



# CERTIFICATION TEST REPORT

**Report Number.** : 4789793179-E6V3

**Applicant** : SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 16677, KOREA

**Model** : SM-A125U, SM-S127DL, SM-A125U1/DS, SM-A125U1

**FCC ID** : A3LSMA125U

**EUT Description** : GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac  
and NFC

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART E

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**TL-637**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	03/02/21	Initial issue	Hyunsik Yun
V2	03/08/21	Updated to address TCB's question	Hyunsik Yun
V3	03/23/21	Added SM-A125U1 model	Hyunsik Yun

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC  
**MODEL NUMBER:** SM-A125U, SM-S127DL, SM-A125U1/DS, SM-A125U1  
**SERIAL NUMBER:** R38R100SMVZ (CONDUCTED);  
R37R100SNBW, R38R100SPAF (RADIATED);  
**DATE TESTED:** FEB 10, 2021 –MAR 08, 2021;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
4. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
5. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
6. ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
<input checked="" type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

## 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

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

### 4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.



## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC. This test report addresses the NII (UNII 802.11a/n/ac) operational mode.

This report covers the Samsung models SM-A125U, SM-A125U1/DS, SM-A125U1 and SM-S127DL.

These models are identical in hardware except SM-A125U1/DS has dual SIM tray, SM-A125U1 has single SIM tray and SM-S127DL is not supported CDMA.

With some pre-scan, model SM-A125U was set for final test.

#### WiFi operating mode

Frequency range	Mode	ANT1
5GHz (5180 MHz ~ 5825 MHz)	802.11a SISO	TX/RX
	802.11n SISO	TX/RX
	802.11ac SISO	TX/RX

**MAXIMUM OUTPUT POWER**

The transmitter has a maximum total conducted average output power as follows:

**UNII-1**

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
5180 - 5240	802.11a SISO	17.72	59.16
	802.11n(HT20) SISO	18.24	66.68
5190 - 5230	802.11n(HT40) SISO	16.65	46.24
5210	802.11ac(VHT80) SISO	15.23	33.34

**UNII-2A**

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
5260 - 5320	802.11a SISO	18.28	67.30
	802.11n(HT20) SISO	18.16	65.46
5270 - 5310	802.11n(HT40) SISO	16.42	43.85
5290	802.11ac(VHT80) SISO	15.08	32.21

**UNII-2C**

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
5500 - 5720	802.11a SISO	18.48	70.47
	802.11n(HT20) SISO	18.41	69.34
5510 - 5710	802.11n(HT40) SISO	16.68	46.56
5530 - 5690	802.11ac(VHT80) SISO	15.42	34.83

**UNII-3**

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
5745 - 5825	802.11a SISO	18.42	69.50
	802.11n(HT20) SISO	18.15	65.31
5755 - 5795	802.11n(HT40) SISO	16.45	44.16
5775	802.11ac(VHT80) SISO	14.86	30.62

## 5.2. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.  
 Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes a internal antenna, with a maximum gain of:

Frequency Band [MHz]	Antenna Gain [dBi]
UNII 1 5150 - 5250	-2.16
UNII 2A 5250 - 5350	-2.16
UNII 2C 5470 - 5725	-2.05
UNII 3 5725 - 5850	-2.02

## 5.3. List of test reduction and modes covering other modes:

The output power on covered modes is equal to or less than one referenced.

Authorized Frequency Band			
Mode	Antenna Stream	Mode	Covered by
802.11a	MIMO	802.11a 1TX	
802.11n HT20		802.11n HT20 1TX	
802.11ac VHT20		802.11ac VHT20 1TX	802.11n HT20 1TX
802.11n HT40		802.11n HT40 1TX	
802.11ac VHT40		802.11ac VHT40 1TX	802.11n HT40 1TX
802.11ac VHT80		802.11ac VHT80 1TX	

## 5.4. WORST-CASE CONFIGURATION AND MODE

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

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps 1Tx  
 802.11n HT20 mode: MCS0 1Tx  
 802.11n HT40 mode: MCS0 1Tx  
 802.11ac VHT80 mode: MCS0 1Tx

Note : All radiated and power line conducted tests were performed connected with charger for evaluation of worst case mode.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	R37NBH409C3SE3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

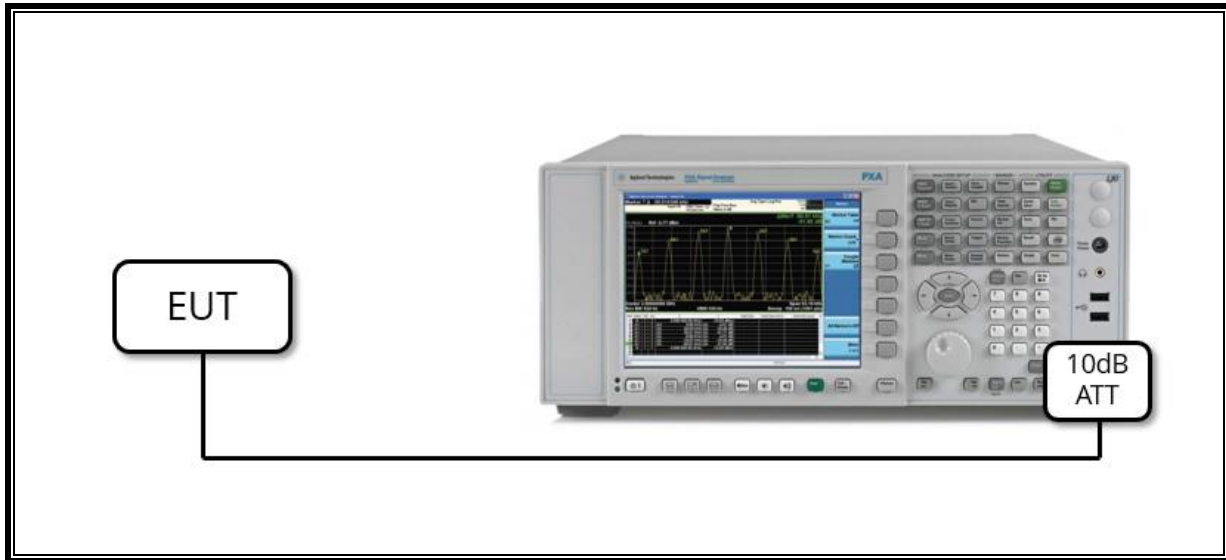
### I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A
2	Audio	2	AUX	Unshielded	1.1 m	N/A

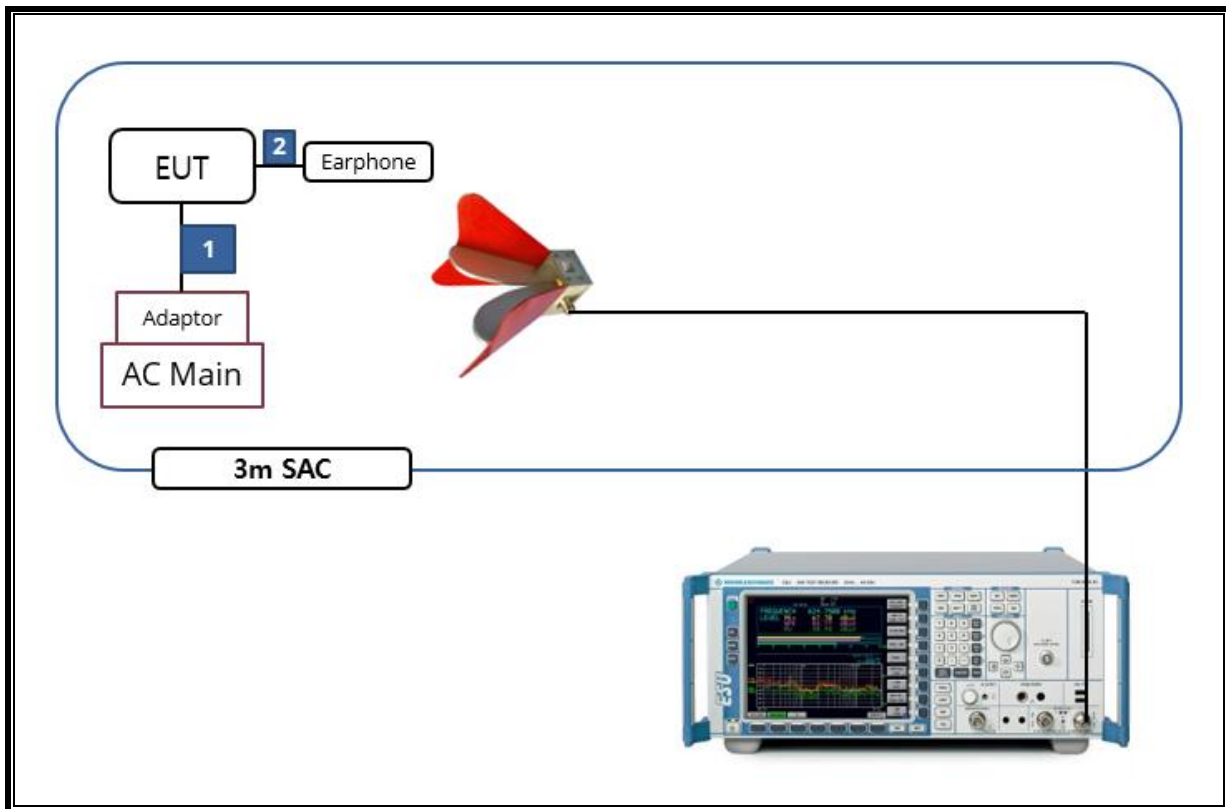
### TEST SETUP

The EUT is a stand-alone unit during the tests.  
 Test software exercised the EUT to enable NII mode.

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. 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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00218957	01-15-23
Antenna, Horn, 40 GHz	ETS	3116C	00166155	01-15-23
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-05-21
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-21
EMI Test Receiver, 44 GHz	R&S	ESW44	101590	08-04-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-03-21
Attenuator	PASTERNAK	PE7004-10	2	08-04-21
Attenuator	PASTERNAK	PE7087-10	A009	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-04-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-04-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-04-21
LISN	R&S	ENV-216	101837	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Termination	WEINSCHL	M1406A	T01	08-05-21
Attenuator	WEINSCHL	WA76-30-21	A015	08-05-21
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

## 7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.407(e)	6dB Band width (5.8GHz)	500kHz	Condcuted	PASS
15.407 (a)(2)	TX Cond. Power 5.15-2.25, 5.25-5.35 & 5.47-5.725	< 24dBm or 11+10Log(26dB BW)		PASS
15.407 (a)(3)	TX Cond. Power 5.725-5.825	< 30dBm		PASS
15.407 (a)(5)	PSD (5.2,5.3,5.5GHz)	< 11dBm		PASS
15.407 (a)(5)	PSD (5.8GHz)	30dBm per 500kHz		PASS
15.207 (a)	AC Power Line conducted emissions	Section 13	Radiated	PASS
15.407 (b) & 15.209	Radiated Spurious Emission	< 54dBuV/m		PASS
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Condcuted	PASS

## 8. MEASUREMENT METHODS

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

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

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

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

Conducted Output Power : KDB 789033 D02 v02r01, Section II.E.3.a(Method PM)

Conducted Output Power for Straddle Channel (ch144/142/138 for 20/40/80MHz BW):

KDB 789033 D02 v02r01, Section II.E.2.b(Method SA-1)

Power Spectral Density : KDB 789033 D02 v02r01, Section II.F.

Unwanted emissions in restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

Unwanted emissions in non-restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.



## 9. REFERENCE MEASUREMENTS RESULTS

### 9.1. ON TIME AND DUTY CYCLE RESULTS

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11a SISO	2.756	2.800	0.984	98.429	-
802.11n(HT20) SISO	2.560	2.604	0.983	98.310	-
802.11n(HT40) SISO	2.292	2.336	0.981	98.116	-
802.11ac(VHT80) SISO	1.164	1.208	0.964	96.358	0.16

Note. If the duty cycle is over 98%, compensation is not included in average measurement.

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

## 9.2. DUTY CYCLE PLOTS



### 9.3. 26 dB & 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

#### RESULTS

##### 9.3.1. 5.2 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz](Note1)
UNII-1	802.11a	Low	5180	19.49	19.49	16.40
		Mid	5200	19.64		16.40
		High	5240	19.97		16.39
	802.11n HT20	Low	5180	20.12	19.72	17.59
		Mid	5200	19.72		17.53
		High	5240	20.10		17.53
	802.11n HT40	Low	5190	39.81	39.69	35.96
		High	5230	39.69		35.97
	802.11ac VHT80	Mid	5210	80.81	80.81	75.23

Note1. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

##### 9.3.2. 5.3 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz](Note2)
UNII-2A	802.11a	Low	5260	19.83	19.66	16.38
		Mid	5300	19.71		16.44
		High	5320	19.66		16.40
	802.11n HT20	Low	5260	20.12	19.87	17.56
		Mid	5300	20.12		17.53
		High	5320	19.87		17.56
	802.11n HT40	Low	5270	39.49	39.49	35.93
		High	5310	39.89		36.01
	802.11ac VHT80	Mid	5290	80.75	80.75	75.16

Note2. As a result of 99% bandwidth test, the bandwidth of UNII-2A does not interfere with UNII-1.

**9.3.3. 5.5 GHz BAND**

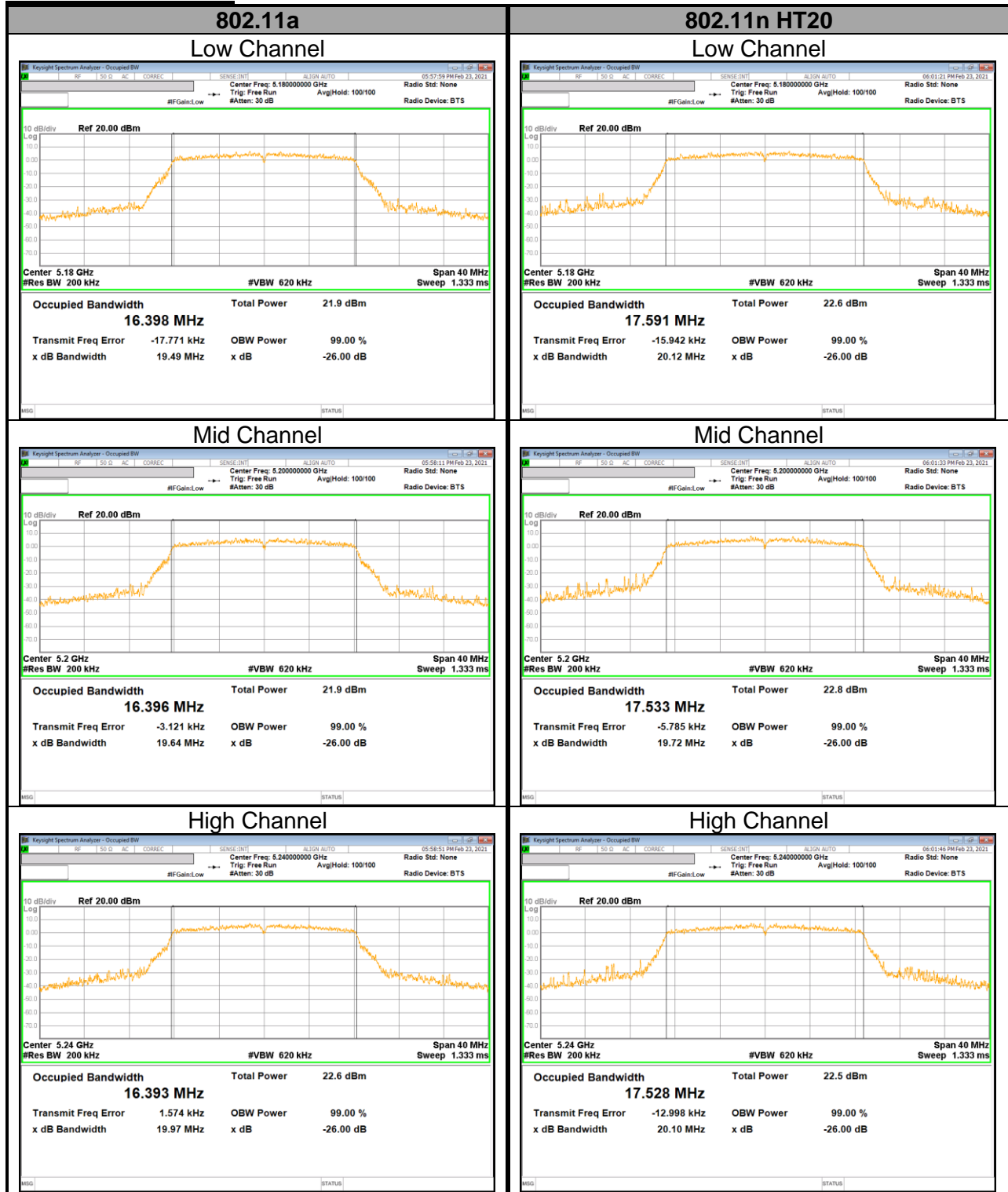
Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
UNII-2A	802.11a	Low	5500	19.75	19.65	16.41
		Mid	5580	19.75		16.40
		High	5700	19.65		16.39
	802.11n HT20	Low	5500	20.07	20.07	17.56
		Mid	5580	20.11		17.57
		High	5700	20.11		17.56
	802.11n HT40	Low	5510	39.90	39.90	35.90
		Mid	5590	40.13		35.92
		High	5670	40.35		35.96
	802.11ac VHT80	Low	5530	80.78	80.78	75.19
		High	5610	80.89		75.20

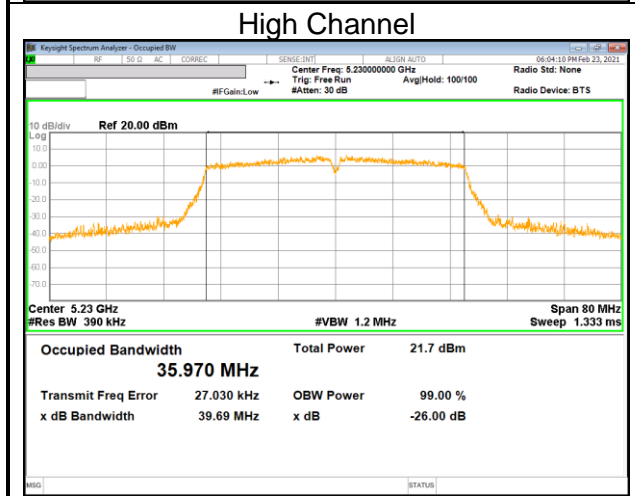
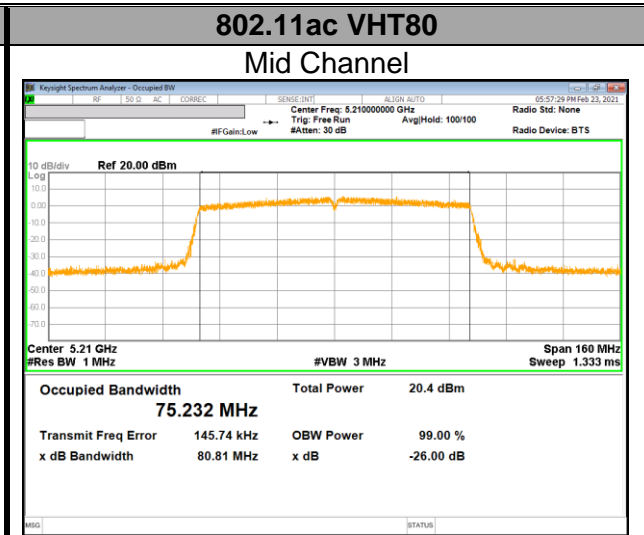
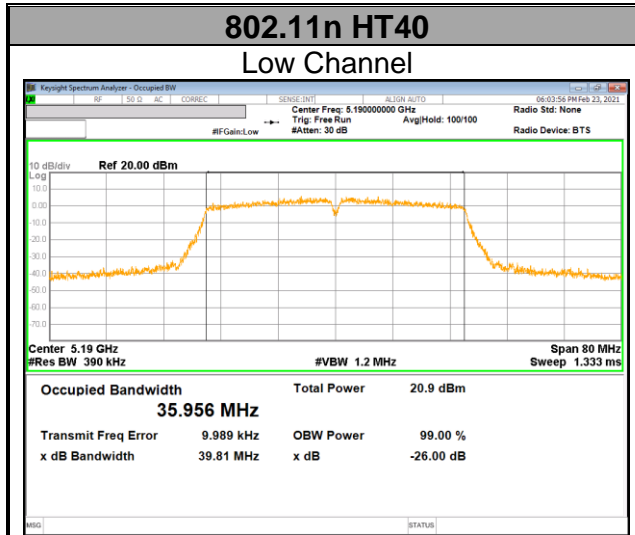
**9.3.4. STRADDLE CHANNEL**

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	
				UNII-2C	UNII-3
Straddle Channel	802.11a	Straddle	5720	15.014	4.862
	802.11n HT20	Straddle	5720	14.996	4.924
	802.11n HT40	Straddle	5710	34.988	4.708
	802.11ac VHT80	Straddle	5690	75.220	5.244

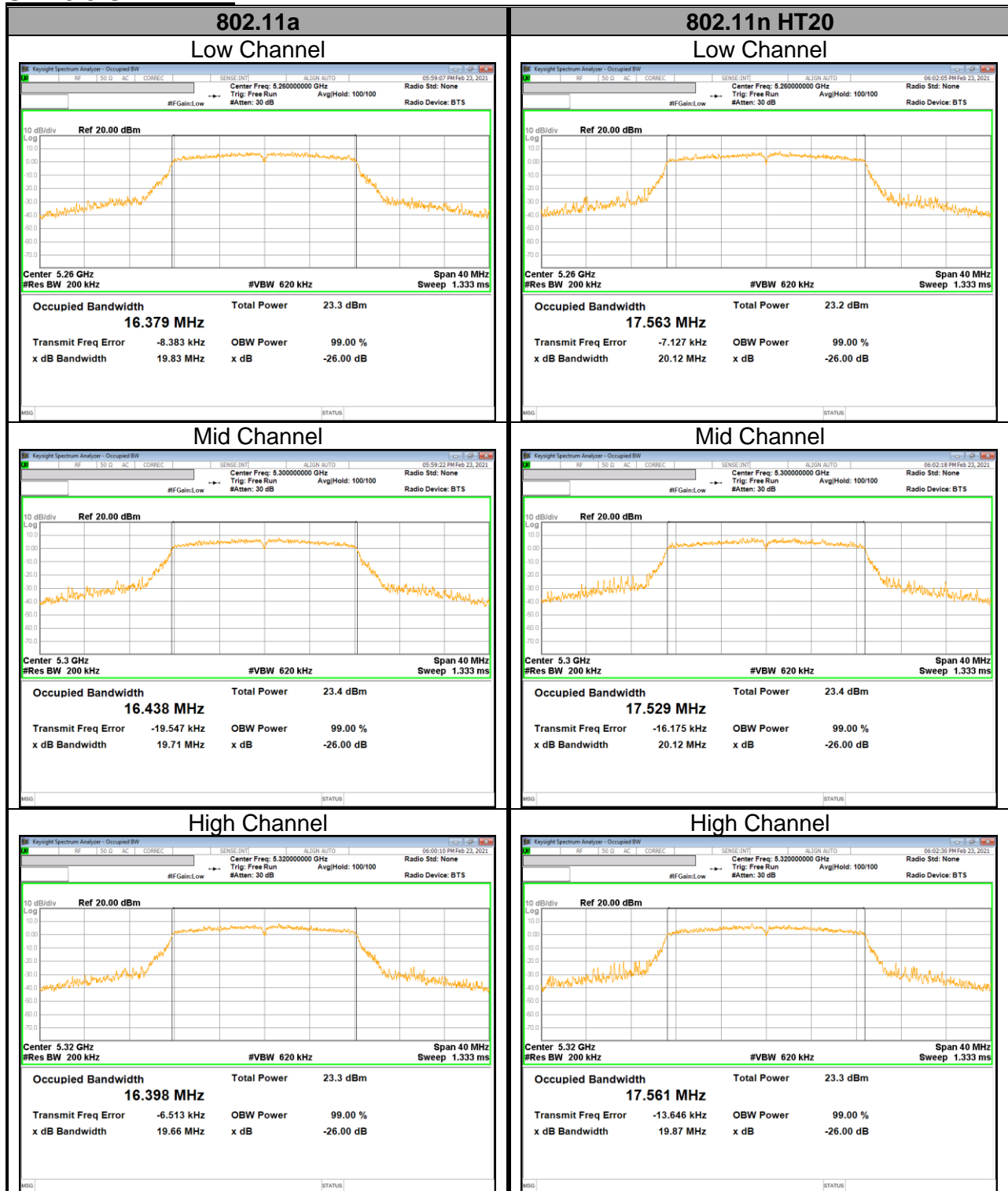
### 9.3.5. 26 dB & 99% BANDWIDTH PLOTS

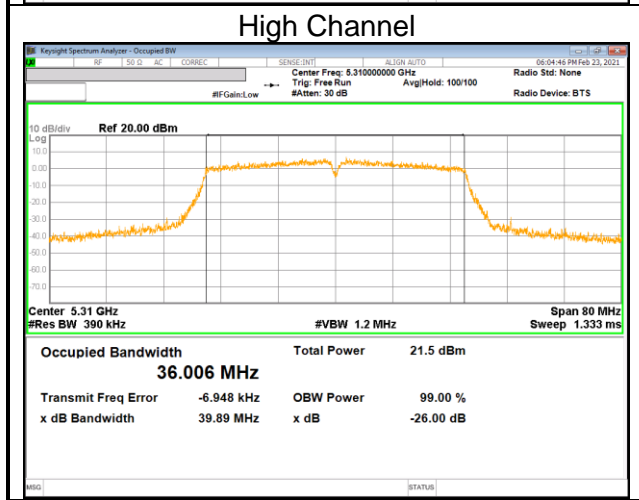
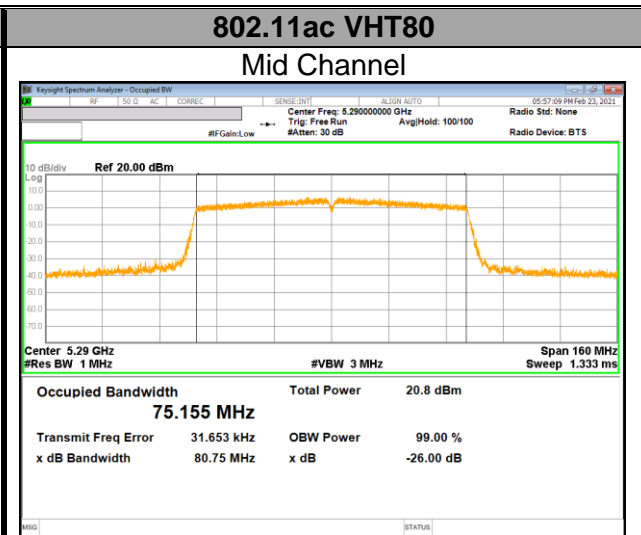
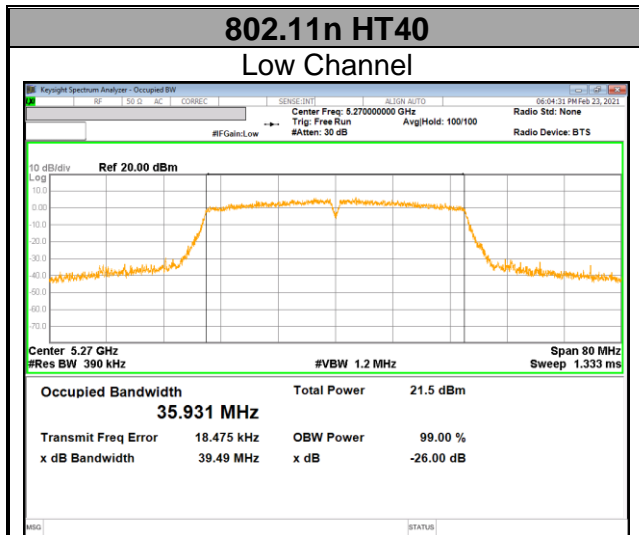
#### UNII 5.2 GHz BAND





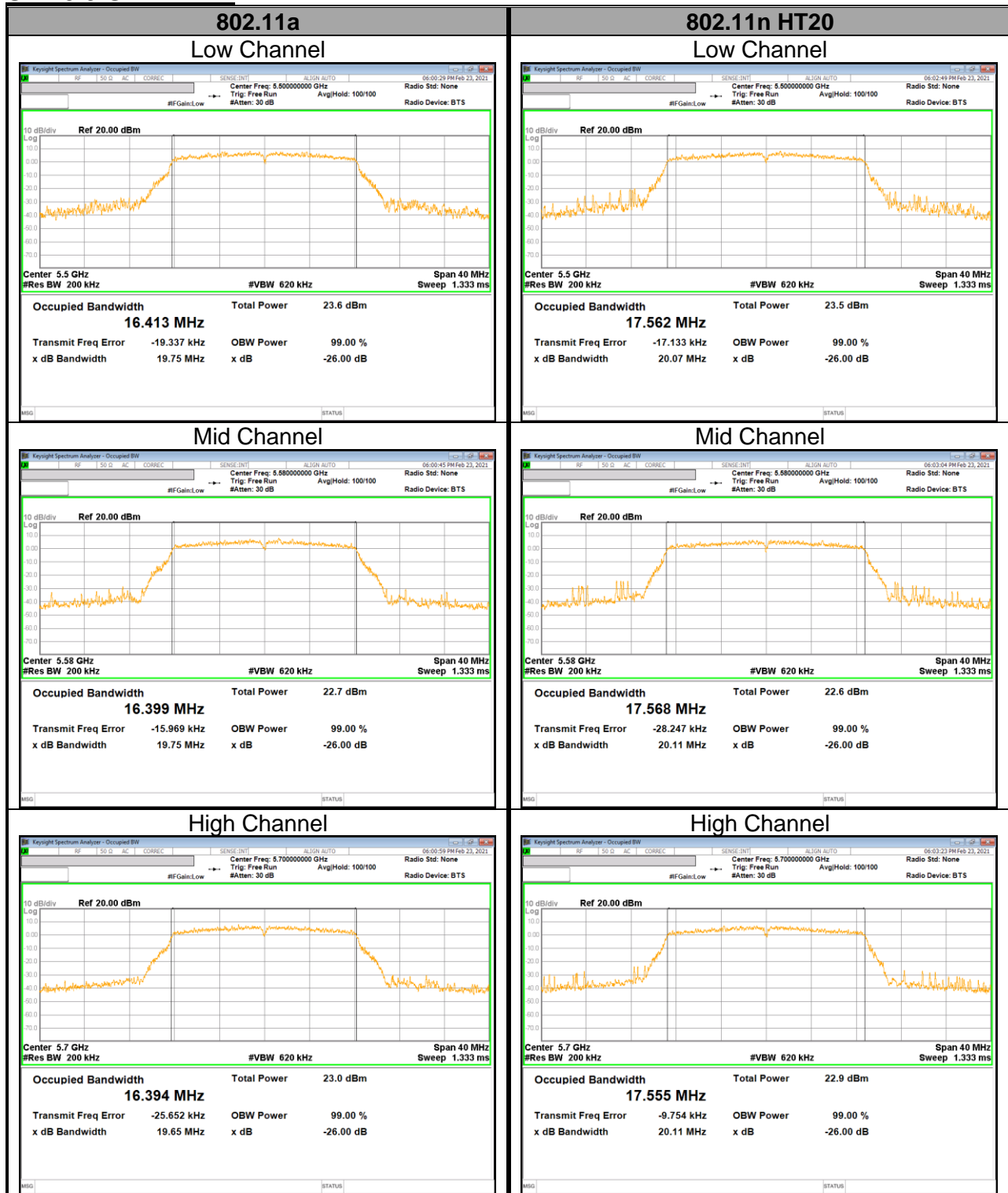
**UNII 5.3 GHz BAND**

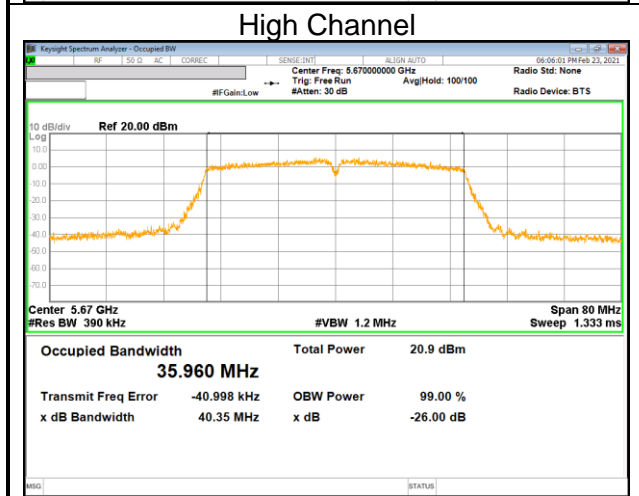
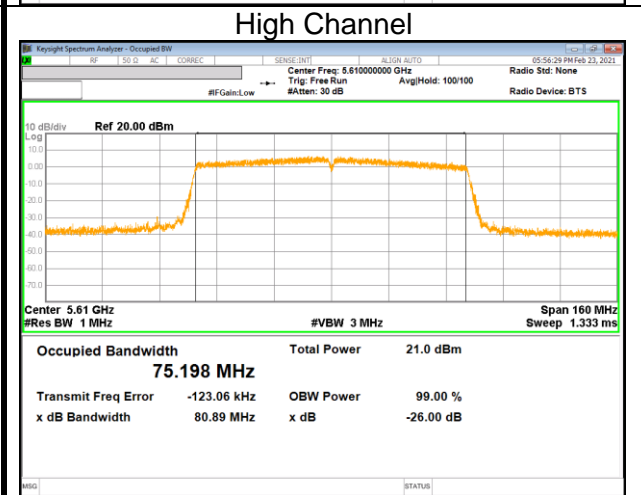
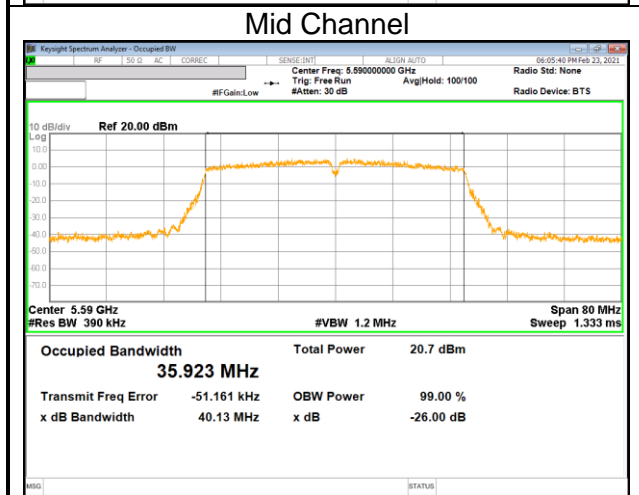
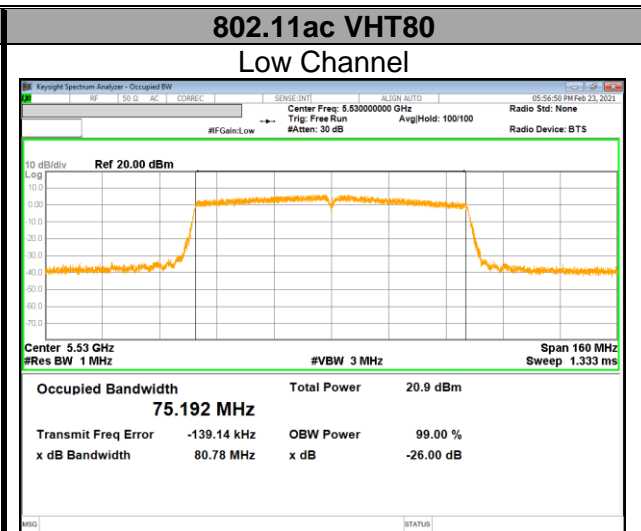
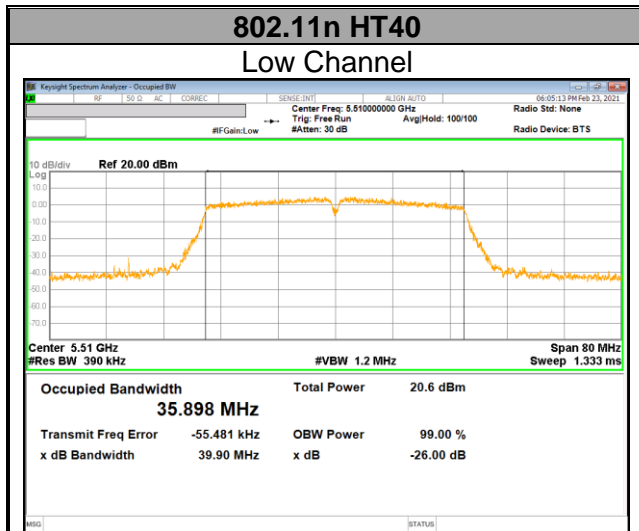




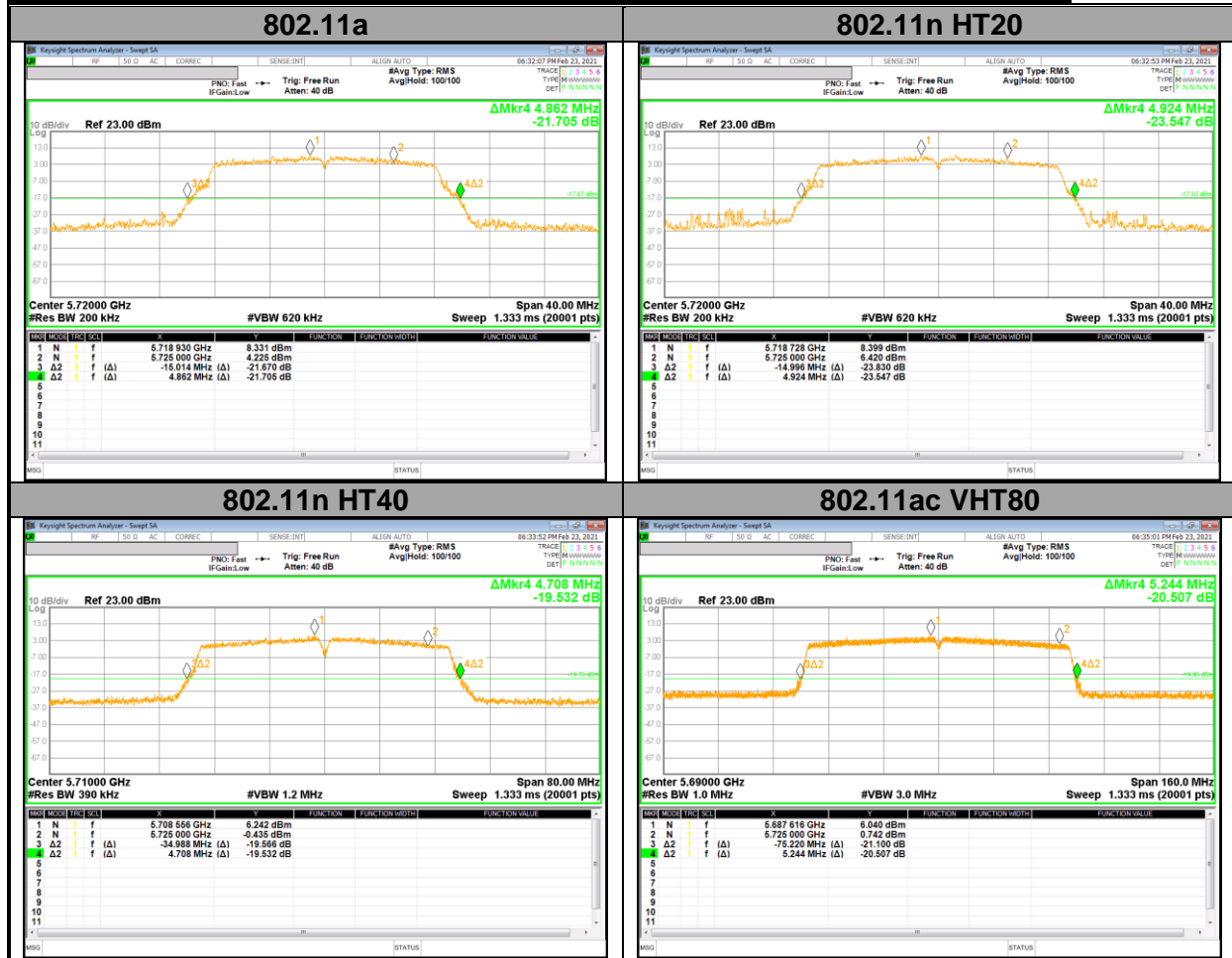


**UNII 5.5 GHz BAND**





**UNII Straddle Channel IEEE 802.11a / n HT20 / n HT40 / ac VHT80 mode**



## 10. ANTENNA PORT TEST RESULTS

### 10.1. 6 dB & 99% BANDWIDTH

#### LIMITS

FCC §15.407

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

#### TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

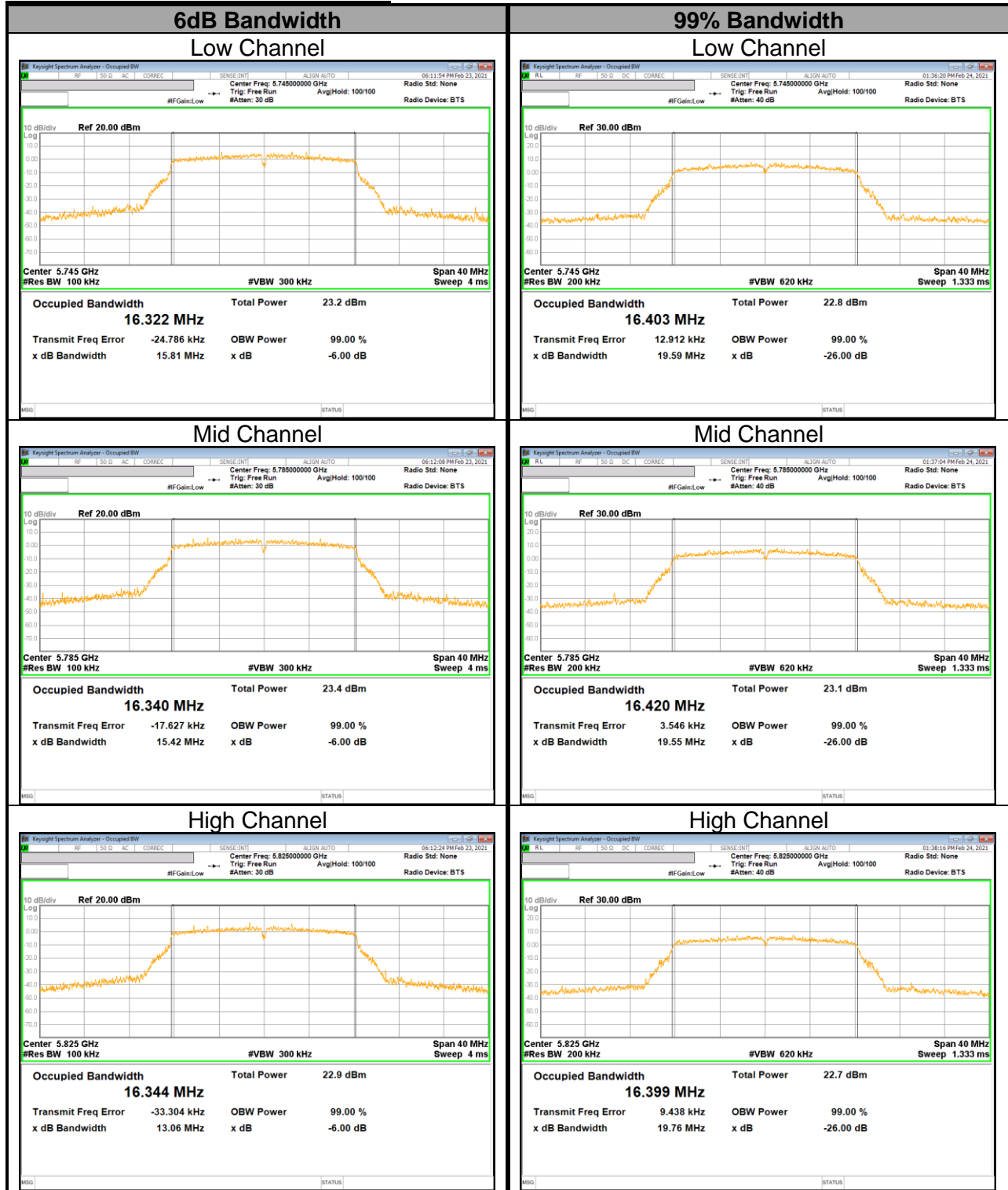
#### RESULTS

##### 10.1.1. 5.8 GHz BAND

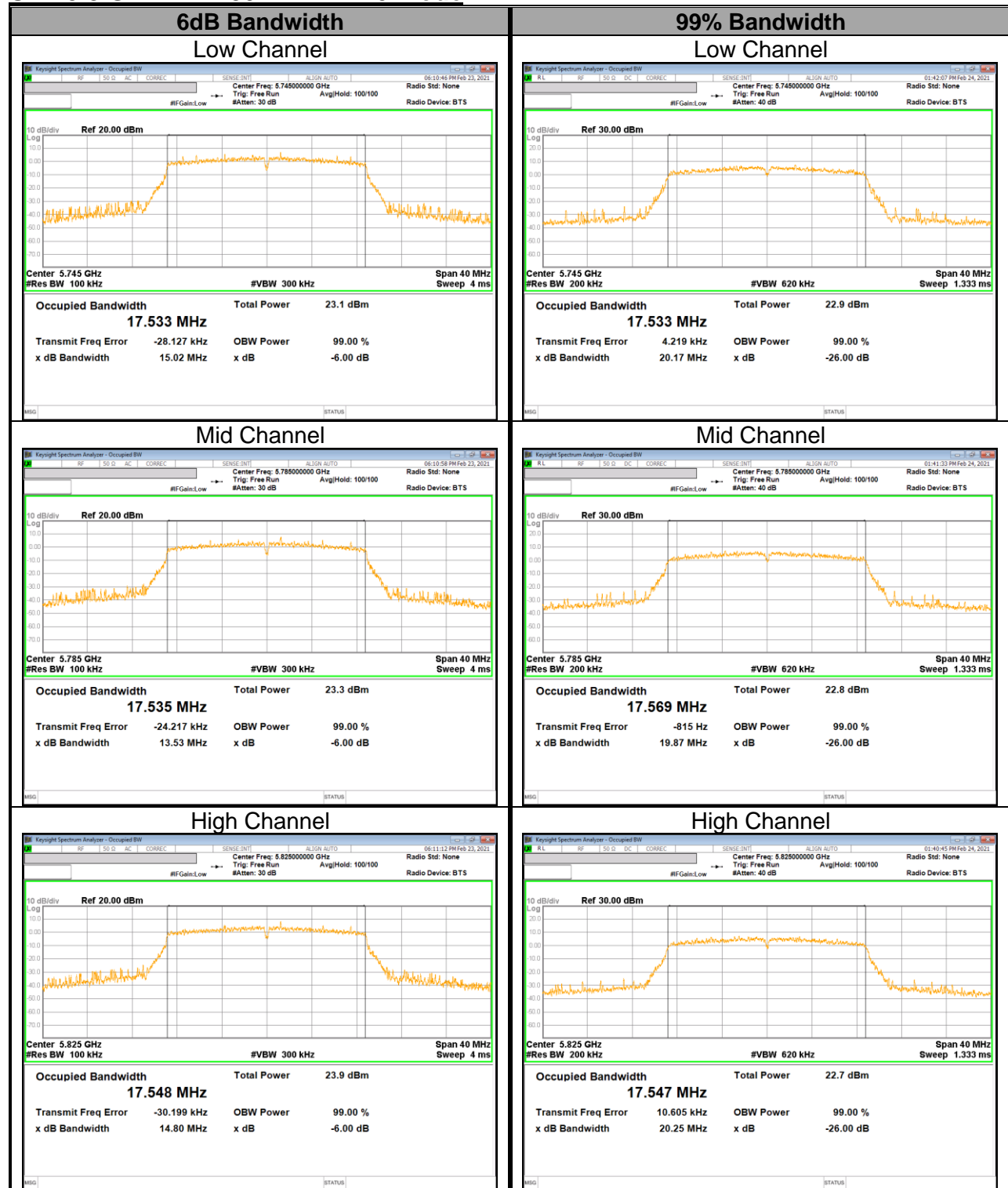
Band	Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	Worst	Minimum Limit [MHz]	99% BW [MHz]
UNII-3	802.11a	Low	5745	15.81	13.06	0.5	16.40
		Mid	5785	15.42			16.42
		High	5825	13.06			16.40
	802.11n HT20	Low	5745	15.02	13.53		17.53
		Mid	5785	13.53			17.57
		High	5825	14.80			17.55
	802.11n HT40	Low	5755	29.17	29.17		35.95
		High	5795	31.30			35.95
	802.11ac VHT80	Mid	5775	75.04	75.04		75.24

### 10.1.2. 6 dB & 99% BANDWIDTH PLOTS

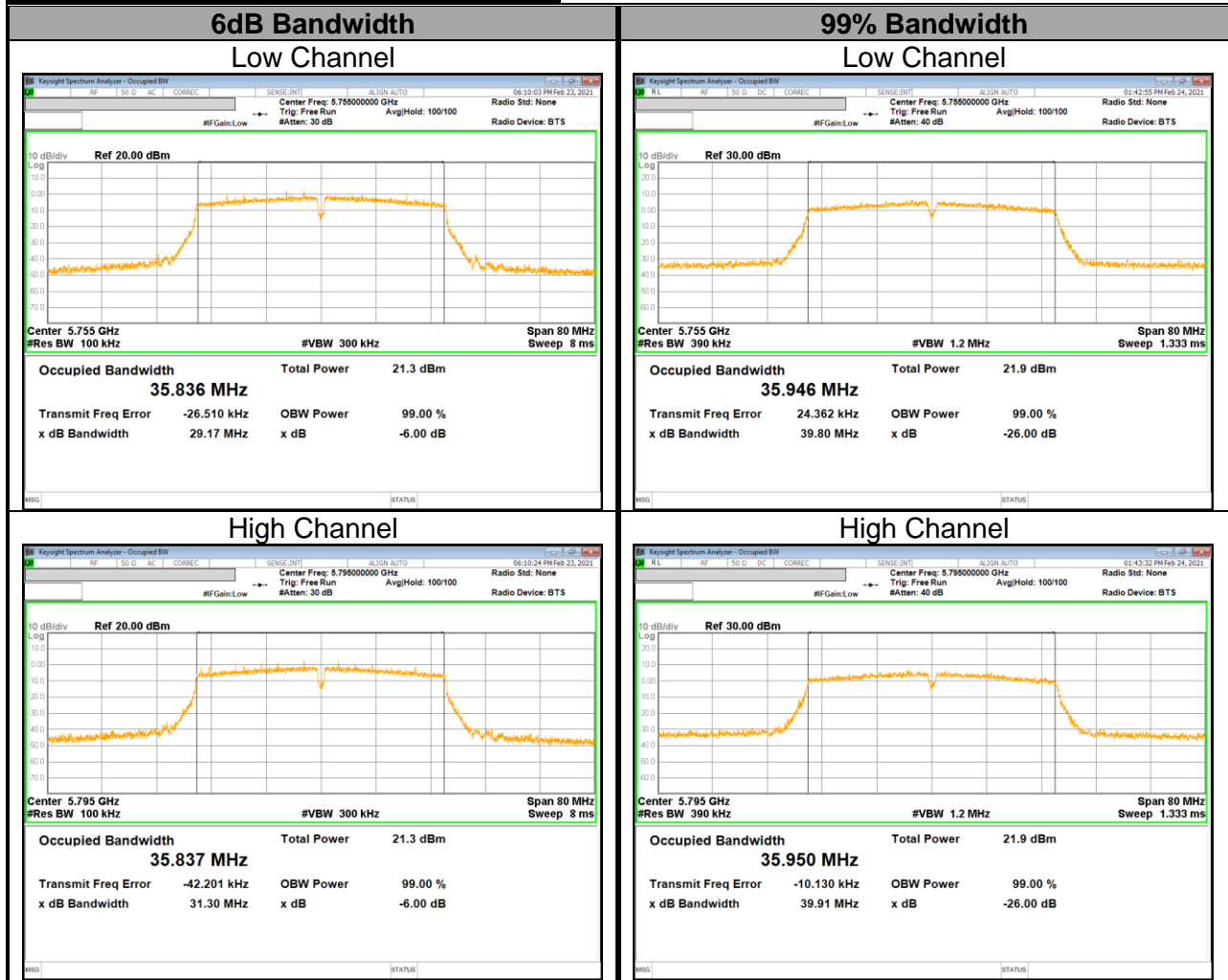
#### UNII 5.8 GHz IEEE 802.11a mode



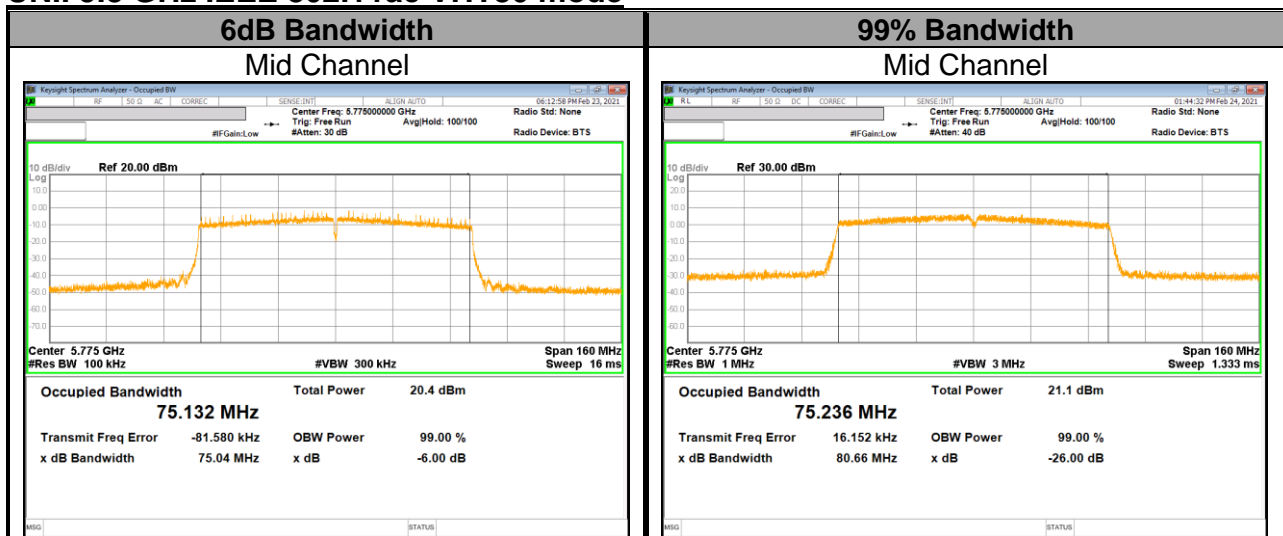
**UNII 5.8 GHz IEEE 802.11n HT20 mode**



**UNII 5.8 GHz IEEE 802.11n HT40 mode**



**UNII 5.8 GHz IEEE 802.11ac VHT80 mode**



## 10.2. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a) (1) (2) (3)

### FCC

For client devices in the 5.15-5.25 GHz 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.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. 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.

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 500-kHz band.

### TEST PROCEDURE

KDB 789033 Method PM is used for output power.

KDB 789033 Method SA-2 is used for only power of straddle Ch. and PPSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW  $\geq 3 \times \text{RBW}$ , RMS detector and trace averaging). Band power function used for power and peak marker value of the spectrum is used for PSD.

### DIRECTIONAL ANTENNA GAIN

For OUTPUT POWER and PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

Frequency Band [MHz]	Antenna Gain [dBi]
UNII 1 5150 - 5250	-2.16
UNII 2A 5250 - 5350	-2.16
UNII 2C 5470 - 5725	-2.05
UNII 3 5725 - 5850	-2.02



**RESULTS**

**10.2.1. 1Tx MODE IN THE 5.2 GHz BAND**

**Bandwidth and Antenna Gain, Limits**

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	19.49	-2.16	23.98	11.00
		Mid	5200				
		High	5240				
	802.11n HT20	Low	5180	19.72		23.98	11.00
		Mid	5200				
		High	5240				
	802.11n HT40	Low	5190	39.69		23.98	11.00
		High	5230				
	802.11ac VHT80	Mid	5210	80.81		23.98	11.00
	<b>Included in Calculations of Corr'd Power &amp; PPSD</b>						
<b>Duty Cycle CF [dB]</b>			802.11a			0.00	dB
			802.11n HT20			0.00	dB
			802.11n HT40			0.00	dB
			802.11ac VHT80			0.16	dB

**Output Power Results**

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]	Power Limit [dBm]
UNII-1	802.11a	Low	5180	17.46	23.98
		Mid	5200	17.46	
		High	5240	17.72	
	802.11n HT20	Low	5180	17.94	23.98
		Mid	5200	18.24	
		High	5240	17.63	
	802.11n HT40	Low	5190	16.41	23.98
		High	5230	16.65	
	802.11ac VHT80	Mid	5210	15.23	23.98

\* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

**PPSD Results**

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]	Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	6.536	6.536	11.00
		Mid	5200	6.714	6.714	
		High	5240	7.239	7.239	
	802.11n HT20	Low	5180	7.194	7.194	
		Mid	5200	7.175	7.175	
		High	5240	6.946	6.946	
	802.11n HT40	Low	5190	2.258	2.258	
		High	5230	3.099	3.099	
	802.11ac VHT80	Mid	5210	-2.062	-1.902	

\* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF [dB]

**10.2.2. 1Tx MODE IN THE 5.3 GHz BAND**

**Bandwidth and Antenna Gain, Limits**

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	19.66	-2.16	23.98	11.00
		Mid	5300				
		High	5320				
	802.11n HT20	Low	5260	19.87		23.98	11.00
		Mid	5300				
		High	5320				
	802.11n HT40	Low	5270	39.49		23.98	11.00
		High	5310				
	802.11ac VHT80	Mid	5290	80.75		23.98	11.00
	<b>Included in Calculations of Corr'd Power &amp; PPSD</b>						
<b>Duty Cycle CF [dB]</b>			802.11a			0.00	dB
			802.11n HT20			0.00	dB
			802.11n HT40			0.00	dB
			802.11ac VHT80			0.16	dB

**Output Power Results**

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]	Power Limit [dBm]
UNII-2A	802.11a	Low	5260	18.14	23.98
		Mid	5300	18.25	
		High	5320	18.28	
	802.11n HT20	Low	5260	18.16	23.98
		Mid	5300	18.13	
		High	5320	18.13	
	802.11n HT40	Low	5270	16.38	23.98
		High	5310	16.42	
	802.11ac VHT80	Mid	5290	15.08	23.98

\* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

**PPSD Results**

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]	Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	7.793	7.793	11.00
		Mid	5300	7.965	7.965	
		High	5320	8.084	8.084	
	802.11n HT20	Low	5260	7.546	7.546	
		Mid	5300	7.671	7.671	
		High	5320	7.809	7.809	
	802.11n HT40	Low	5270	2.996	2.996	
		High	5310	3.183	3.183	
	802.11ac VHT80	Mid	5290	-1.042	-0.882	

\* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF [dB]

### 10.2.3. 1Tx MODE IN THE 5.5 GHz BAND

#### Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	19.65	-2.05	23.98	11.00
		Mid	5580				
		High	5700				
	802.11n HT20	Low	5500	20.07			
		Mid	5580				
		High	5700				
	802.11n HT40	Low	5510	39.90			
		Mid	5590				
		High	5670				
	802.11ac VHT80	Low	5530	80.78			
		High	5610				
	<b>Included in Calculations of Corr'd Power &amp; PSD</b>						
<b>Duty Cycle CF [dB]</b>			802.11a			0.00	dB
			802.11n HT20			0.00	dB
			802.11n HT40			0.00	dB
			802.11ac VHT80			0.16	dB

**Output Power Results**

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]	Power Limit [dBm]
UNII-2C	802.11a	Low	5500	18.48	23.98
		Mid	5580	17.71	
		High	5700	18.43	
	802.11n HT20	Low	5500	18.41	23.98
		Mid	5580	17.76	
		High	5700	18.10	
	802.11n HT40	Low	5510	16.68	23.98
		Mid	5590	15.70	
		High	5670	16.30	
	802.11ac VHT80	Low	5530	15.24	23.98
		High	5610	15.42	

\* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

**PPSD Results**

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]	Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	8.416	8.416	11.00
		Mid	5580	7.636	7.636	
		High	5700	7.706	7.706	
	802.11n HT20	Low	5500	8.139	8.139	
		Mid	5580	6.987	6.987	
		High	5700	7.603	7.603	
	802.11n HT40	Low	5510	3.397	3.397	
		Mid	5590	2.613	2.613	
		High	5670	2.274	2.274	
	802.11ac VHT80	Low	5530	-1.170	-1.010	
		High	5610	-1.138	-0.978	

\* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF [dB]

### 10.2.4. 1Tx MODE IN THE 5.8 GHz BAND

#### Bandwidth and Antenna Gain, Limits

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n HT20	0.00	dB
	802.11n HT40	0.00	dB
	802.11ac VHT80	0.16	dB

#### Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]	Power Limit [dBm]
UNII-3	802.11a	Low	5745	18.42	30.00
		Mid	5785	18.30	
		High	5825	18.29	
	802.11n HT20	Low	5745	17.91	30.00
		Mid	5785	18.15	
		High	5825	17.87	
	802.11n HT40	Low	5755	16.14	30.00
		High	5795	16.45	
	802.11ac VHT80	Mid	5775	14.86	30.00

\* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

#### PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]	Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Low	5745	4.820	4.820	30.00
		Mid	5785	4.953	4.953	
		High	5825	4.428	4.428	
	802.11n HT20	Low	5745	4.426	4.426	
		Mid	5785	4.667	4.667	
		High	5825	4.283	4.283	
	802.11n HT40	Low	5755	-0.483	-0.483	
		High	5795	-0.235	-0.235	
	802.11ac VHT80	Mid	5775	-4.576	-4.416	

\* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF [dB]

### 10.2.5. 1Tx Mode Straddle channel IN THE 5.5 GHz BAND

#### Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	15.014	-2.05	22.76	11.00
	802.11n HT20	Straddle	5720	14.996		22.76	11.00
	802.11n HT40	Straddle	5710	34.988		23.98	11.00
	802.11ac VHT80	Straddle	5690	75.220		23.98	11.00
<b>Included in Calculations of Corr'd Power &amp; PPSD</b>							
<b>Duty Cycle CF [dB]</b>			802.11a			0.00	dB
			802.11n HT20			0.00	dB
			802.11n HT40			0.00	dB
			802.11ac VHT80			0.16	dB

#### Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-2C	802.11a	Straddle	5720	17.535	17.535	22.76
	802.11n HT20	Straddle	5720	17.316	17.316	22.76
	802.11n HT40	Straddle	5710	15.329	15.329	23.98
	802.11ac VHT80	Straddle	5690	13.946	14.106	23.98

\* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

#### PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]	Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	8.182	8.182	11.00
	802.11n HT20	Straddle	5720	7.887	7.887	
	802.11n HT40	Straddle	5710	2.858	2.858	
	802.11ac VHT80	Straddle	5690	-1.946	-1.786	

\* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF



### 10.2.6. 1Tx Mode Straddle channel IN THE 5.8 GHZ BAND

#### Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	4.862	-2.02	30.00	30.00
	802.11n HT20	Straddle	5720	4.924			
	802.11n HT40	Straddle	5710	4.708			
	802.11ac VHT80	Straddle	5690	5.244			
<b>Included in Calculations of Corr'd Power &amp; PSD</b>							
<b>Duty Cycle CF [dB]</b>			802.11a			0.00	dB
			802.11n HT20			0.00	dB
			802.11n HT40			0.00	dB
			802.11ac VHT80			0.16	dB

#### Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-3	802.11a	Straddle	5720	9.880	9.880	30.00
	802.11n HT20	Straddle	5720	10.072	10.072	
	802.11n HT40	Straddle	5710	2.673	2.673	
	802.11ac VHT80	Straddle	5690	-2.319	-2.159	

\* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

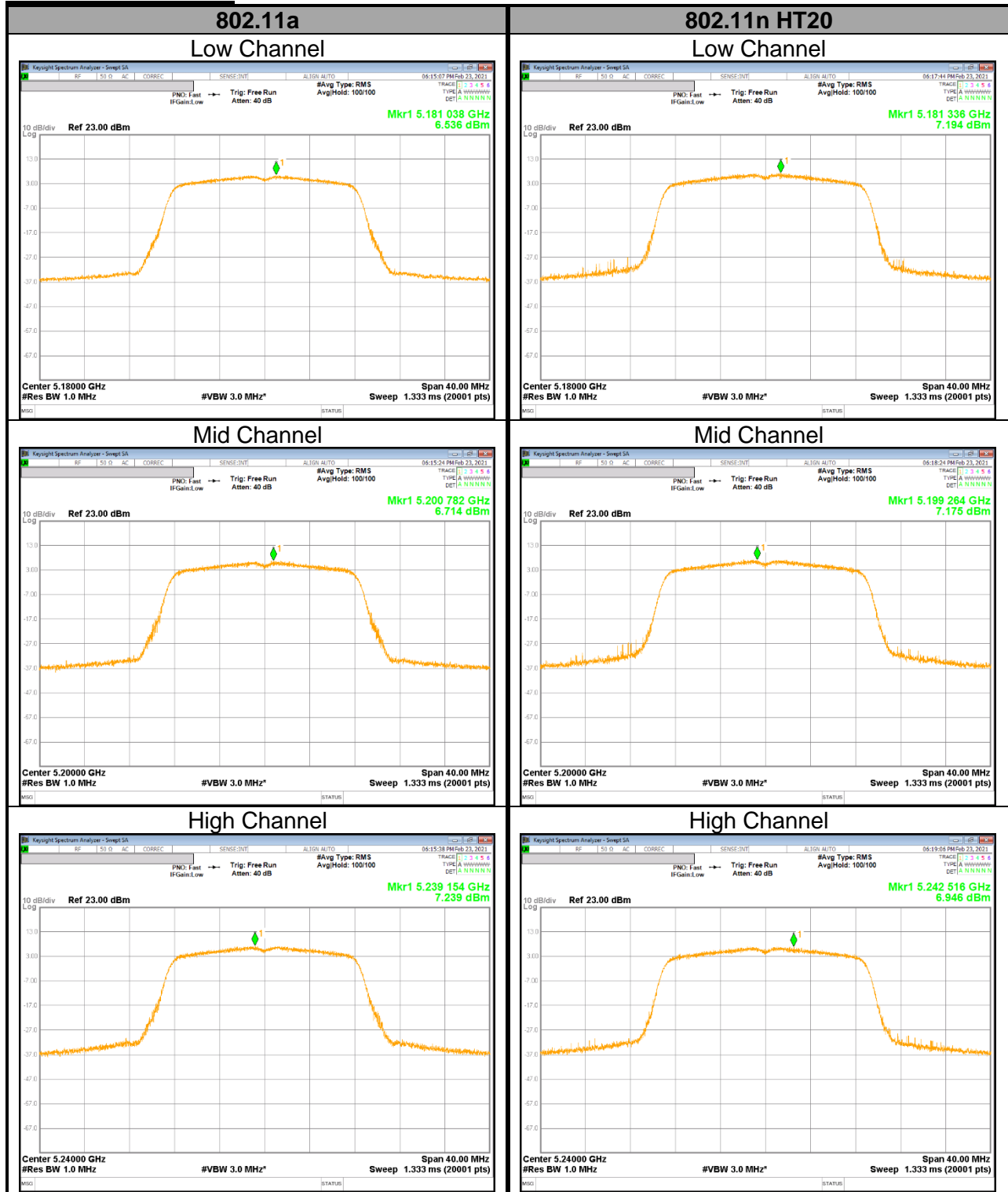
#### PPSD Results

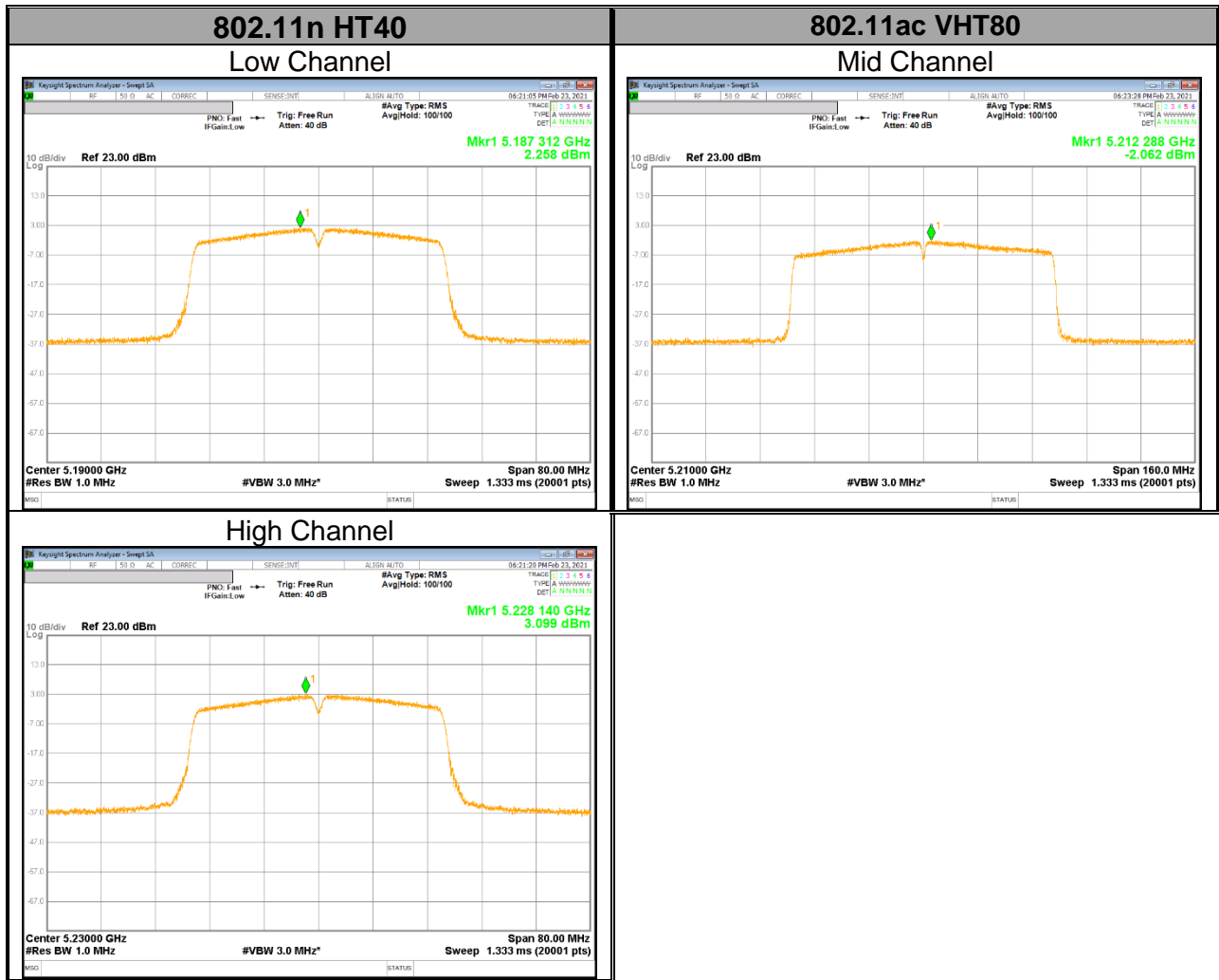
Band	Mode	Channel	Center Freq. [MHz]	Meas PSD [dBm/500kHz]	Corr'd PSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	3.043	3.043	30.00
	802.11n HT20	Straddle	5720	2.961	2.961	
	802.11n HT40	Straddle	5710	-3.573	-3.573	
	802.11ac VHT80	Straddle	5690	-8.848	-8.688	

\* Calculation of PSD result : Corr'd PSD = Meas PSD + Duty CF

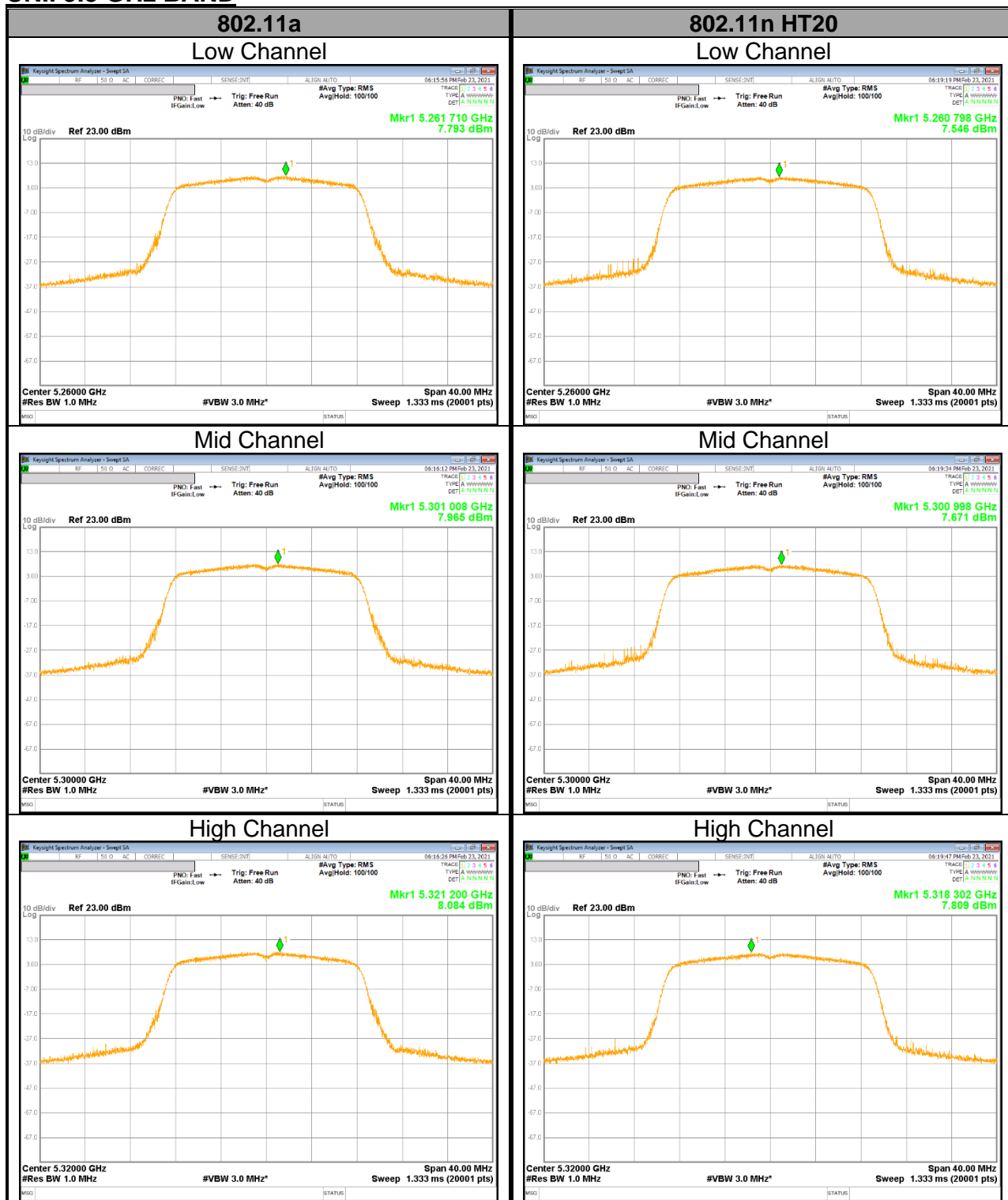
### 10.2.7. OUTPUT POWER AND PPSD PLOTS

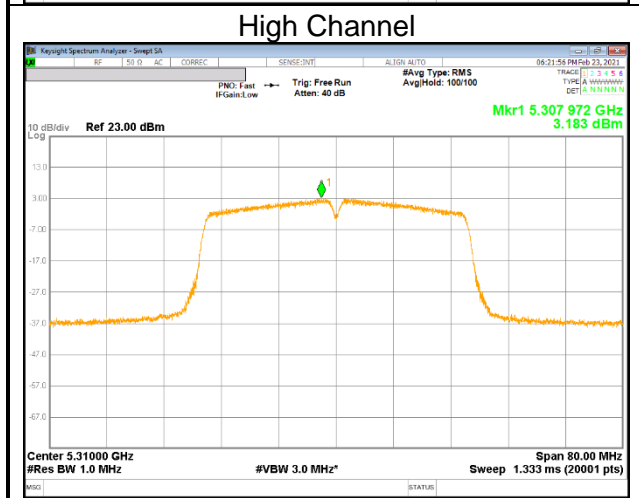
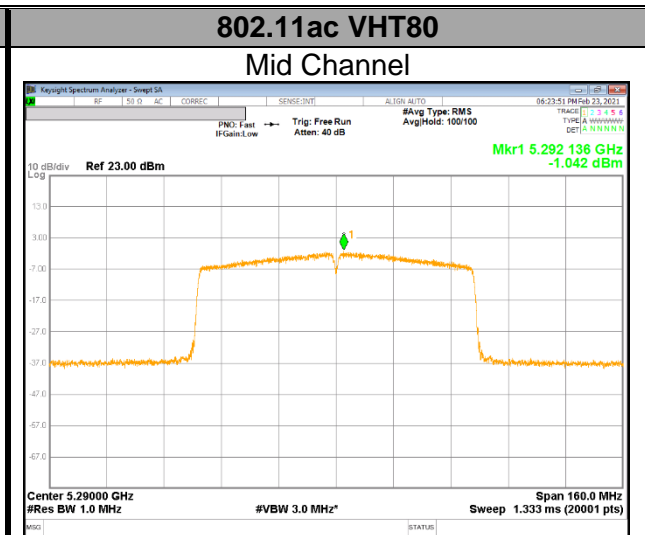
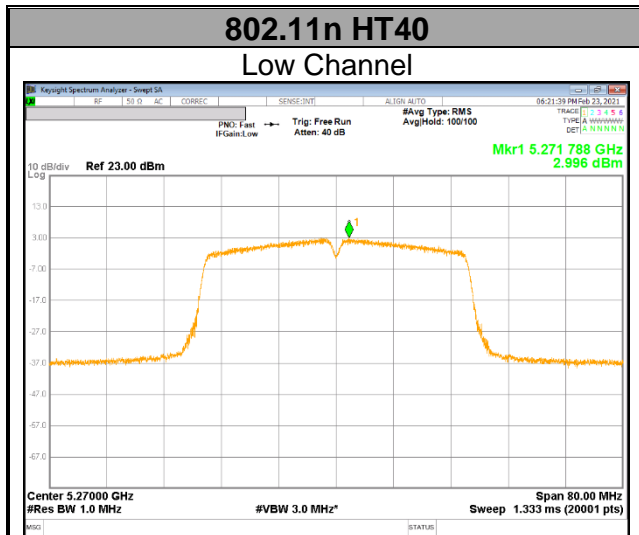
#### UNII 5.2 GHz BAND



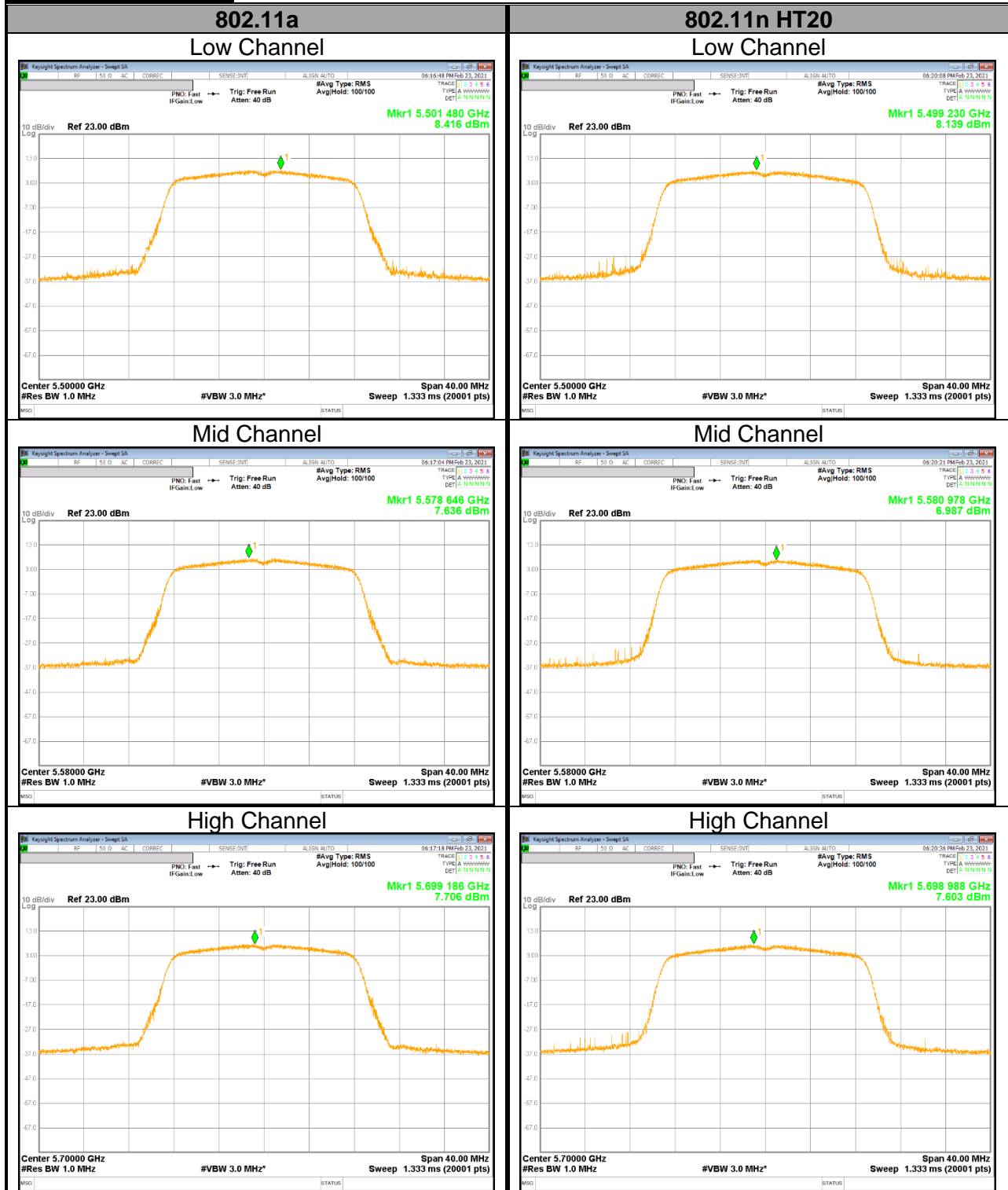


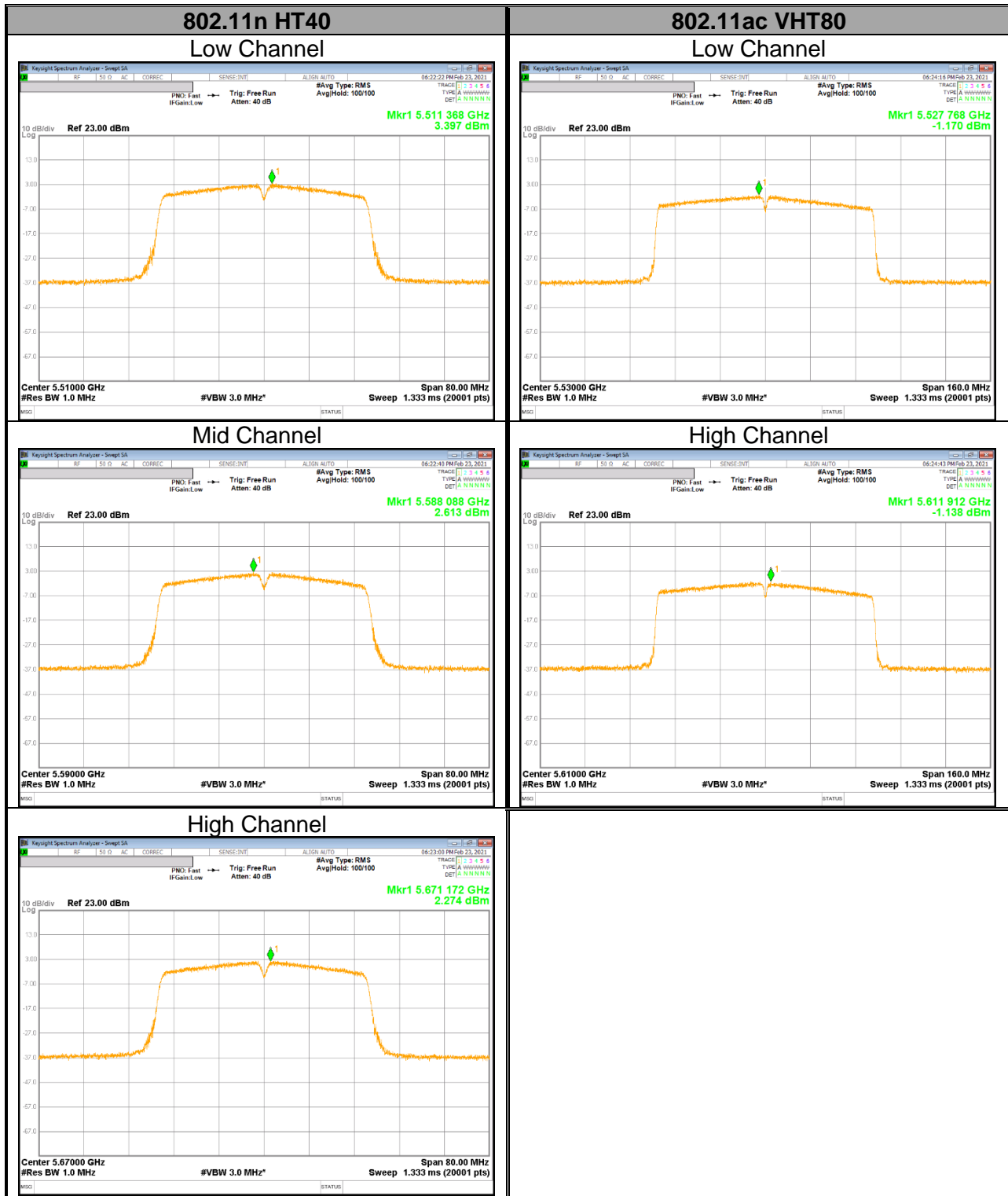
**UNII 5.3 GHz BAND**





### UNII 5.5 GHz BAND





### UNII 5.8 GHz BAND

