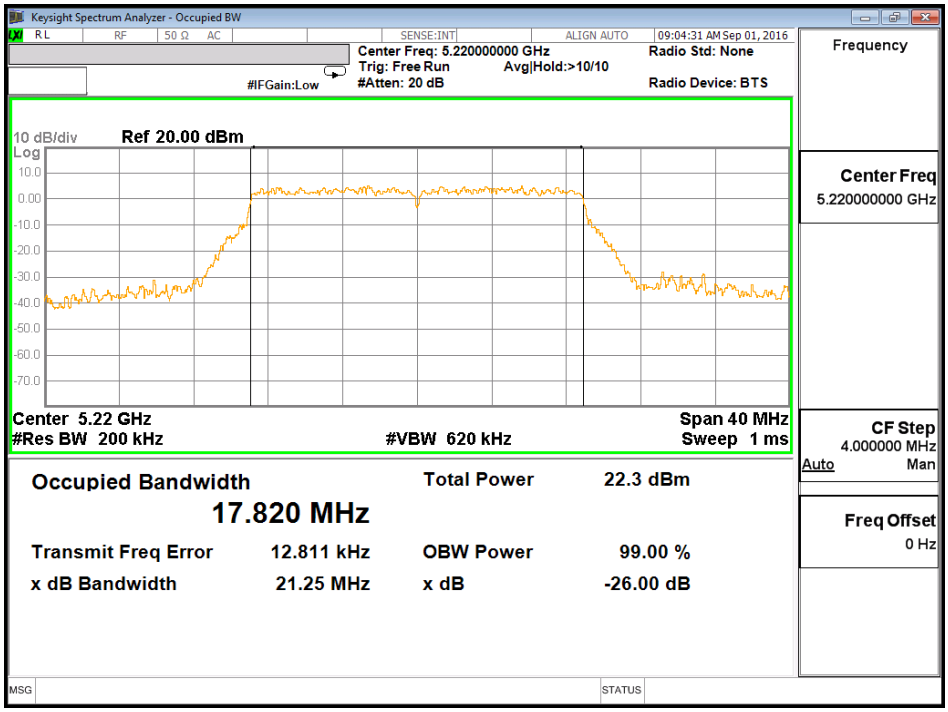
Low Channel



Mid Channel

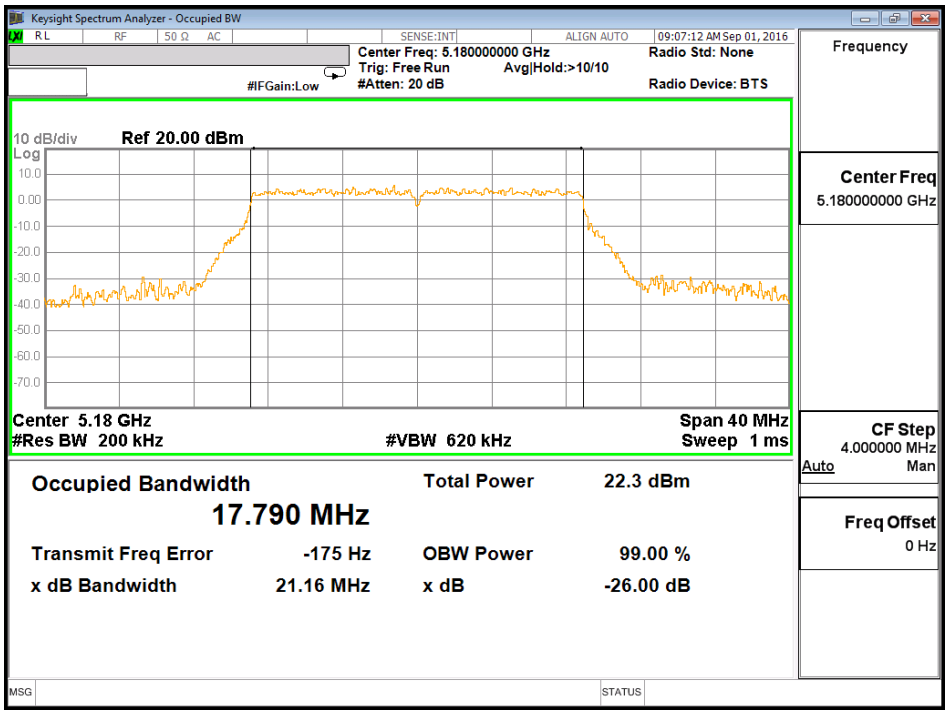


High Channel

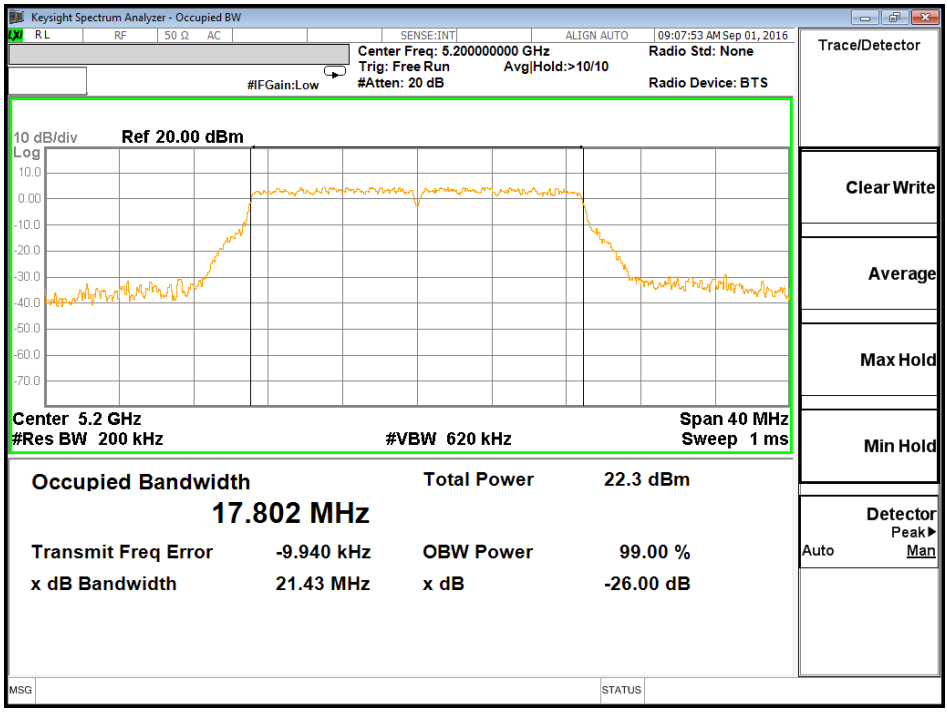


Test Plot of 26dB Bandwidth (802.11n HT20)

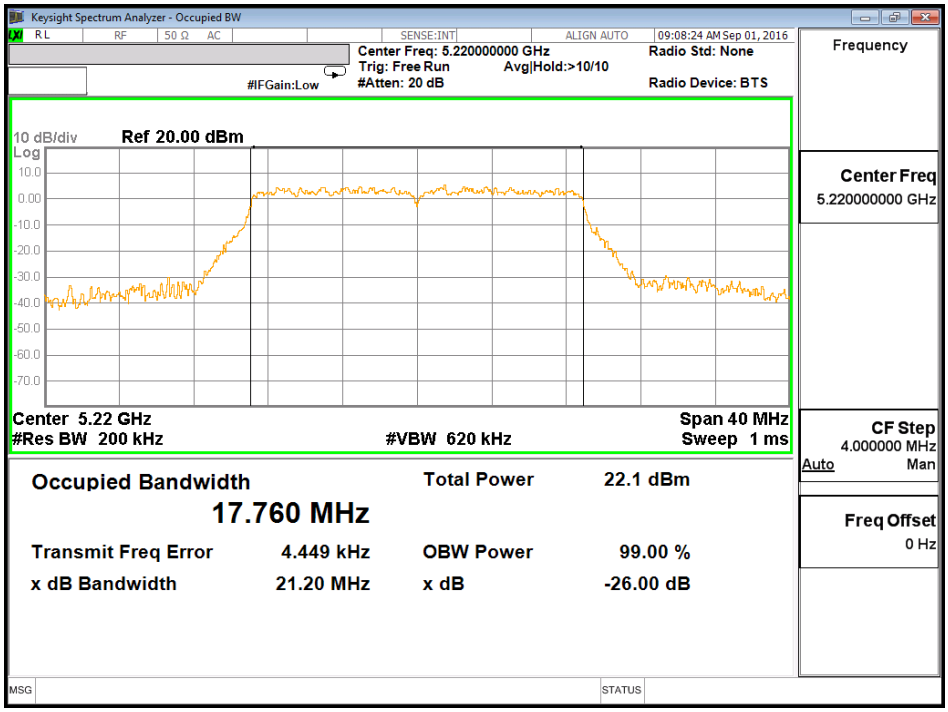
Low Channel



Mid Channel

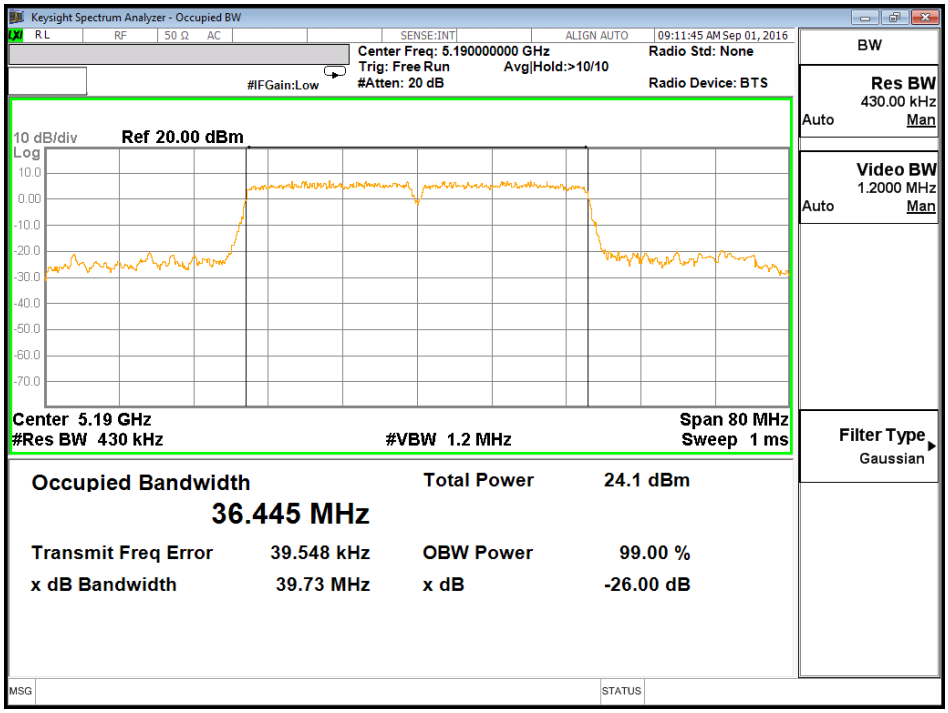


High Channel

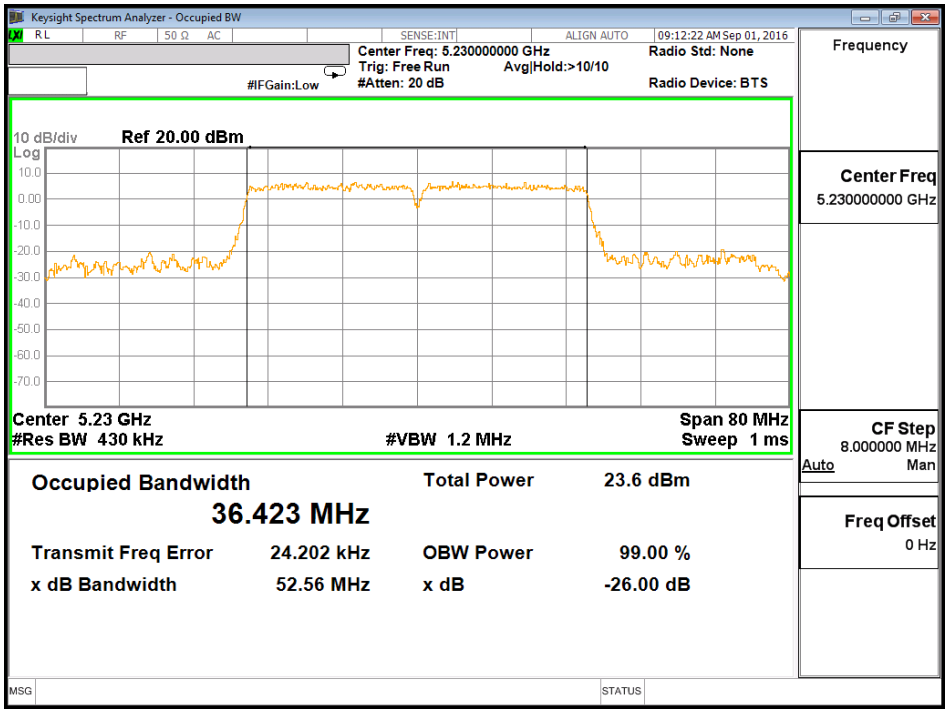


Test Plot of 26dB Bandwidth (802.11n HT40)

Low Channel

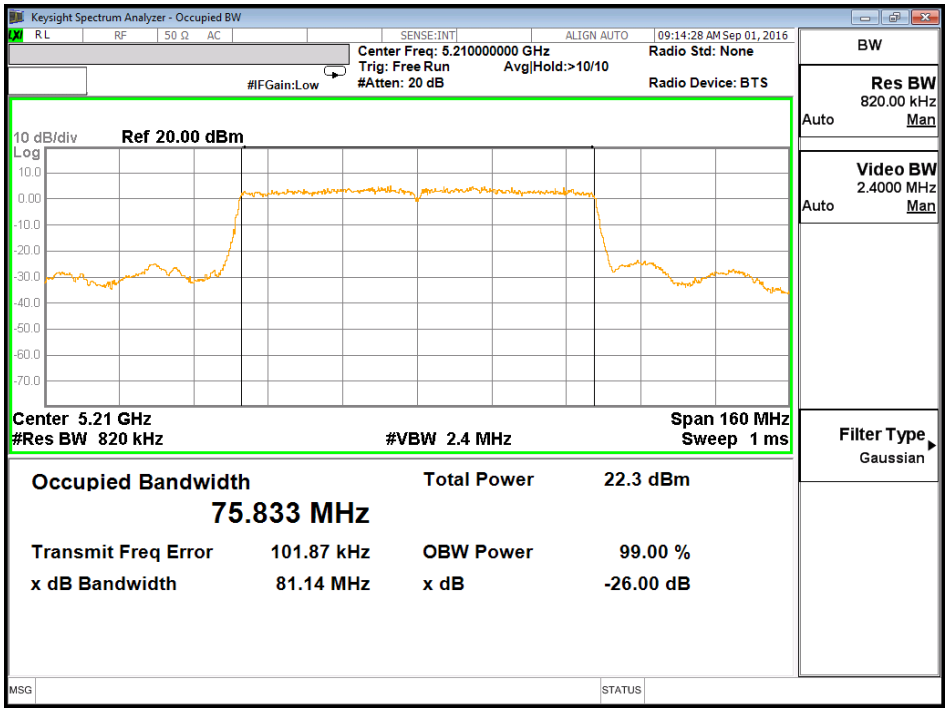


High Channel



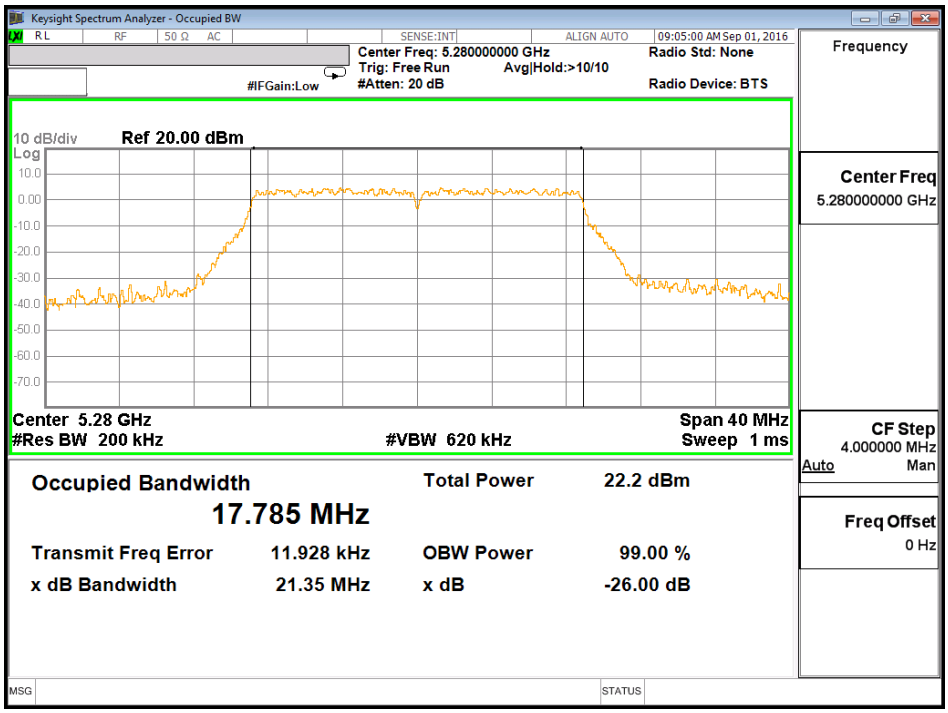
Test Plot of 26dB Bandwidth(802.11ac VHT80)

Low Channel

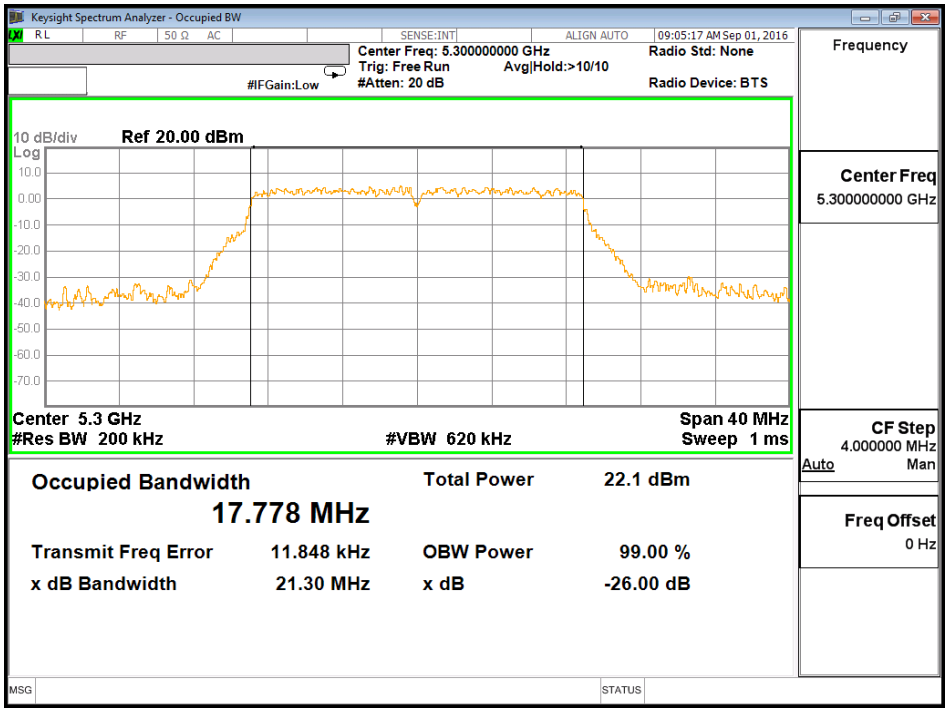


Test Plot of 26dB Bandwidth (11a) ; (5250~5350MHz)

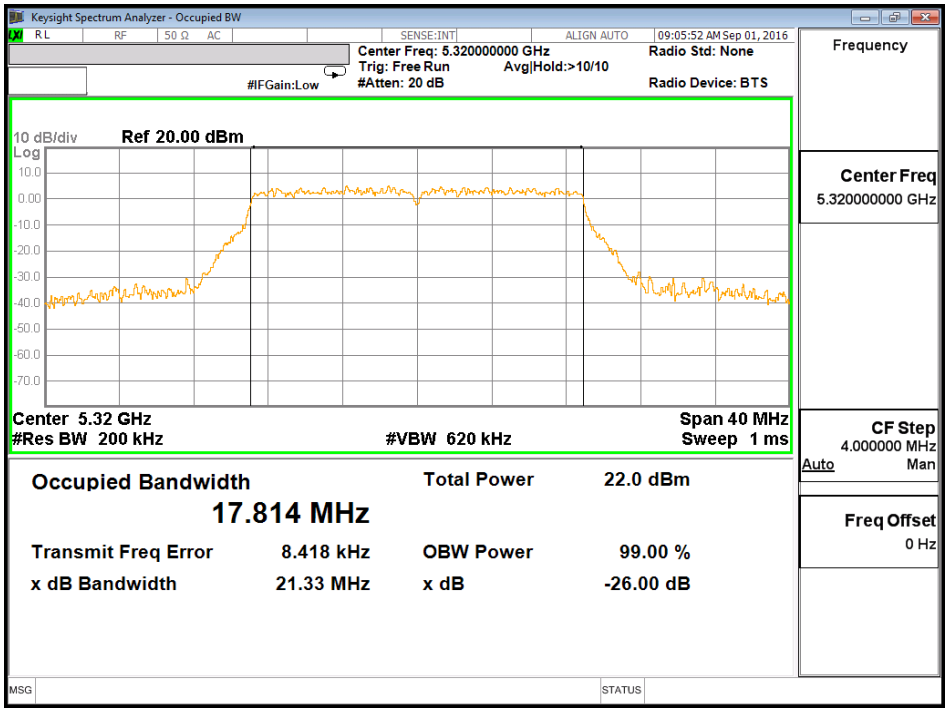
Low Channel



Mid Channel

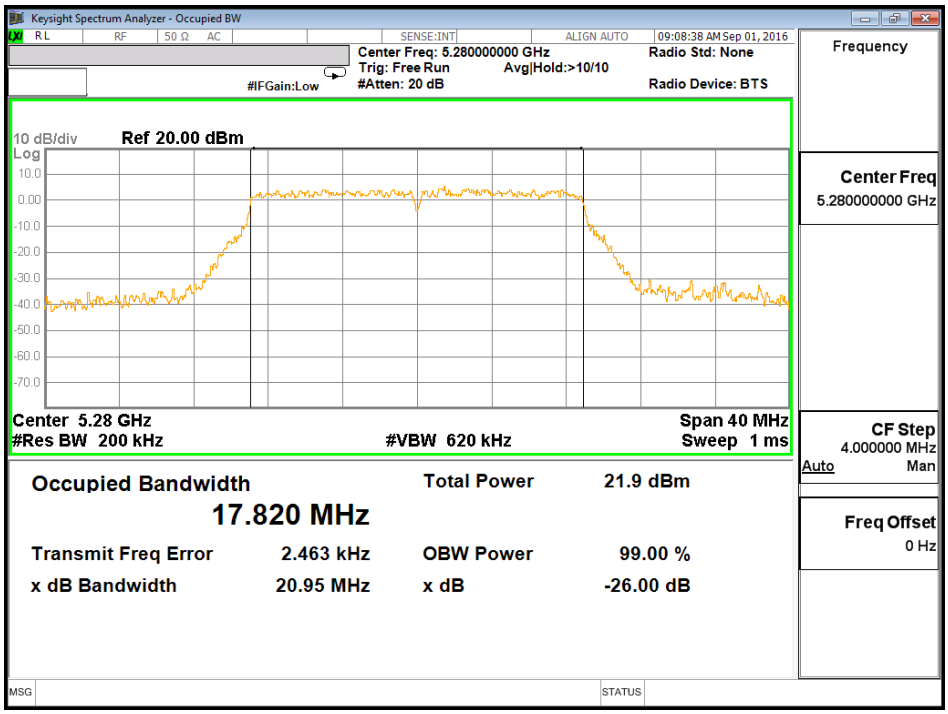


High Channel

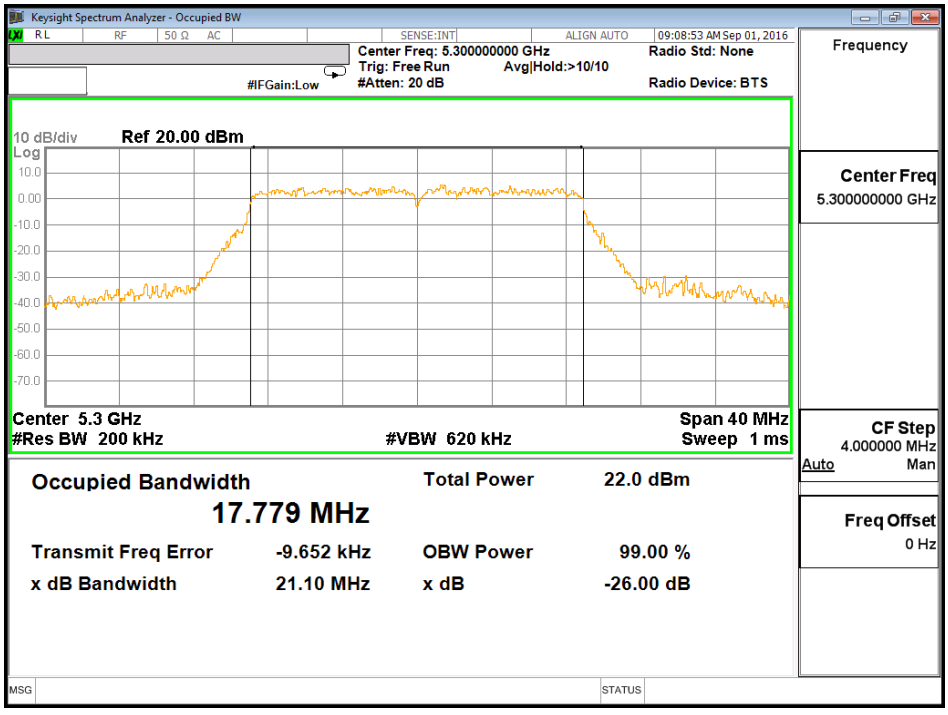


Test Plot of 26dB Bandwidth (802.11n HT20)

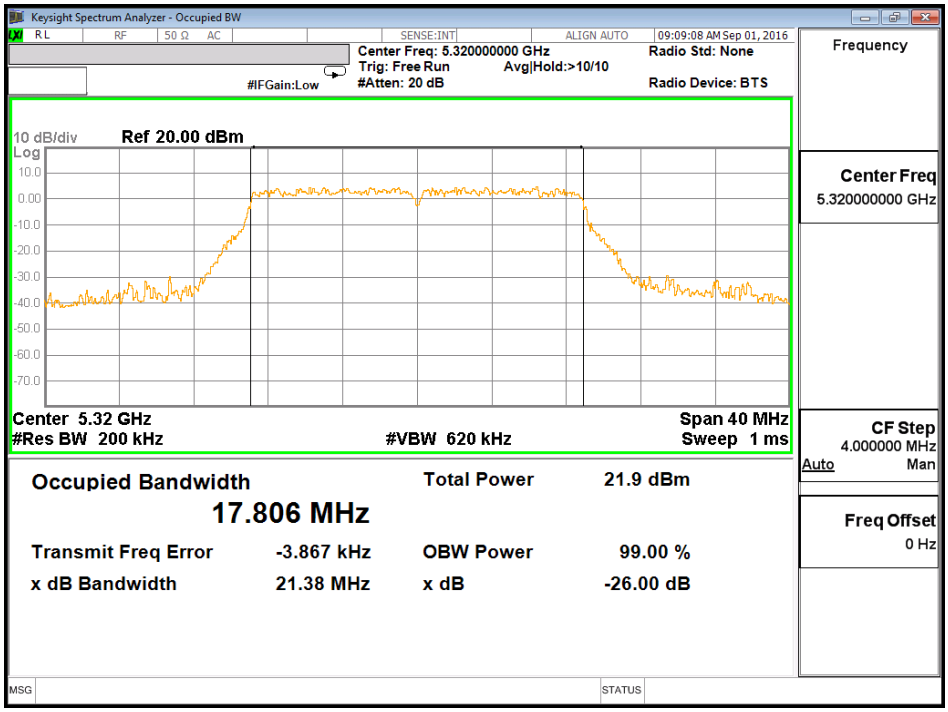
Low Channel



Mid Channel

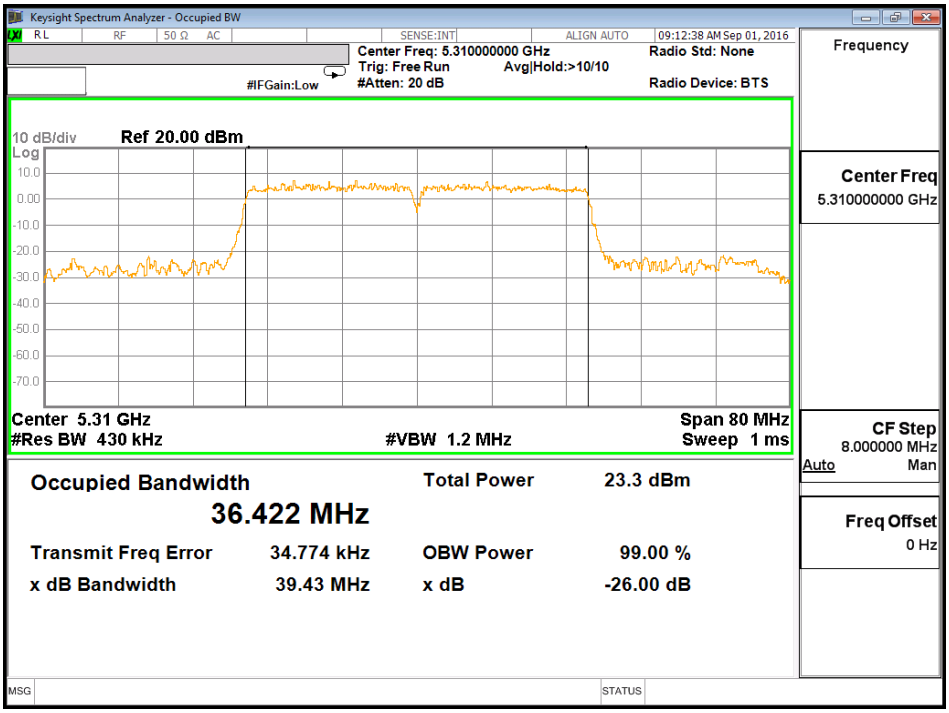


High Channel



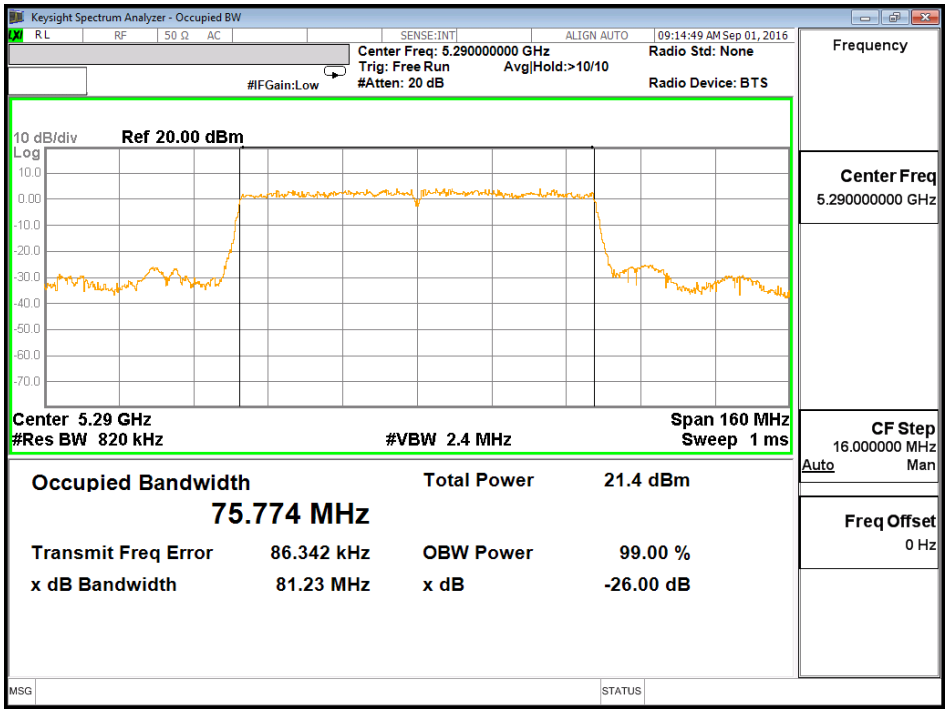
Test Plot of 26dB Bandwidth (802.11n HT40)

Low Channel



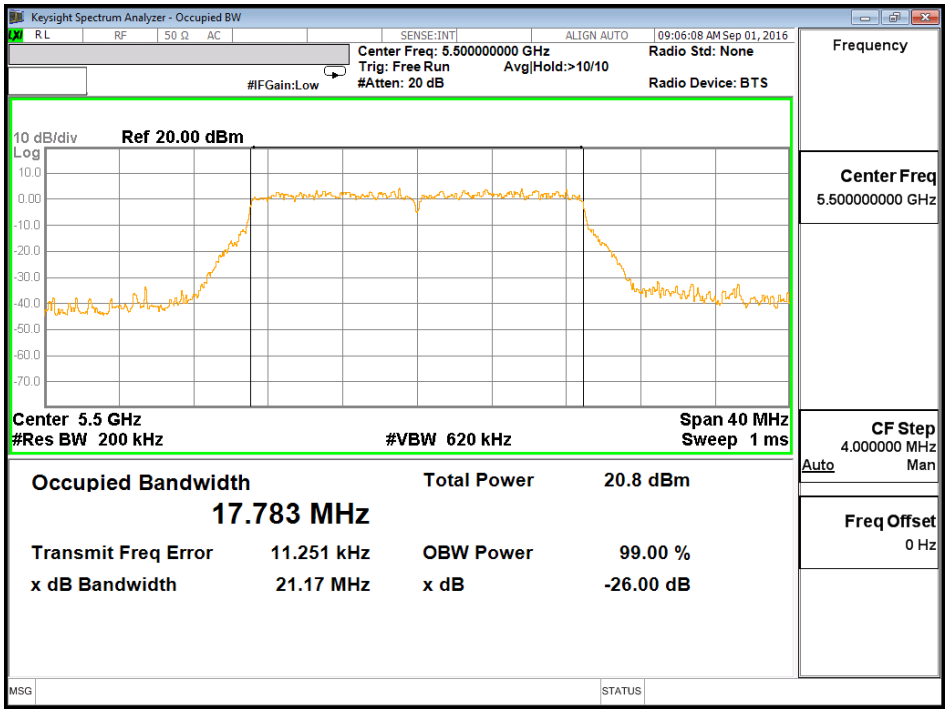
Test Plot of 26dB Bandwidth(802.11ac VHT80)

Low Channel

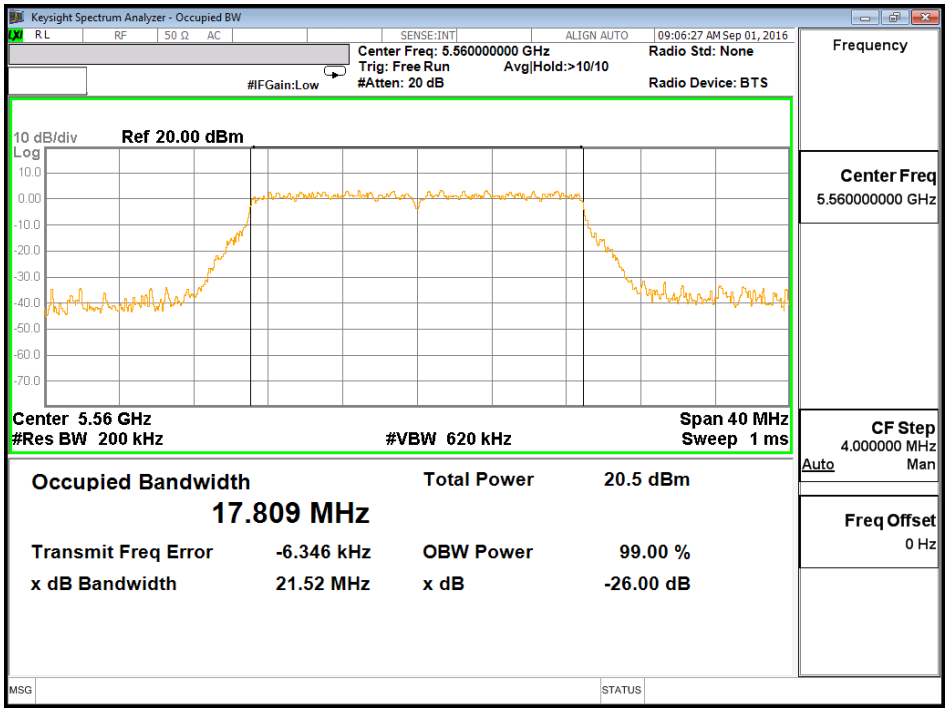


Test Plot of 26dB Bandwidth (11a) ; (5470~5725MHz)

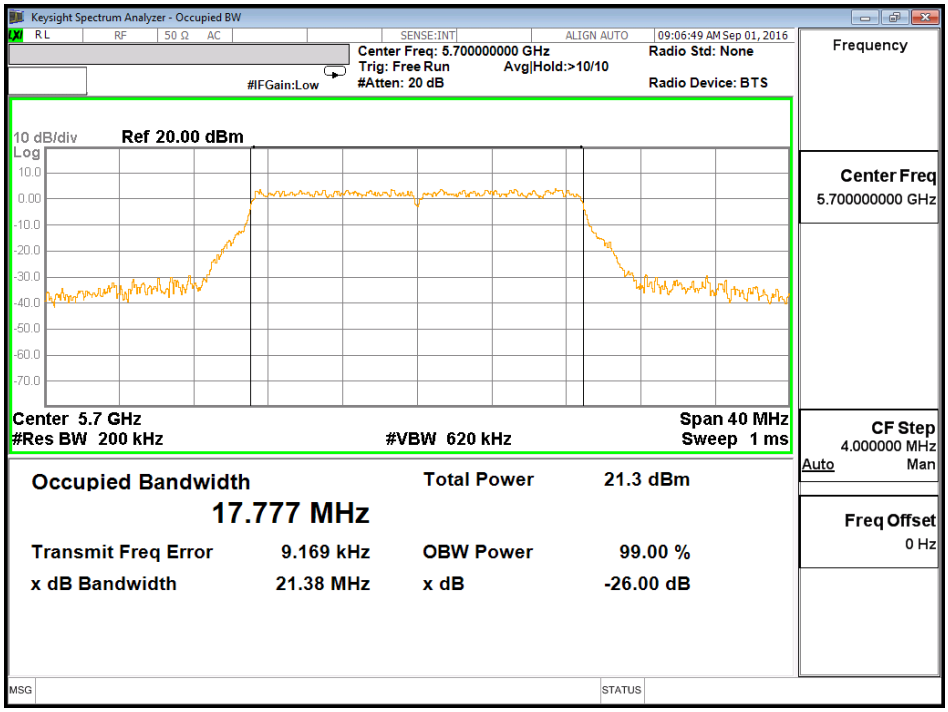
Low Channel



Mid Channel

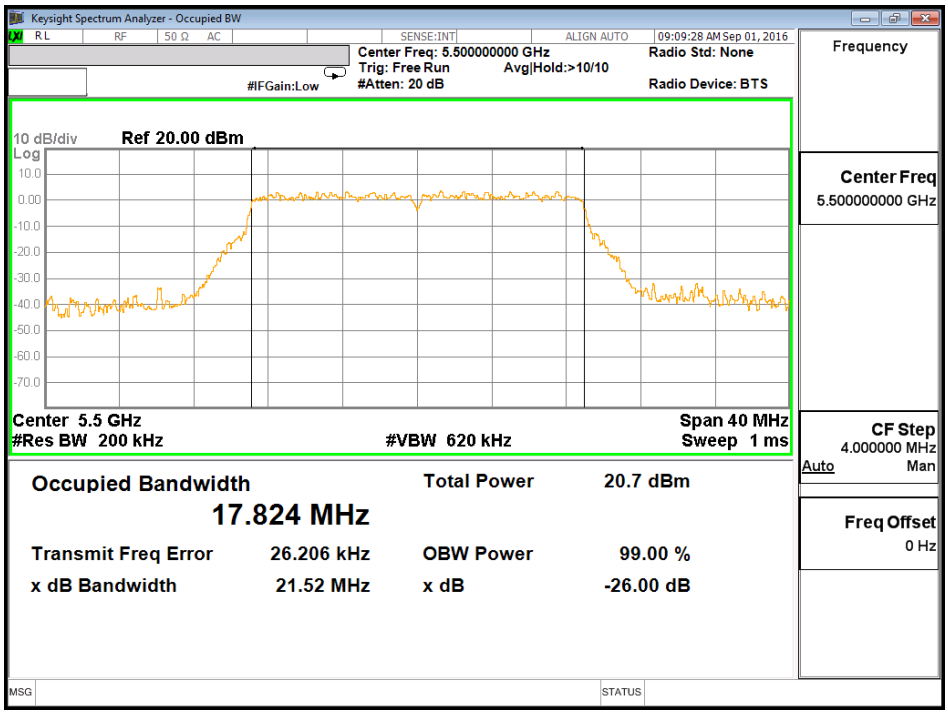


High Channel

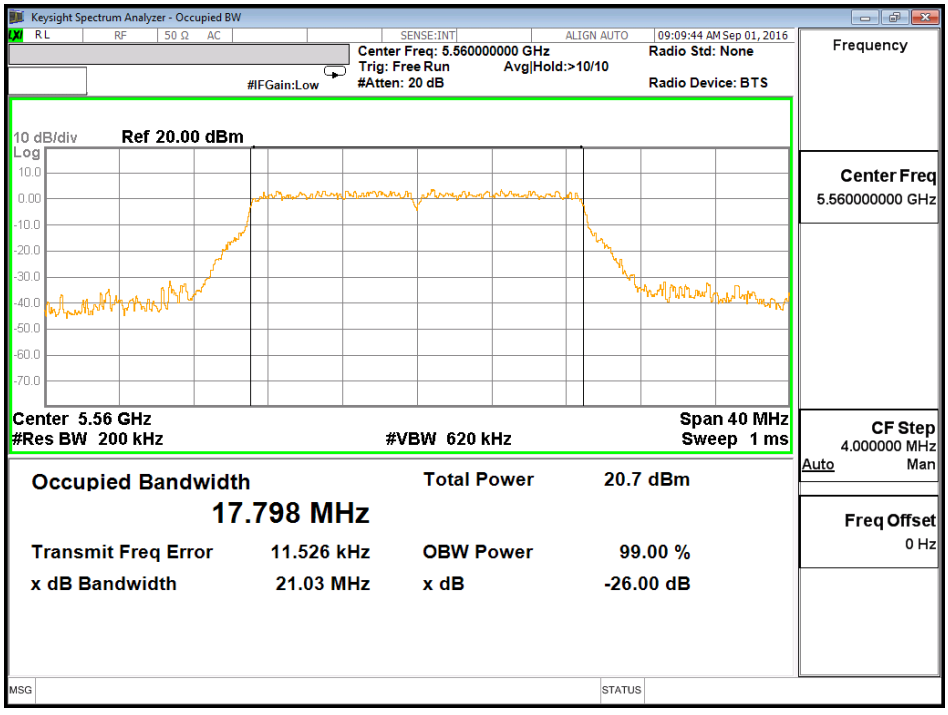


Test Plot of 26dB Bandwidth (802.11n HT20)

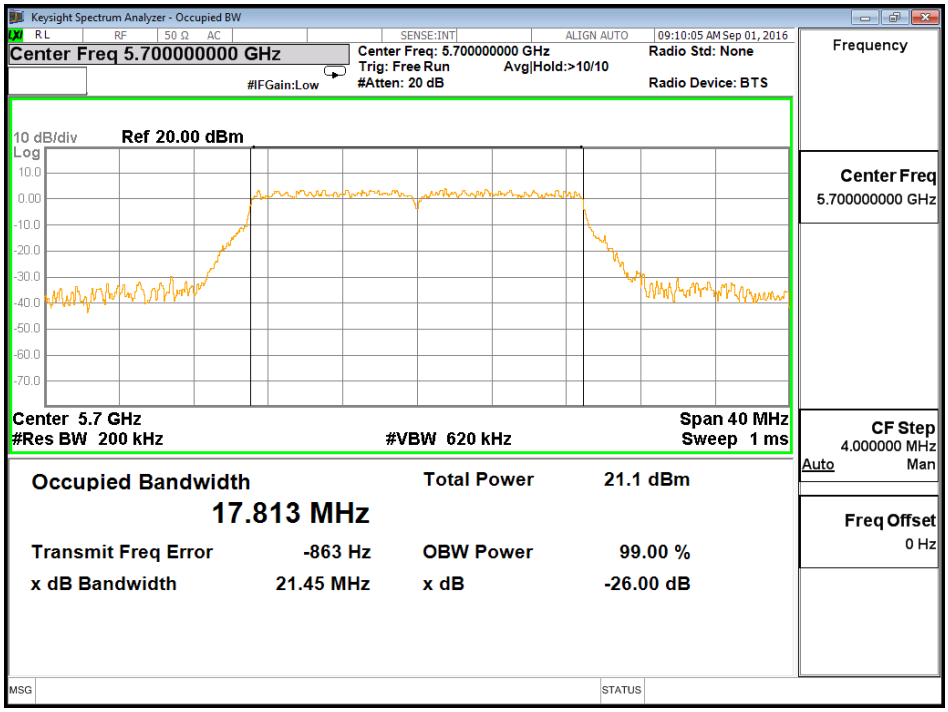
Low Channel



Mid Channel

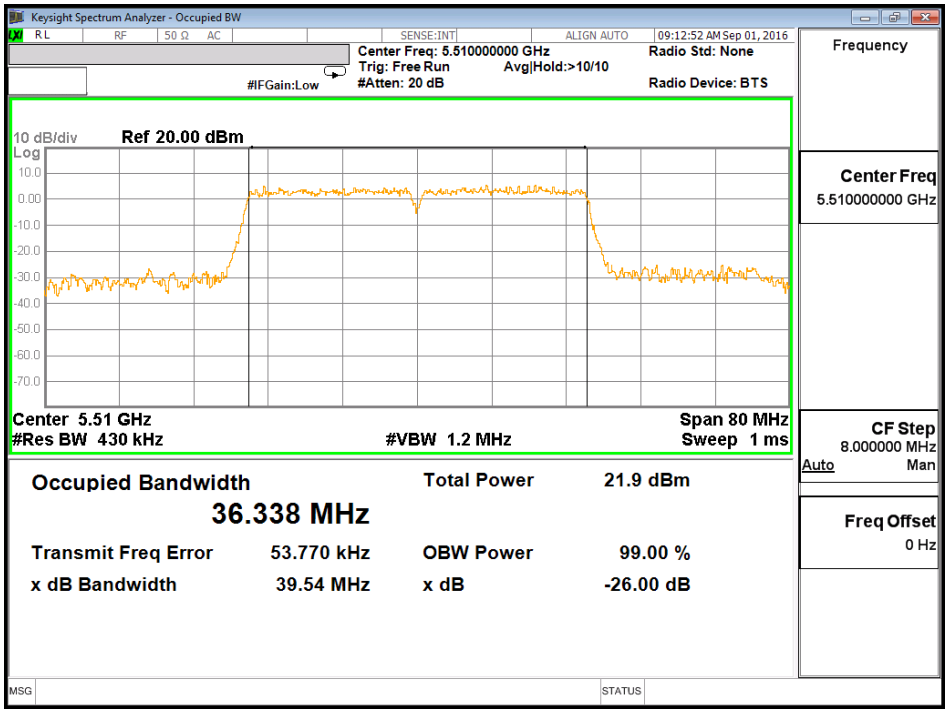


High Channel

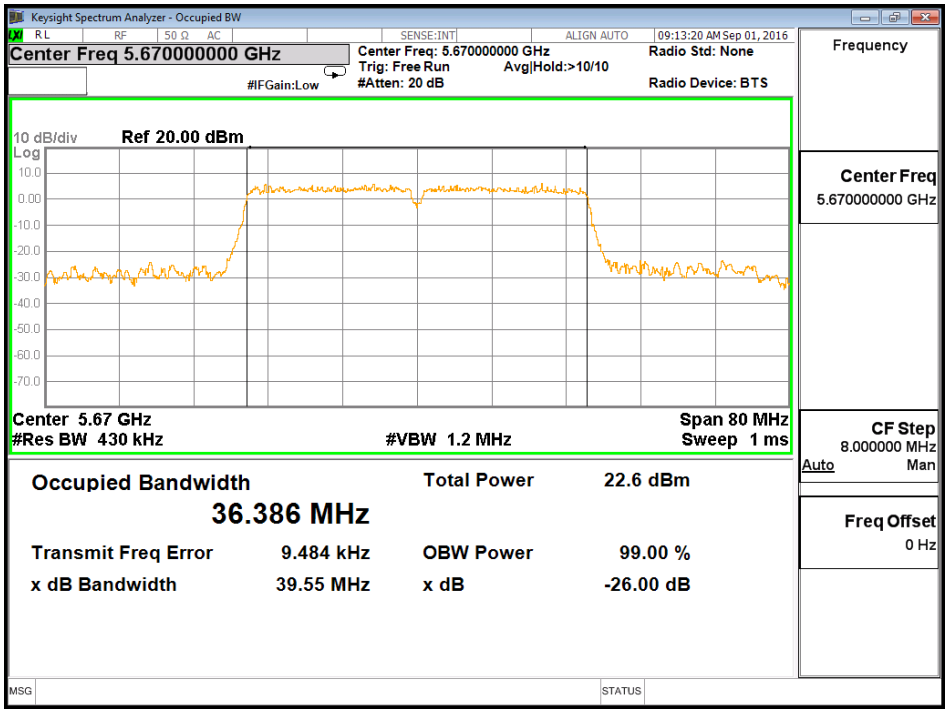


Test Plot of 26dB Bandwidth (802.11n HT40)

Low Channel

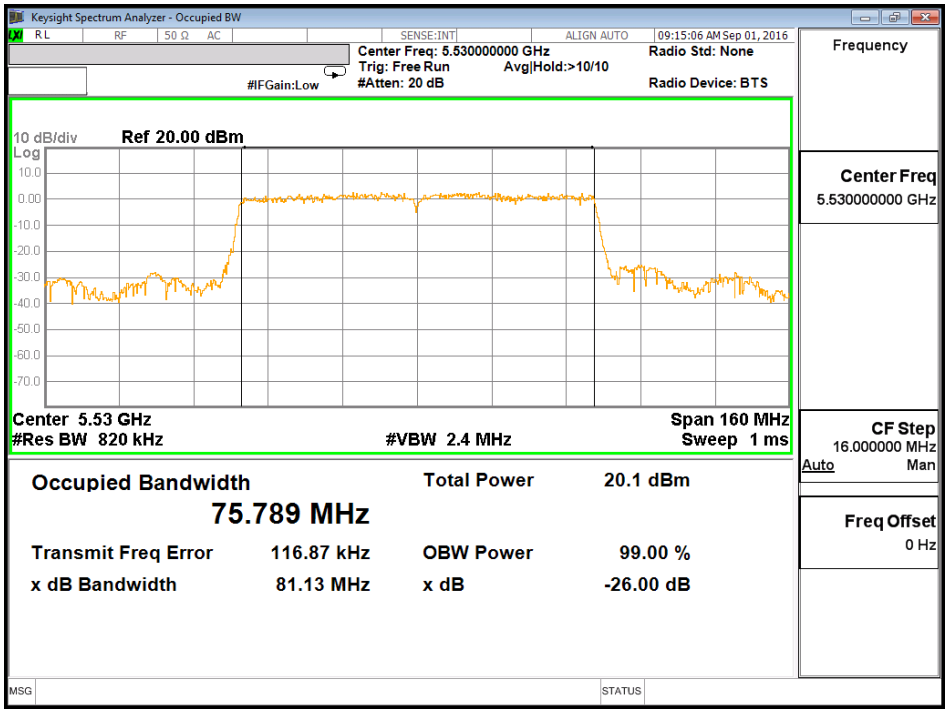


High Channel

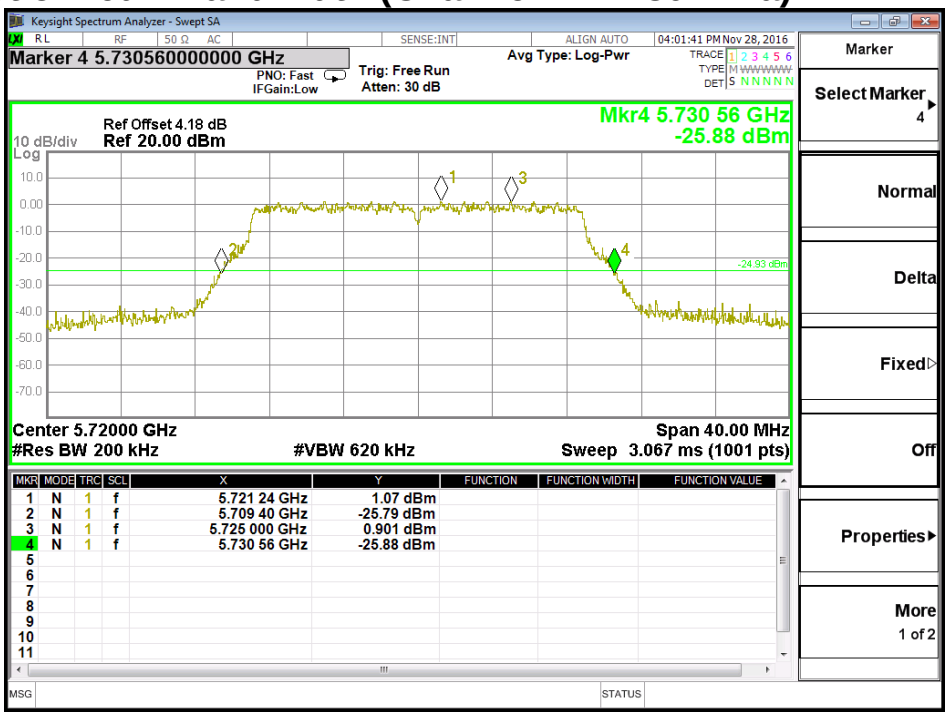


Test Plot of 26dB Bandwidth(802.11ac VHT80)

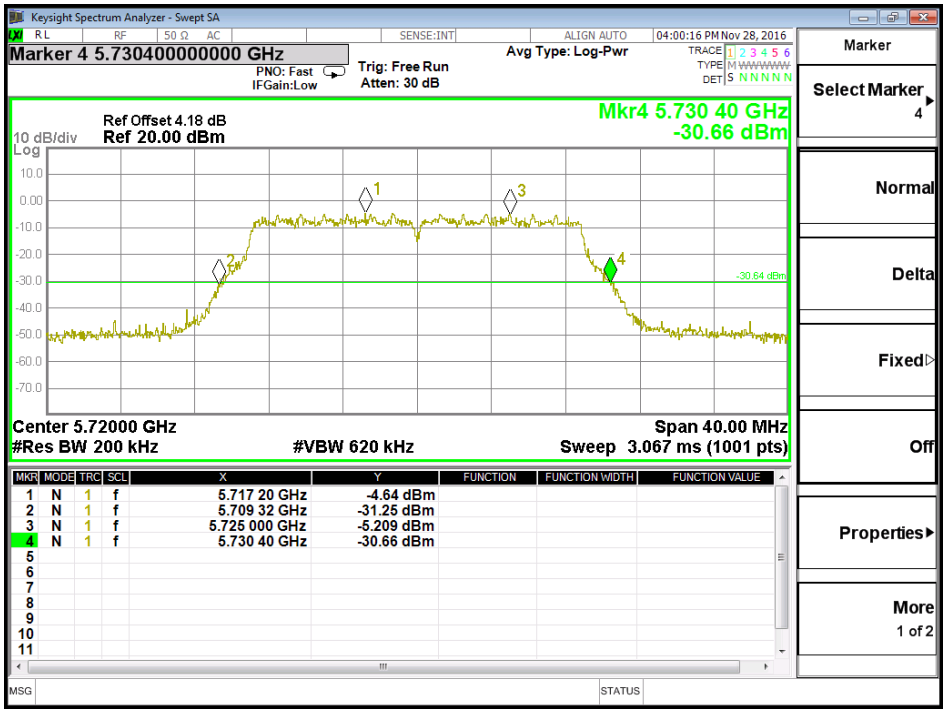
Low Channel



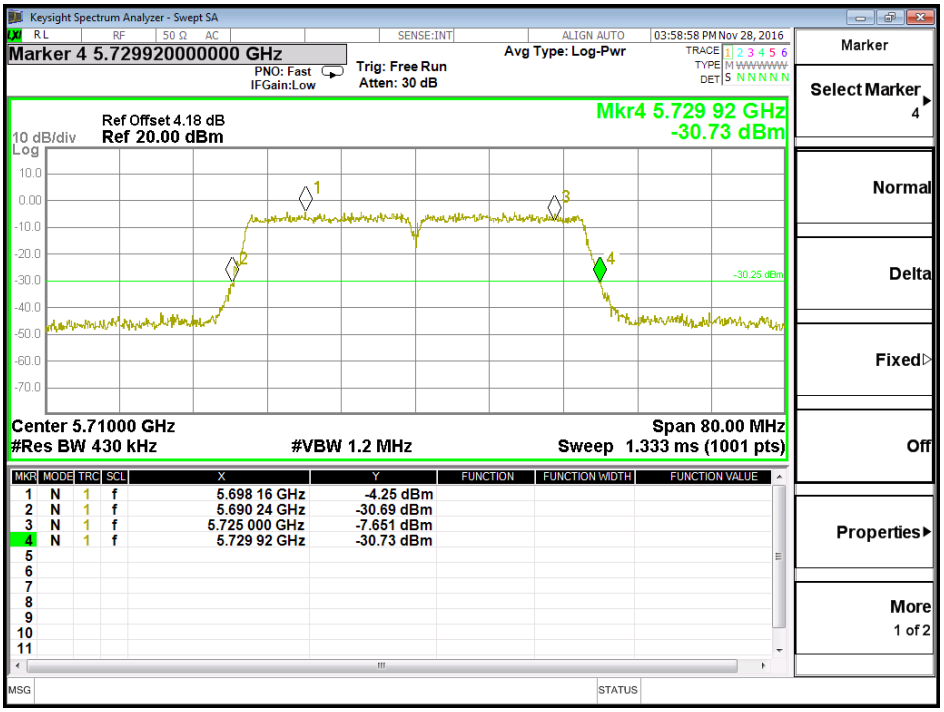
Test Plot of 26dB Bandwidth (Channel 144: 802.11a)



Test Plot of 26dB Bandwidth (Channel 144: 802.11n HT20)



Test Plot of 26dB Bandwidth(Channel 142: 802.11n HT40)



Test Plot of 26dB Bandwidth(Channel 138: 802.11ac VHT80)

5.1.3 6 dB Bandwidth (5745-5850MHz)

RESULT: **Passed**

Test standard	:	FCC Part 15.407(a), RSS-247 6.2.4
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 22: Test result of 6dB Bandwidth (802.11a)

Channel	Channel Frequency (MHz)	6dB Bandwidth TX1 (MHz)
Low Channel	5745	17.76
Mid Channel	5785	17.70
High Channel	5825	17.76

Table 23: Test result of 6dB Bandwidth (802.11n HT20)

Channel	Channel Frequency (MHz)	6dB Bandwidth TX1 (MHz)
Low Channel	5745	17.73
Mid Channel	5785	17.73
High Channel	5825	17.73

Table 24: Test result of 6dB Bandwidth (802.11n HT40)

Channel	Channel Frequency (MHz)	6dB Bandwidth TX1 (MHz)
Low Channel	5755	36.51
High Channel	5795	36.54

Table 25: Test result of 6dB Bandwidth (802.11ac VHT80)

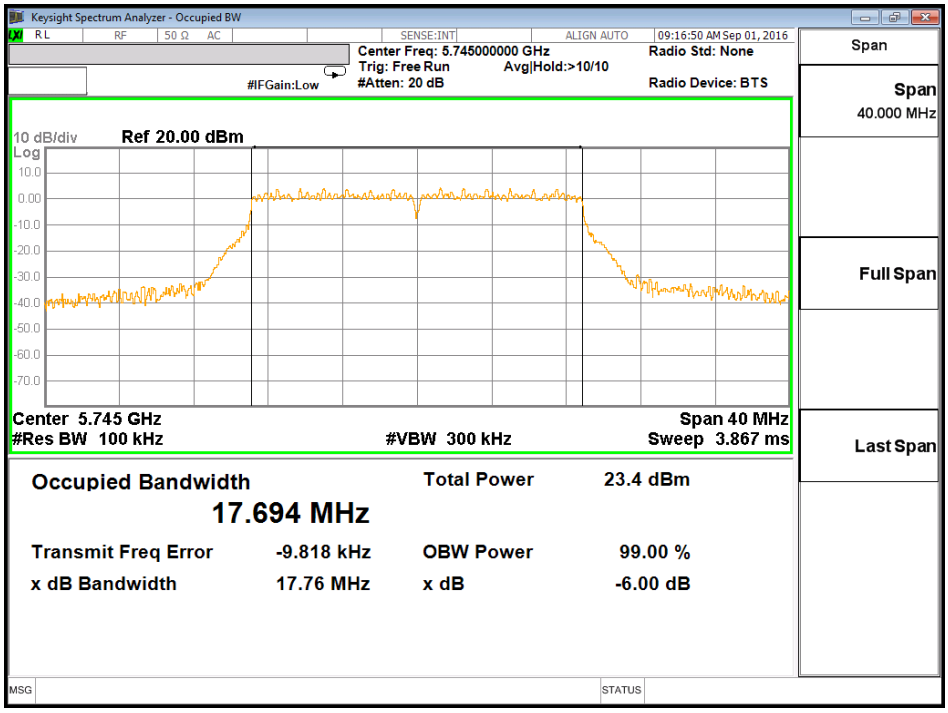
Channel	Channel Frequency (MHz)	6dB Bandwidth TX1 (MHz)
Low Channel	5775	76.40

Table 26: Test result of 6dB Bandwidth

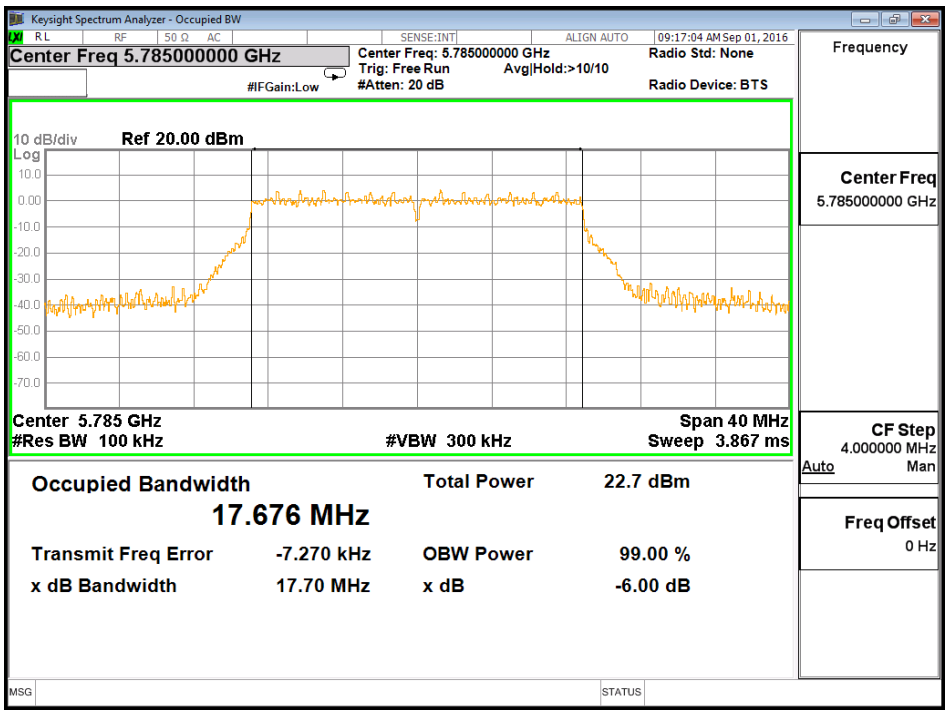
Mode	Channel Frequency (MHz)	6dB Bandwidth TX1 (MHz)
802.11a	5720	3.824
802.11 HT20	5720	3.848
802.11 HT40	5710	3.192
802.11ac VHT80	5690	2.92

Test Plot of 6dB Bandwidth (802.11a)

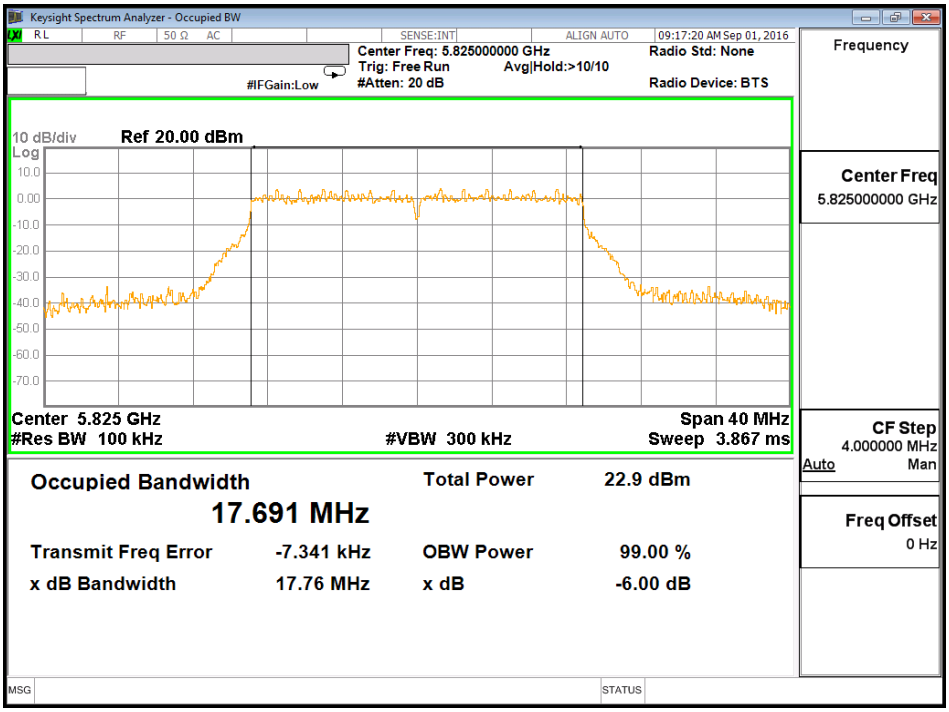
Low Channel



Mid Channel

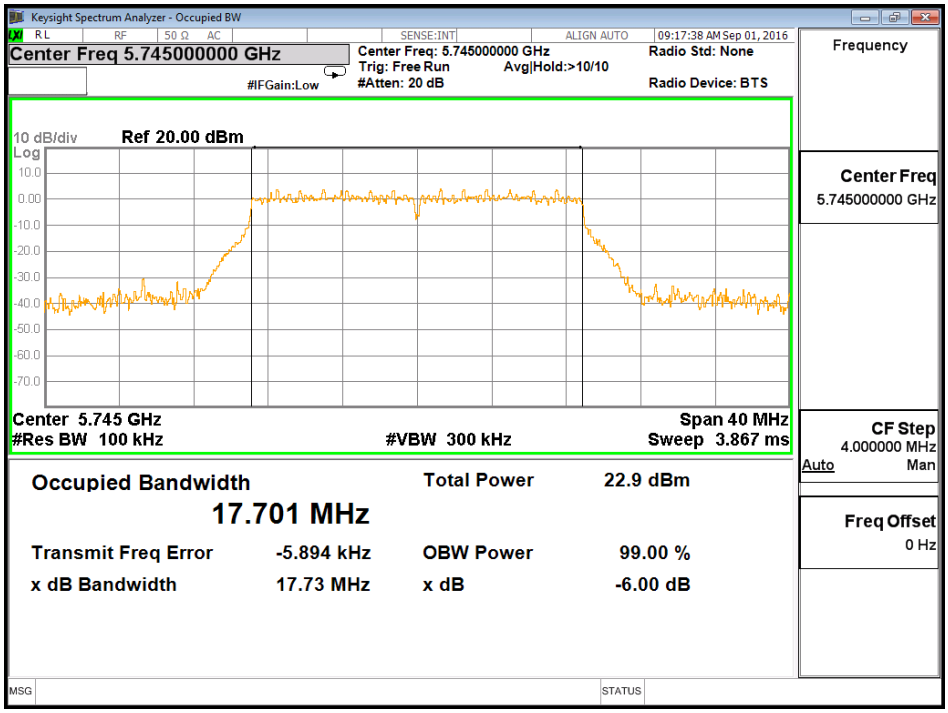


High Channel

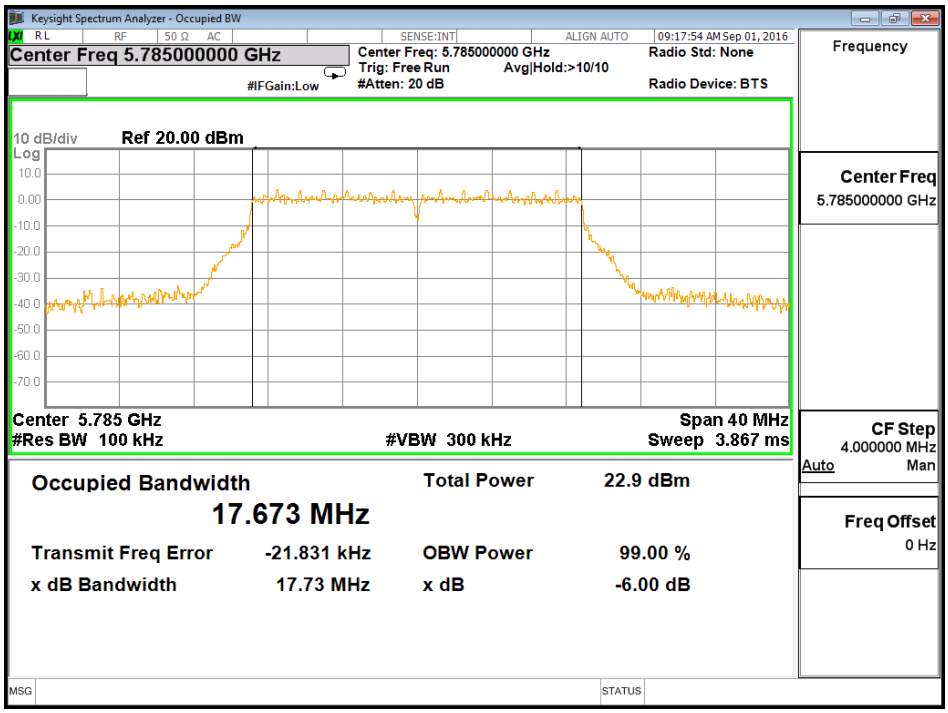


Test Plot of 6dB Bandwidth (802.11n HT20)

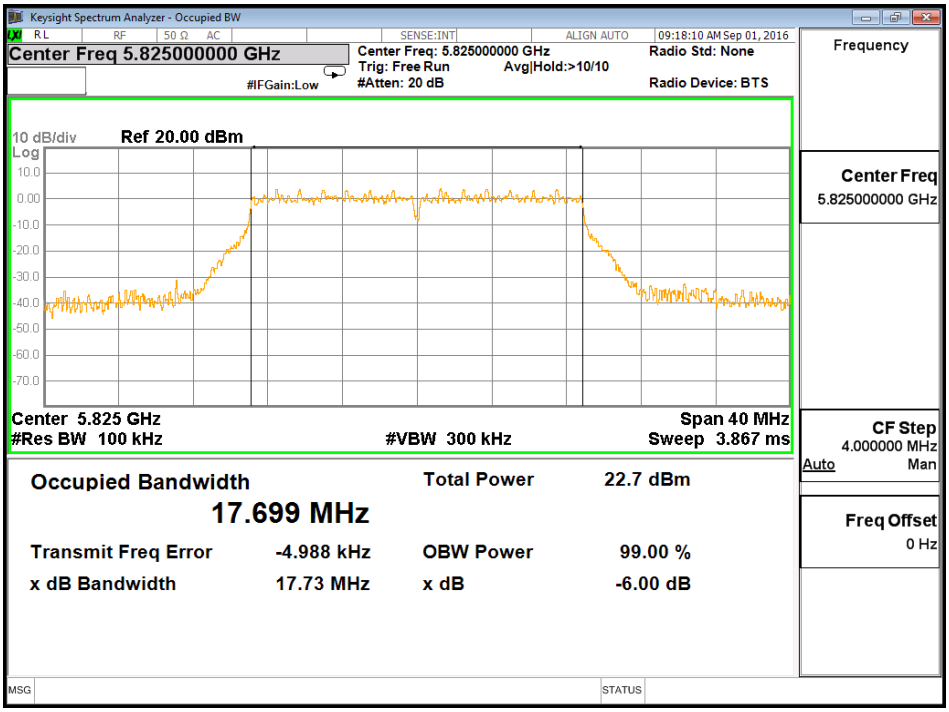
Low Channel



Mid Channel

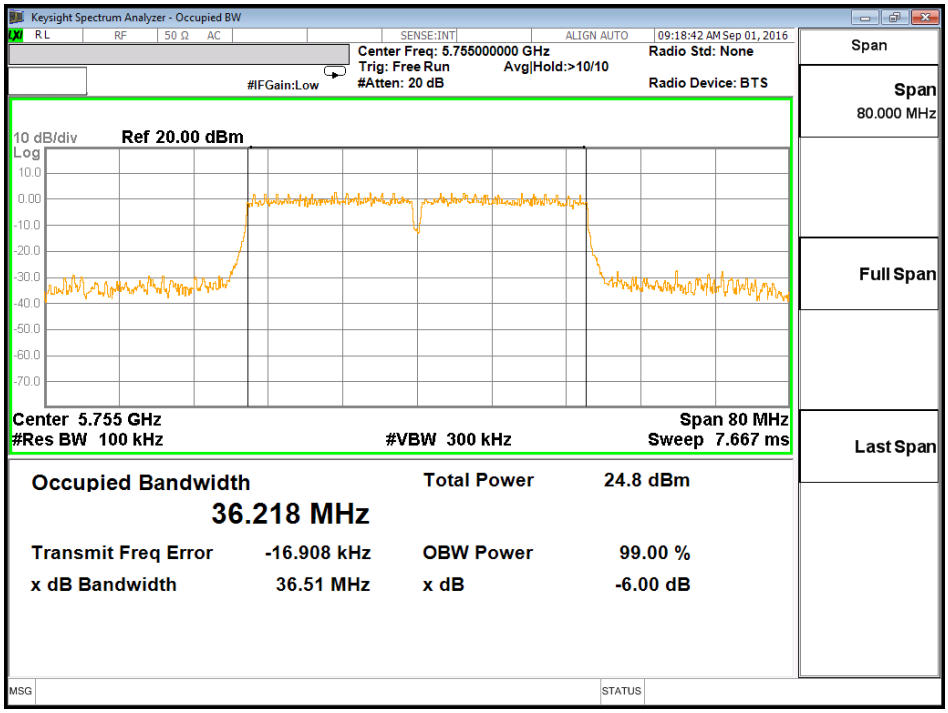


High Channel

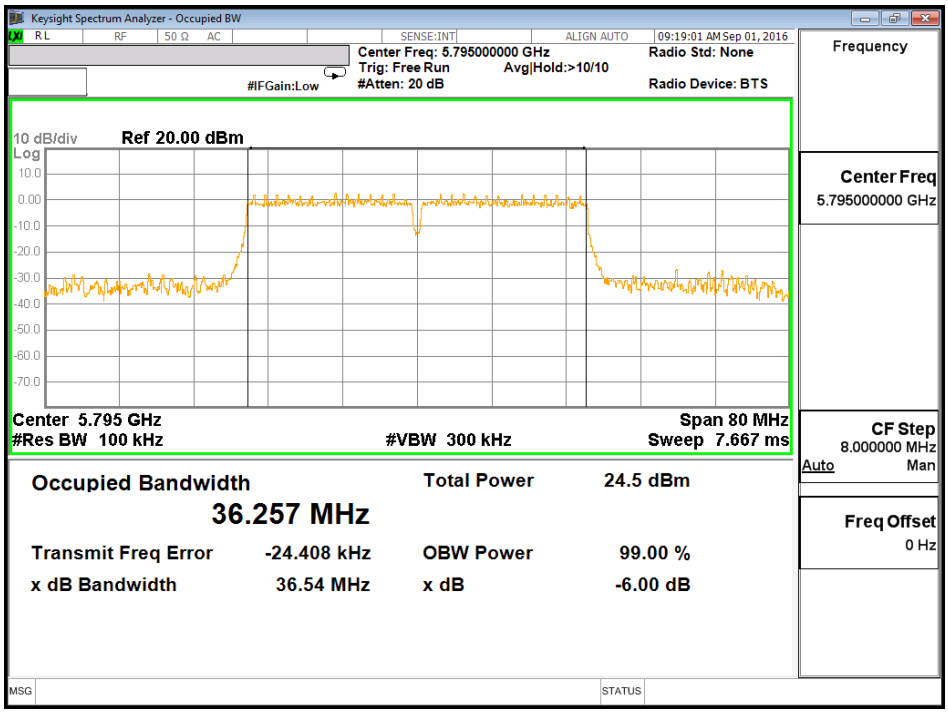


Test Plot of 6dB Bandwidth (802.11n HT40)

Low Channel

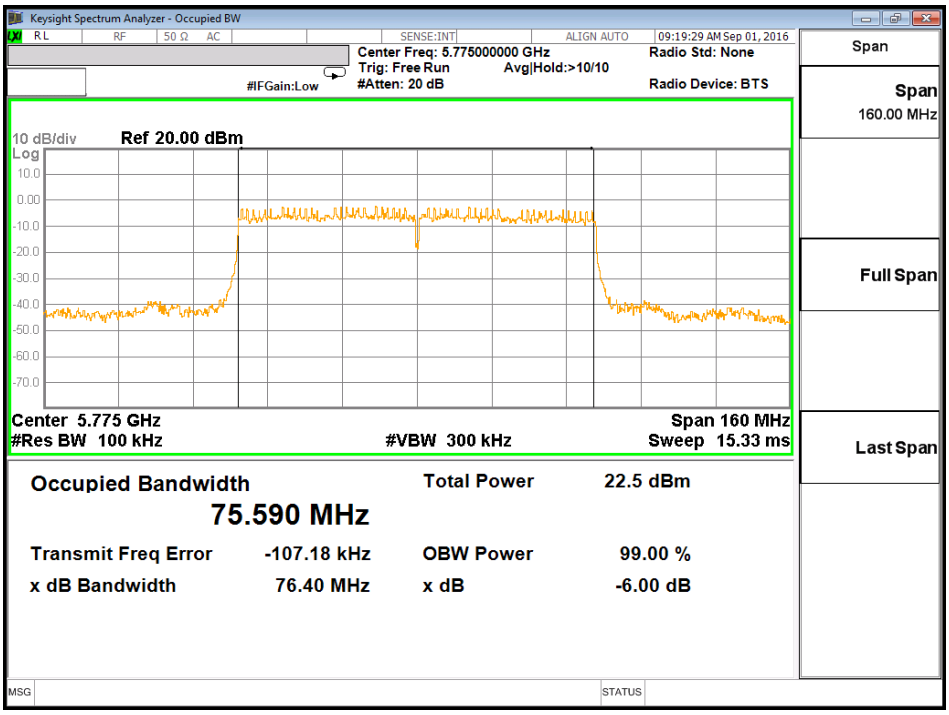


High Channel

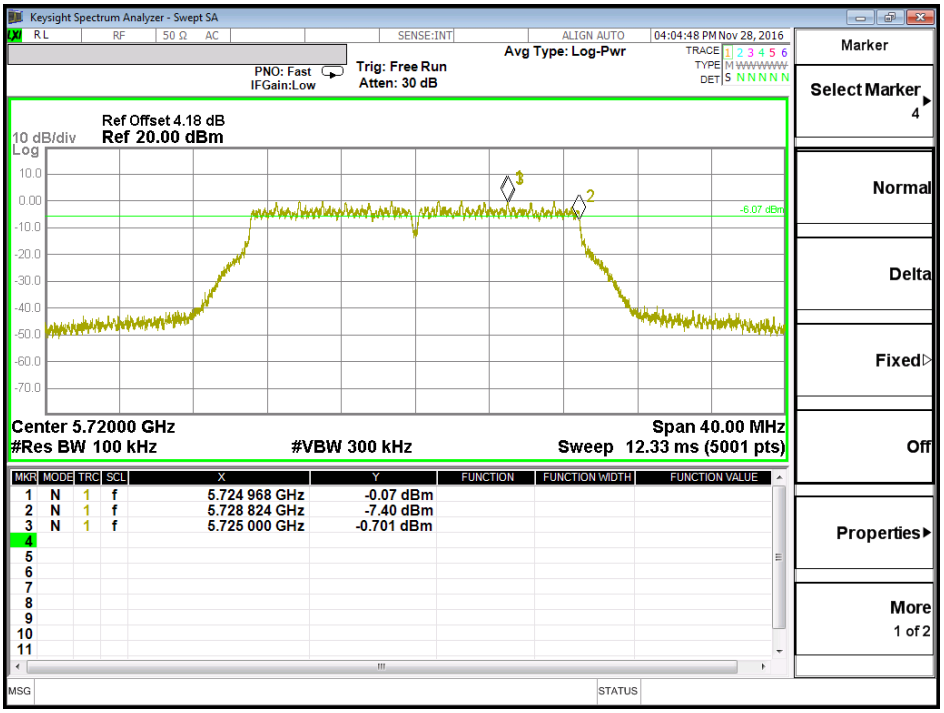


Test Plot of 6dB Bandwidth (802.11ac VHT80)

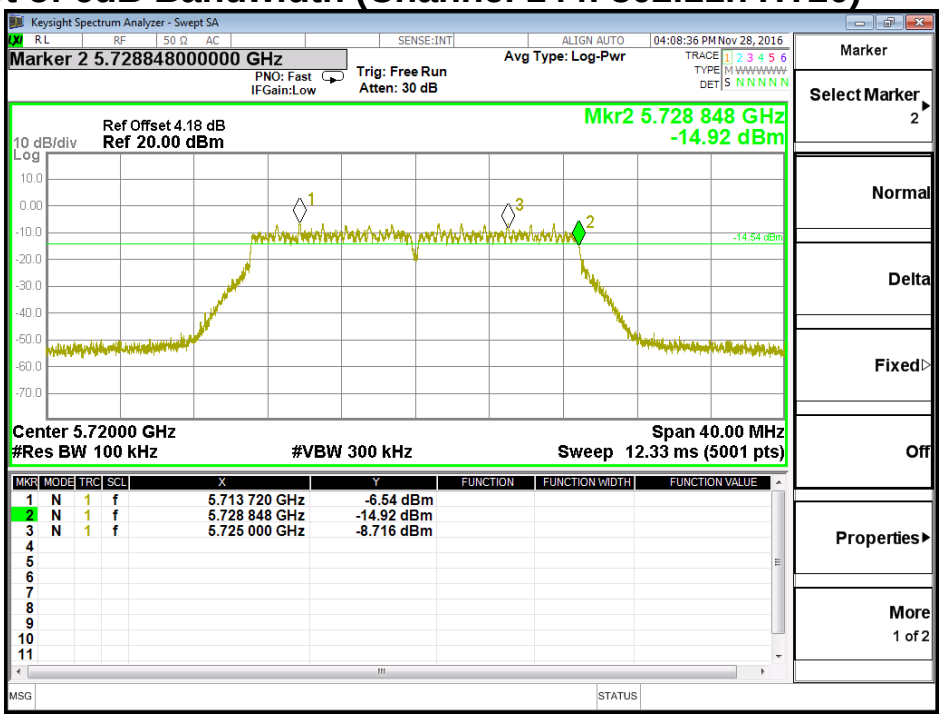
High Channel



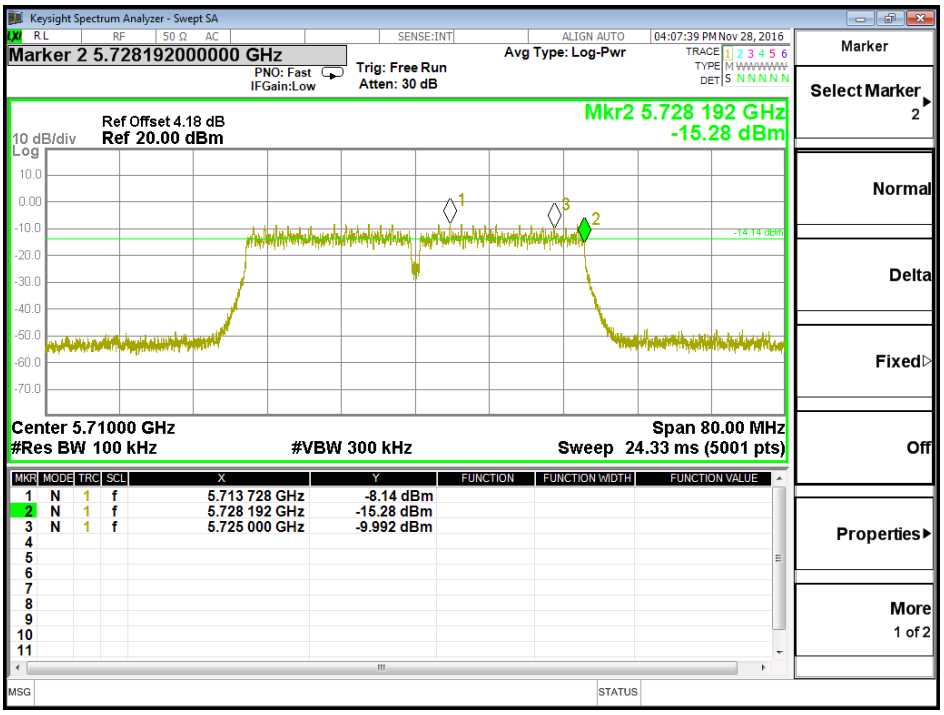
Test Plot of 6dB Bandwidth (Channel 144: 802.11a)



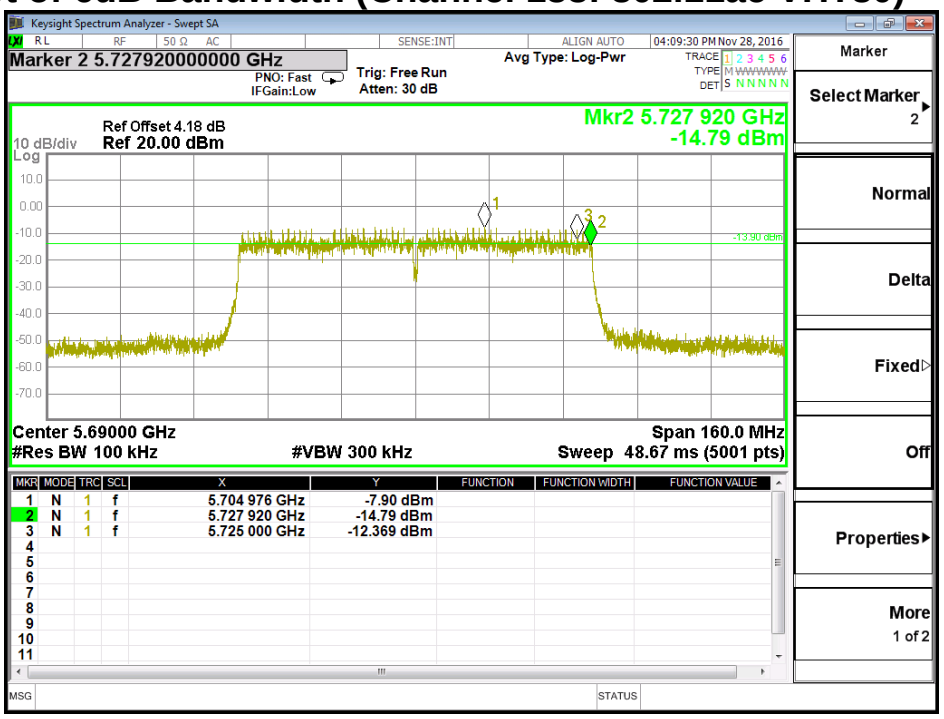
Test Plot of 6dB Bandwidth (Channel 144: 802.11n HT20)



Test Plot of 6dB Bandwidth (Channel 142: 802.11n HT40)



Test Plot of 6dB Bandwidth (Channel 138: 802.11ac VHT80)



5.1.4 Transmit Output Power

RESULT: **Passed**

Test standard	:	FCC Part 15.407(a), RSS-247 6.2.1, 6.2.4
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

15.407 General technical requirements.
(a) Power limits:

For the band 5.15–5.25 GHz. 5250-5350MHz. 5470-5725MHz:
(iv) For mobile and portable client devices in the 5.15–5.25 GHz. 5250-5350MHz. 5470-5725MHz band, the maximum **conducted** output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

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(3)For the 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 500kHz 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.

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Table 27: Test result of Transmit Power (802.11a)

5150-5250MHz:

Channel	Channel Frequency (MHz)	Output Power		Limit	Result
		(dBm)	(mW)	Limit (mW)	
Low Channel	5180	12.99	19.9	251	Pass
Middle Channel	5200	12.98	19.9	251	Pass
High Channel	5220	13.07	20.3	251	Pass

Pmax: 20.3mW

5250-5350MHz

Channel	Channel Frequency (MHz)	Output Power		Limit	Result
		(dBm)	(mW)	Limit (mW)	
Low Channel	5280	12.85	19.3	251	Pass
Middle Channel	5300	12.67	18.5	251	Pass
High Channel	5320	12.56	18.0	251	Pass

Pmax: 19.3 mW

5470-5725MHz:

Channel	Channel Frequency (MHz)	Output Power		Limit	Result
		(dBm)	(mW)	Limit (mW)	
Low Channel	5500	11.43	13.9	251	Pass
Middle Channel	5560	10.83	12.1	251	Pass
High Channel	5700	11.3	13.5	251	Pass

Pmax: 13.9 mW

5725-5850MHz:

Channel	Channel Frequency (MHz)	Output Power		Limit	Result
		(dBm)	(mW)	Limit (mW)	
Low Channel	5745	12.26	16.8	1000	Pass
Middle Channel	5785	12.04	16.0	1000	Pass
High Channel	5825	12.3	17.0	1000	Pass

Pmax: 17 mW

Table 28: Test result of Transmit Power (802.11n HT20)

5150-5250MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5180	4.77	5.77	7	174.58	Pass
Middle Channel	5200	4.49	5.69	6.5	174.58	Pass
High Channel	5220	4.31	5.73	6.4	174.58	Pass

Pmax: 6.8 mW

Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 24 – (7.58-6) = 22.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5280	3.69	4.71	5.3	139.95	Pass
Middle Channel	5300	3.45	4.43	5	139.95	Pass
High Channel	5320	3.64	4.56	5	139.95	Pass

Pmax: 5.3 mW

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5500	3.4	3.21	4.3	139.95	Pass
Middle Channel	5560	2.21	1.75	3	139.95	Pass
Middle Channel	5700	1.82	2.33	3	139.95	Pass

Pmax: 4.3 mW

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5725-5850MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5745	12.67	9.52	27.4	741	Pass
Middle Channel	5785	13.09	9.71	30	741	Pass
High Channel	5825	12.57	9.93	28	741	Pass

Pmax: 30 mW

Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 29: Test result of Transmit Power (802.11n HT40)

5150-5250MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5190	4.36	6.27	7	174.58	Pass
High Channel	5230	4.6	6.2	7	174.58	Pass

Pmax: 7 mW

Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 24 – (7.58-6) = 22.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Middle Channel	5310	3.99	5.07	5.7	139.95	Pass

Pmax: 5.7 mW

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5510	3.41	3.68	4.5	139.95	Pass
Middle Channel	5670	2.98	2.44	4	139.95	Pass

Pmax: 4.5 mW

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5725-5850MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5755	12.82	10.1	29.4	741	Pass
High Channel	5795	13.08	10.48	31	741	Pass

Pmax: 31 Mw

Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 30: Test result of Transmit Power (802.11ac VHT80)

5150-5250MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Middle Channel	5210	8.7	9.35	16.0	174.58	Pass

Pmax: 16 mW
Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 24 – (7.58-6) = 22.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Middle Channel	5290	8.04	8.46	13.4	139.95	Pass

Pmax: 13.4 mW
Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Low Channel	5530	6.7	6.88	9.6	139.95	Pass

Pmax: 9.6 mW
Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 24 – (8.54-6) = 21.46dBm

5725-5850MHz:

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
Middle Channel	5775	10.12	9.01	18.2	741	Pass

Pmax: 18.2 mW
Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 31: Test result of Transmit Power (802.11a)

Band	Channel Frequency (MHz)	Output Power		Limit	Result
		(dBm)	(mW)	Limit (mW)	
UNII2C	5720	9.89	9.7	196.3	Pass
UNII3	5720	9.89	9.7	1000	Pass

UNII2C :24dBm or 11 dBm + 10 log B, B is the 26 dB , B=15.6MHz 22.93dBm < 24dBm

Table 32: Test result of Transmit Power (802.11n HT20)

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
UNII2C	5720	0.84	2.67	3.1	109.9	Pass
UNII3	5720	0.84	2.67	3.1	741	Pass

UNII2C : 21.46dBm or 8.46dBm + 10 log B, B is the 26 dB , B=15.68MHz 20.41dBm < 21.46dBm

Table 33: Test result of Transmit Power (802.11n HT40)

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
UNII2C	5710	2.19	3.53	3.9	139.95	Pass
UNII3	5710	2.19	3.53	3.9	741	Pass

UNII2C : 21.46dBm or 8.46dBm + 10 log B, B is the 26 dB , B=34.76MHz 23.67dBm > 21.46 dBm

Table 34: Test result of Transmit Power (802.11ac VHT80)

Channel	Channel Frequency (MHz)	Output Power			Limit	Result
		Power TX1 (dBm)	PowerTX2 (dBm)	Power TX + TX2 (mW)	Limit (mW)	
UNII2C	5690	6.58	6.13	9	139.95	Pass
UNII3	5690	6.58	6.13	9	741	Pass

UNII2C : 21.46dBm or 8.46dBm + 10 log B, B is the 26 dB , B=75.52MHz 27.24dBm > 21.46 dBm

5.1.5 Power Spectral Density

RESULT: **Passed**

Test standard	:	FCC Part 15.407(a)(1),(5) RSS-247 6.2.1, 6.2.4
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 35: Test result of Power Spectral Density (802.11a)

5150-5250MHz

Channel	Channel Frequency (MHz)	Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5180	9.60	11	Pass
Mid Channel	5200	10.01	11	Pass
High Channel	5220	9.30	11	Pass

5250-5350MHz:

Channel	Channel Frequency (MHz)	Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5280	9.48	11	Pass
Mid Channel	5300	9.35	11	Pass
High Channel	5320	9.47	11	Pass

5470-5725MHz:

Channel	Channel Frequency (MHz)	Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5500	8.06	11	Pass
Mid Channel	5560	7.26	11	Pass
Mid Channel	5700	7.98	11	Pass

5745-5850MHz

Channel	Channel Frequency (MHz)	Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5745	6.31	30	Pass
Mid Channel	5785	5.28	30	Pass
High Channel	5825	6.16	30	Pass

Table 36: Test result of Power Spectral Density (802.11n HT20)

5150-5250MHz

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5180	4.66	5.12	7.91	9.42	Pass
Mid Channel	5200	4.27	4.56	7.43	9.42	Pass
High Channel	5220	4.58	5.43	8.04	9.42	Pass

Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 11 – (7.58-6) = 9.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5280	3.97	3.6	6.80	8.5	Pass
Mid Channel	5300	3.8	4.64	7.25	8.5	Pass
High Channel	5320	4.18	3.57	6.90	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5500	3.07	3.69	6.40	8.5	Pass
Mid Channel	5560	2.14	1.98	5.07	8.5	Pass
Mid Channel	5700	2.45	1.43	4.98	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5745-5850MHz

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/500k Hz)	Result
Low Channel	5745	9.32	7.59	11.55	28.7	Pass
Mid Channel	5785	9.69	6.39	11.36	28.7	Pass
High Channel	5825	9.29	6.24	11.04	28.7	Pass

Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 37: Test result of Power Spectral Density (802.11n H40)

5150-5250MHz

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5190	3.15	3.43	6.30	9.42	Pass
High Channel	5230	4.04	3.76	6.91	9.42	Pass

Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 11 – (7.58-6) = 9.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Mid Channel	5310	3.47	3.33	6.41	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5510	4.18	1.41	6.02	8.5	Pass
Mid Channel	5670	1.49	0.98	4.25	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5745-5850MHz

Channel	Channel Frequency (MHz)	Peak Power Density T1 (dBm)	Peak Power Density T2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/500k Hz)	Result
Low Channel	5755	7.76	4.72	9.51	28.7	Pass
High Channel	5795	7.69	5.17	9.62	28.7	Pass

Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 38: Test result of Power Spectral Density (802.11ac VHT80)

5150-5250MHz

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Mid Channel	5210	4.63	5.53	8.11	9.42	Pass

Main Ant: 5.7, Aux Ant: 3.27 , Total ANT. Gain = 7.58 >6dbi , Power Limit(dBm): 11 – (7.58-6) = 9.42dBm

5250-5350MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Mid Channel	5290	4.01	4.61	7.33	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5470-5725MHz:

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Low Channel	5530	3.5	2.57	6.07	8.5	Pass

Main Ant: 5.7, Aux Ant: 5.36 , Total ANT. Gain = 8.54 >6dbi , Power Limit(dBm): 11 – (8.54-6) = 8.5dBm

5745-5850MHz

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
Mid Channel	5775	0.2	0.12	3.17	28.7	Pass

Main Ant: 4.51, Aux Ant: 4.07 , Total ANT. Gain = 7.30 >6dbi , Power Limit(dBm): 30 – (7.3-6) = 28.7dBm

Table 39: Test result of Power Spectral Density (Channel 144: 802.11a)

Channel	Channel Frequency (MHz)	Peak Power Density (dBm)	Limit (dBm/MHz)	Result
UNII2C	5720	8.9	11	Pass
UNII3	5720	5.75	30	Pass

Table 40: Test result of Power Spectral Density (Channel 144: 802.11n HT20)

Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
UNII2C	5720	2.74	3.6	4	8.5	Pass
UNII3	5720	-1.49	0.19	1.8	28.7	Pass

Table 41: Test result of Power Spectral Density (Channel 142: 802.11n H40)

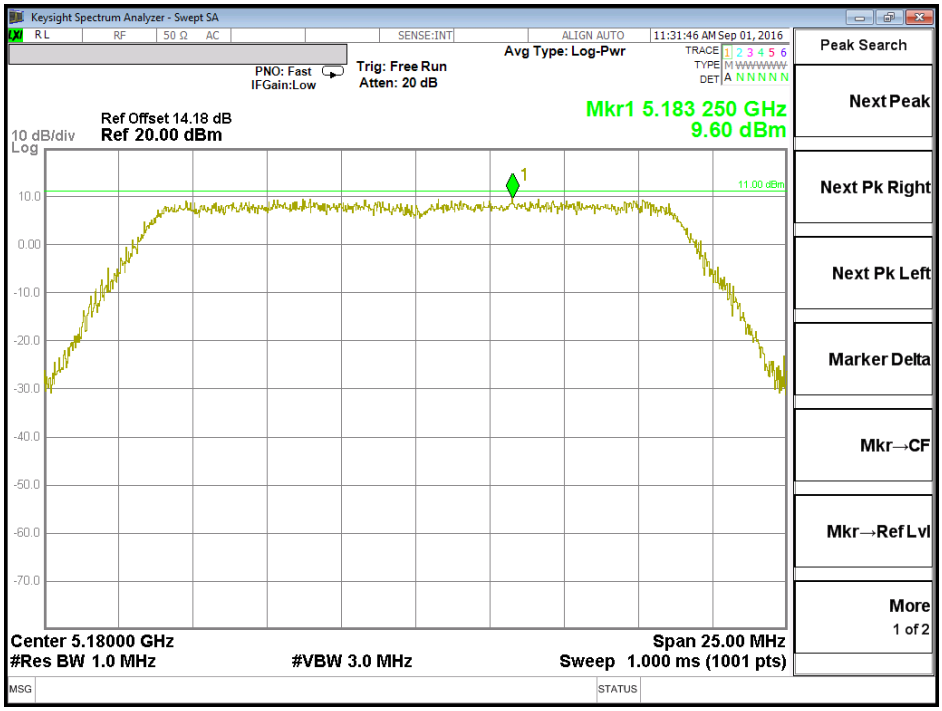
Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
UNII2C	5710	0.09	1.82	3	8.5	Pass
UNII3	5710	-2.81	-2.29	1	28.7	Pass

Table 42: Test result of Power Spectral Density (Channel 138:802.11ac VHT80)

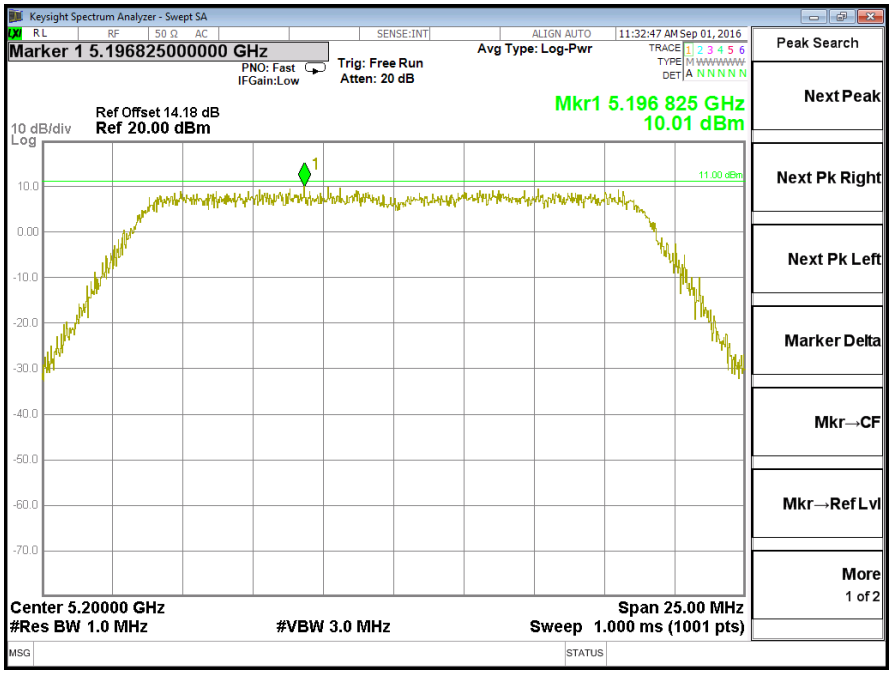
Channel	Channel Frequency (MHz)	Peak Power Density TX1 (dBm)	Peak Power Density TX2 (dBm)	Total Peak Power Density (dBm)	Limit (dBm/MHz)	Result
UNII2C	5690	1.15	1.69	3	8.5	
UNII3	5690	-3.87	-2.48	1	28.7	Pass

Test Plot of Power Density 802.11a (Band I)

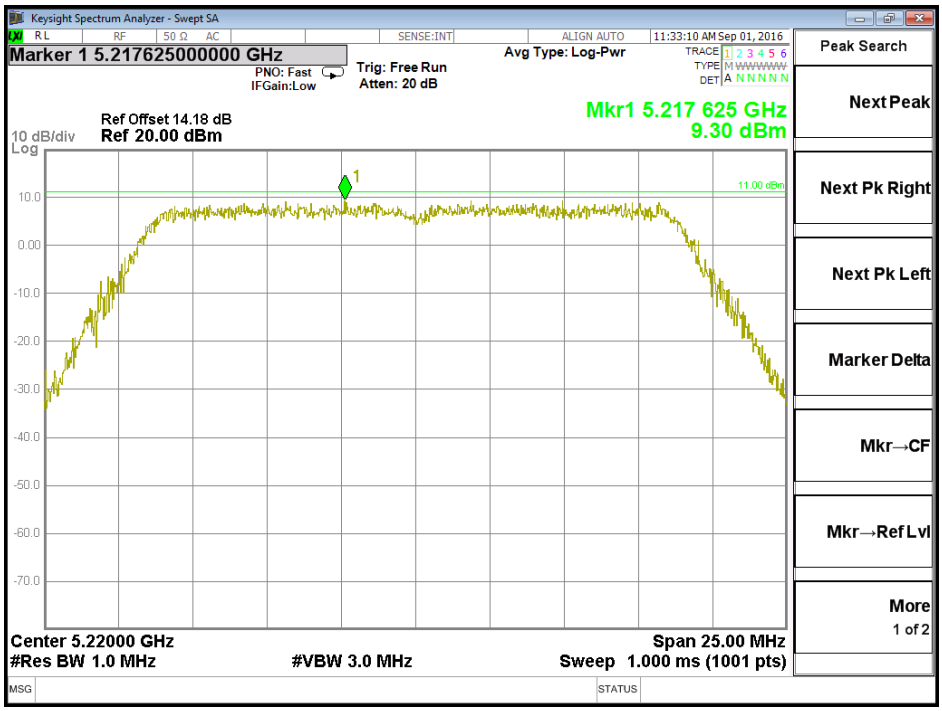
Low Channel



Middle Channel

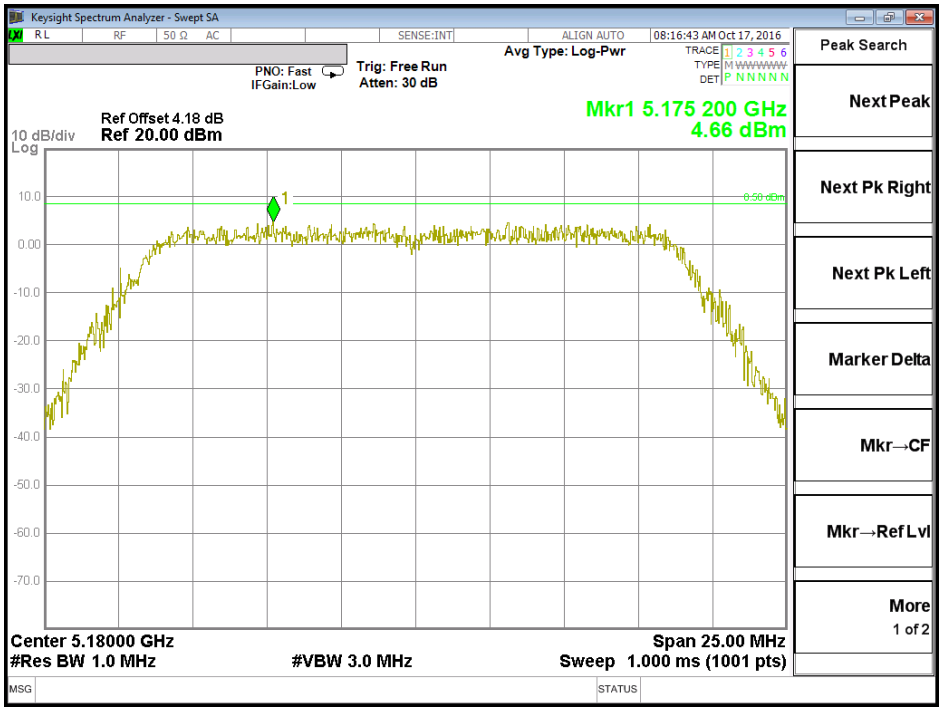


High Channel

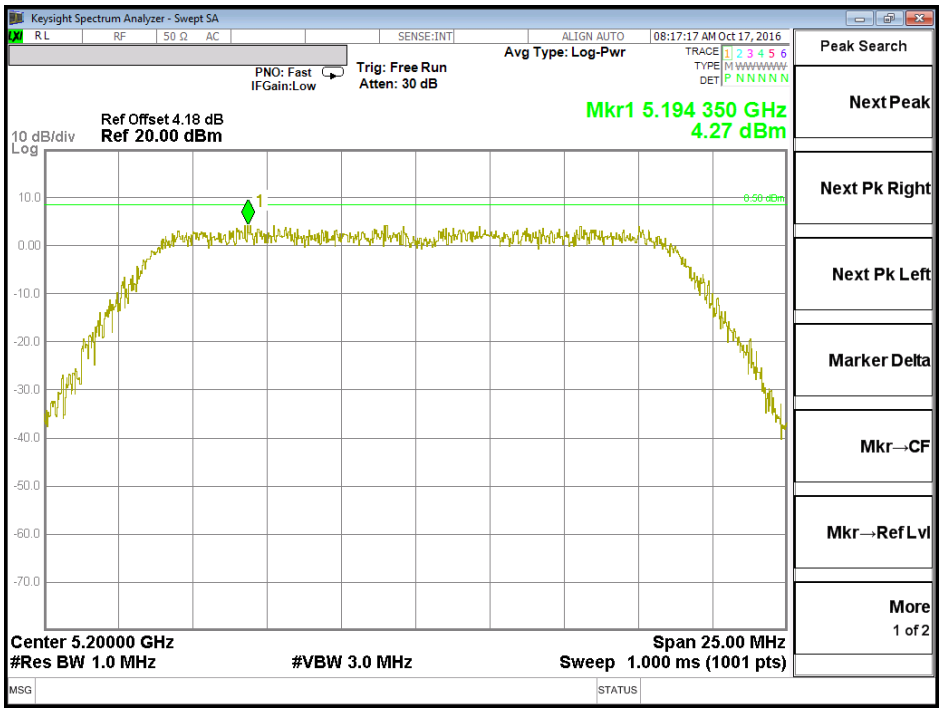


Test Plot of Power Density 802.11n HT20 (Band I)

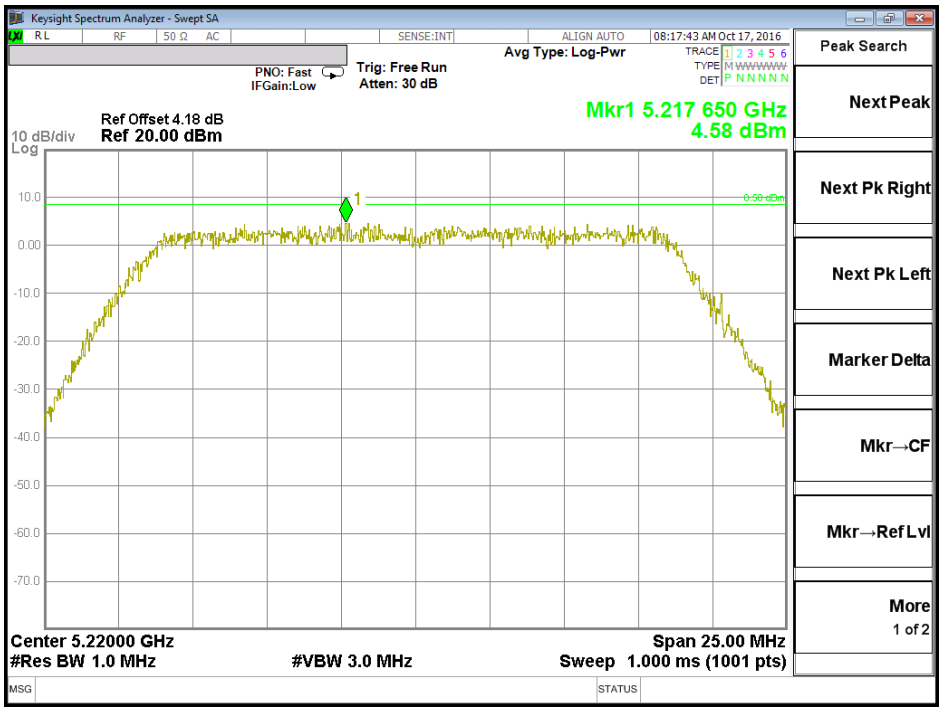
TX1 : Low Channel



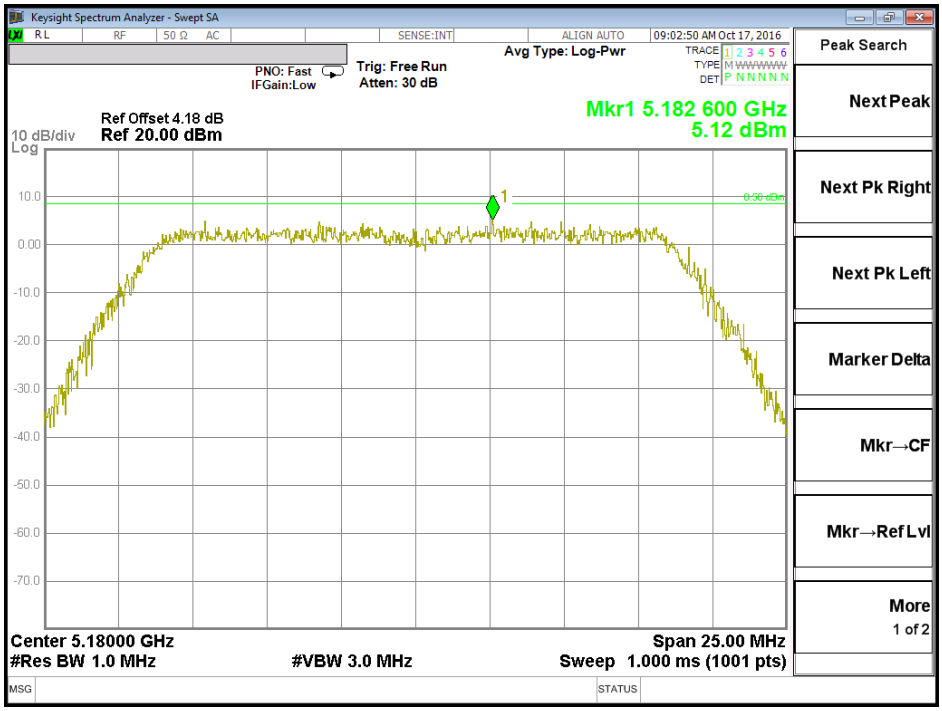
Middle Channel



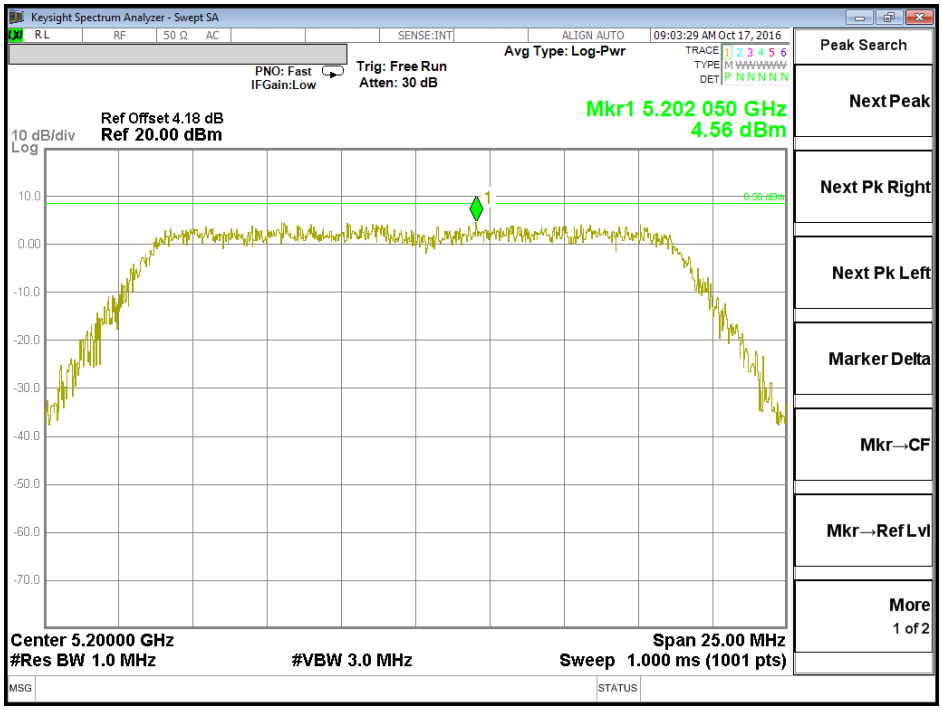
High Channel



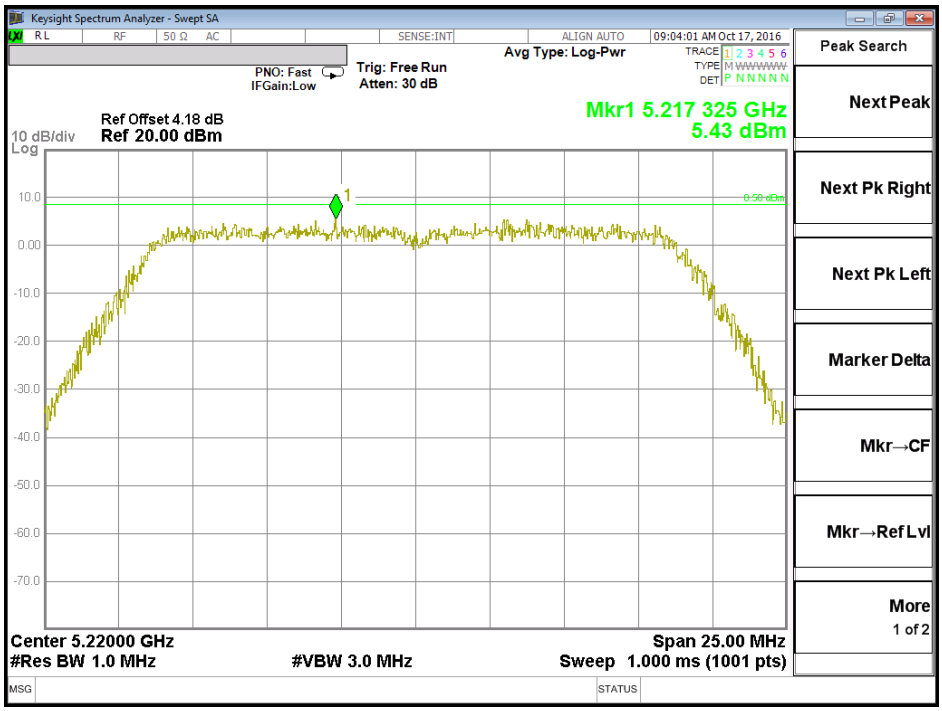
TX2
Low Channel



Middle Channel

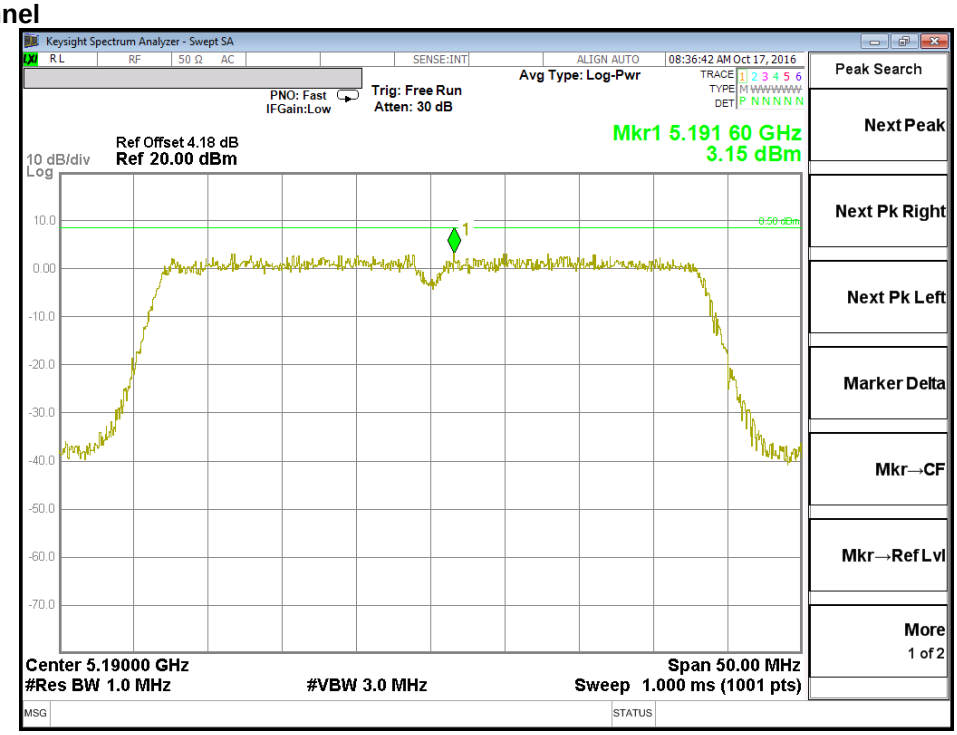


High Channel

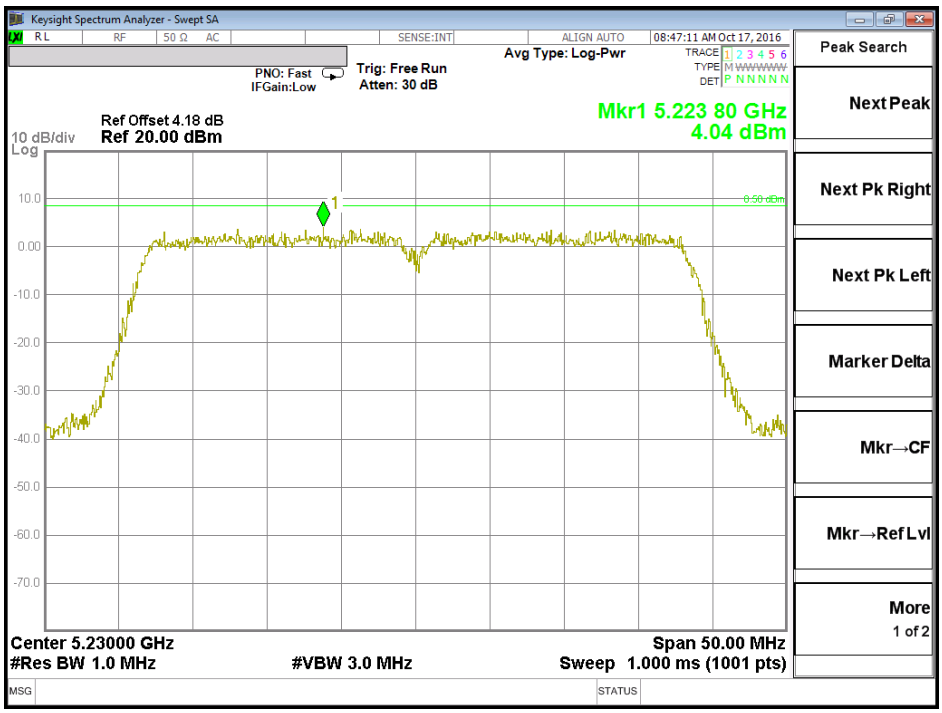


Test Plot of Power Density 802.11n HT40 (Band I)

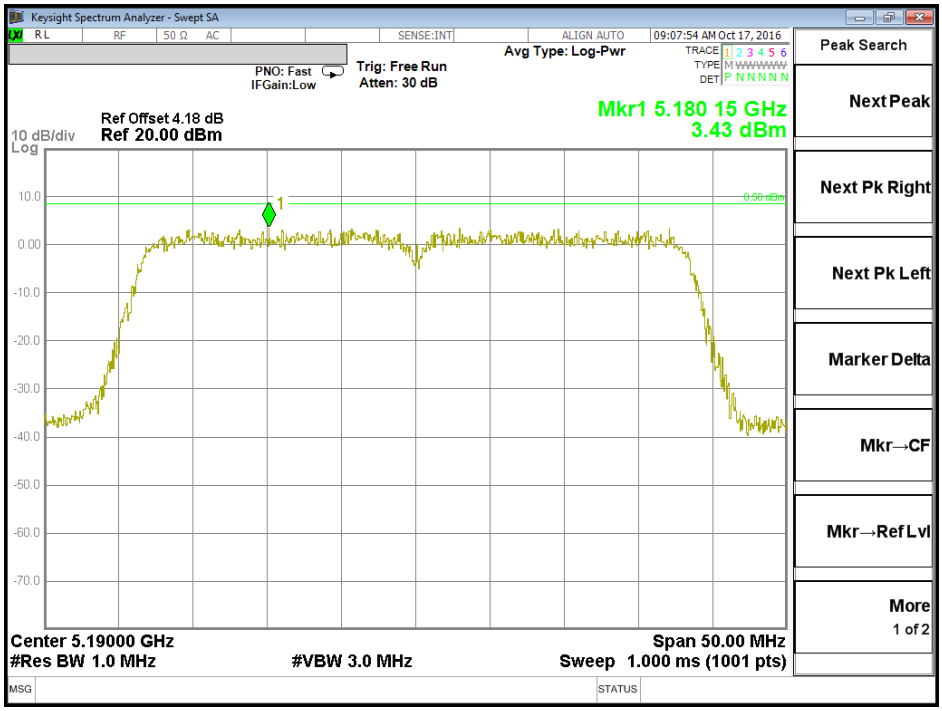
TX1 :
Low Channel



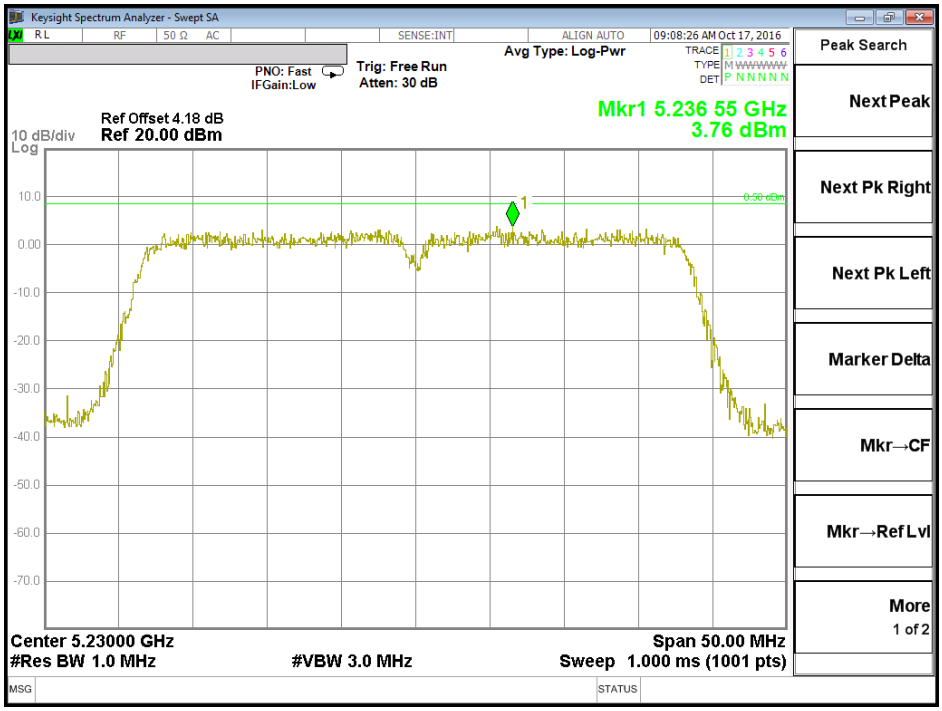
High Channel



TX2 :
Low Channel



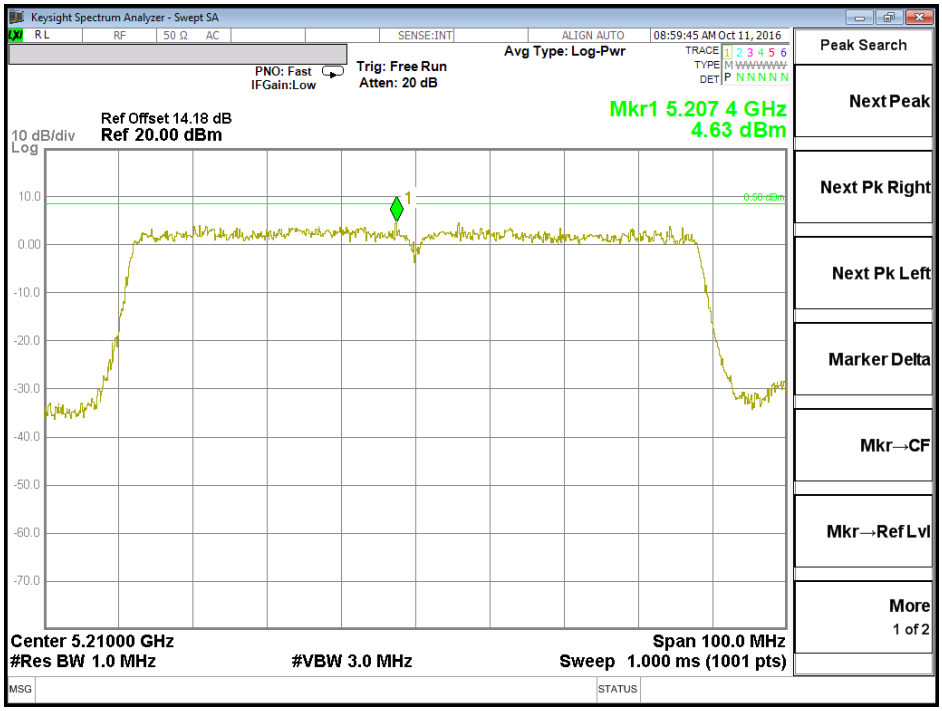
High Channel



Test Plot of Power Density 802.11AC VHT80 (Band I)

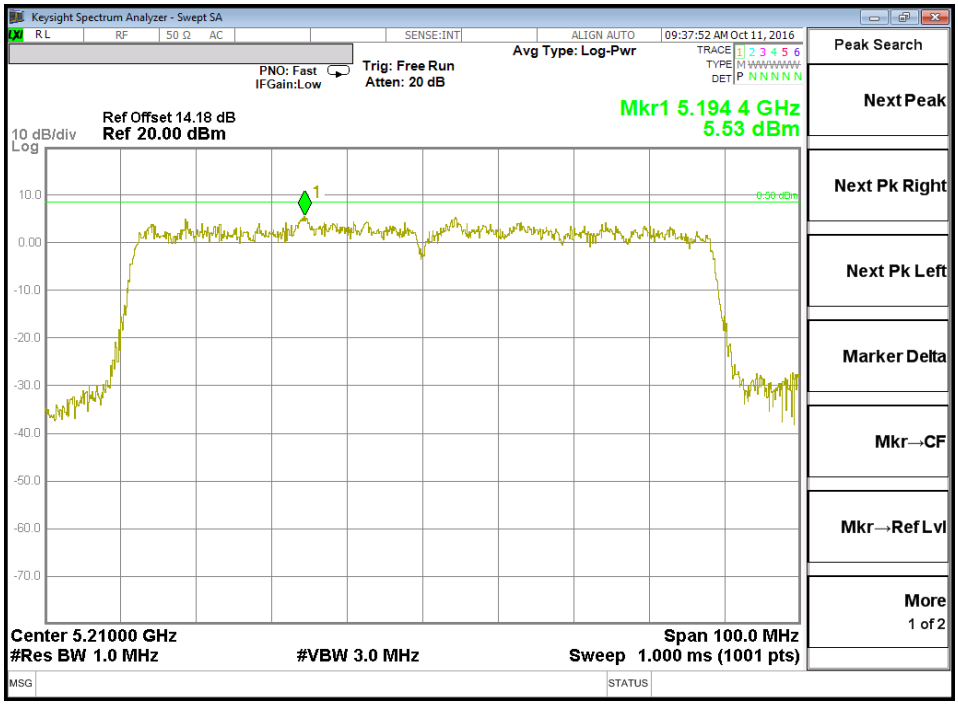
TX1 :

Middle Channel



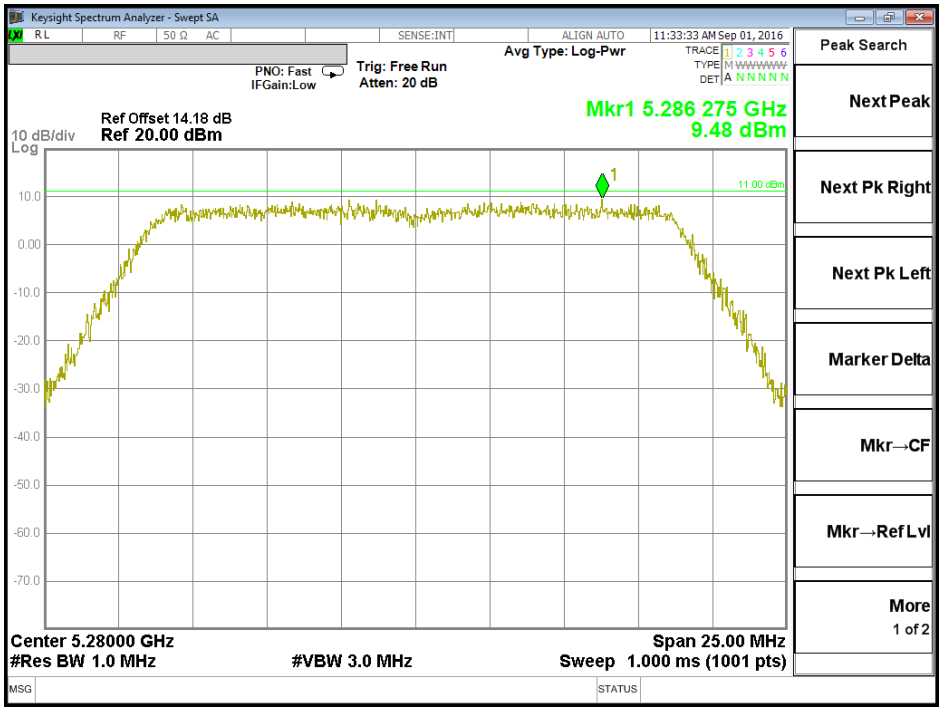
TX2 :

Middle Channel

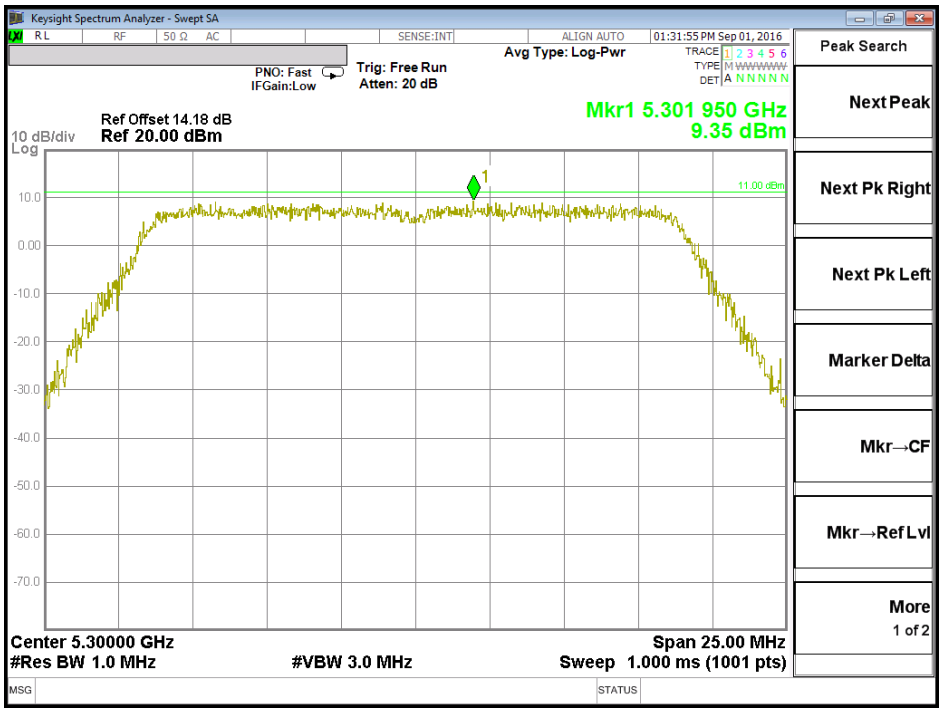


Test Plot of Power Density 802.11a (Band II)

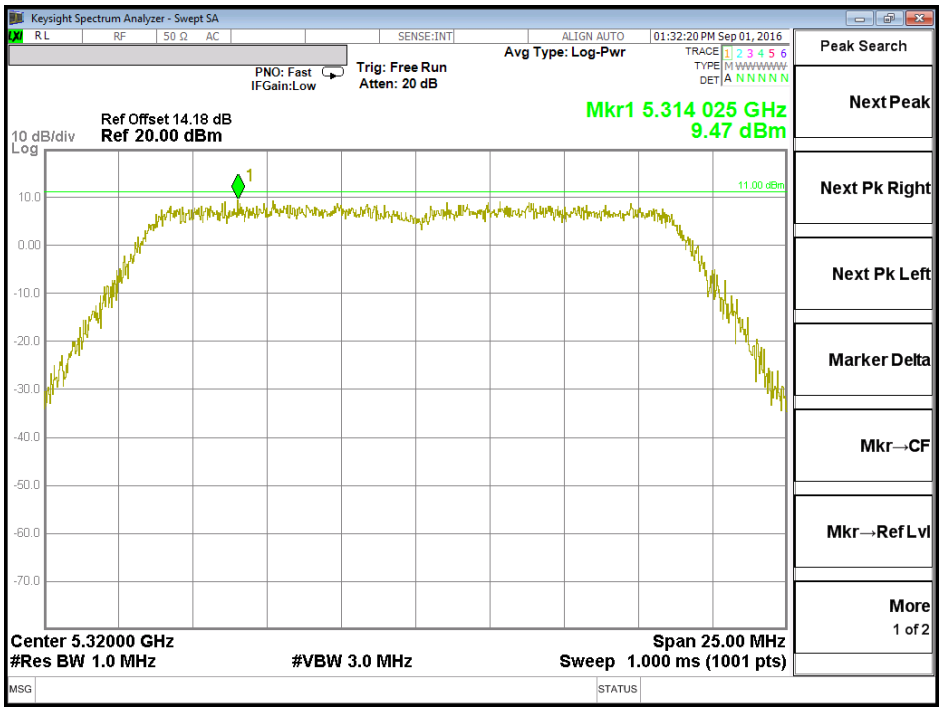
Low Channel



Middle Channel



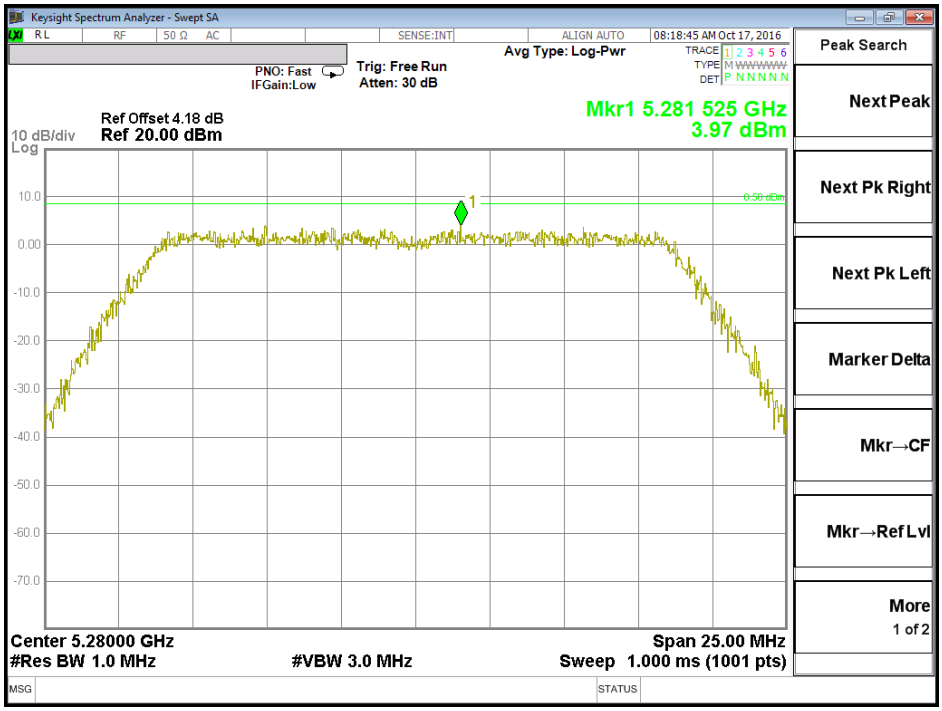
High Channel



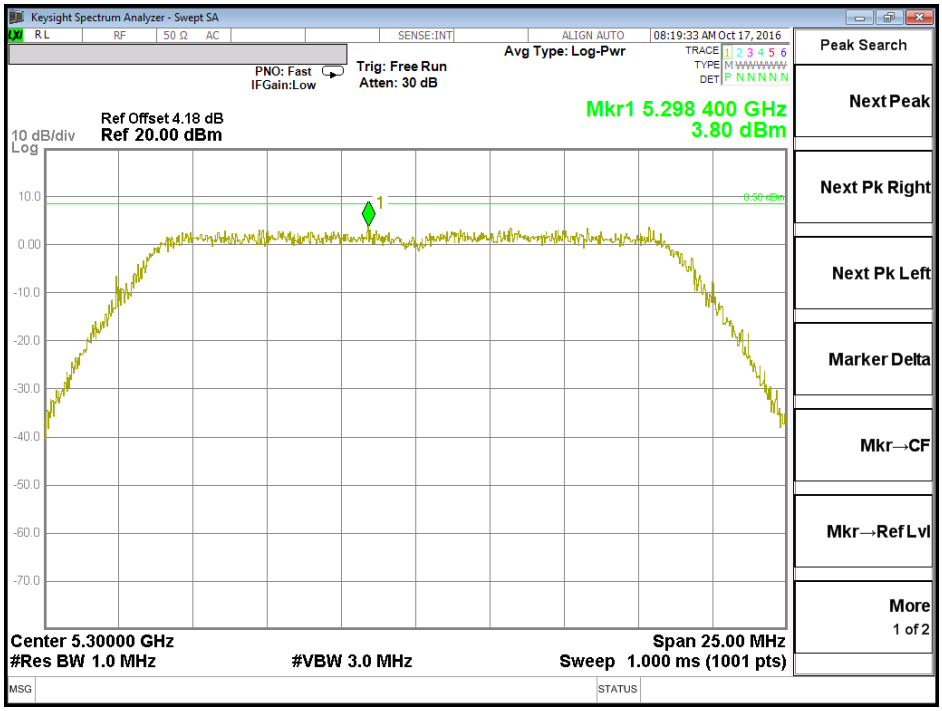
Test Plot of Power Density 802.11n HT20 (Band II)

TX1 :

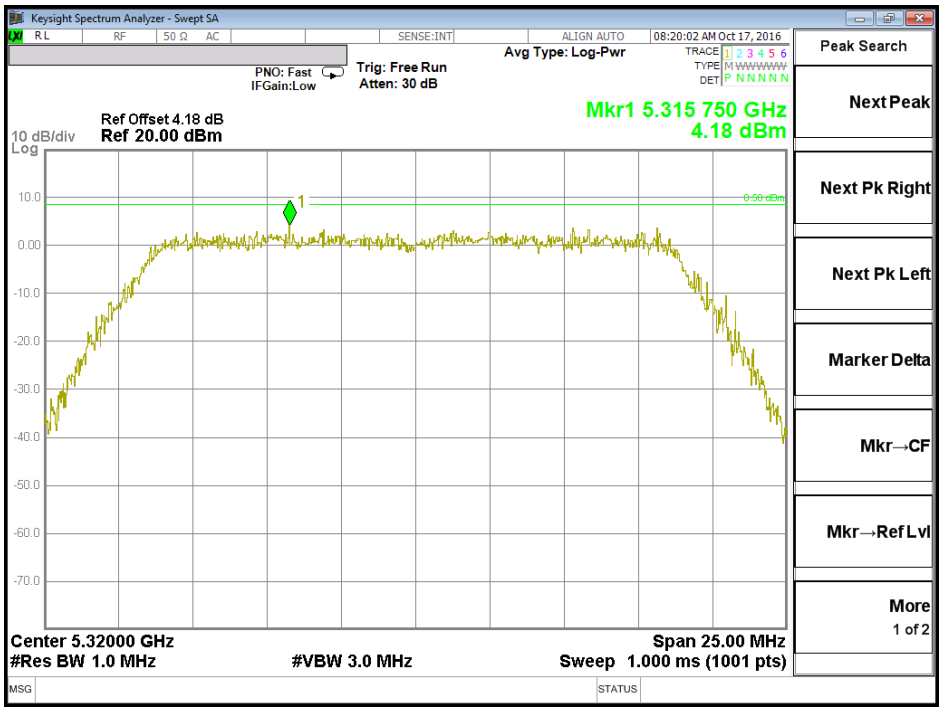
Low Channel



Middle Channel

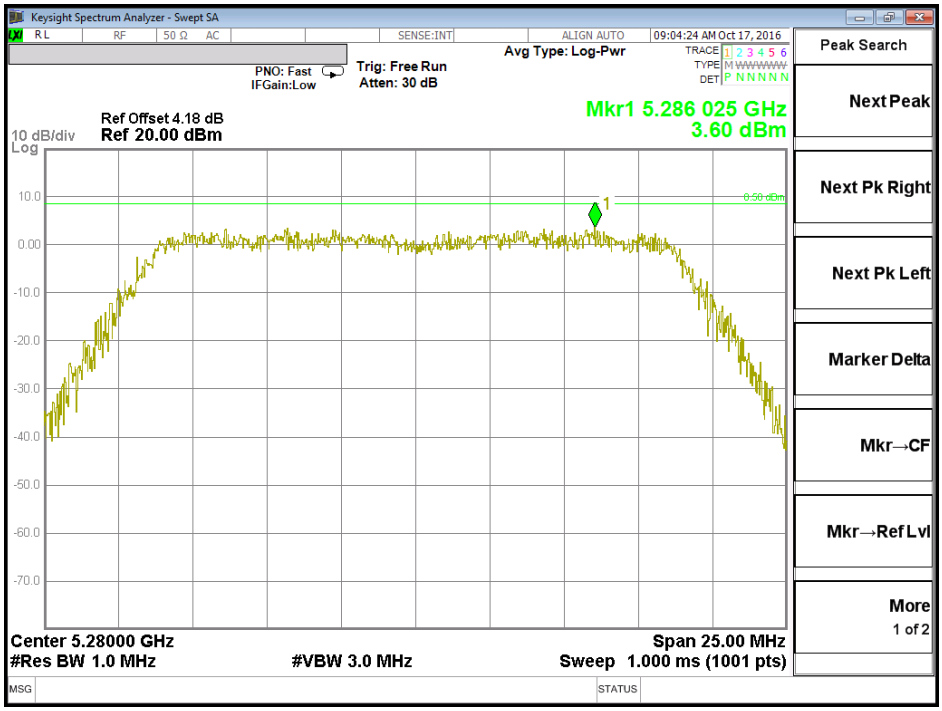


High Channel

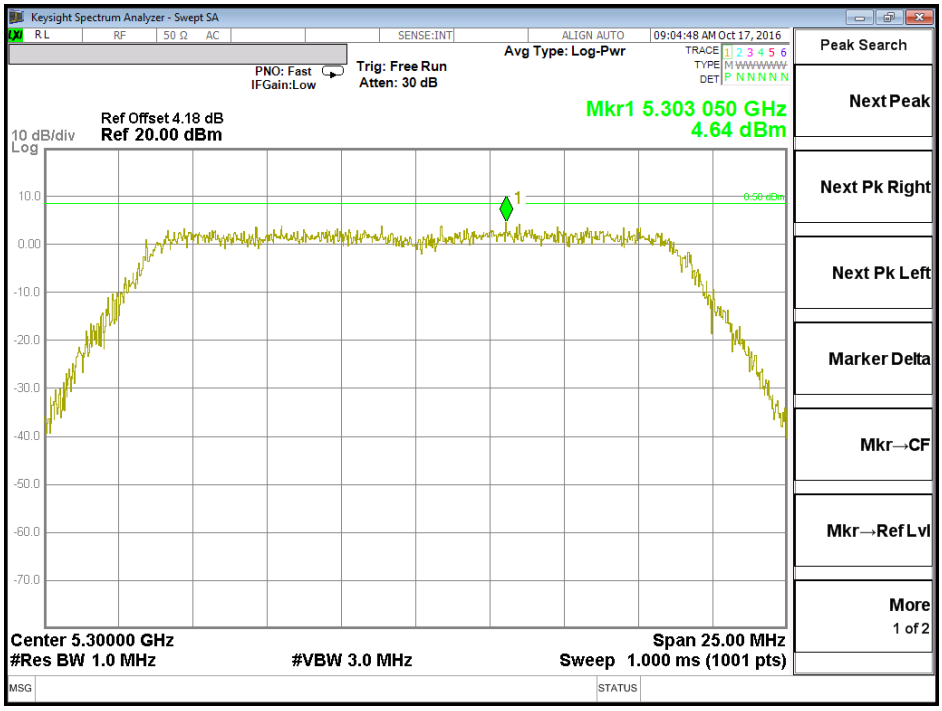


TX2 :

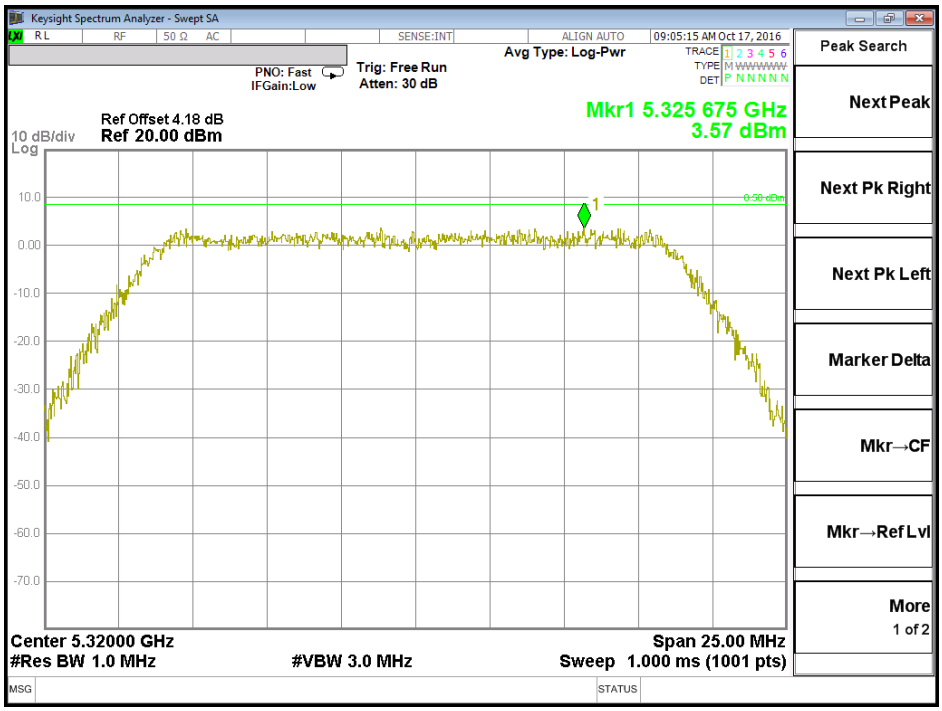
Low Channel



Middle Channel



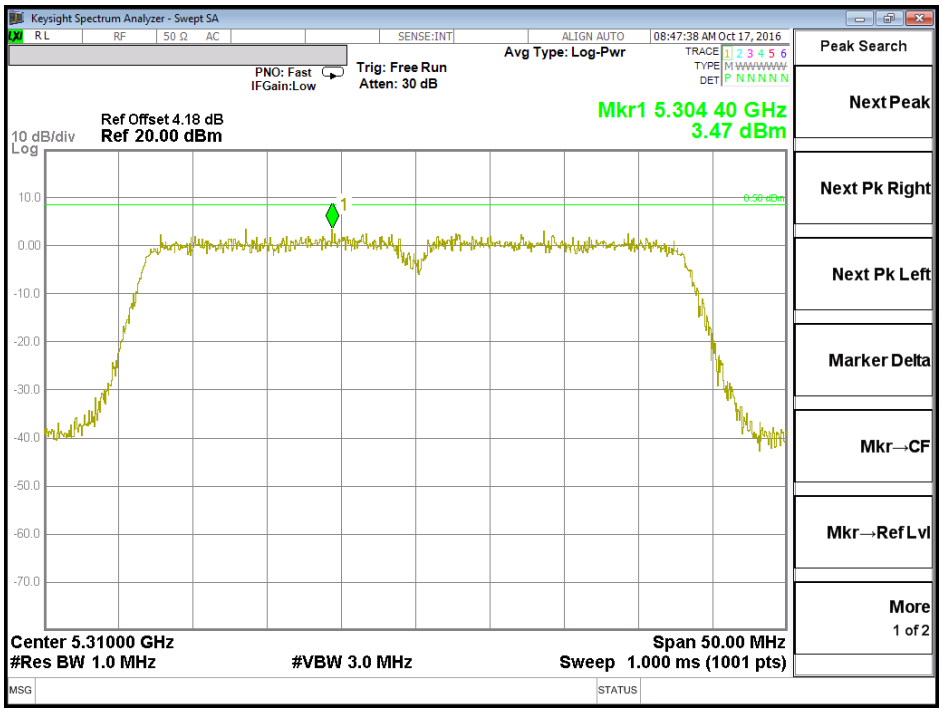
High Channel



Test Plot of Power Density 802.11n HT40 (Band II)

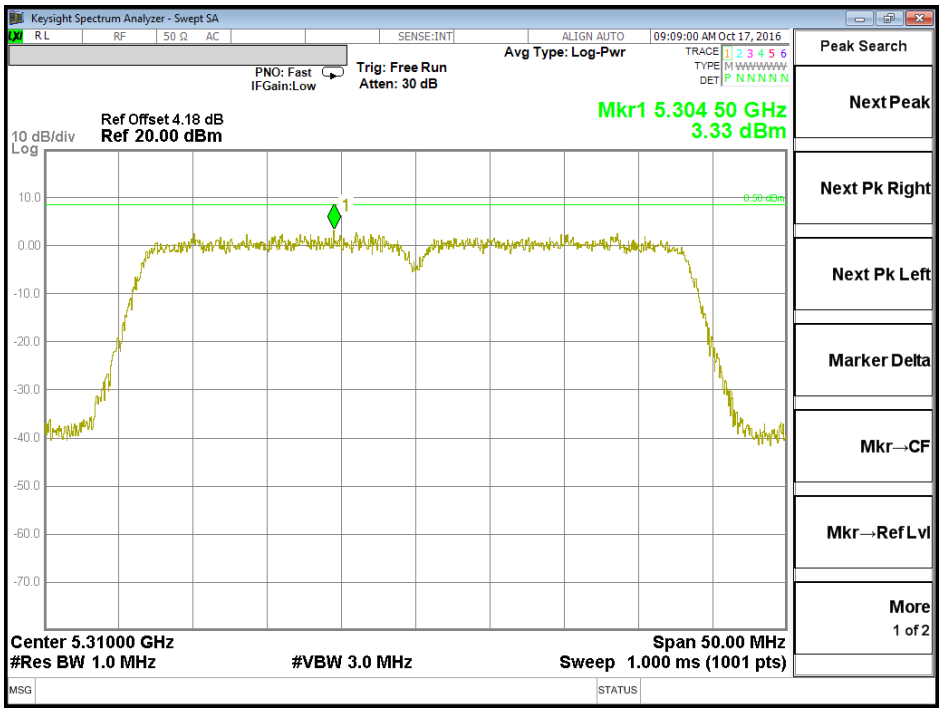
TX1 :

Middle Channel



TX2 :

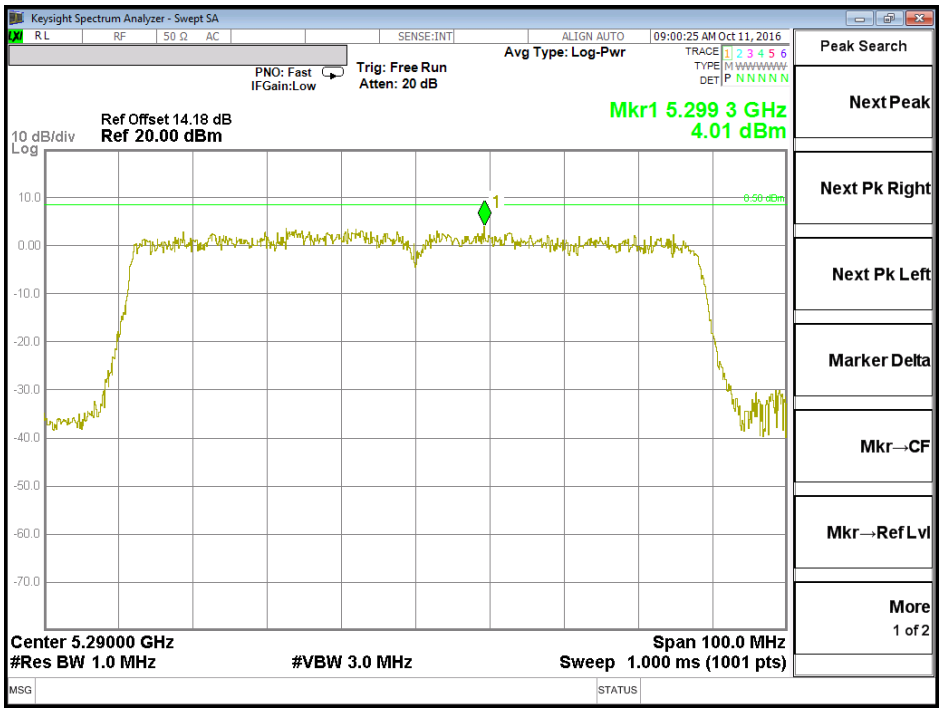
Middle Channel



Test Plot of Power Density 802.11ac VHT80 (Band II)

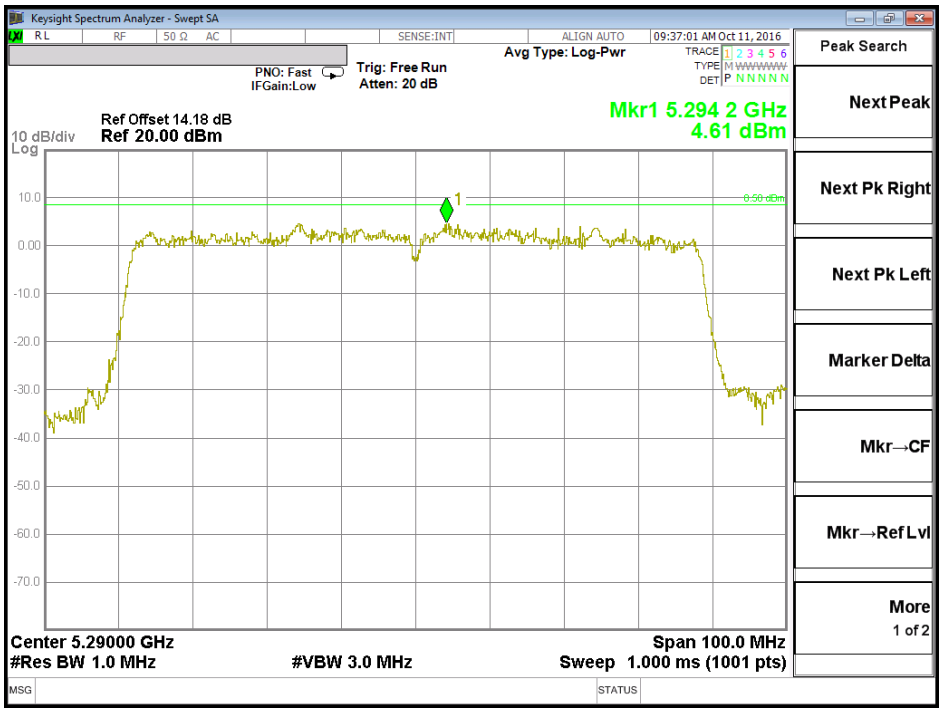
TX1 :

Middle Channel



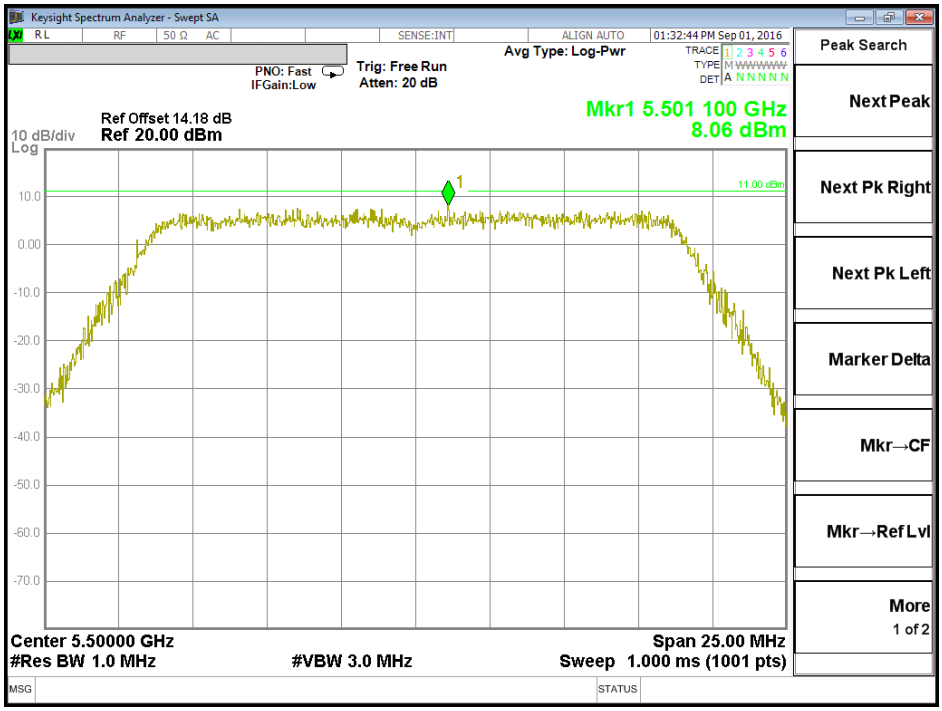
TX2 :

Middle Channel

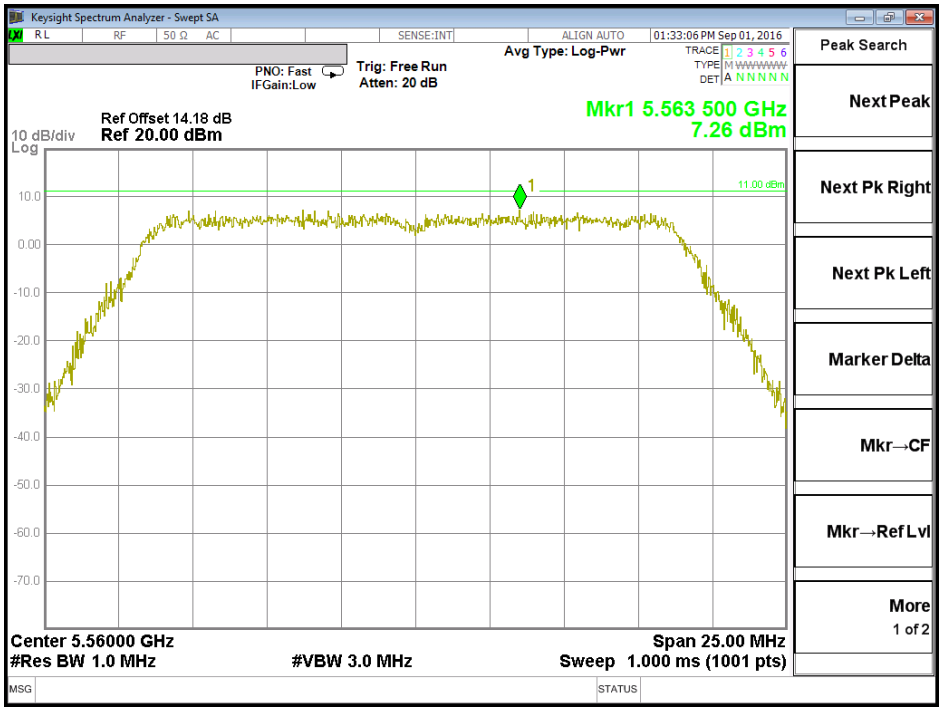


Test Plot of Power Density 802.11a (Band III)

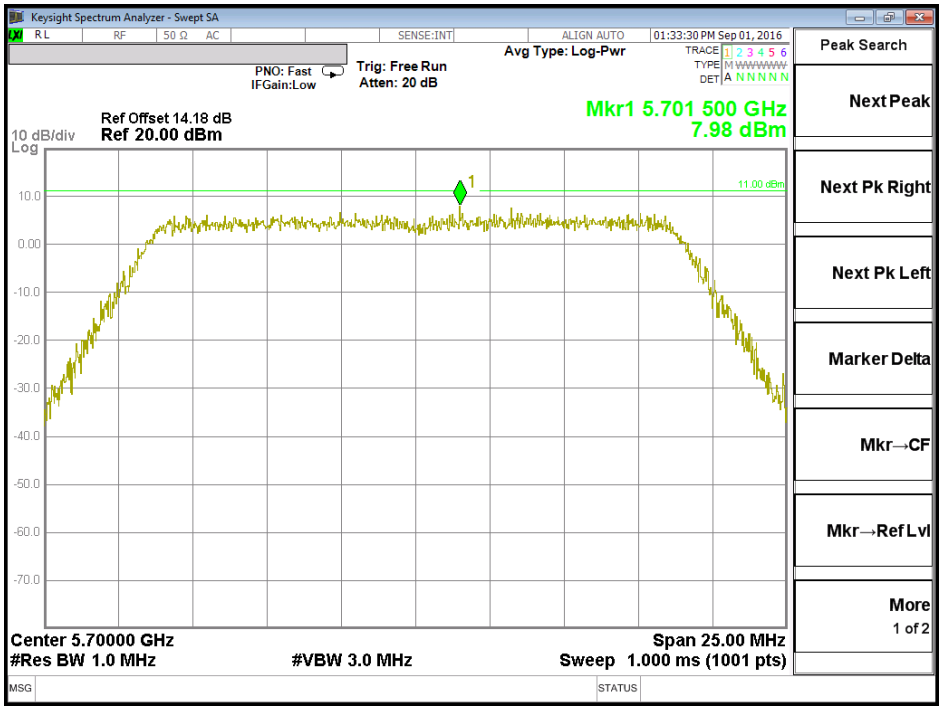
Low Channel



Middle Channel



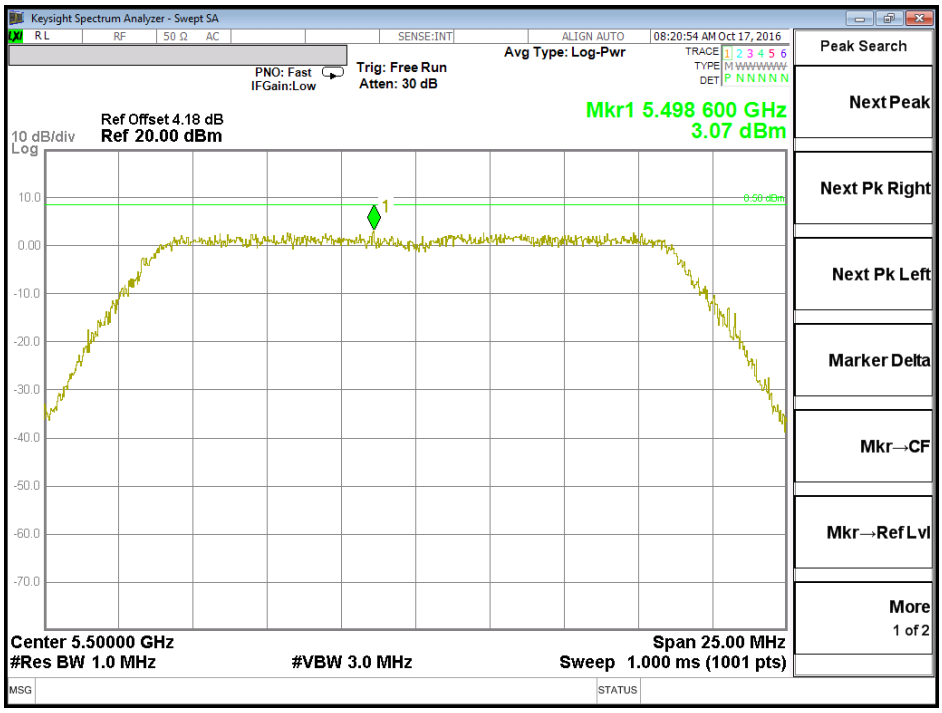
Middle Channel



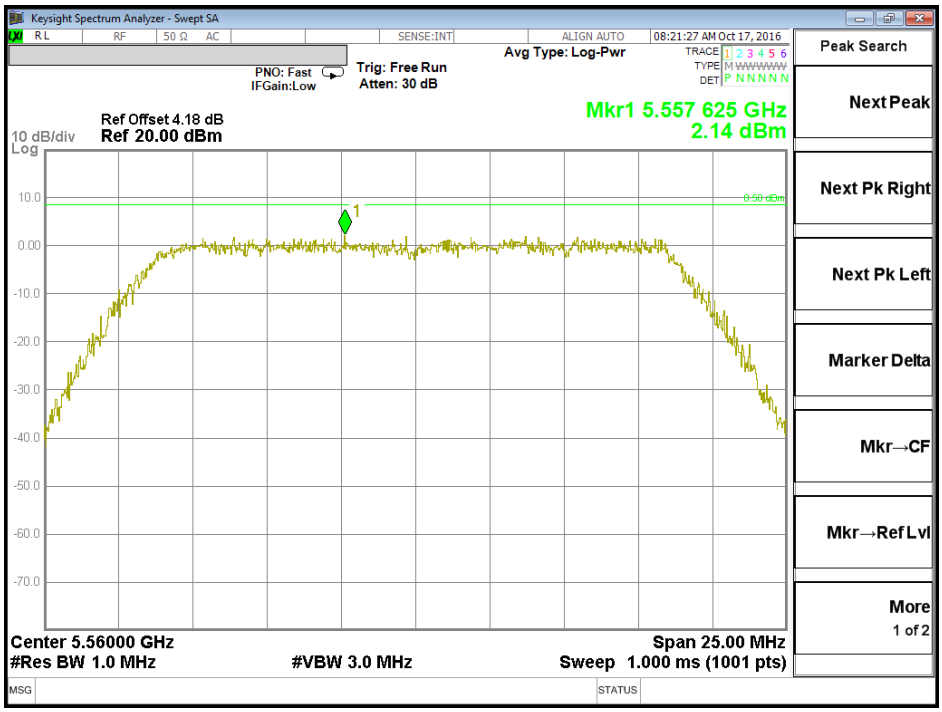
Test Plot of Power Density 802.11n HT20 (Band III)

TX1 :

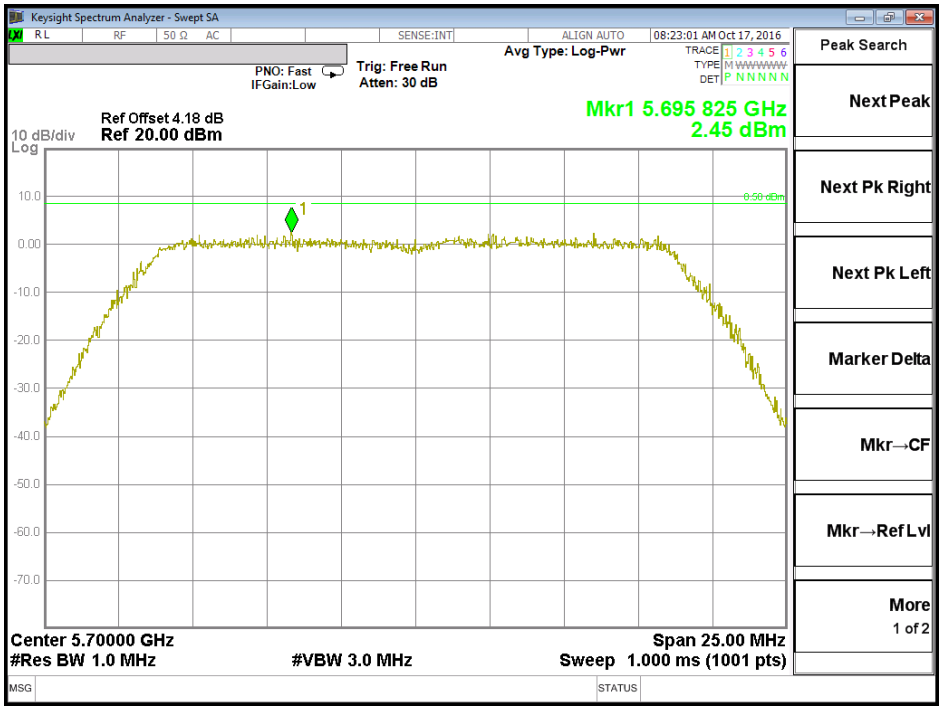
Low Channel



Middle Channel

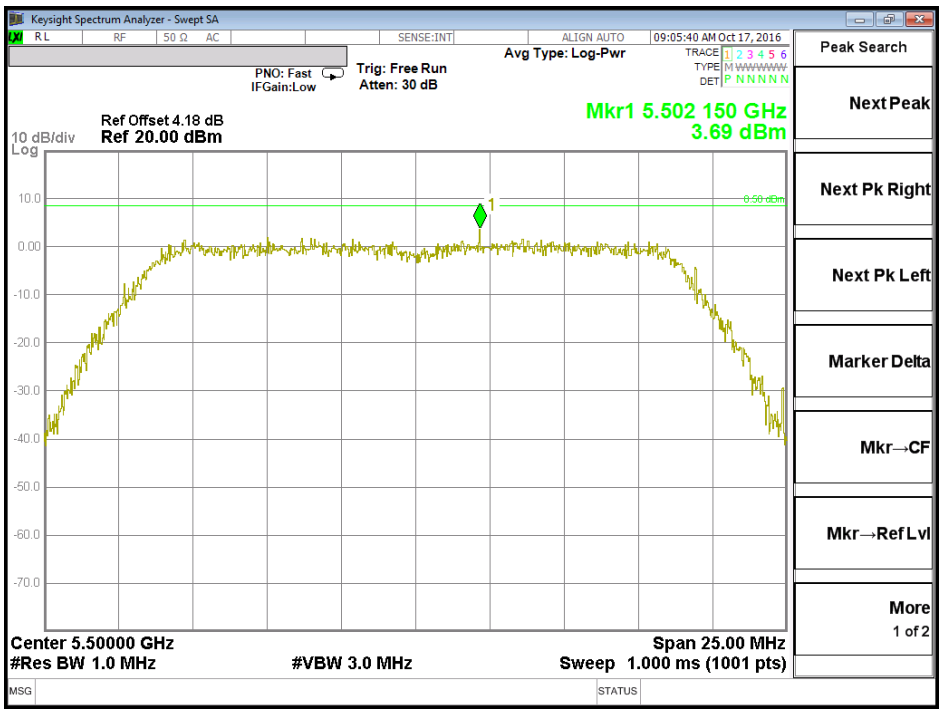


Middle Channel

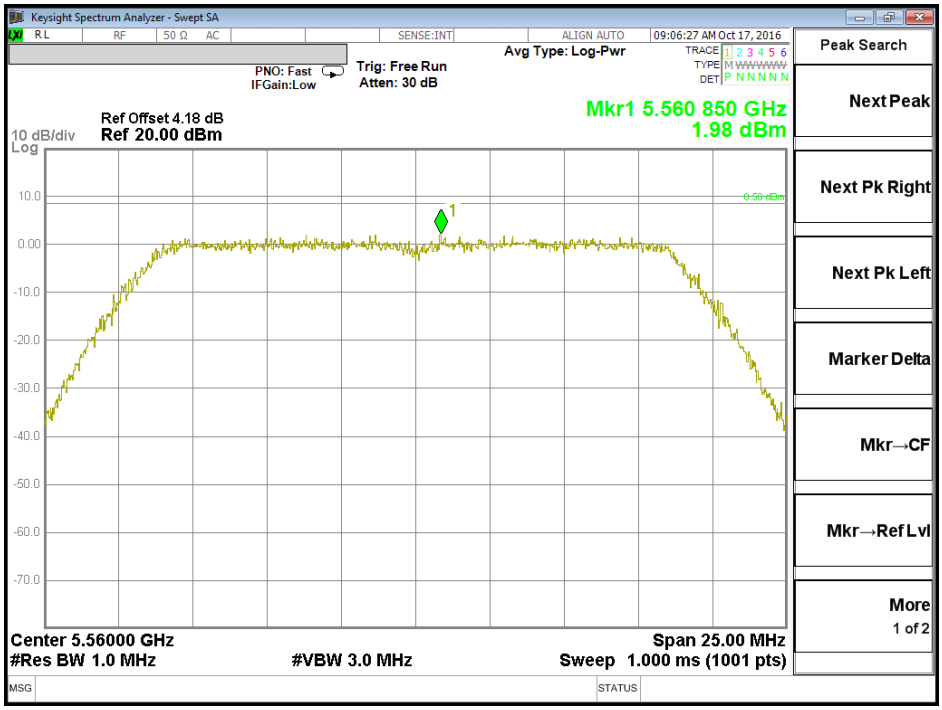


TX2 :

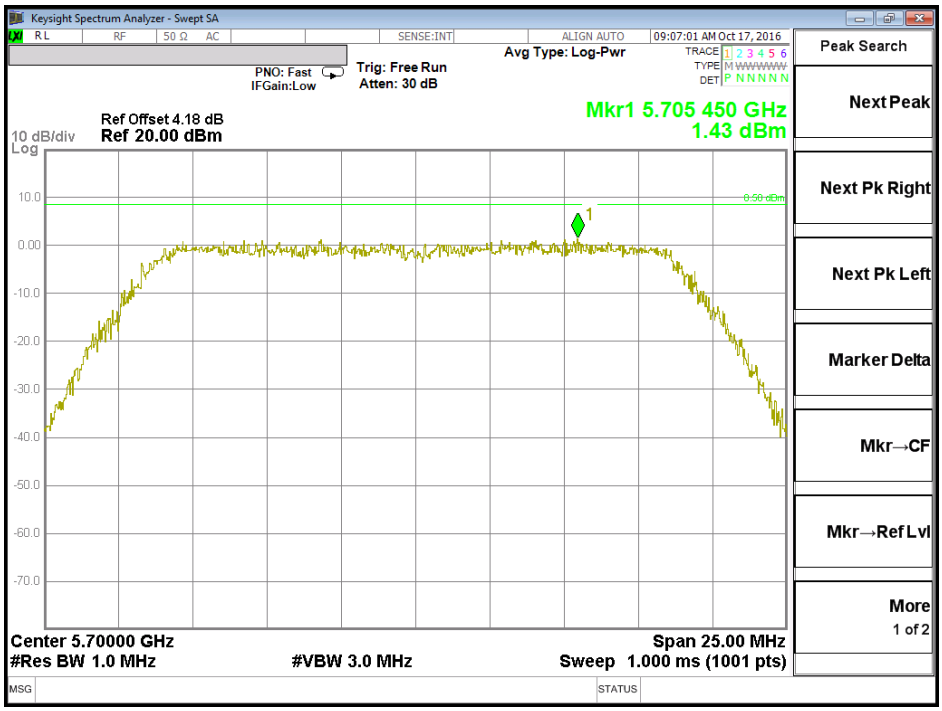
Low Channel



Middle Channel



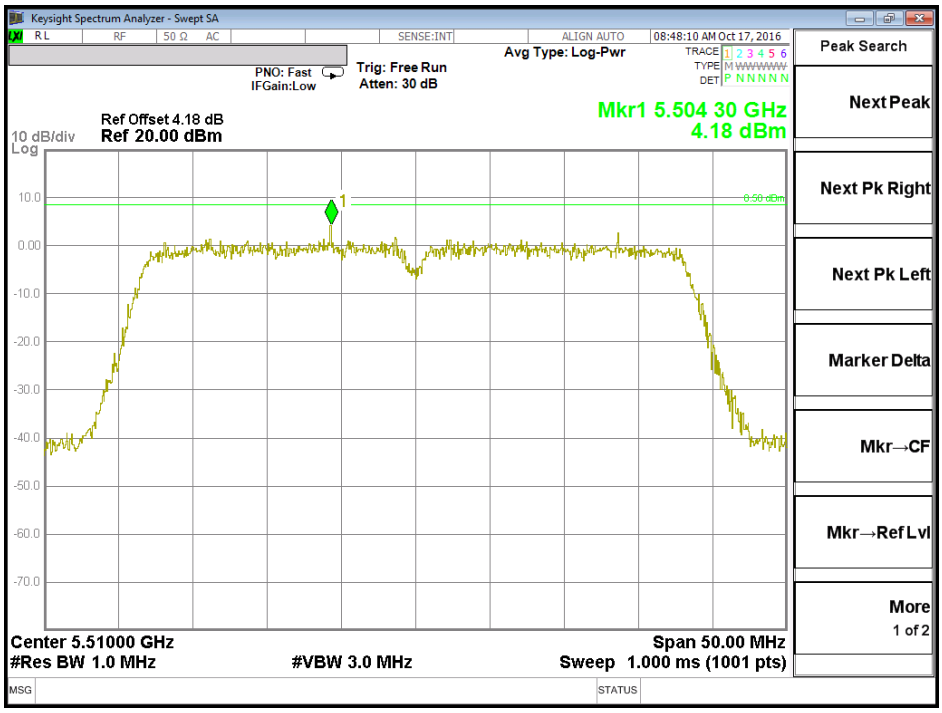
Middle Channel



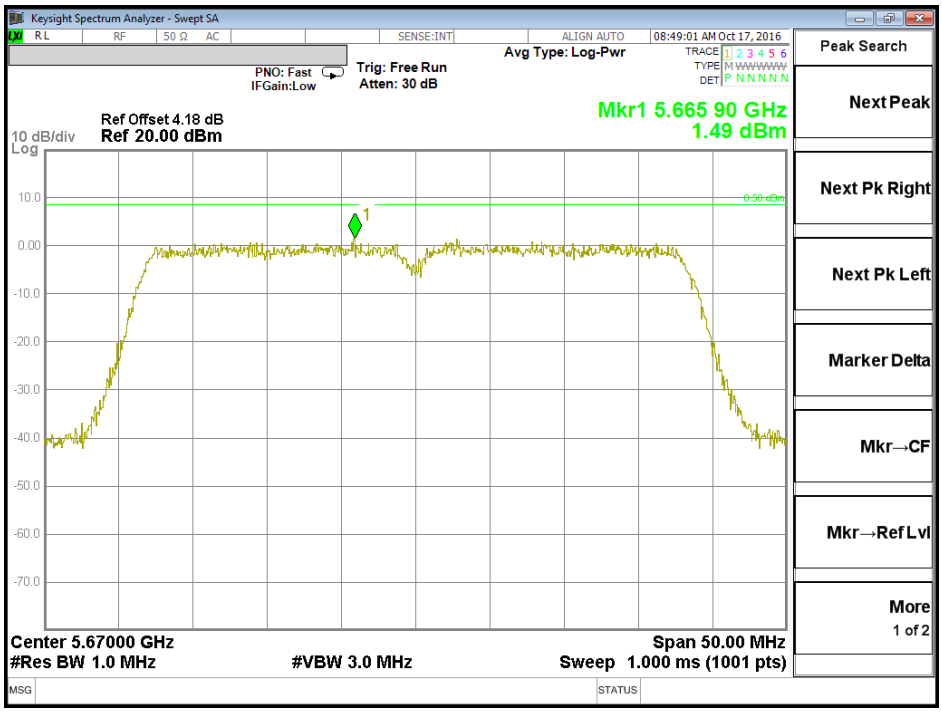
Test Plot of Power Density 802.11n HT40 (Band III)

TX1 :

Low Channel

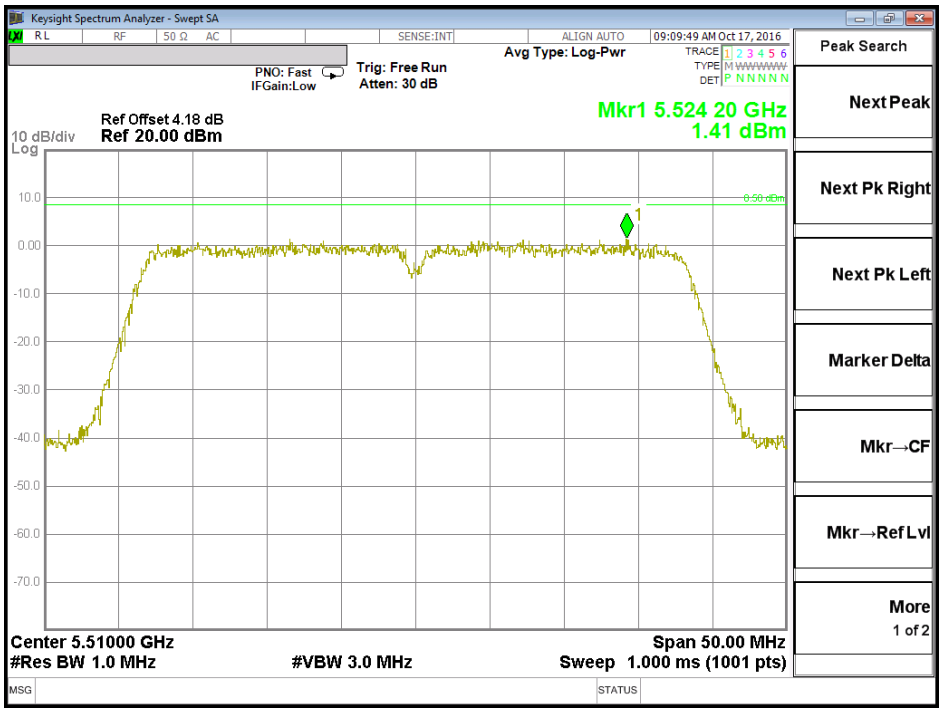


Middle Channel

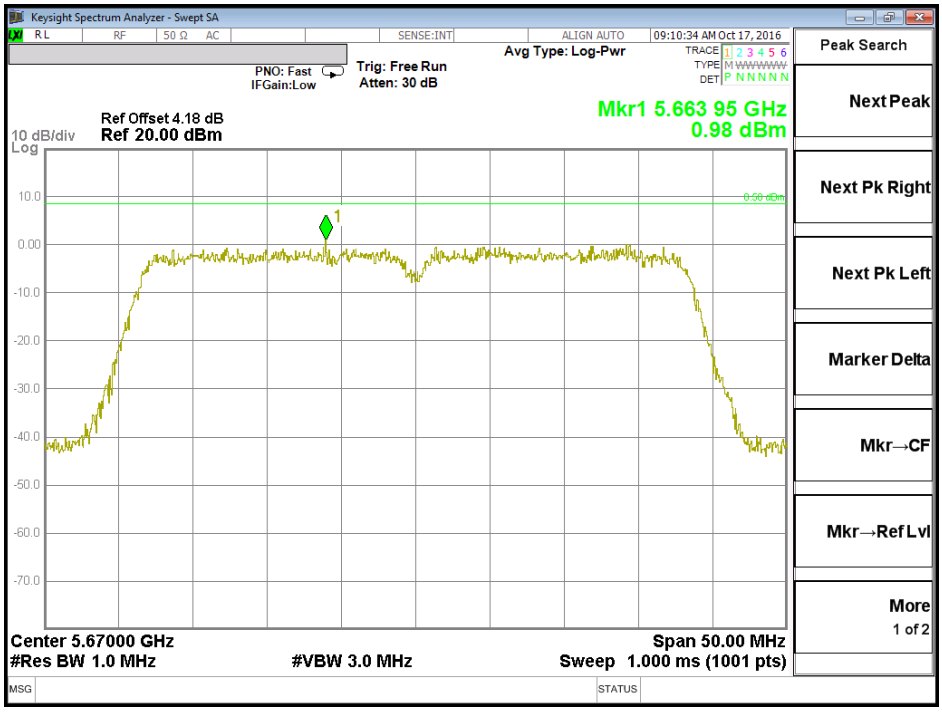


TX2

Low Channel:



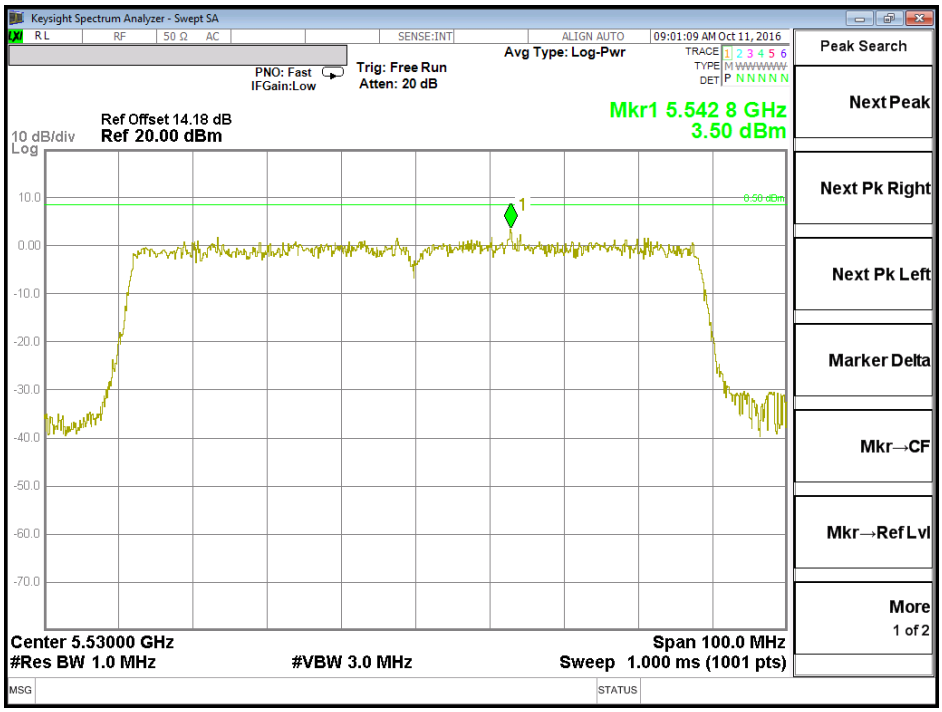
Middle Channel



Test Plot of Power Density 802.11ac VHT80 (Band III)

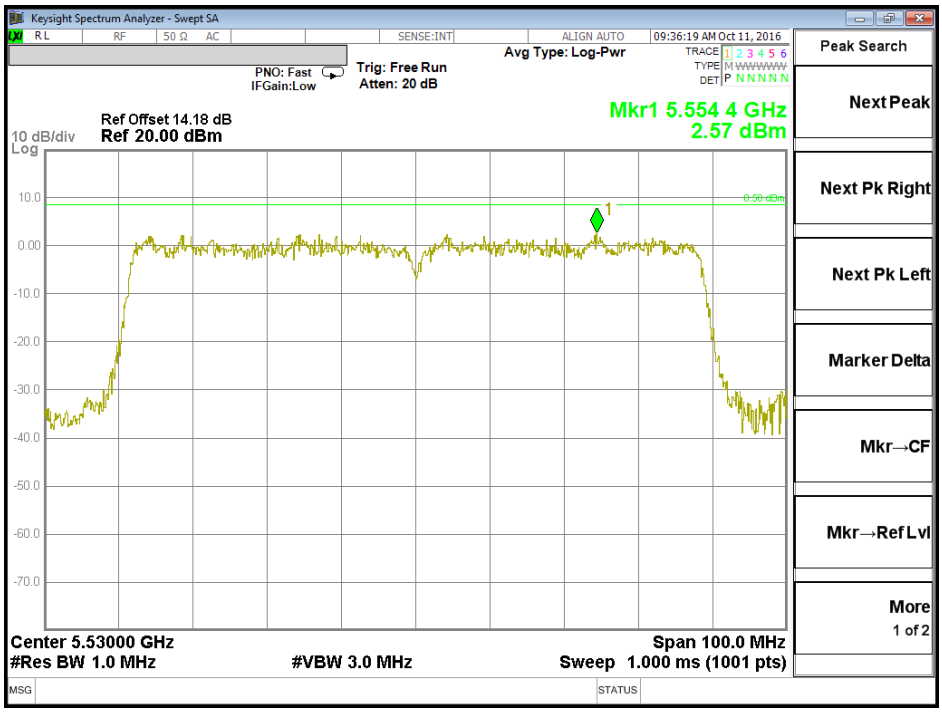
TX1 :

Low Channel



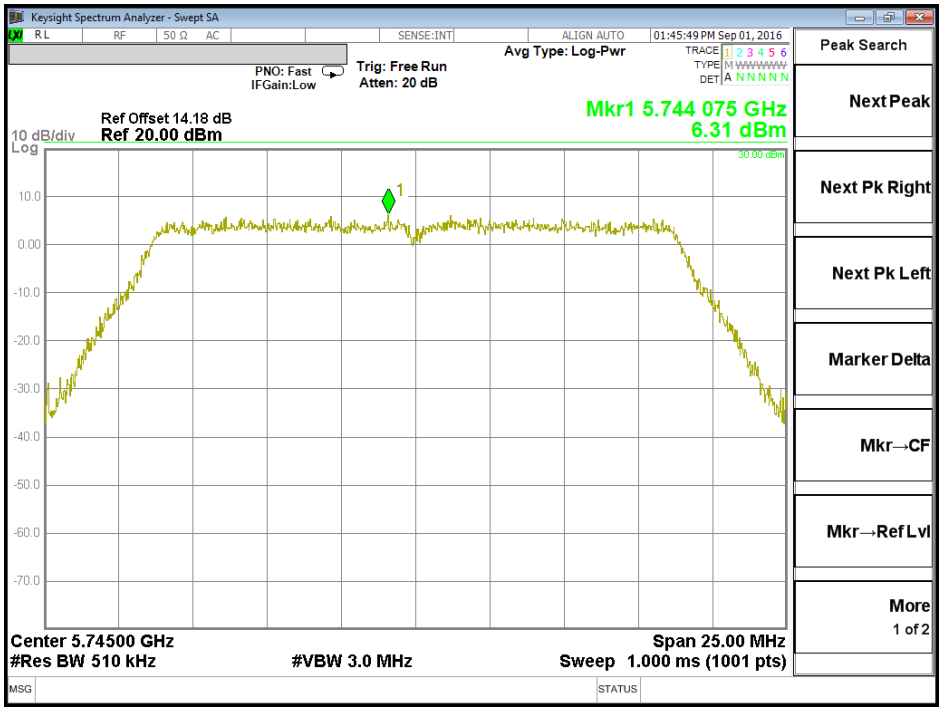
TX2 :

Low Channel

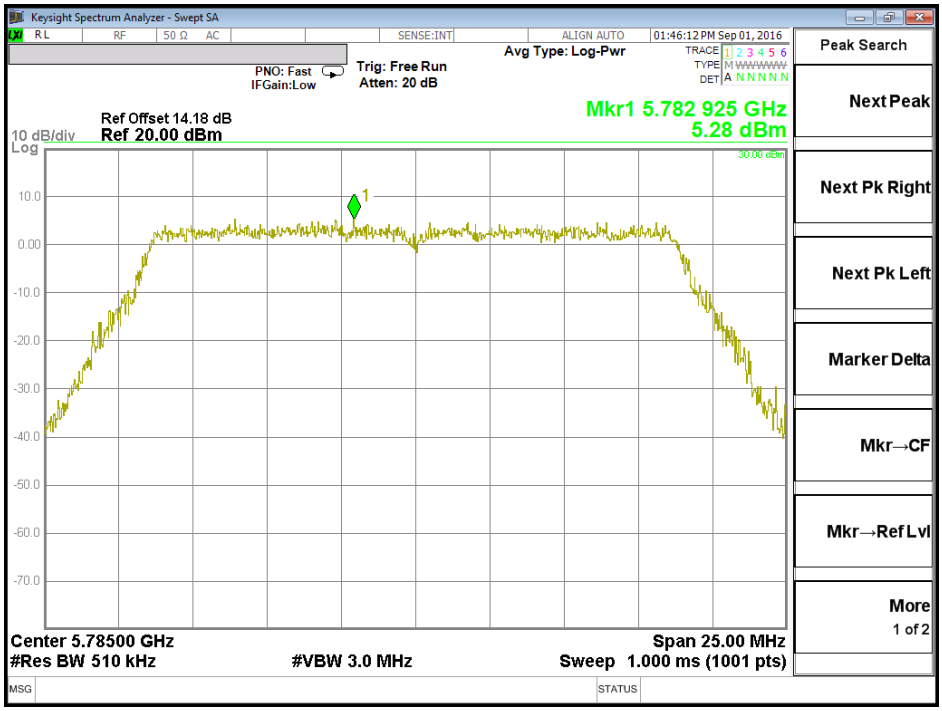


Test Plot of Power Density 802.11a (Band IV)

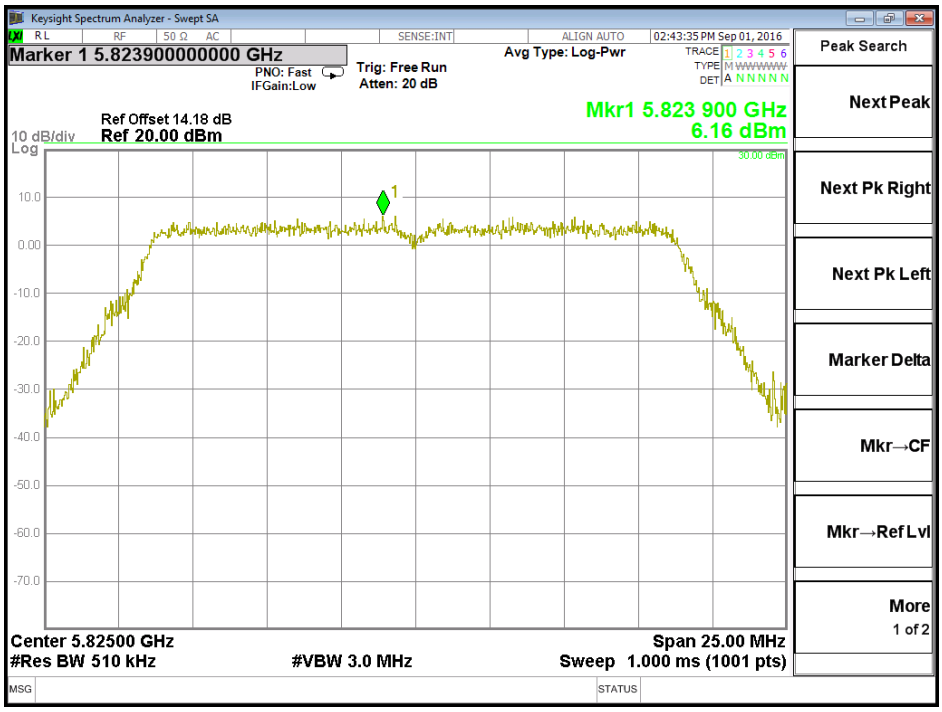
Low Channel



Middle Channel



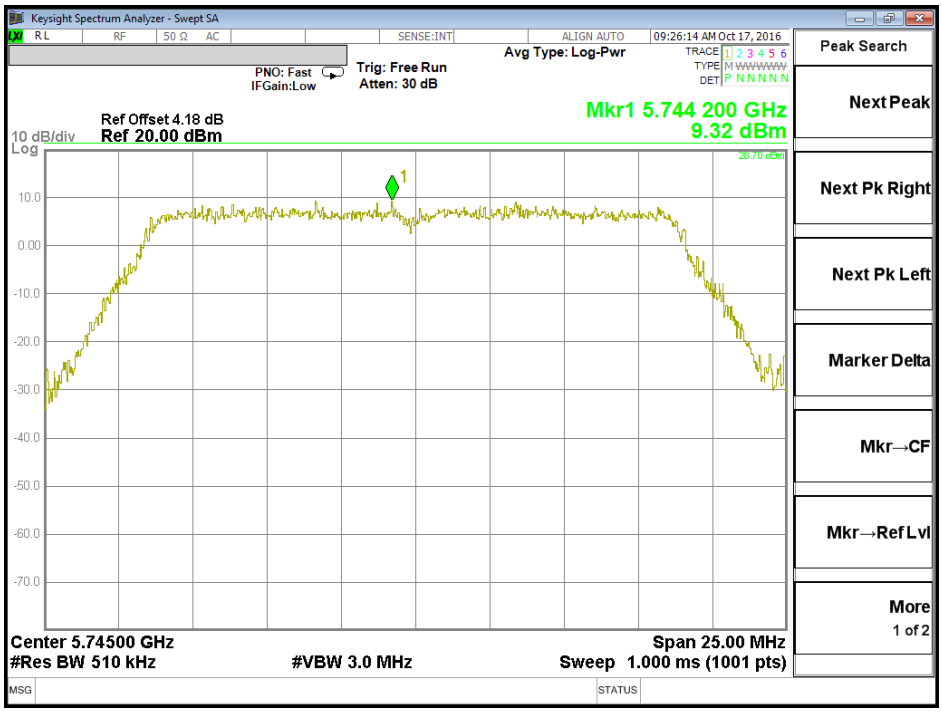
High Channel



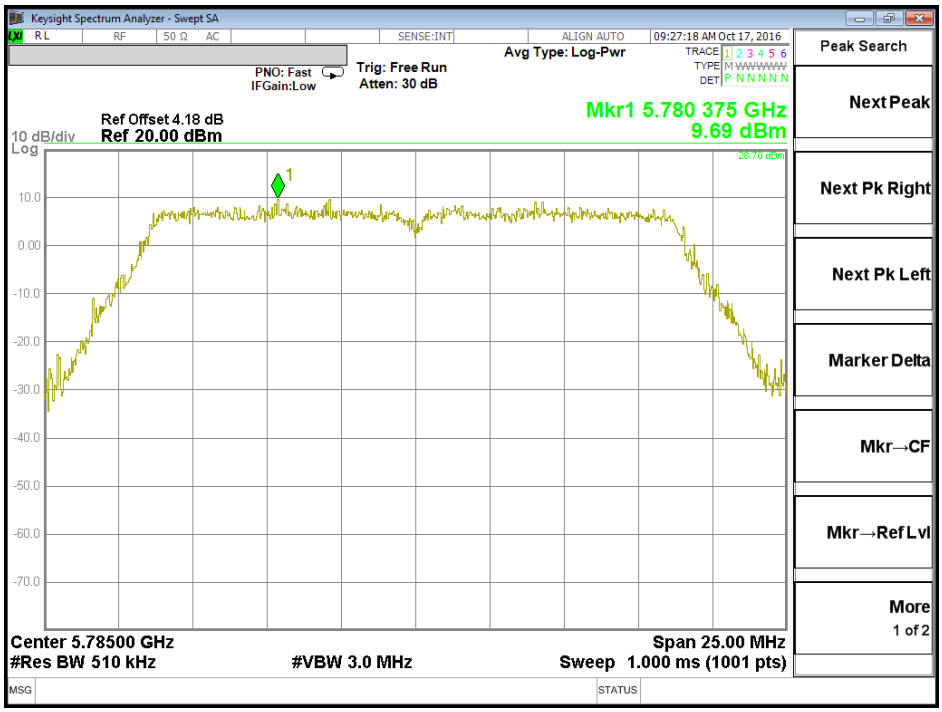
Test Plot of Power Density 802.11N HT20 (Band IV)

TX1 :

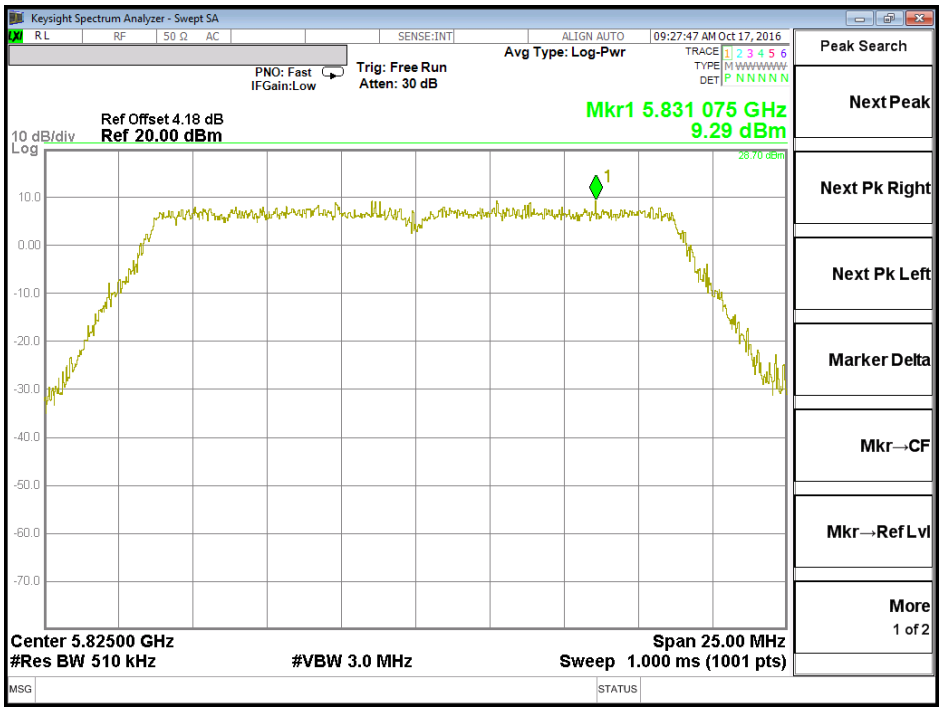
Low Channel



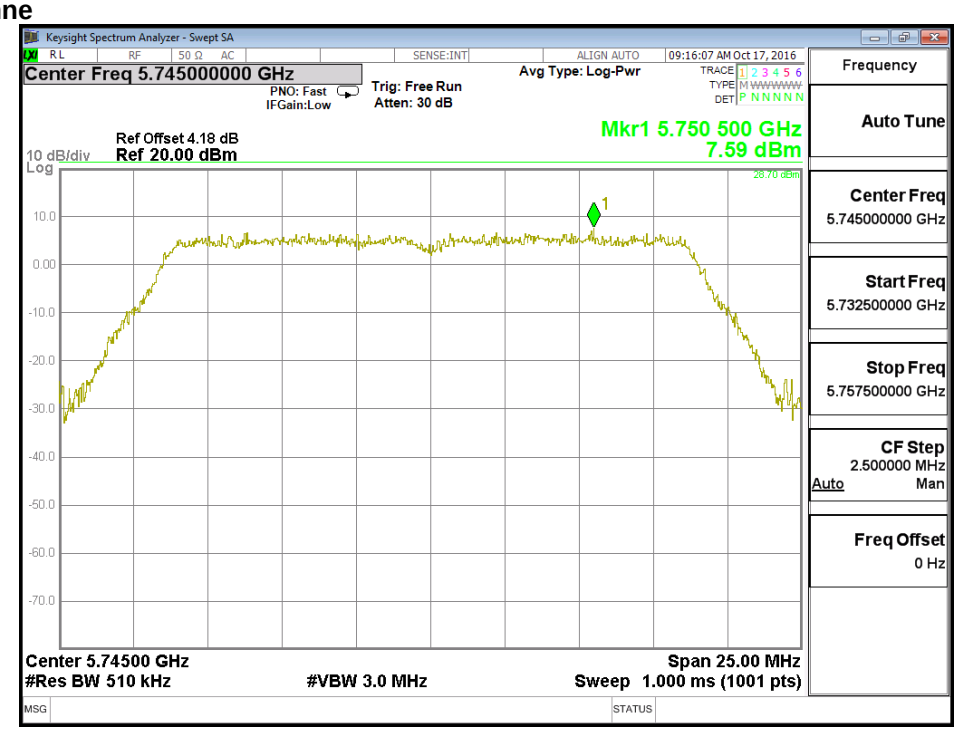
Middle Channel



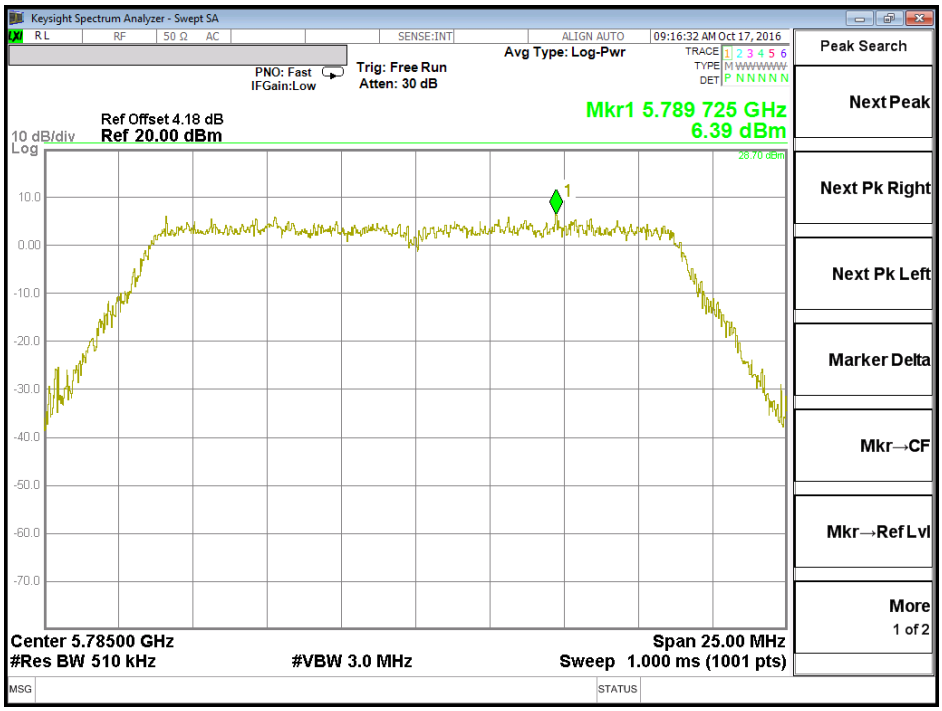
High Channel



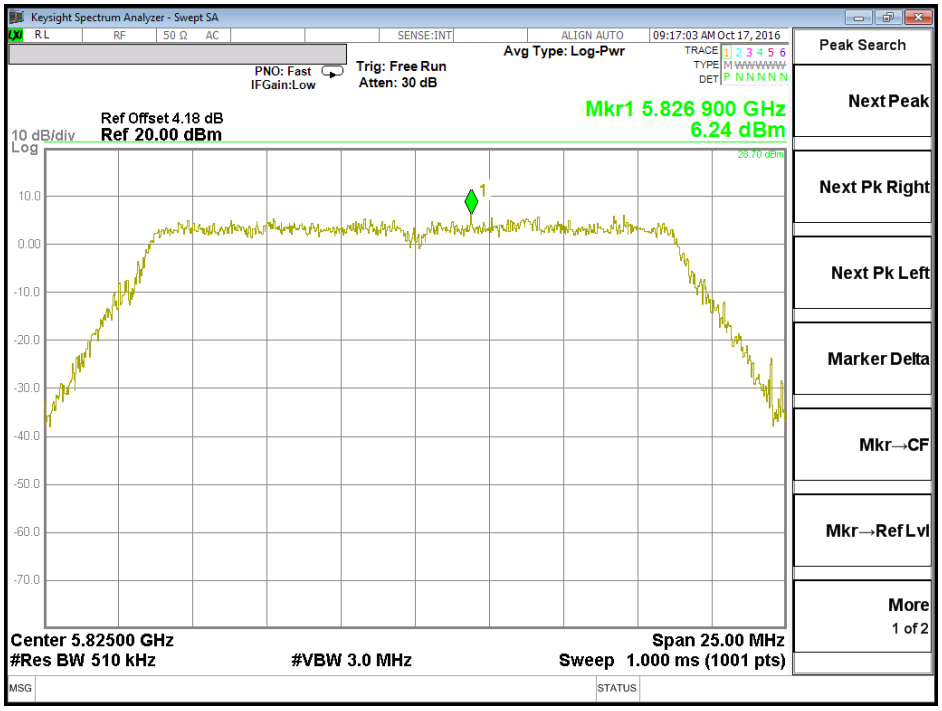
TX2:
Low Channe



Middle Channel



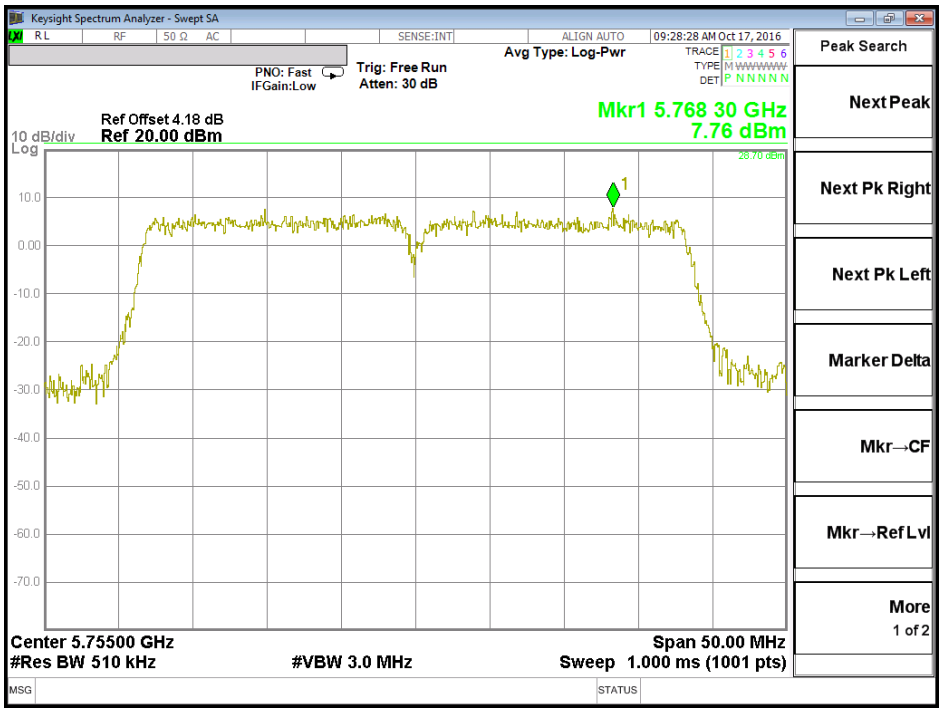
High Channel



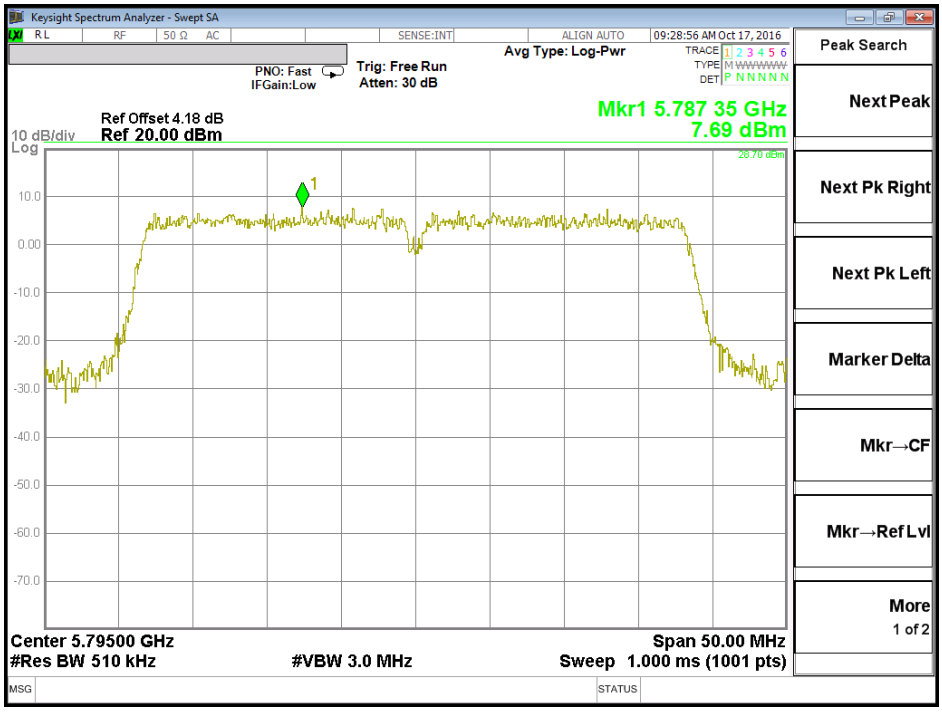
Test Plot of Power Density 802.11n HT40 (Band IV)

TX1 :

Low Channel

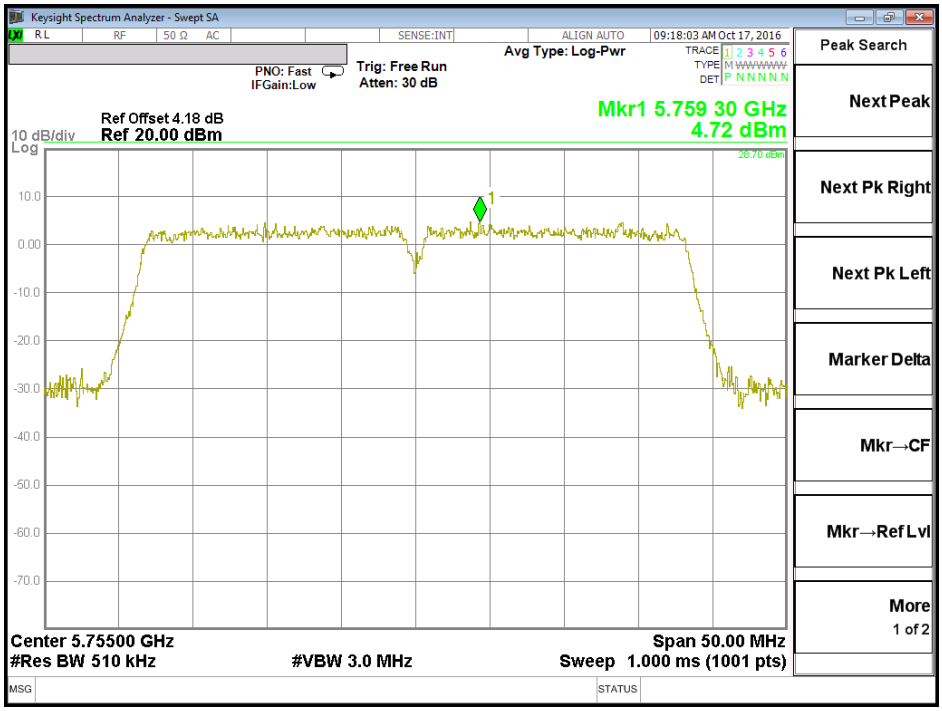


High Channel

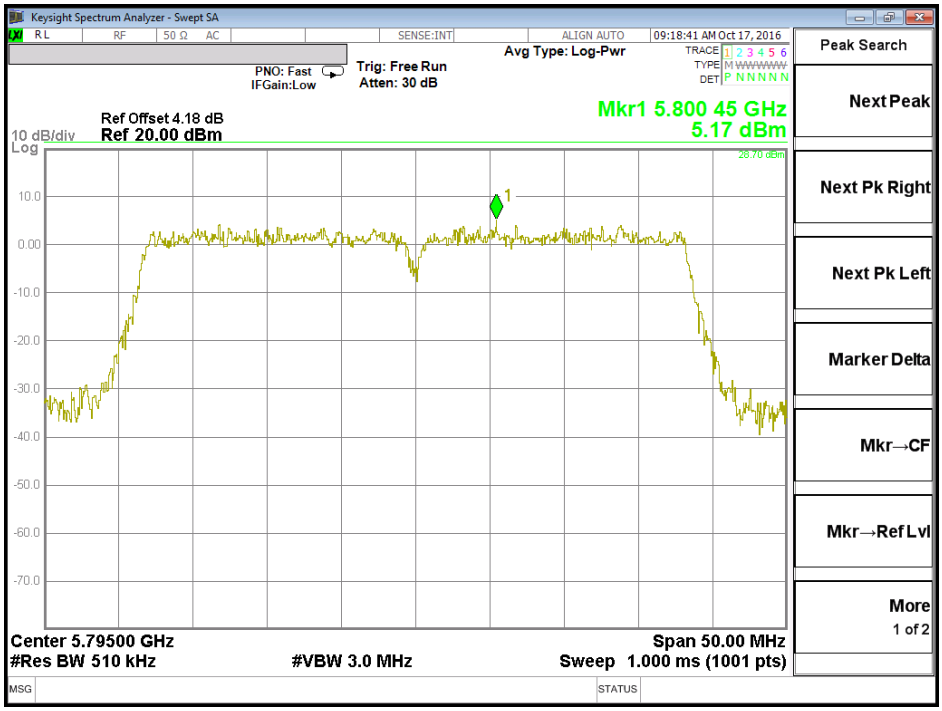


TX2:

Low Channel

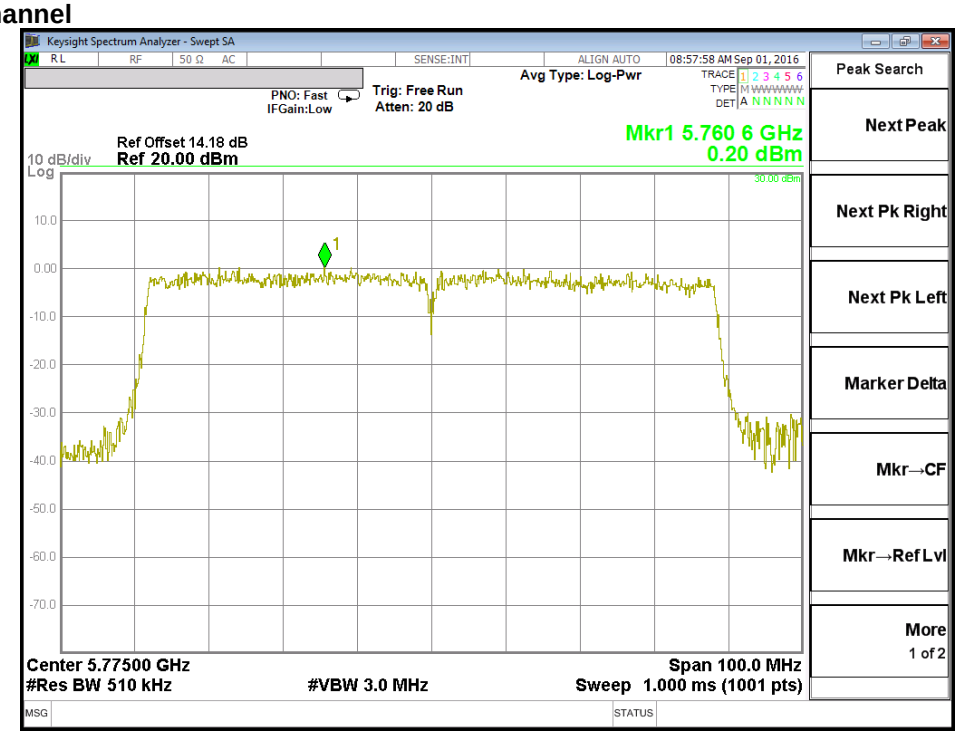


High Channe

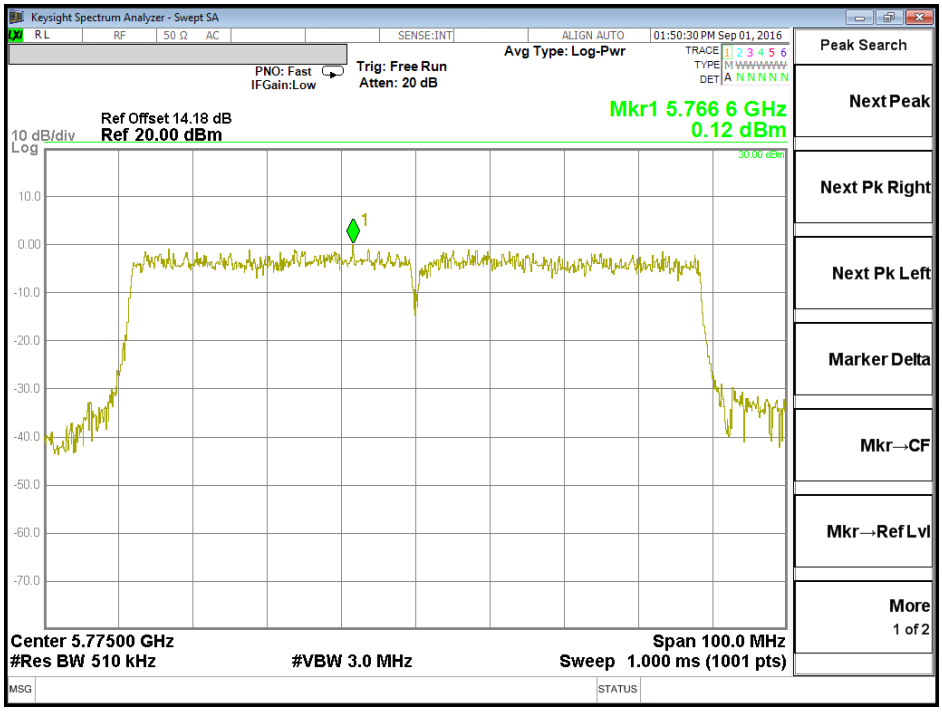


Test Plot of Power Density 802.11ac VHT80 (Band IV)

TX1:
Middle Channel



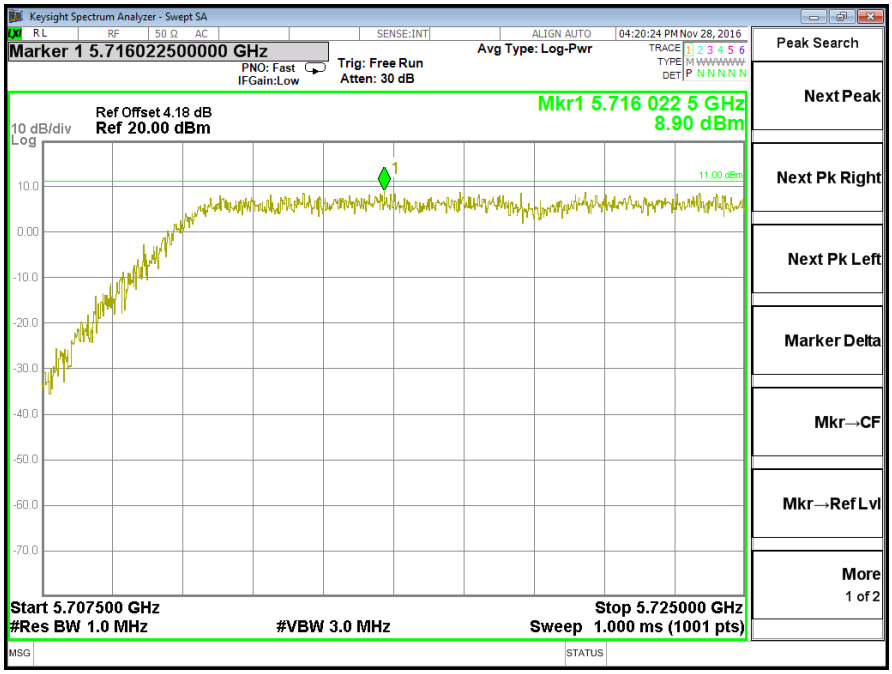
TX2:
Middle Channel



Band III

Test Plot of Power Density (Channel 144: 802.11a)

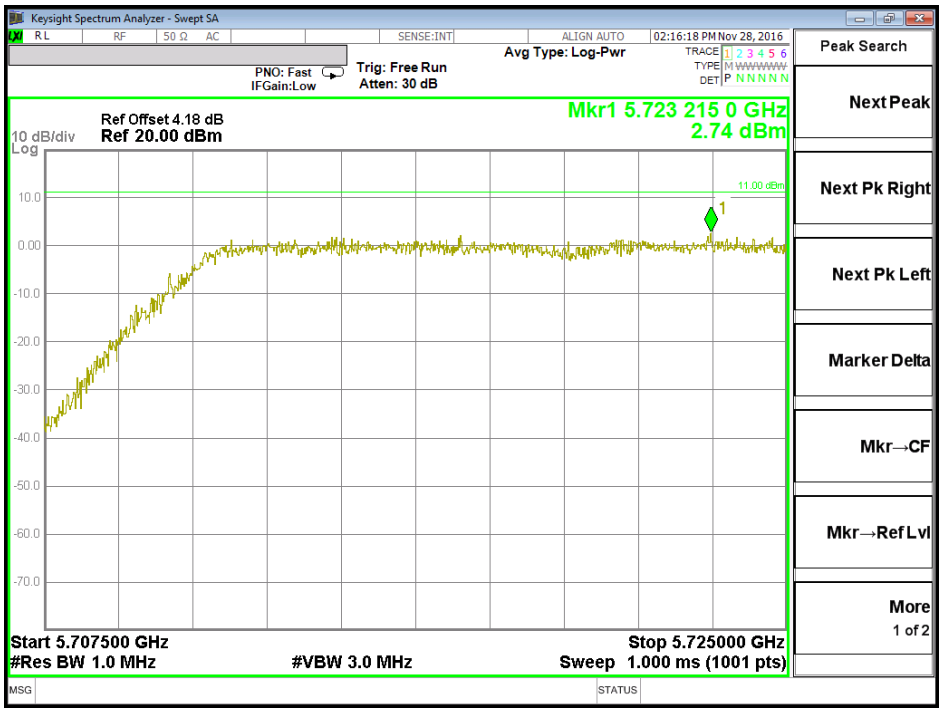
TX1



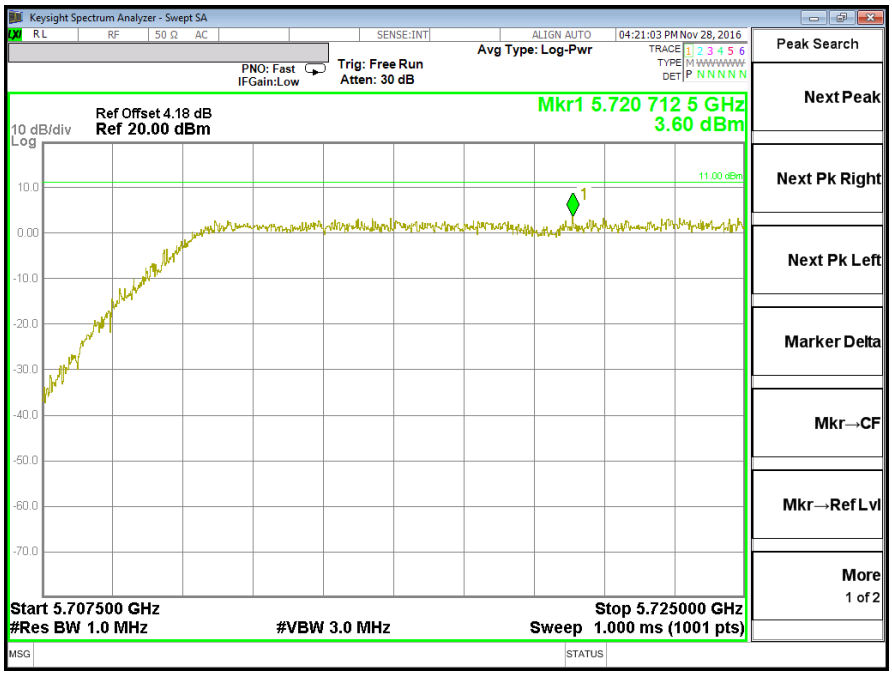
Band III

Plot of Power Density (Channel 144: 802.11n HT20)

TX1



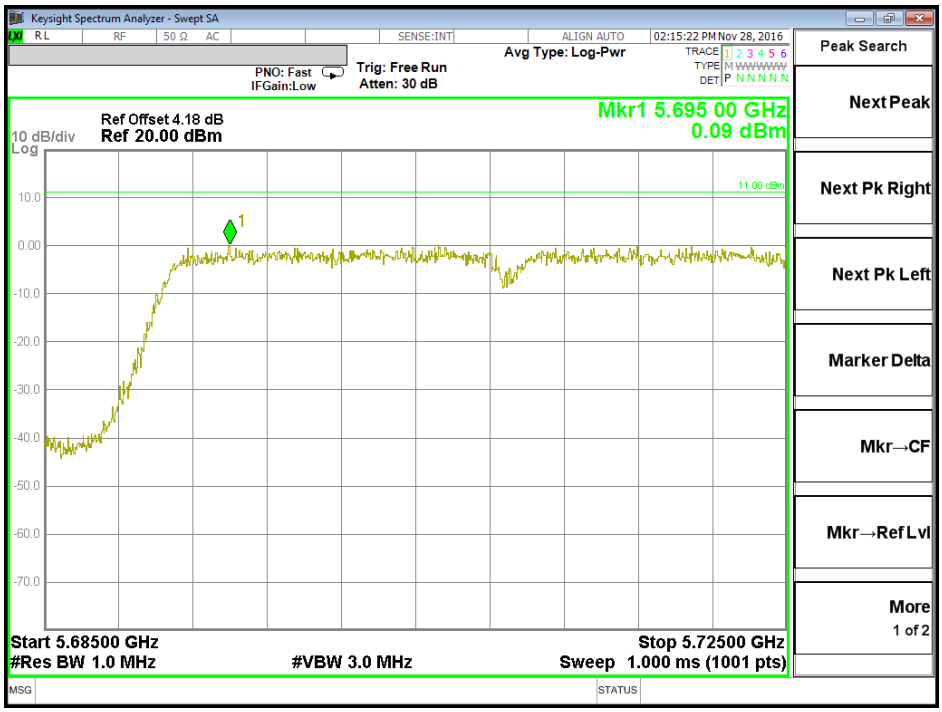
TX2



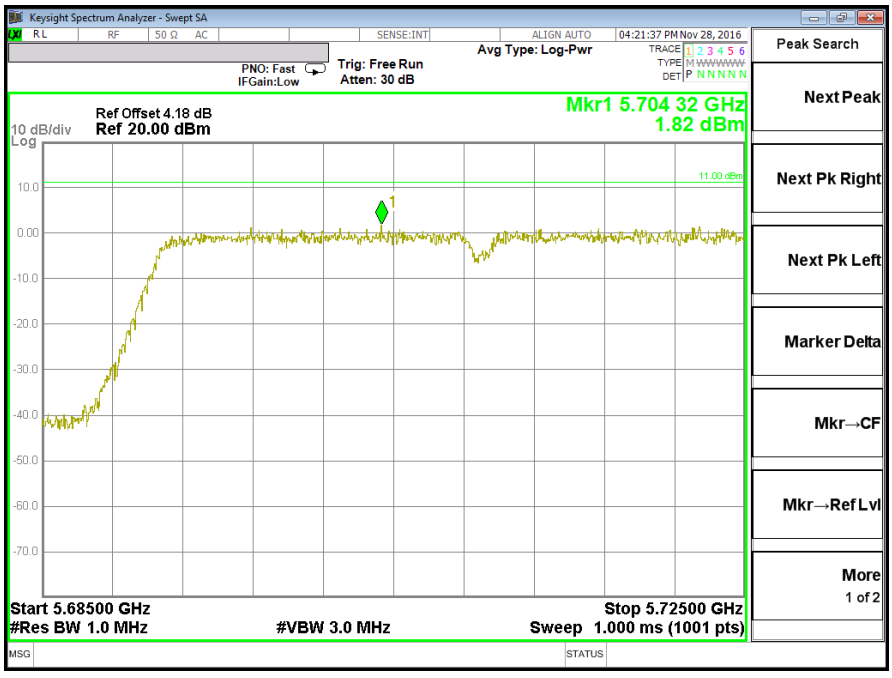
Band III

Plot of Power Density (Channel 142: 802.11n HT40)

TX1



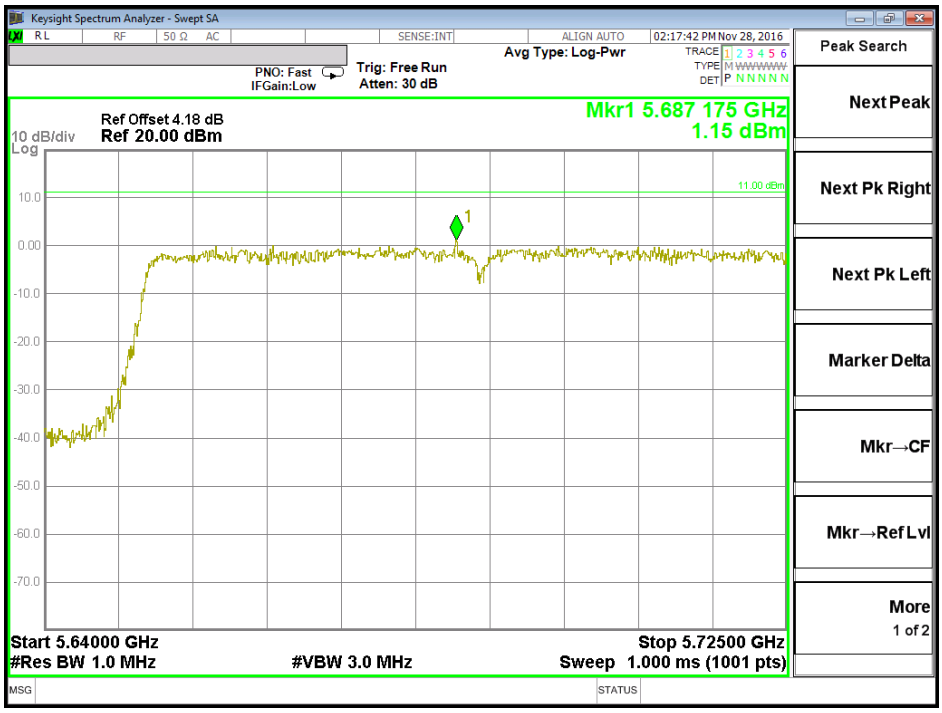
TX1



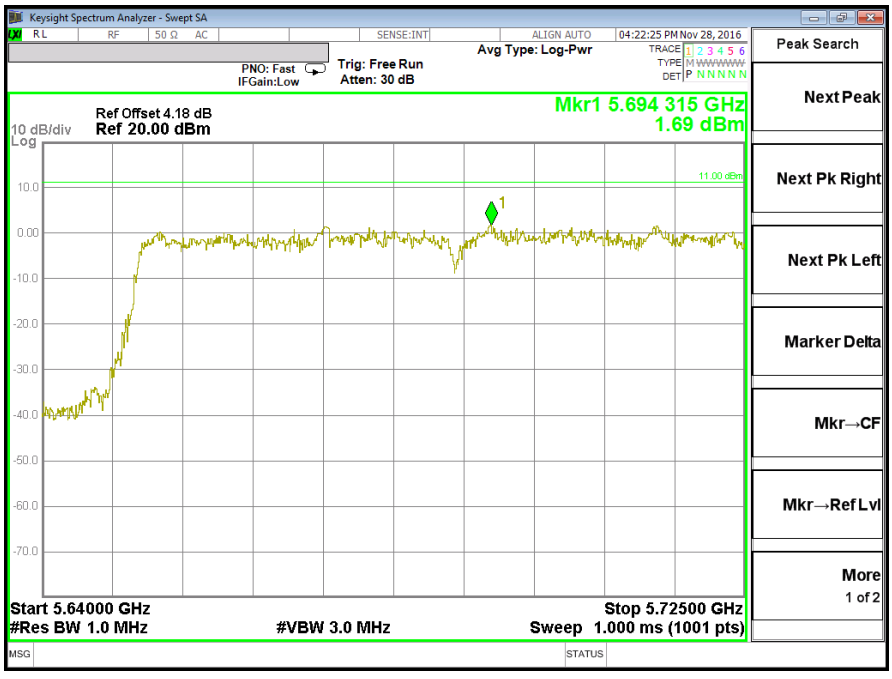
Band III

Plot of Power Density (Channel 138: 802.11ac VHT80)

TX1



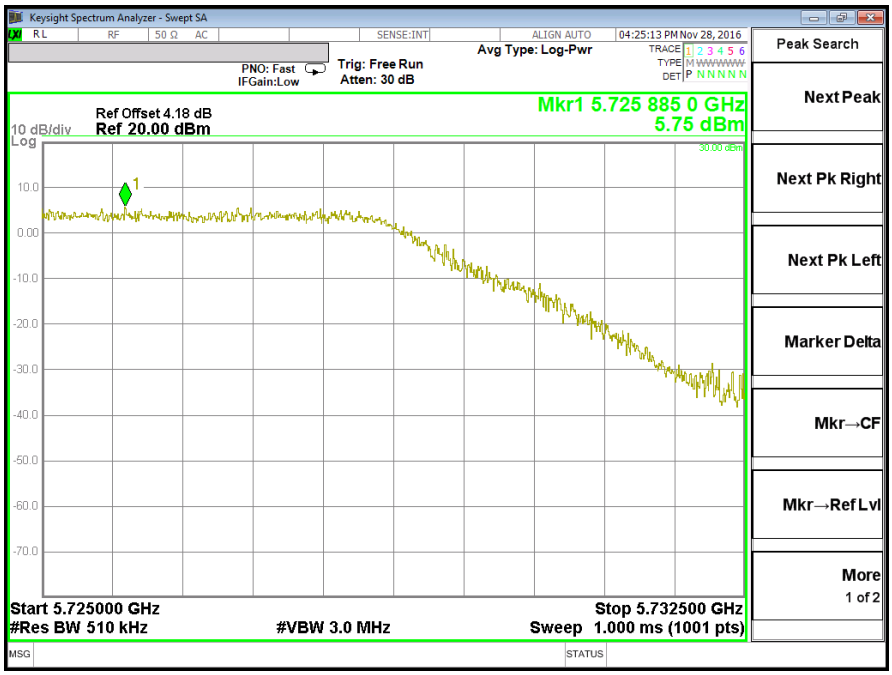
TX2



Band IV

Plot of Power Density (Channel 144: 802.11a)

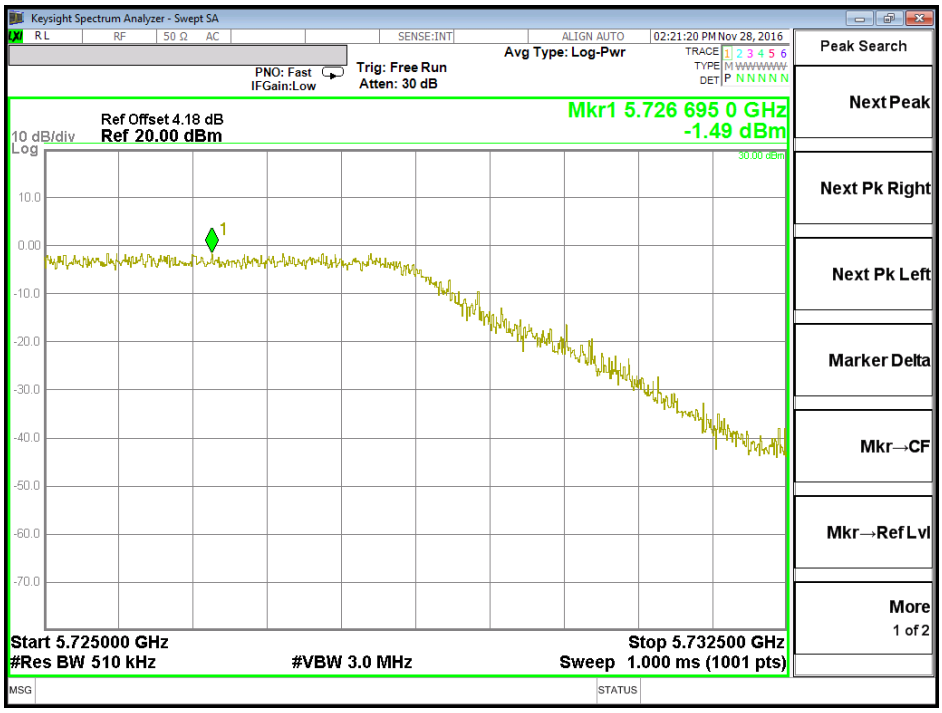
TX1



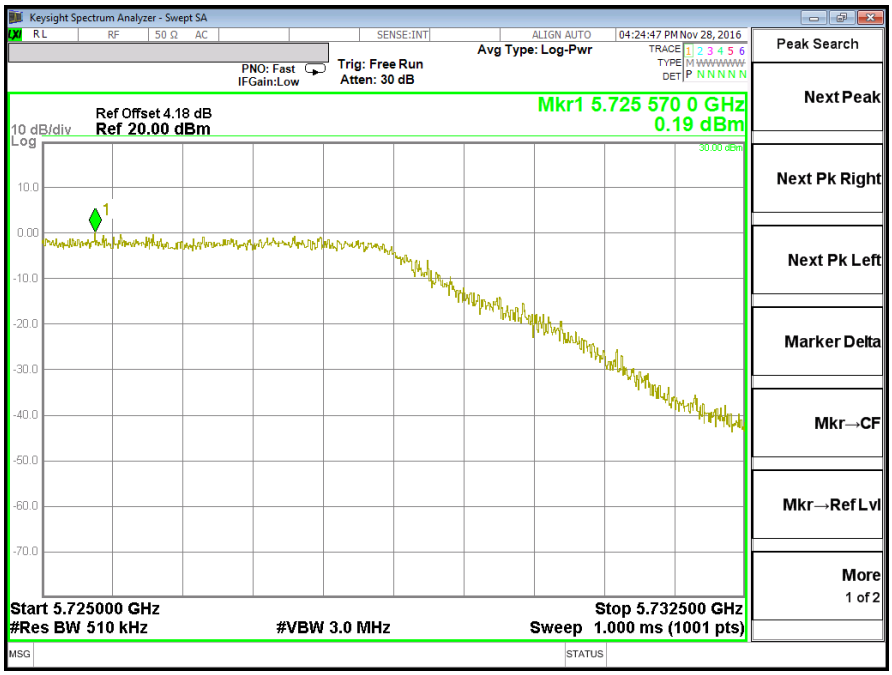
Band IV

Plot of Power Density (Channel 144: 802.11n HT20)

TX1



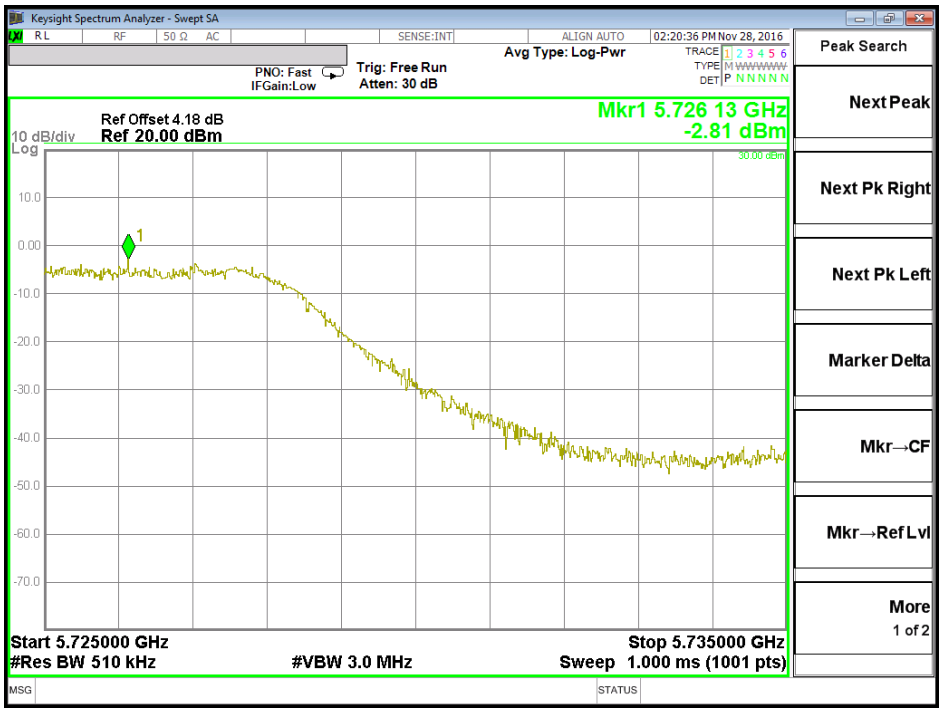
TX2



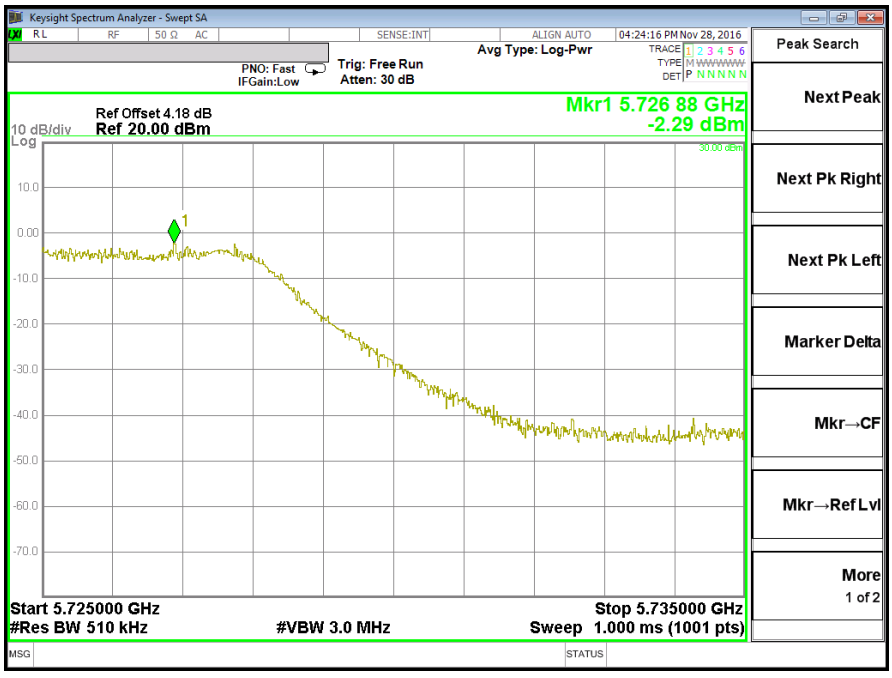
Band IV

Plot of Power Density (Channel 142: 802.11n HT40)

TX1



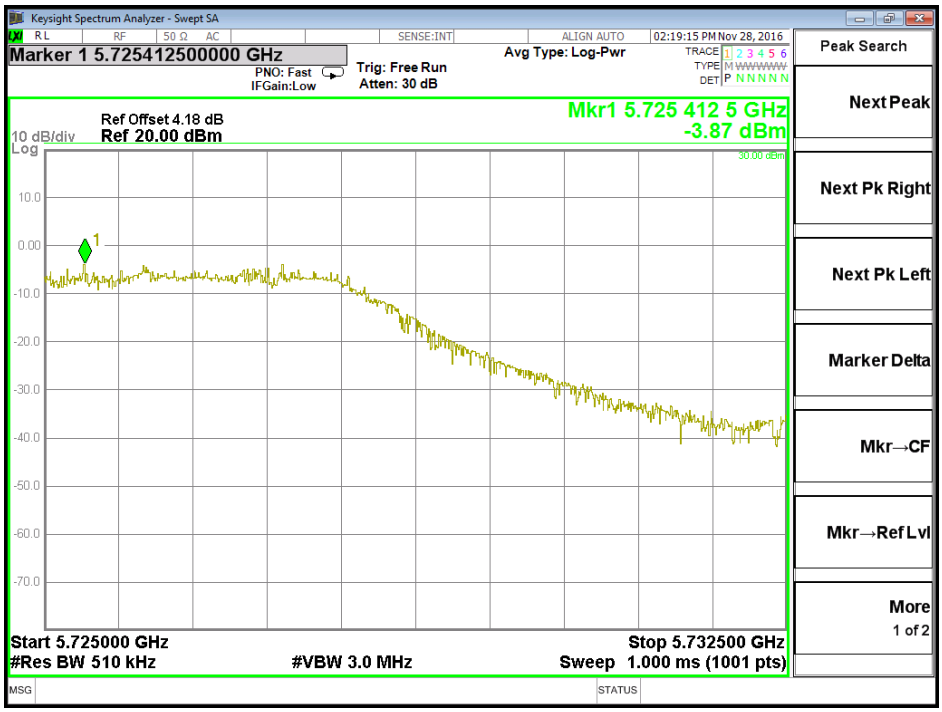
TX2



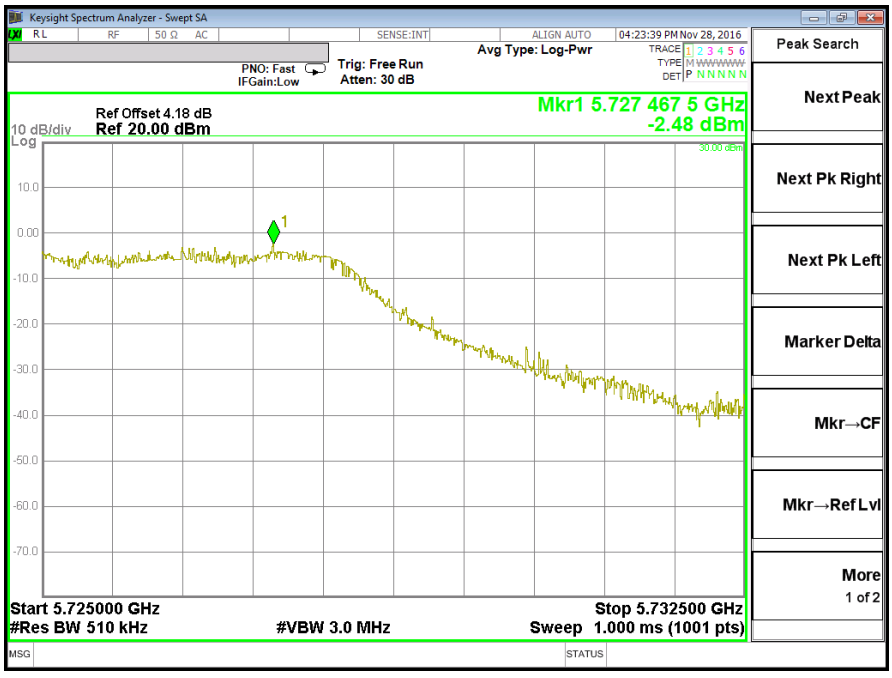
Band IV

Plot of Power Density (Channel 138: 802.11ac V HT80)

TX1



TX2



5.1.6 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC 15.205, FCC 15.209, RSS-247, and RSS-Gen 7.2.1
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a), RSS-210 2.7 (Table 2 and 3) and RSS-210 A2.9(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The Z Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT: **Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 8.8 LP0002(2016): 2.3
Limits	:	Mains Conducted emissions as defined in above standards
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	Middle
Operation mode	:	A

Remark: For details refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Passed**

Test standard : FCC KDB Publication 447498 D01 v06
RSS--102

Separation distance is more than 20 cm, thus mobile device exposure limits can be applied

Maximum Exposure:

Power to Antenna (mW)	31 mW
Power to Antenna (dBm)	14.9 dBm
Antenna Gain	5.7 dBi
Power+Ant Gain	115.2 mW
Distance	20 cm
S=	0.023 mW/cm^2

Limit FCC:

0.3-1.34 MHz	(100) mW/cm^2
1.34-30 MHz	(180/f2) mW/cm^2
30-300 MHz	0.2 mW/cm^2
300-1500 MHz	f/1500 mW/cm^2
1500-100,000 MHz	**1.0 mW/cm^2**

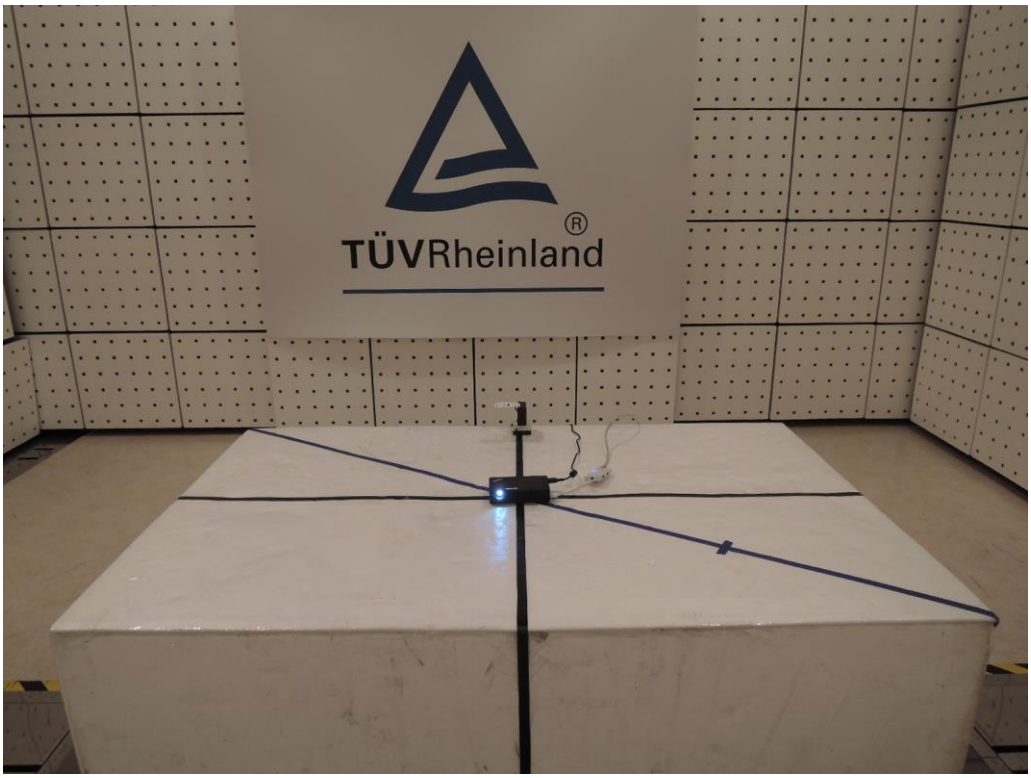
Limit Canada: $0.02619 f^{0.6834}$

8W/m^2 @ 5 GHz

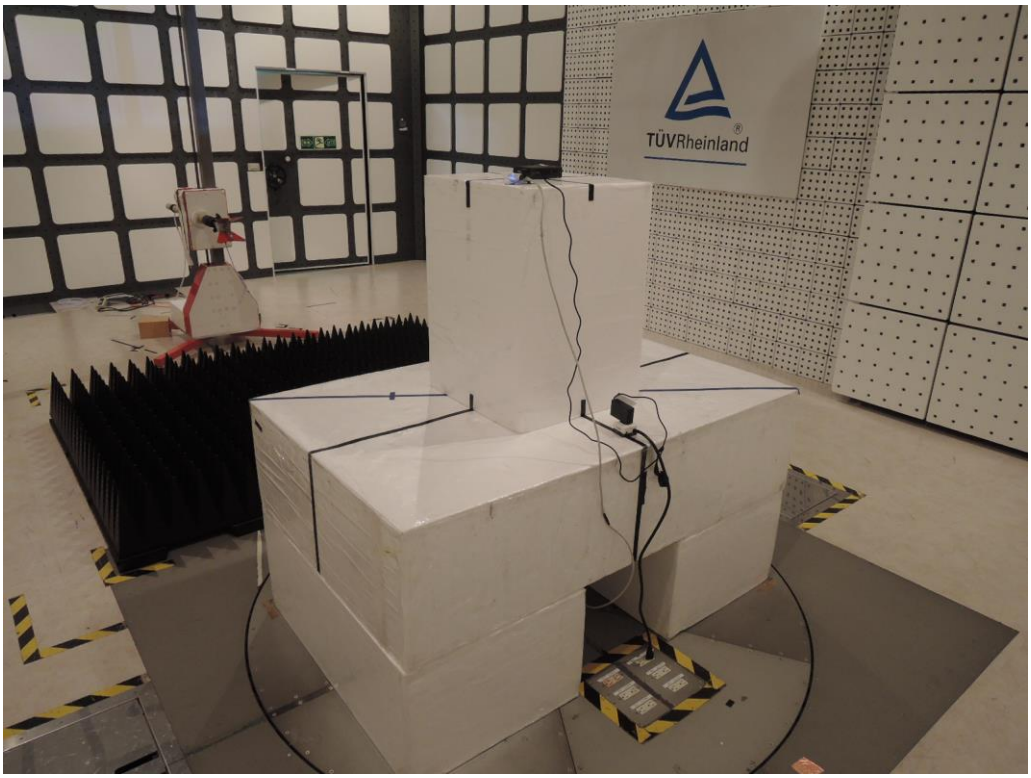
---End---

Photographs of the Test Set-Up

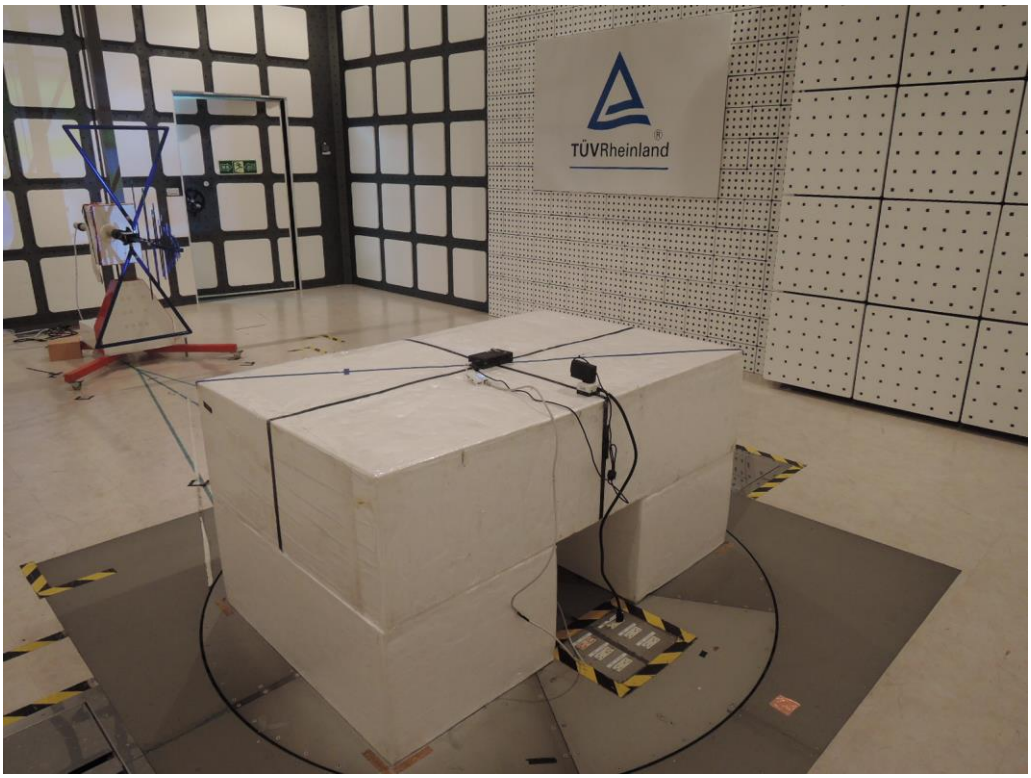
Photograph 1: Set-up for Spurious Emissions (Front View)



Photograph 2: Set-up for Spurious Emissions (Back View 1)



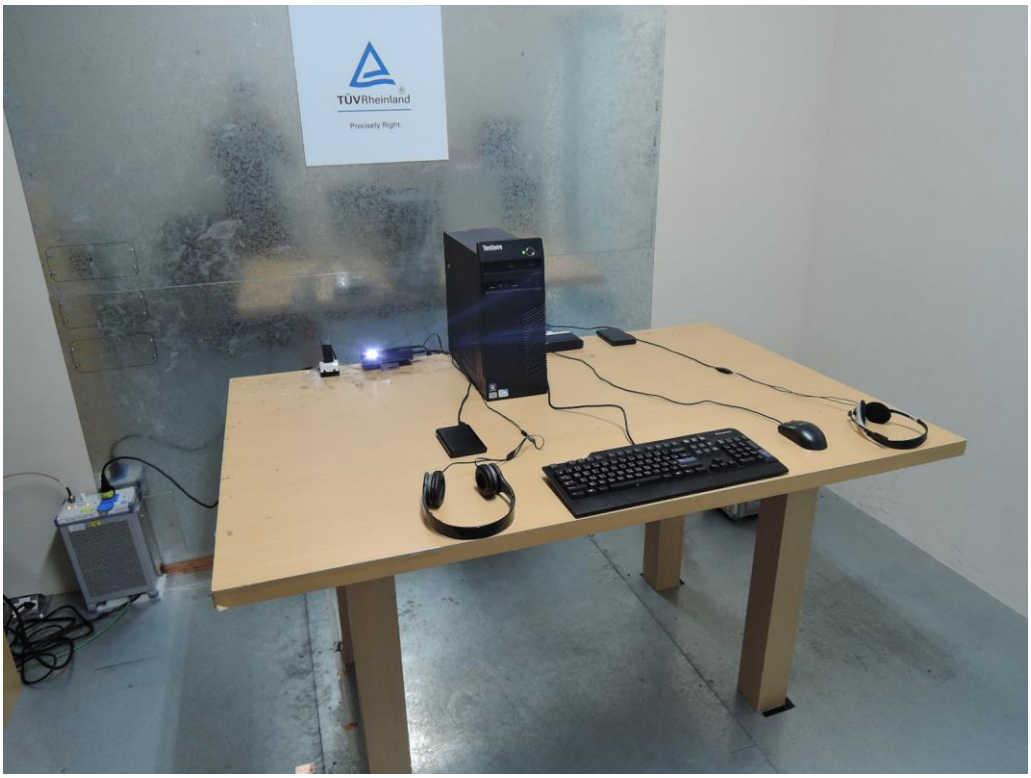
Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Conducted testing

Photograph 5: Set-up for for Mains Conducted testing Back

Photograph 6: Set-up for for Mains Conducted testing Front



7. List of Tables

8. List of Photographs