CERTIFICATION TEST REPORT

Report Number. : 4789582668-E6V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SC-54A, SCG07
FCC ID	:	A3LSMA516JPN
EUT Description	:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
August 31, 2020

Prepared by:
UL Korea, Ltd.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

IAS ACCREDITED
Testing Laboratory
TL-637

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	08/26/20	Initial issue	Hyunsik Yun
V2	08/28/20	Updated to address TCB's question	Hyunsik Yun
V3	08/31/20	Updated to address TCB's question	Hyunsik Yun

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15E(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC
MODEL NUMBER:	SC-54A, SCG07
SERIAL NUMBER:	R38CN709MKFY (CONDUCTED); R3CN709MX2E (RADIATED);
DATE TESTED:	AUG 05, 2020 – AUG 26, 2020;

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies

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.

Approved & Released For
UL Korea, Ltd. By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Hyunsik Yun
Suwon Lab Engineer
UL Korea, Ltd.

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
☒ Chamber 1
☒ Chamber 2
☐ 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 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.

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218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

This report covers the Samsung models SC-54A and SCG07.
These models are identical in hardware. Basic model SC-54A was set for test.
(see the PED document for details).

WiFi operating mode

Frequency rage	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:

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
5180 - 5240	802.11a SISO	15.57	36.06
	802.11n(HT20) SISO	15.39	34.59
5190 – 5230	802.11n(HT40) SISO	12.86	19.32
5210	802.11ac(VHT80) SISO	11.01	12.62
5260 - 5320	802.11a SISO	15.54	35.81
	802.11n(HT20) SISO	15.36	34.36
5270 - 5310	802.11n(HT40) SISO	12.74	18.79
5290	802.11ac(VHT80) SISO	11.39	13.77
5500 - 5720	802.11a SISO	15.51	35.56
	802.11n(HT20) SISO	15.49	35.40
5510 - 5710	802.11n(HT40) SISO	12.62	18.28
5530 - 5690	802.11ac(VHT80) SISO	11.90	15.49
5745 - 5825	802.11a SISO	15.47	35.24
	802.11n(HT20) SISO	15.34	34.20
5755 - 5795	802.11n(HT40) SISO	12.85	19.28
5775	802.11ac(VHT80) SISO	11.60	14.45

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]	Single Antenna Gain[dBi]
UNII 1(5150 – 5250)	-5.7
UNII 2A(5250 – 5350)	-3.0
UNII 2C(5470 – 5725)	-3.7
UNII 3(5725 – 5850)	-3.1

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	SISO	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.

For SISO, 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 and earphone for evaluation of worst case mode.

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA200	R37MEFL0WRDK3	N/A
Data Cable	SAMSUNG	EP-DR140ABE	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

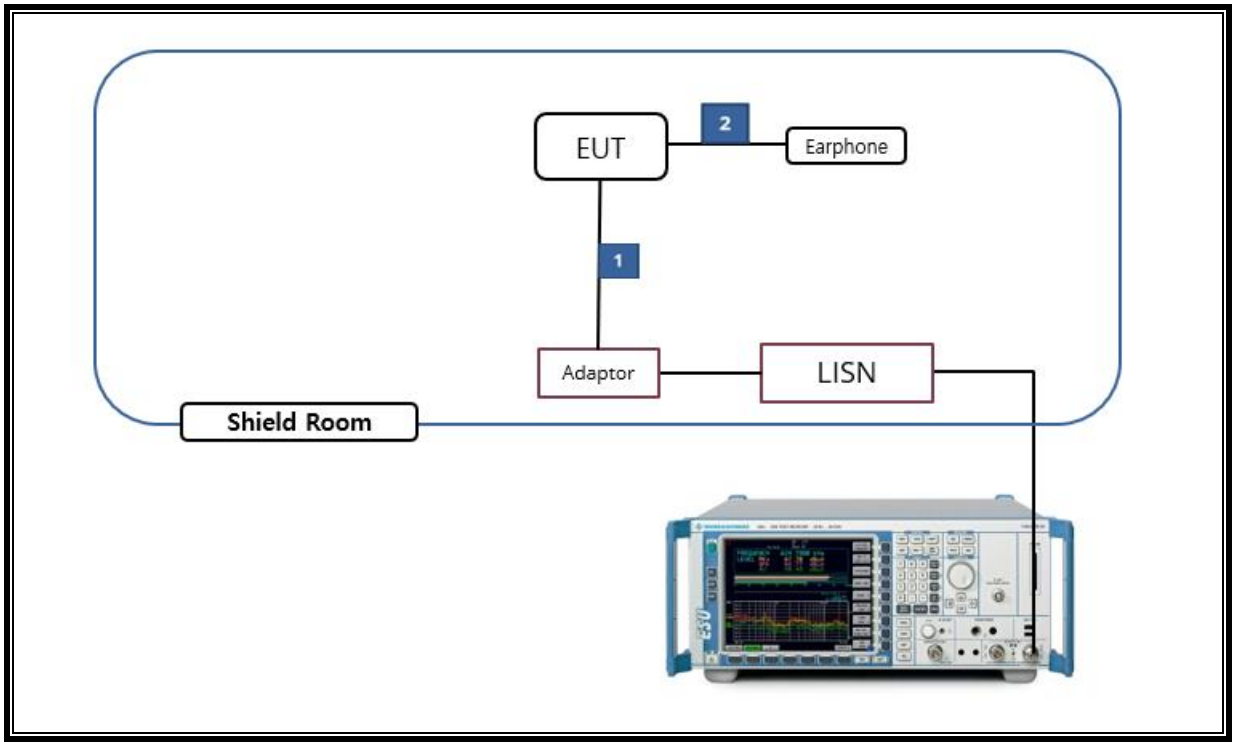
I/O CABLE

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	1.1m	N/A

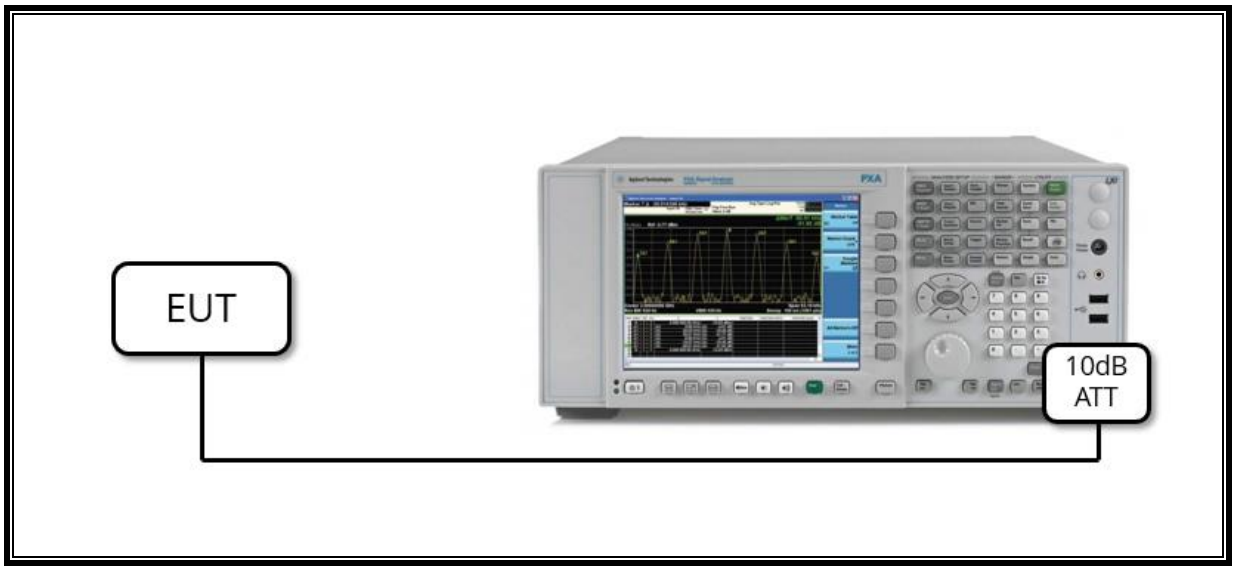
TEST SETUP

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

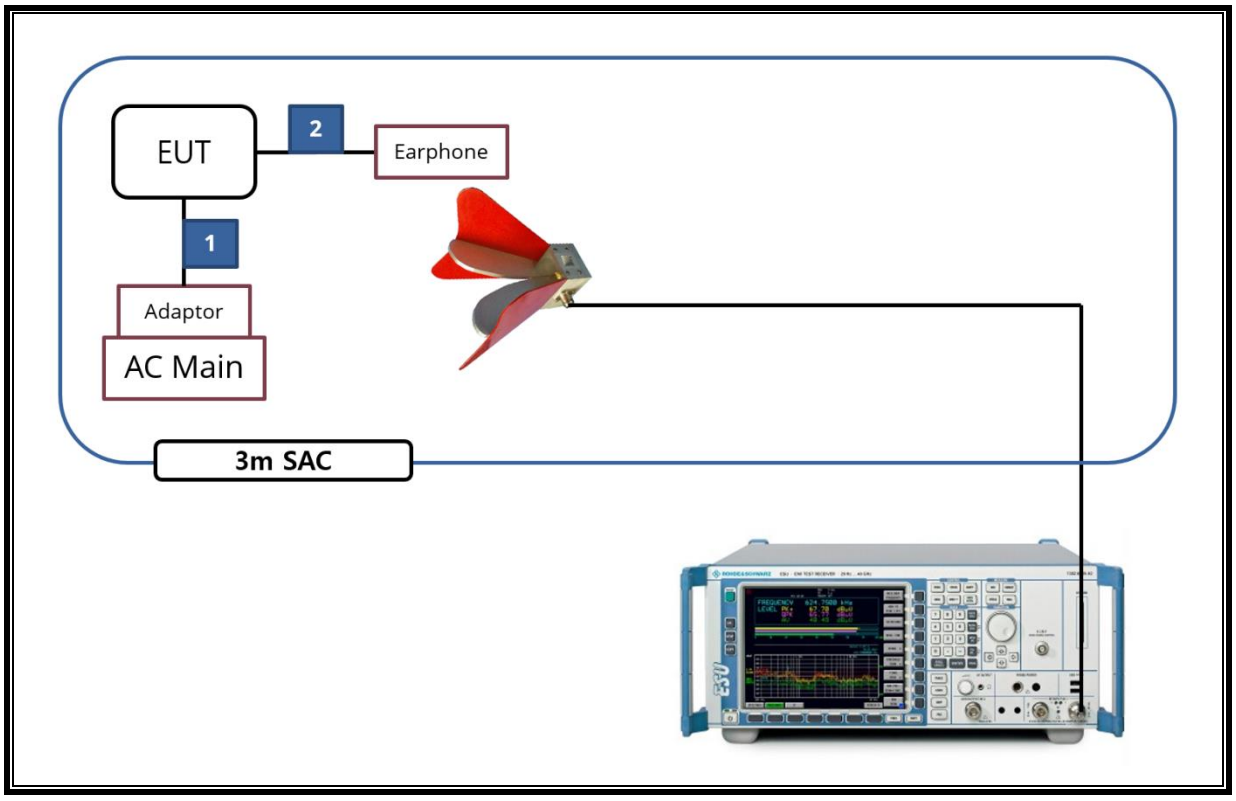
SETUP DIAGRAM FOR TESTS (AC Line Conducted)



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**	**Next Cal. Date**	
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845(Note)	08-04-20	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749(Note)	08-04-20	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20	07-27-22
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-13-20	08-04-22
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21	
Preamplifier	ETS	3116C-PA	00168841	08-08-20	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20	08-03-21
Spectrum Analyzer, 44 GHz	Keysight	N9030B	MY57143717	01-20-21	
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20	08-05-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20	08-05-21
Attenuator	PASTERNACK	PE7087-10	A001	08-08-20	08-03-21
Attenuator	PASTERNACK	PE7087-10	A008	08-08-20	08-03-21
Attenuator	PASTERNACK	PE7087-10	A007	08-08-20	08-03-21
Attenuator	PASTERNACK	PE7087-10	A009	08-08-20	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20	08-03-21
LISN	R&S	ENV-216	101837	08-09-20	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21	
Termination	WEINSCHEL	M1406A	T01	08-08-20	08-05-21
Attenuator	WEINSCHEL	WA76-30-21	A015	08-08-20	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		

Note. The above antenna was not used for testing from August 4th to August 13th.

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 10	Radiated	PASS
15.407 (b) & 15.209	Radiated Spurious Emission	< 54dBuV/m		PASS
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Condcuted	PASS

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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.b(Method PM-G)

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.

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9. REFERENCE MEASUREMENTS RESULTS

9.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ANT	ON Time [msec)	Period [msec]	Duty Cycle X [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]
802.11a	Single	2.795	2.833	0.987	98.659	0.0
802.11n HT20		2.600	2.637	0.986	98.597	0.0
802.11n HT40		2.483	2.521	0.985	98.493	0.0
802.11ac VHT80		2.555	2.593	0.985	98.535	0.0

Note. Since the duty cycle of all modes is over 98%, compensation is not included in the average measurement.

LIMITS

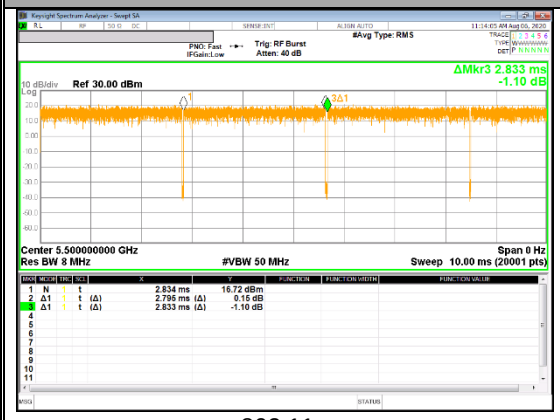
None; for reporting purposes only.

PROCEDURE

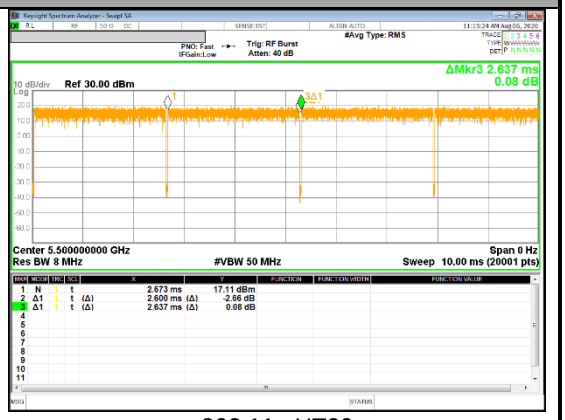
KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

9.2. DUTY CYCLE PLOTS

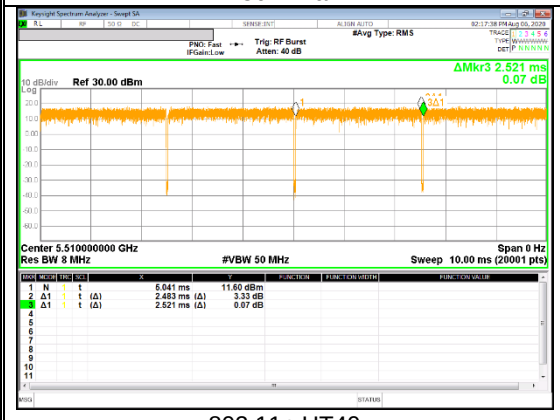
ANT SINGLE



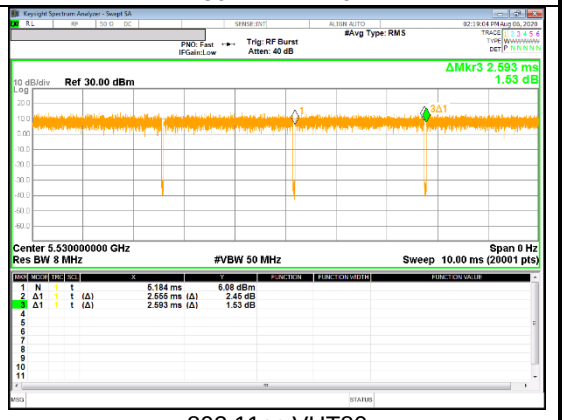
802.11a



802.11n HT20



802.11n HT40



802.11ac VHT80

9.3. 26 dB 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	20.58	19.73	16.39
		Mid	5200	20.24		16.38
		High	5240	19.73		16.33
	802.11n HT20	Low	5180	21.10	20.86	17.57
		Mid	5200	21.57		17.56
		High	5240	20.86		17.56
	802.11n HT40	Low	5190	40.70	39.27	35.89
		High	5230	39.24		35.96
	802.11ac VHT80	Mid	5210	81.19	81.19	75.02

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] (Note.)
UNII-1	802.11a	Low	5260	21.61	20.74	16.37
		Mid	5300	20.74		16.34
		High	5320	21.15		16.35
	802.11n HT20	Low	5260	20.76	20.57	17.57
		Mid	5300	20.57		17.54
		High	5320	20.75		17.56
	802.11n HT40	Low	5270	39.43	39.43	35.91
		High	5310	39.55		35.89
	802.11ac VHT80	Mid	5290	81.58	81.58	75.05

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

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9.3.3. 5.5 GHz BAND

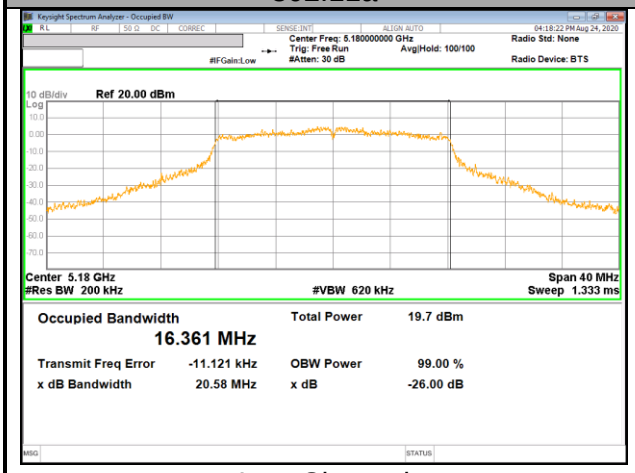
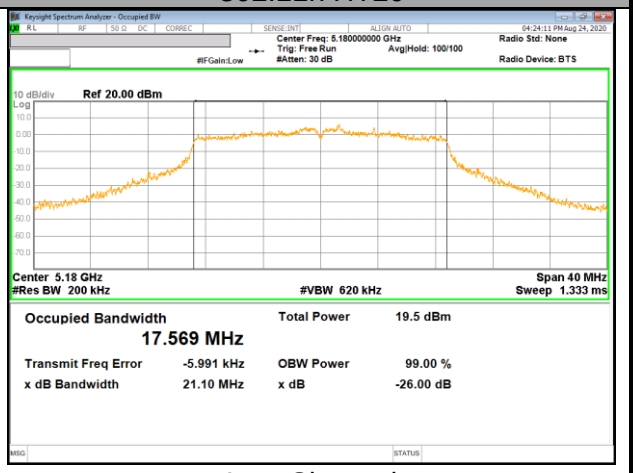
Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst
UNII-2C	802.11a	Low	5500	20.69	20.06
		Mid	5580	21.43	
		High	5700	20.06	
	802.11n HT20	Low	5500	20.08	20.08
		Mid	5580	21.09	
		High	5700	21.62	
	802.11n HT40	Low	5510	39.61	39.48
		Mid	5590	39.67	
		High	5670	39.48	
	802.11ac VHT80	Low	5530	82.66	81.32
		High	5610	81.32	

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	14.938	4.638
	802.11n HT20		5720	15.210	5.250
	802.11n HT40		5710	34.910	5.222
	802.11ac VHT80		5690	75.188	5.084

9.3.5. 26 dB BANDWIDTH PLOTS

UNII 5.2 GHz Band

802.11a	802.11n HT20
	
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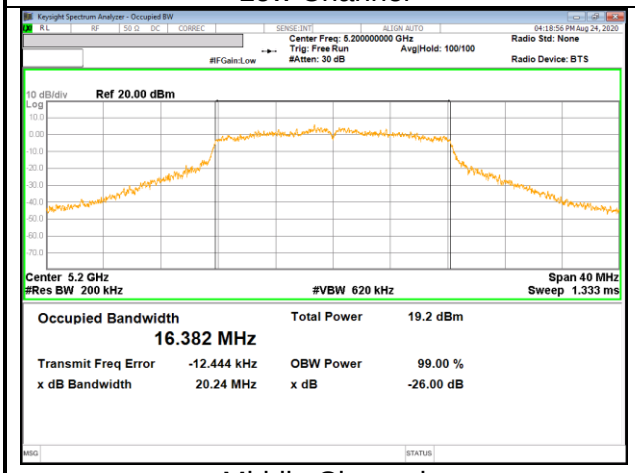
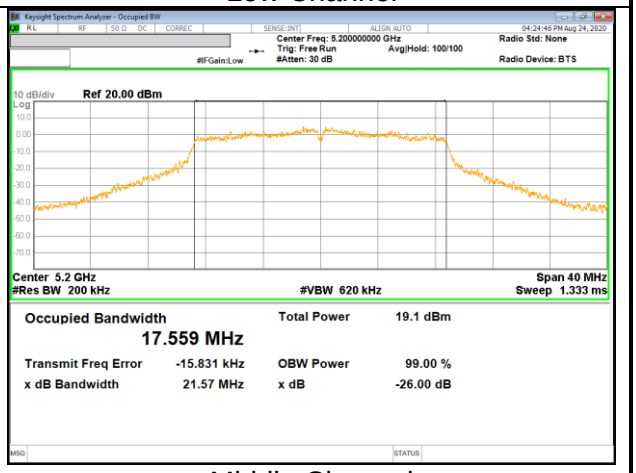
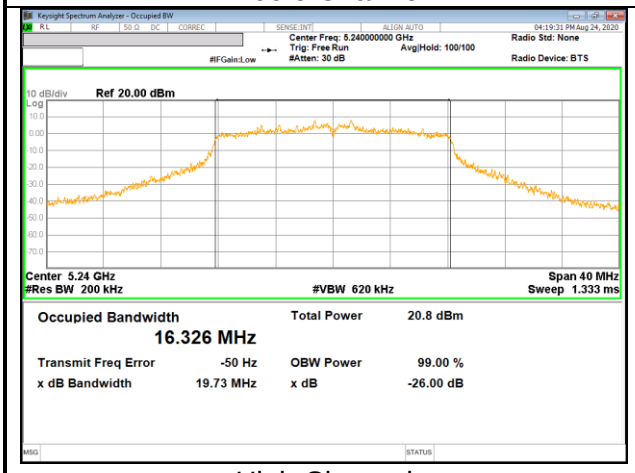
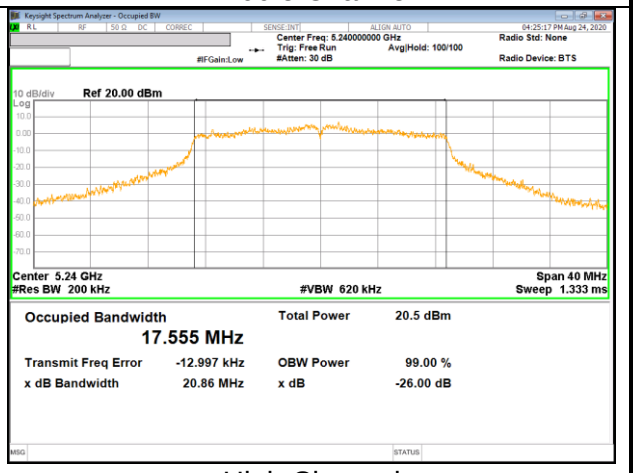
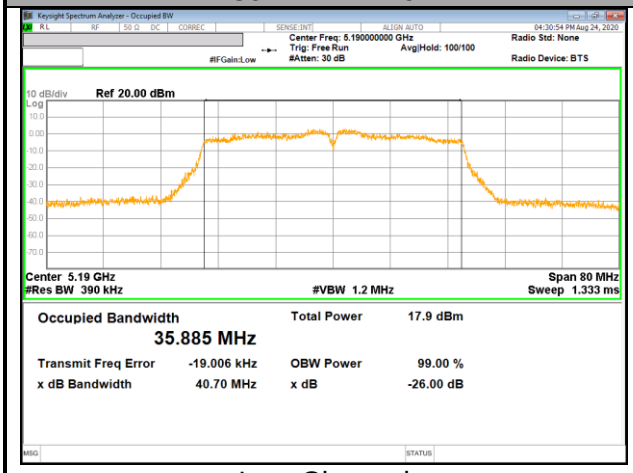
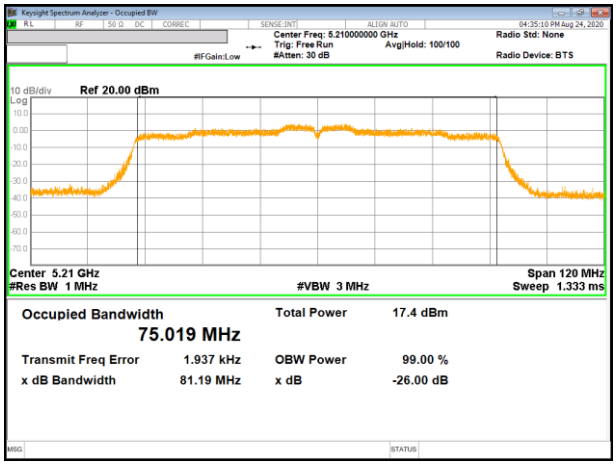
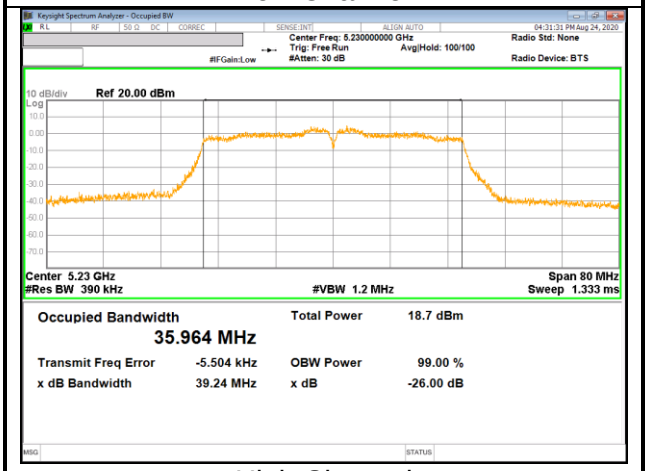
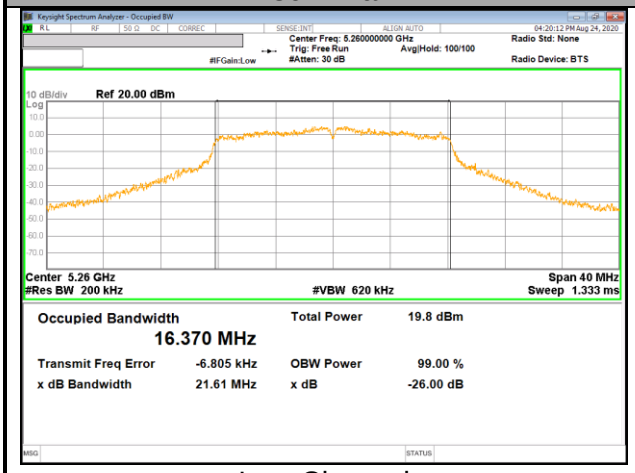
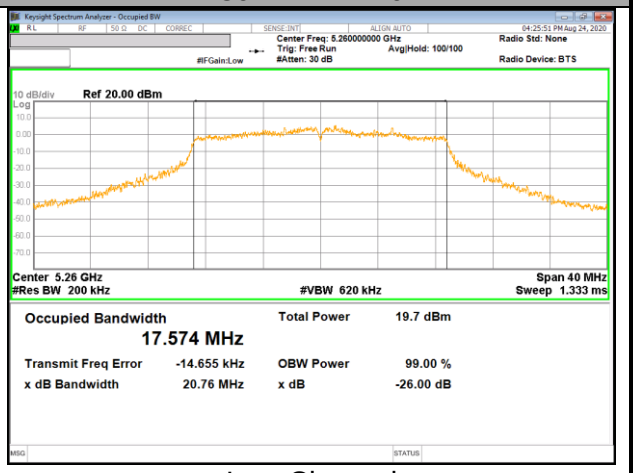
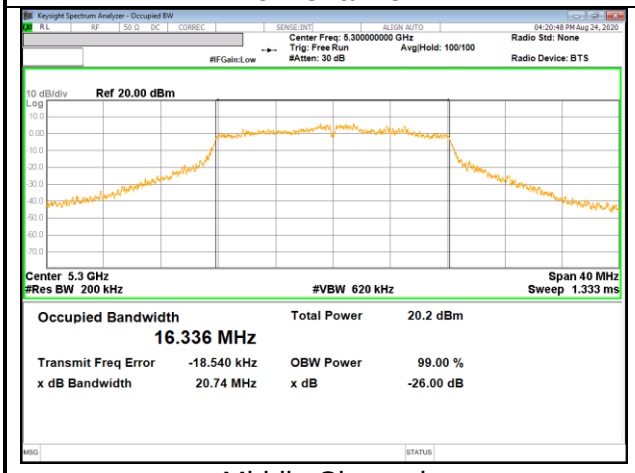
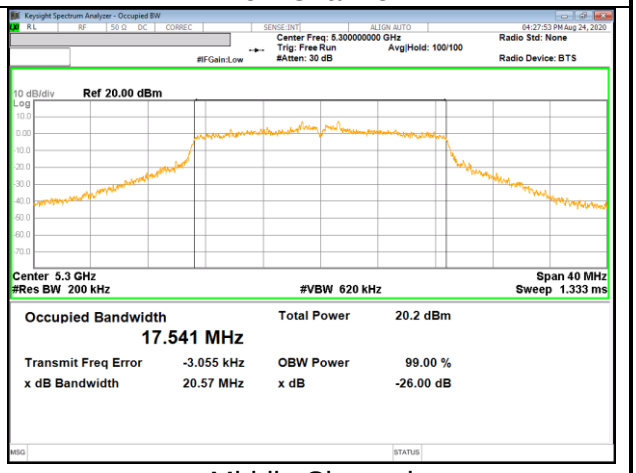
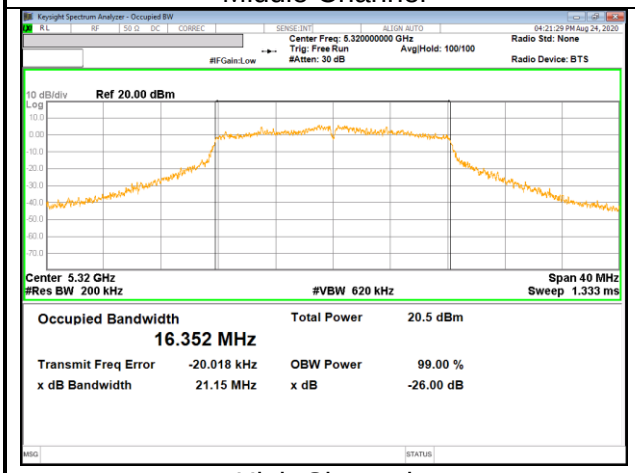
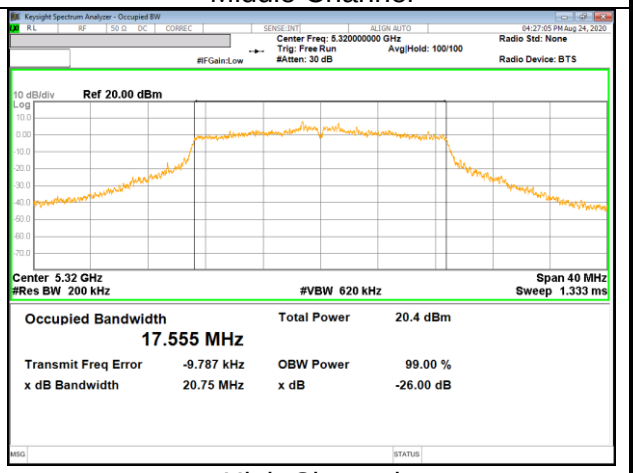
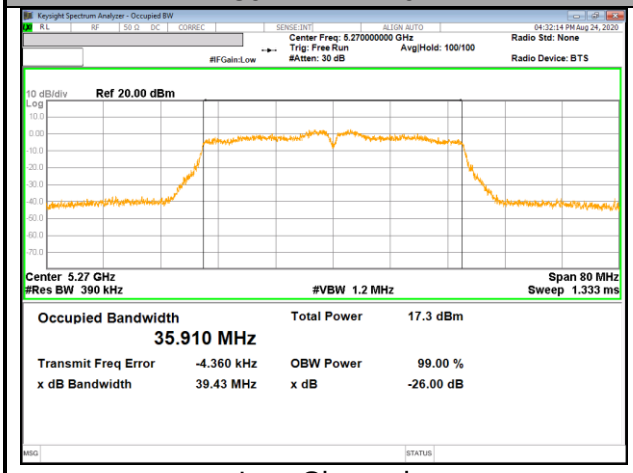
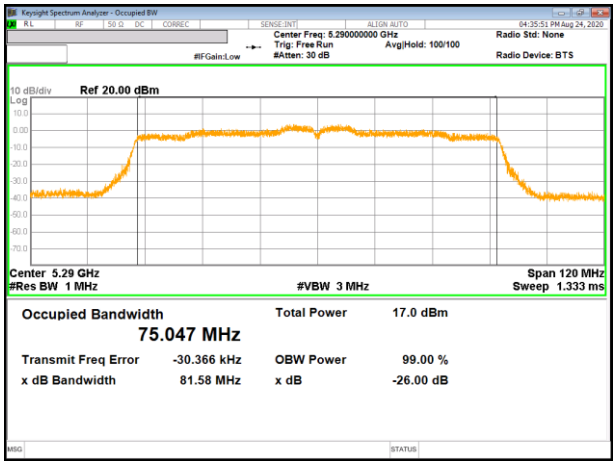
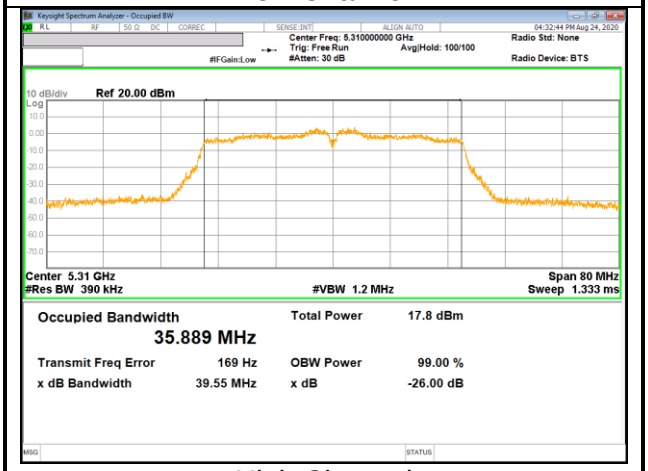
	
Middle Channel	Middle Channel
	
High Channel	High Channel

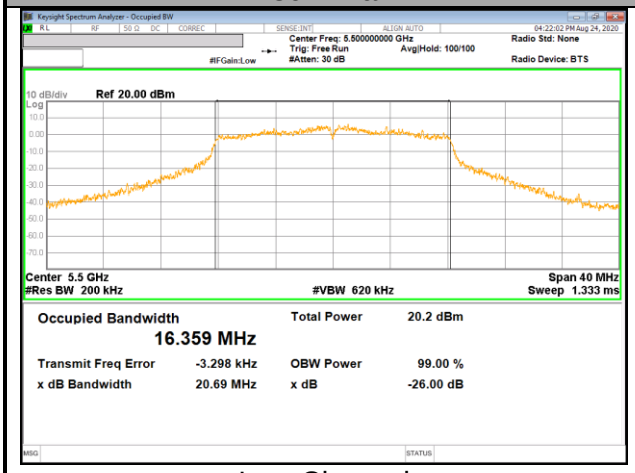
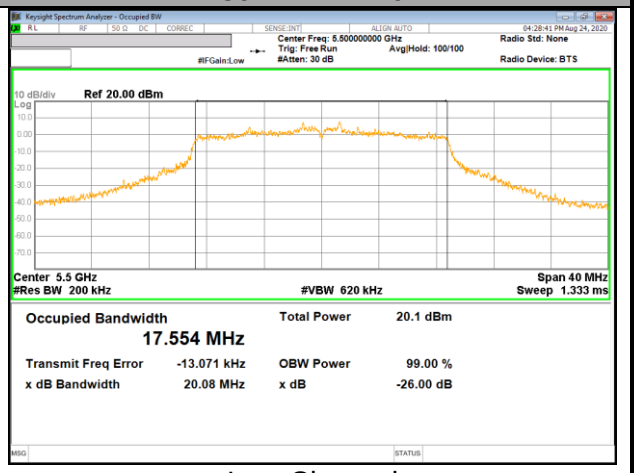
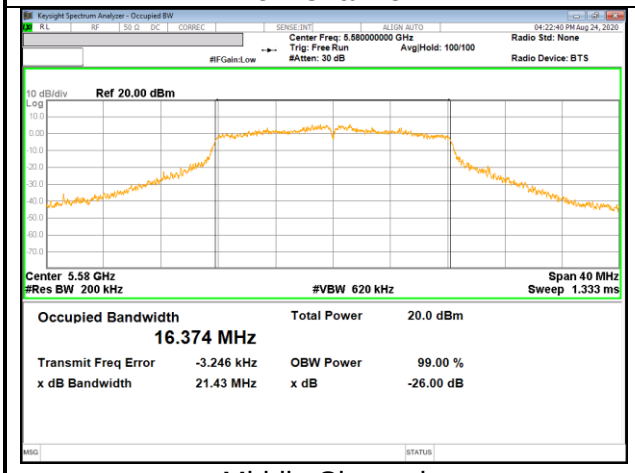
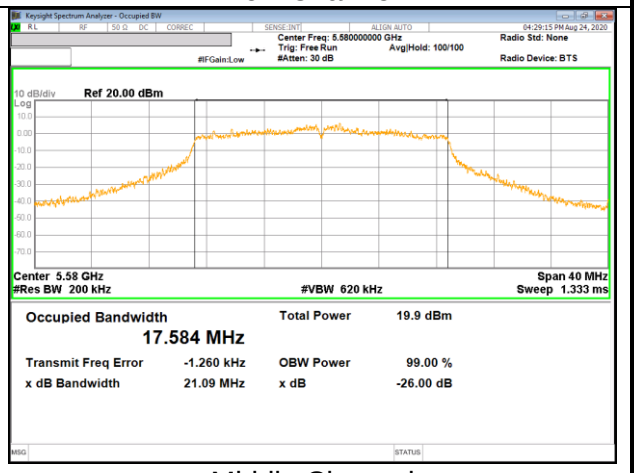
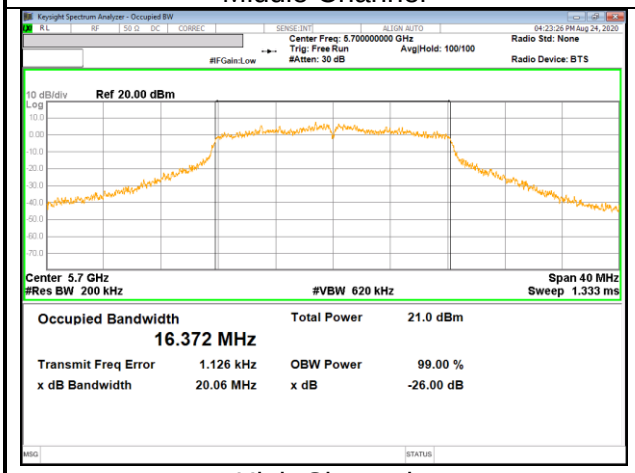
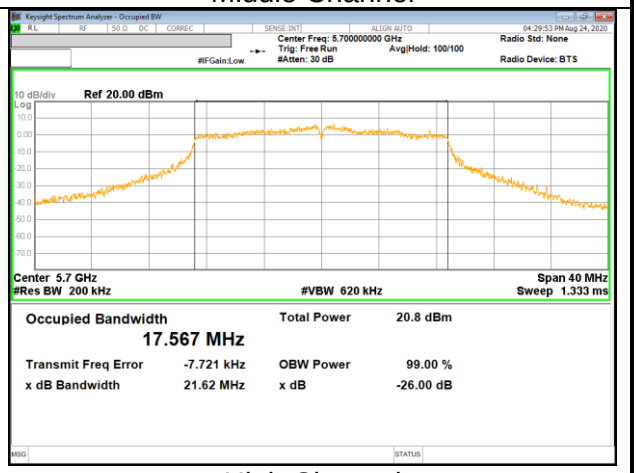
802.11n HT40	802.11ac VHT80
 Low Channel	 Middle Channel
 High Channel	

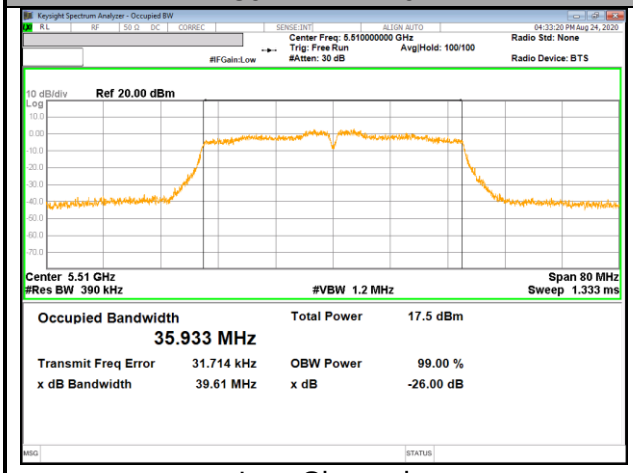
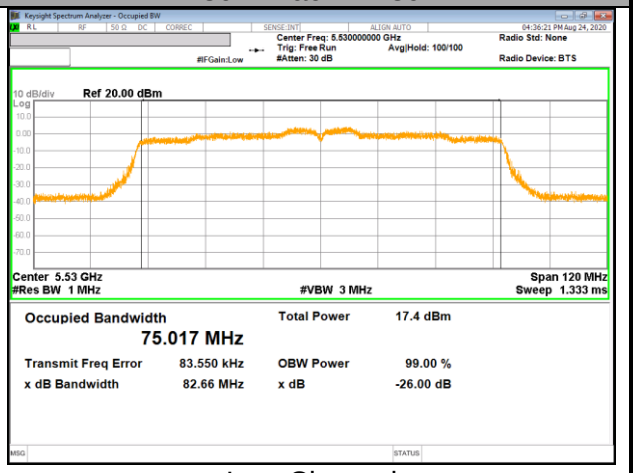
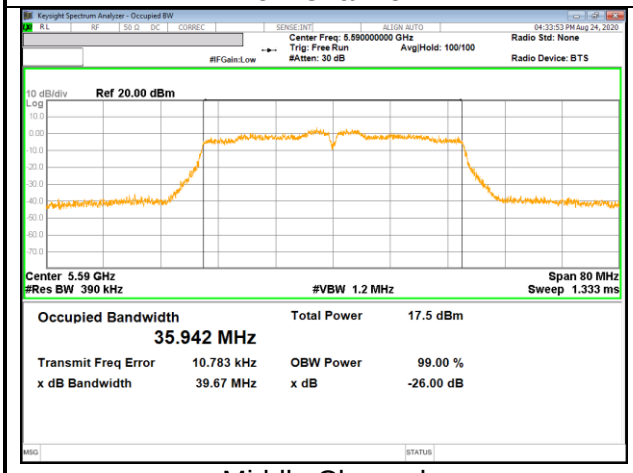
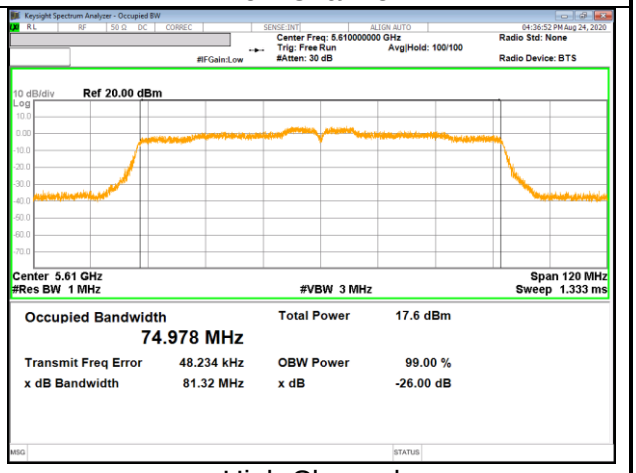
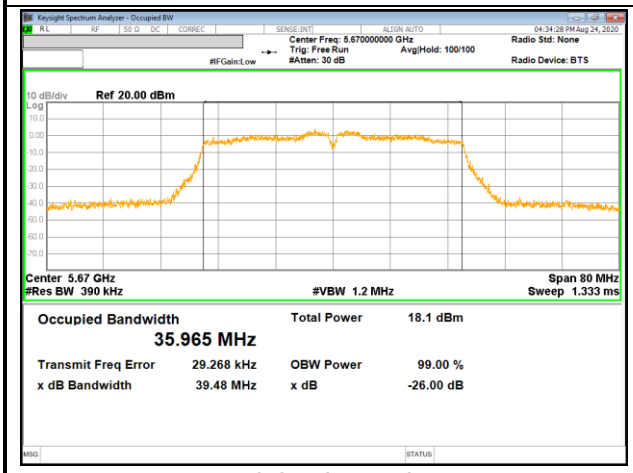
UNII 5.3 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel

802.11n HT40	802.11ac VHT80
 Low Channel	 Middle Channel
 High Channel	

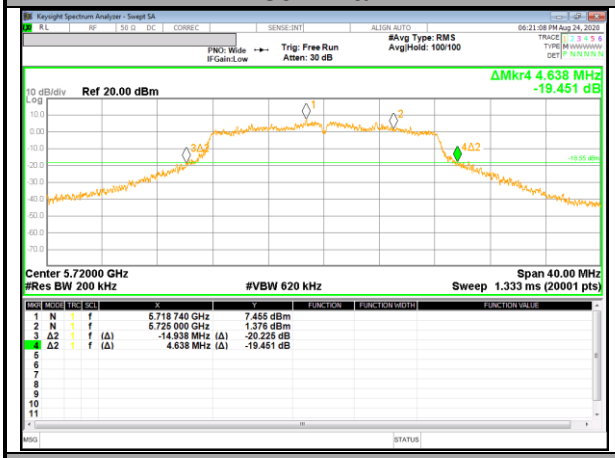
UNII 5.5 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel

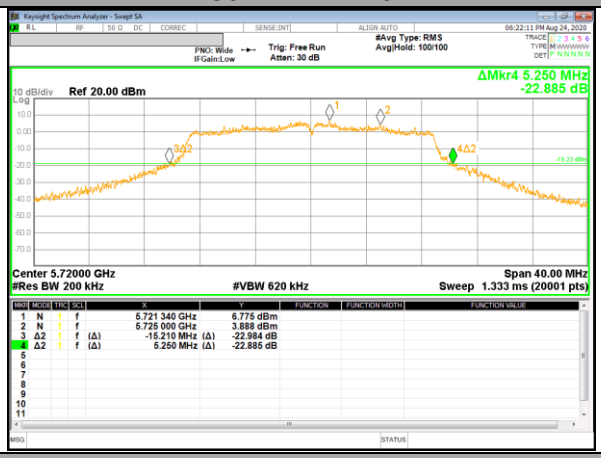
802.11n HT40	802.11ac VHT80
	
Low Channel	Low Channel
	
Middle Channel	High Channel
	
High Channel	

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

802.11a



802.11n HT20



802.11n HT40

802.11ac VHT80

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB 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 to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

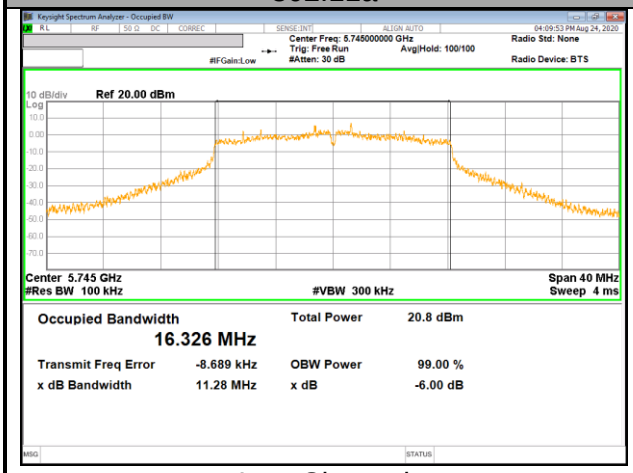
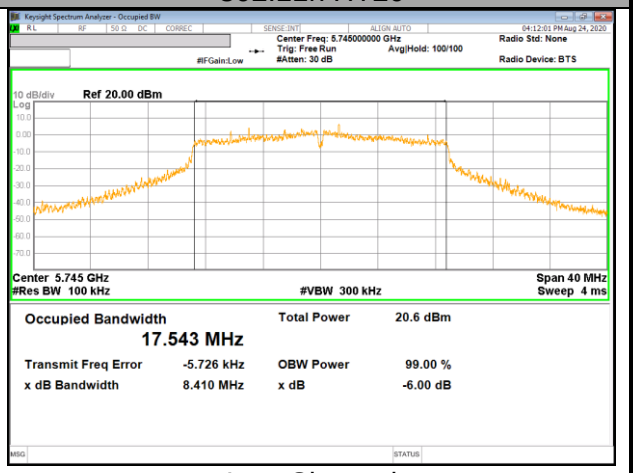
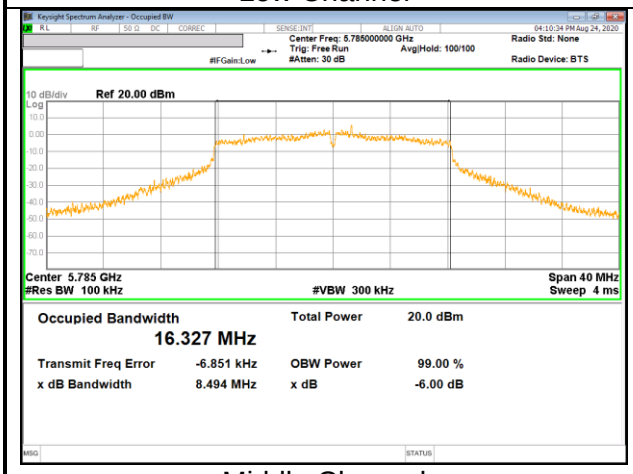
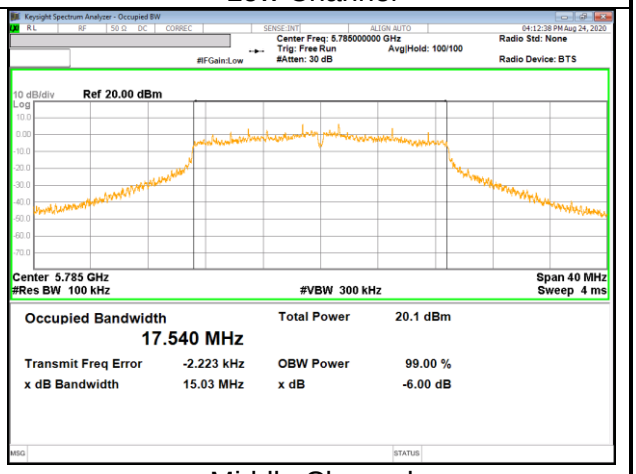
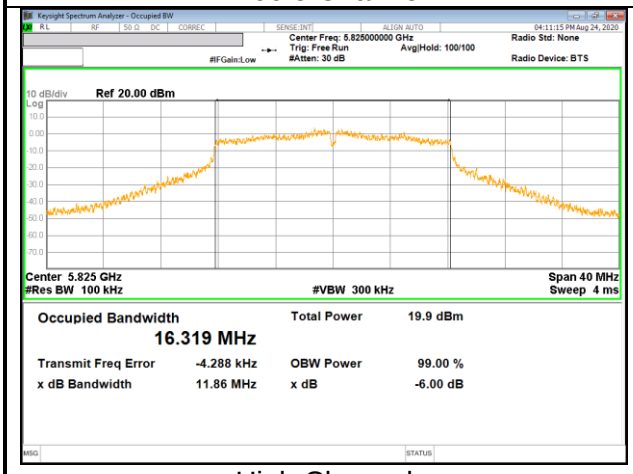
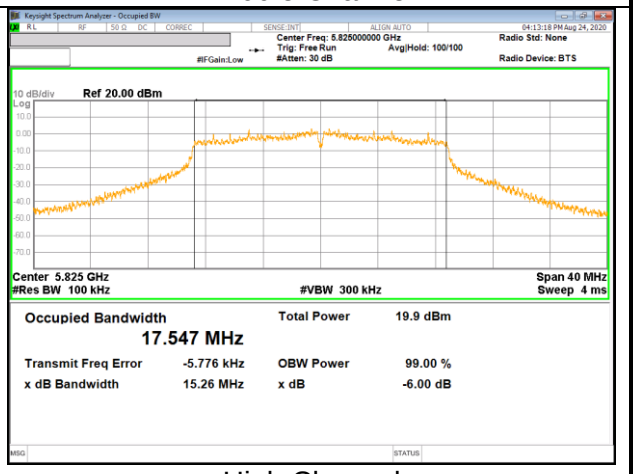
RESULTS

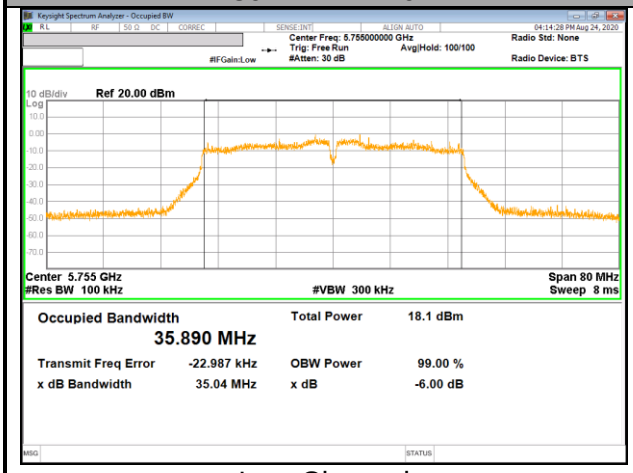
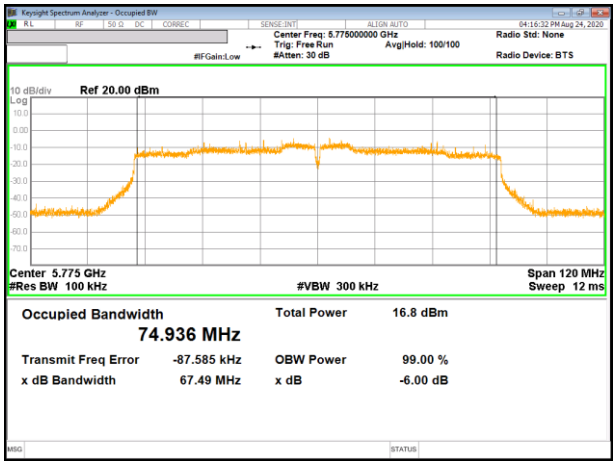
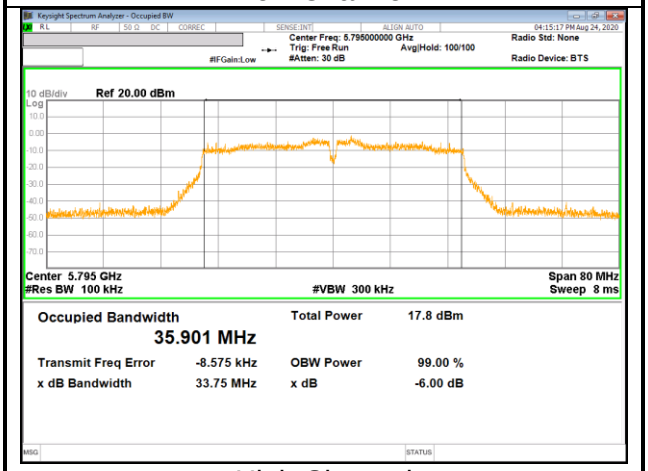
10.1.1. 5.8 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	Worst
UNII-3	802.11a	Low	5745	11.28	8.49
		Mid	5785	8.49	
		High	5825	11.86	
	802.11n HT20	Low	5745	8.41	8.41
		Mid	5785	15.03	
		High	5825	15.26	
	802.11n HT40	Low	5755	35.04	33.75
		High	5795	33.75	
	802.11ac VHT80	Mid	5775	67.49	67.49

10.1.2. 6 dB BANDWIDTH PLOTS

UNII 5.8 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel

802.11n HT40	802.11ac VHT80
 Low Channel	 Middle Channel
 High Channel	

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 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 >= 3 x RBW, RMS detector and trace averaging). Band power function used for power and peak marker value of the spectrum is used for PSD.

ANTENNA GAIN

Frequency Band[MHz]	Single Antenna Gain[dBi]
UNII 1(5150 – 5250)	-5.7
UNII 2A(5250 – 5350)	-3.0
UNII 2C(5470 – 5725)	-3.7
UNII 3(5725 – 5850)	-3.1

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15E(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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]	Antenna Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	19.73	-5.7	23.98	11.00
		Mid	5200				
		High	5240				
	802.11n HT20	Low	5180	20.86		23.98	
		Mid	5200				
		High	5240				
	802.11n HT40	Low	5190	39.24		23.98	
		High	5230				
	802.11ac VHT80	Mid	5210	81.19		23.98	

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-1	802.11a	Low	5180	14.75	14.75	23.98
		Mid	5200	14.35	14.35	
		High	5240	15.57	15.57	
	802.11n HT20	Low	5180	14.41	14.41	23.98
		Mid	5200	14.82	14.82	
		High	5240	15.39	15.39	
	802.11n HT40	Low	5190	12.56	12.56	23.98
		High	5230	12.86	12.86	
	802.11ac VHT80	Mid	5210	11.01	11.01	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/1MHz]
UNII-1	802.11a	Low	5180	5.617	5.617	11.00
		Mid	5200	5.077	5.077	
		High	5240	6.575	6.575	
	802.11n HT20	Low	5180	5.248	5.248	
		Mid	5200	5.550	5.550	
		High	5240	6.013	6.013	
	802.11n HT40	Low	5190	0.658	0.658	
		High	5230	1.407	1.407	
	802.11ac VHT80	Mid	5210	-3.292	-3.292	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [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]	Antenna Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	20.74	-3.0	24.00	11.00
		Mid	5300				
		High	5320				
	802.11n HT20	Low	5260	20.57		24.00	
		Mid	5300				
		High	5320				
	802.11n HT40	Low	5270	39.43		24.00	
		High	5310				
	802.11ac VHT80	Mid	5290	81.58		24.00	

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-2A	802.11a	Low	5260	14.92	14.92	24.00
		Mid	5300	15.17	15.17	
		High	5320	15.54	15.54	
	802.11n HT20	Low	5260	14.69	14.69	24.00
		Mid	5300	15.01	15.01	
		High	5320	15.36	15.36	
	802.11n HT40	Low	5270	12.08	12.08	24.00
		High	5310	12.74	12.74	
	802.11ac VHT80	Mid	5290	11.39	11.39	24.00

* 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/1MHz]
UNII-2A	802.11a	Low	5260	5.713	5.713	11.00
		Mid	5300	6.146	6.146	
		High	5320	6.285	6.285	
	802.11n HT20	Low	5260	5.404	5.404	
		Mid	5300	5.701	5.701	
		High	5320	5.877	5.877	
	802.11n HT40	Low	5270	-0.221	-0.221	
		High	5310	0.408	0.408	
	802.11ac VHT80	Mid	5290	-3.895	-3.895	

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

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15E(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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]	Antenna Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	20.06	-3.7	24.00	11.00
		Mid	5580				
		High	5700				
	802.11n HT20	Low	5500	20.08		24.00	
		Mid	5580				
		High	5700				
	802.11n HT40	Low	5510	39.48		24.00	
		Mid	5590				
		High	5670				
	802.11ac VHT80	Low	5530	81.32		24.00	
		High	5610				

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-2C	802.11a	Low	5500	14.99	14.99	24.00
		Mid	5580	14.71	14.71	
		High	5700	15.51	15.51	
	802.11n HT20	Low	5500	14.69	14.69	24.00
		Mid	5580	14.48	14.48	
		High	5700	15.49	15.49	
	802.11n HT40	Low	5510	12.39	12.39	24.00
		Mid	5590	12.36	12.36	
		High	5670	12.62	12.62	
	802.11ac VHT80	Low	5530	11.85	11.85	24.00
		High	5610	11.90	11.90	

* 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/1MHz]
UNII-2C	802.11a	Low	5500	6.095	6.095	11.00
		Mid	5580	6.049	6.049	
		High	5700	6.796	6.796	
	802.11n HT20	Low	5500	5.475	5.475	
		Mid	5580	5.452	5.452	
		High	5700	6.453	6.453	
	802.11n HT40	Low	5510	0.154	0.154	
		Mid	5590	0.002	0.002	
		High	5670	0.736	0.736	
	802.11ac VHT80	Low	5530	-3.342	-3.342	
		High	5610	-3.159	-3.159	

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

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218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]	Corr'd Power [dBm]	Power Limit [dBm]
UNII-3	802.11a	Mid	5745	15.47	15.47	30.00
		High	5785	15.16	15.16	
		High	5825	15.29	15.29	
	802.11n HT20	Low	5745	15.34	15.34	
		Mid	5785	15.00	15.00	
		High	5825	15.14	15.14	
	802.11n HT40	Low	5755	12.85	12.85	
		High	5795	12.80	12.80	
	802.11ac VHT80	Middle	5775	11.60	11.60	

* Calculation of Output Power : Corr'd 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	3.639	3.639	30.00
		Mid	5785	3.490	3.490	
		High	5825	3.601	3.601	
	802.11n HT20	Low	5745	3.242	3.242	
		Mid	5785	3.161	3.161	
		High	5825	2.841	2.841	
	802.11n HT40	Low	5755	-1.643	-1.643	
		High	5795	-1.799	-1.799	
	802.11ac VHT80	Middle	5775	-6.059	-6.059	

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

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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]	Antenna Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	14.938	-3.7	22.74	11.00
	802.11n HT20	Straddle	5720	15.210		22.82	11.00
	802.11n HT40	Straddle	5710	34.910		24.00	11.00
	802.11ac VHT80	Straddle	5690	75.188		24.00	11.00
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	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	14.805	14.805	22.74
	802.11n HT20		5720	14.570	14.570	22.82
	802.11n HT40		5710	12.405	12.405	24.00
	802.11ac VHT80		5690	11.439	11.439	24.00

* 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/1MHz]
UNII-2C	802.11a	Straddle	5720	7.124	7.124	11.00
	802.11n HT20		5720	6.690	6.690	
	802.11n HT40		5710	1.588	1.588	
	802.11ac VHT80		5690	-3.021	-3.021	

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

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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]	Antenna Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	4.638	-3.1	30.00	30.00
	802.11n HT20	Straddle	5720	5.250			
	802.11n HT40	Straddle	5710	5.222			
	802.11ac VHT80	Straddle	5690	5.084			

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	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	6.545	6.545	30.00
	802.11n HT20		5720	6.900	6.900	
	802.11n HT40		5710	-0.174	-0.174	
	802.11ac VHT80		5690	-4.649	-4.649	

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

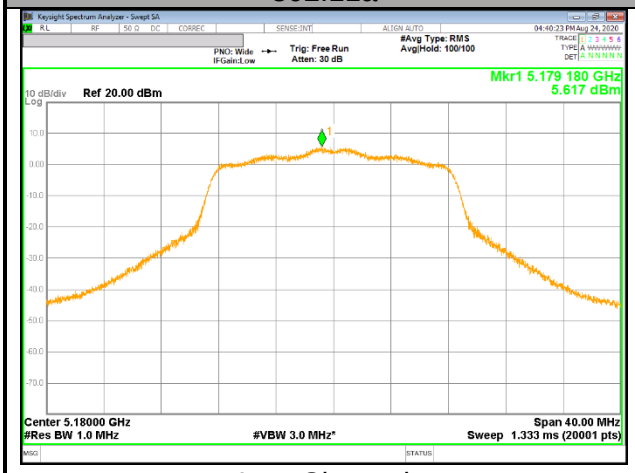
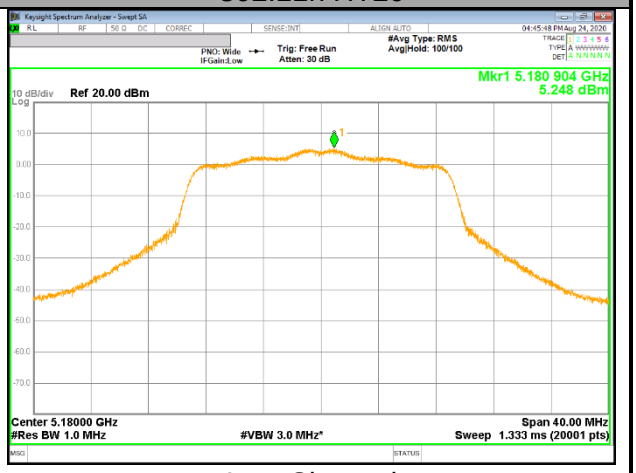
PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]	Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	1.084	1.084	30.00
	802.11n HT20		5720	0.938	0.938	
	802.11n HT40		5710	-6.520	-6.520	
	802.11ac VHT80		5690	-11.385	-11.385	

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

10.2.7. OUTPUT POWER AND PPSD PLOTS

UNII 5.2 GHz Band

802.11a	802.11n HT20
	
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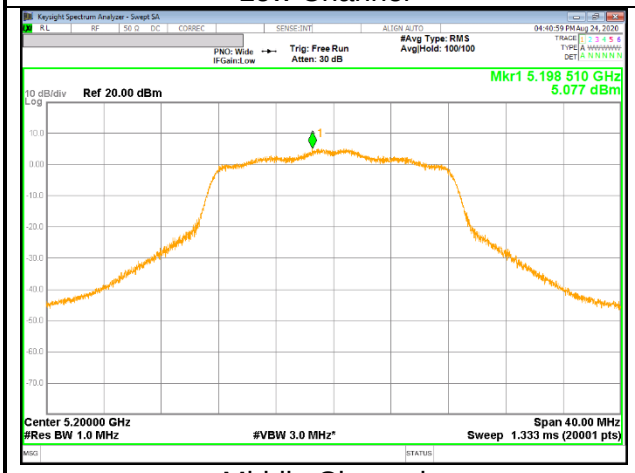
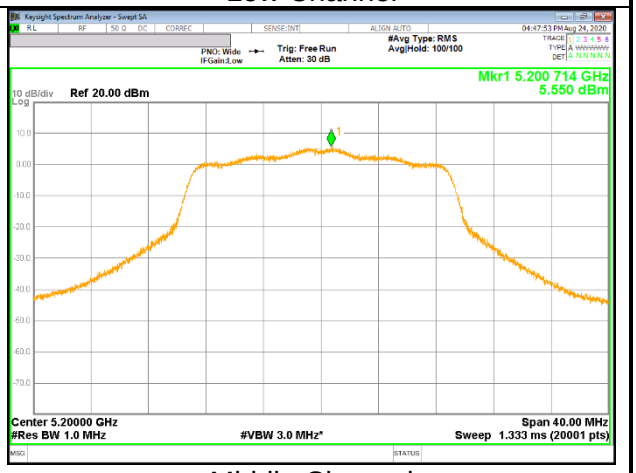
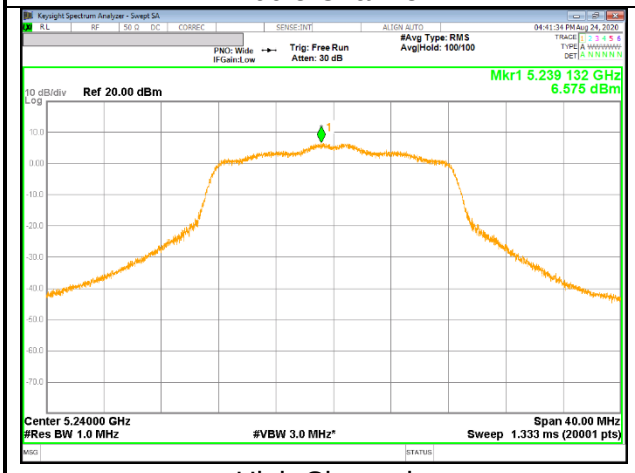
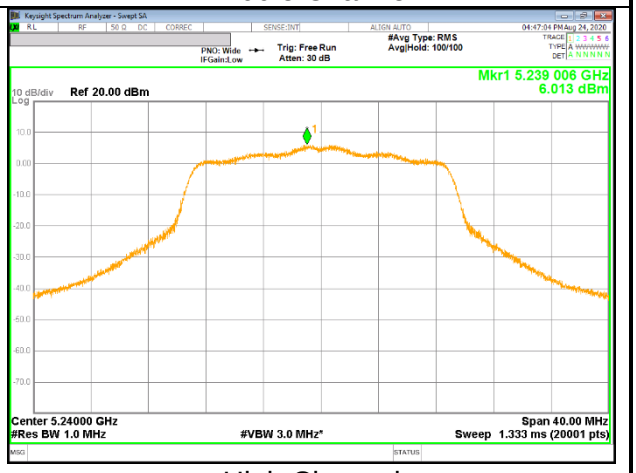
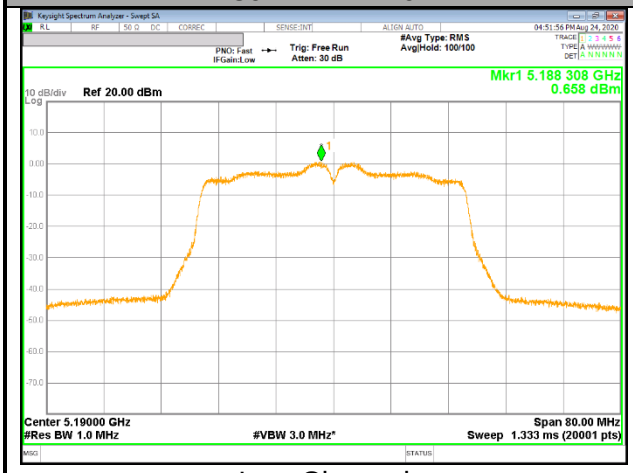
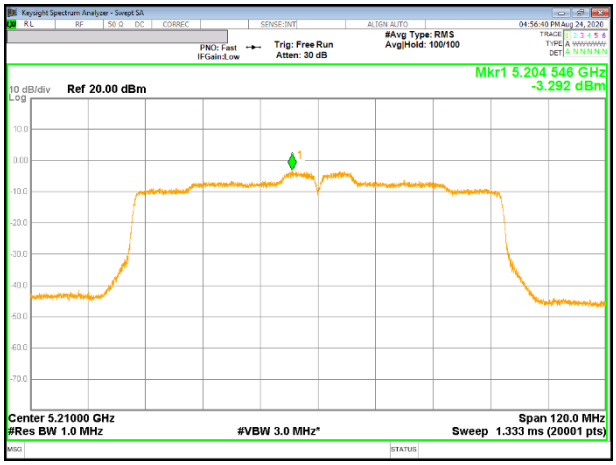
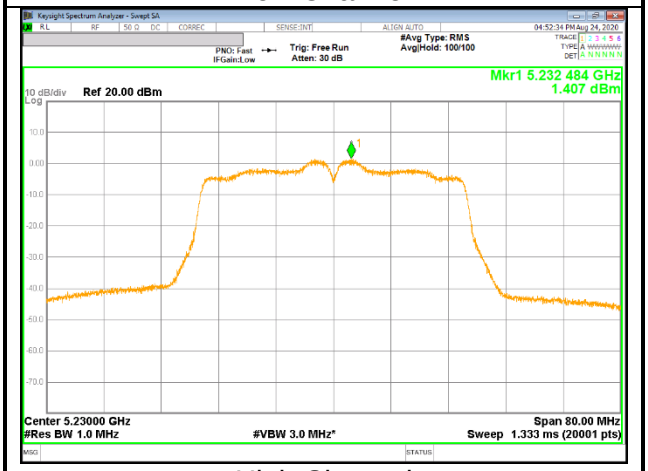
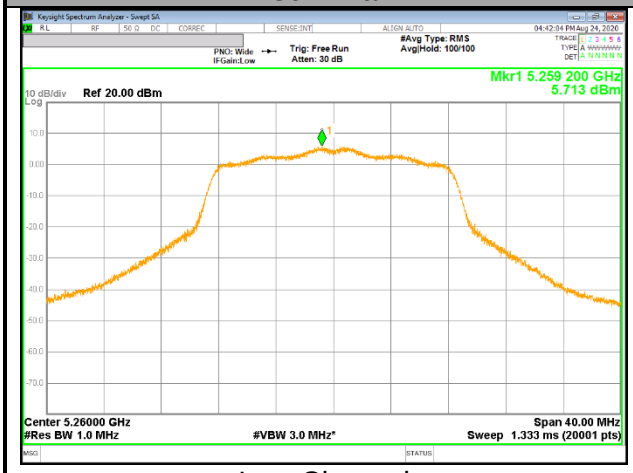
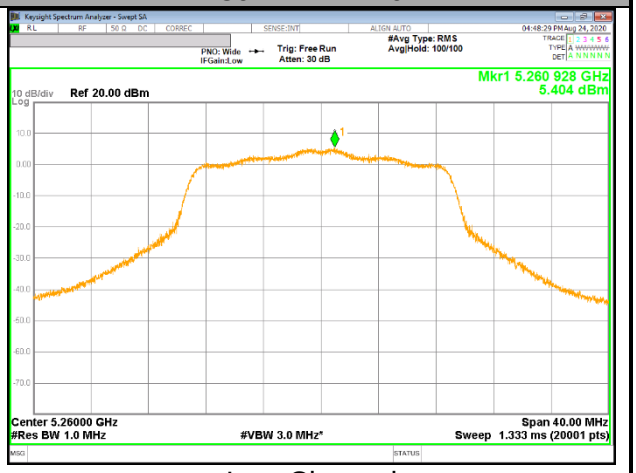
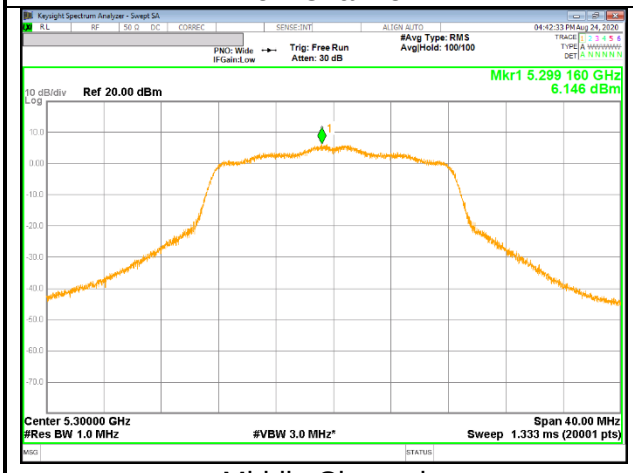
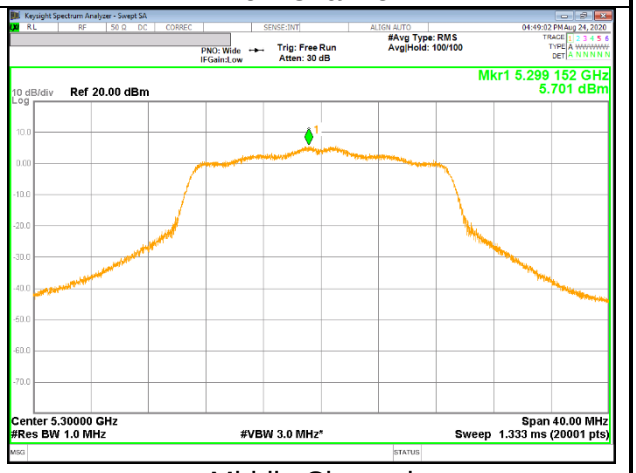
	
Middle Channel	Middle Channel
	
High Channel	High Channel

802.11n HT40	802.11ac VHT80
 Low Channel	 Middle Channel
 High Channel	

UNII 5.3 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
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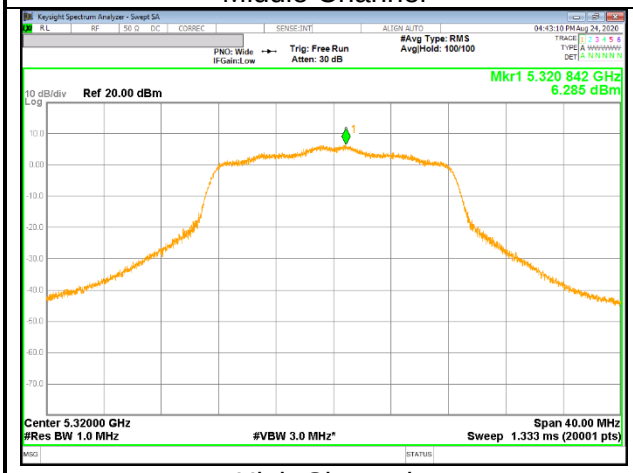
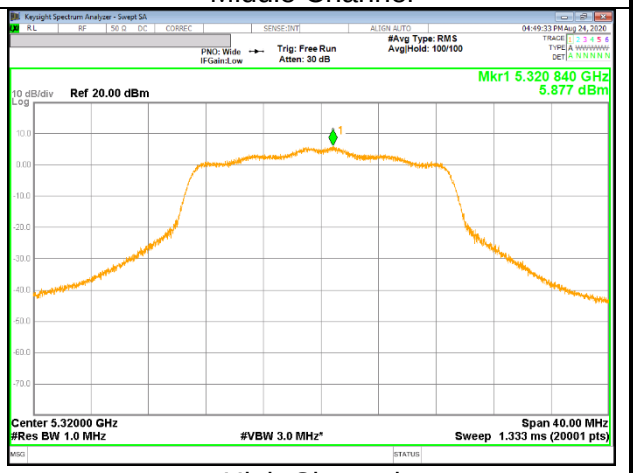
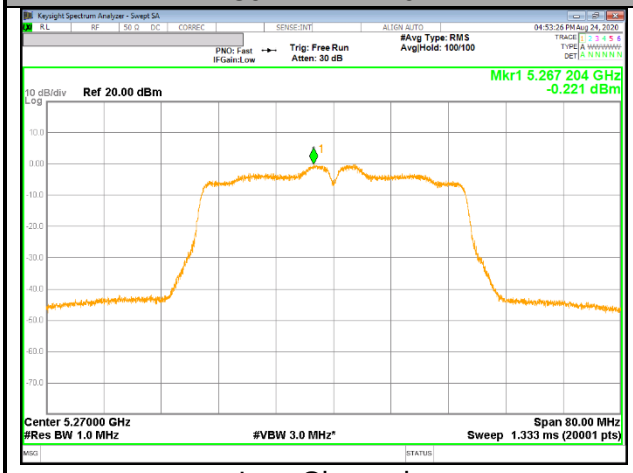
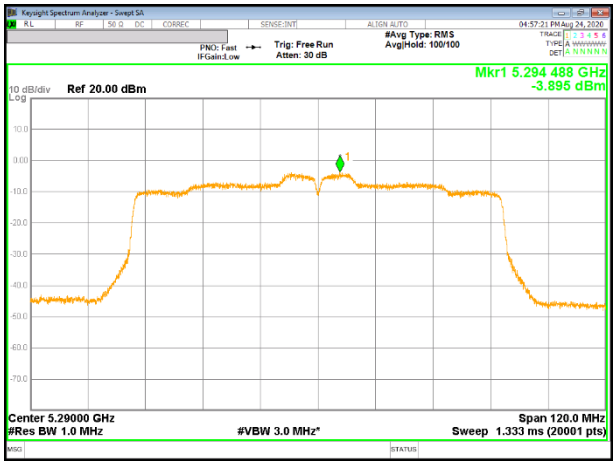
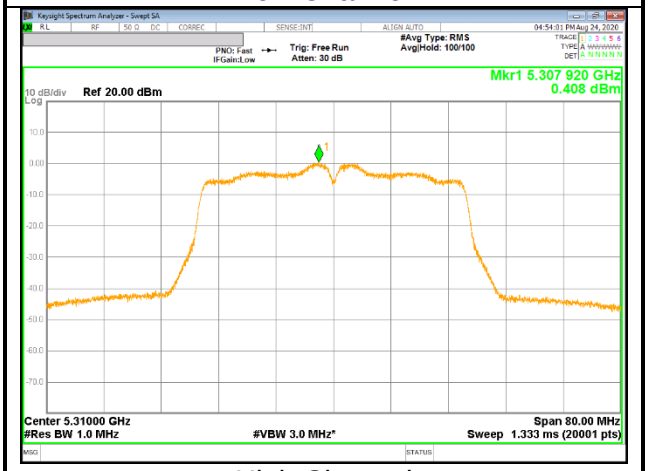
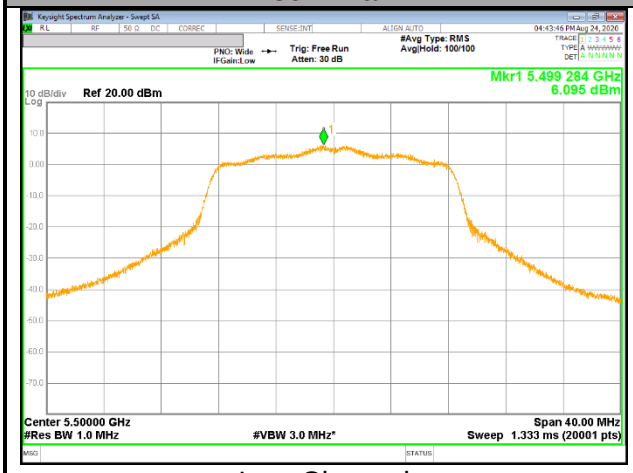
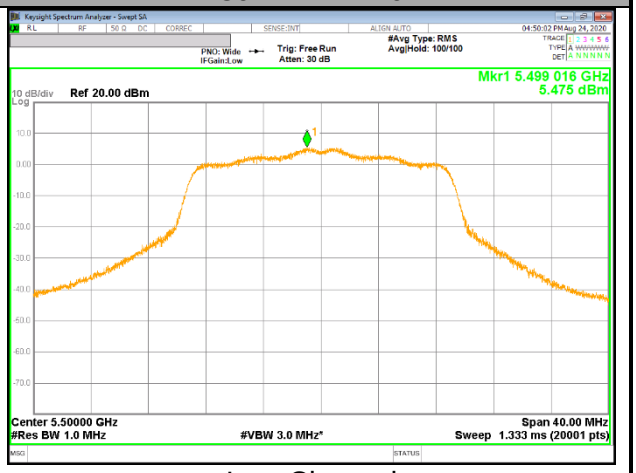
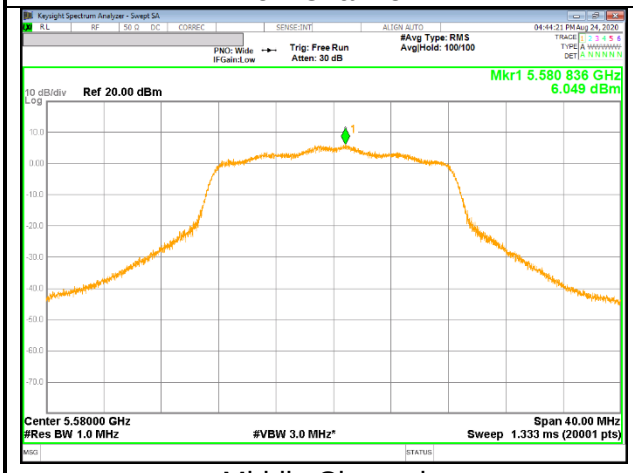
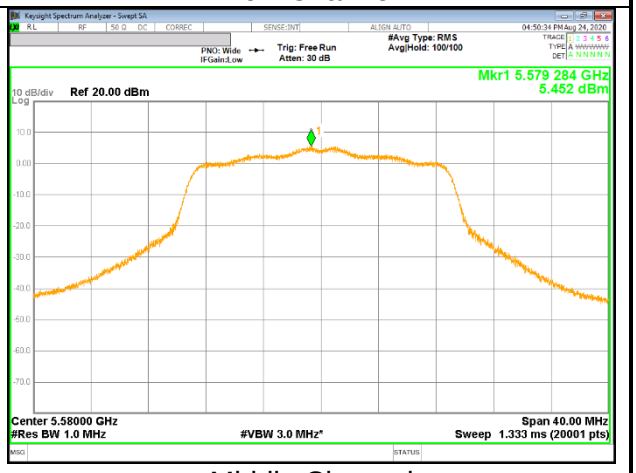
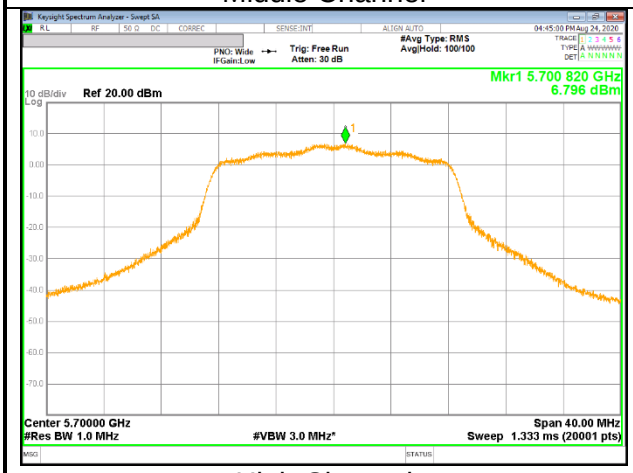
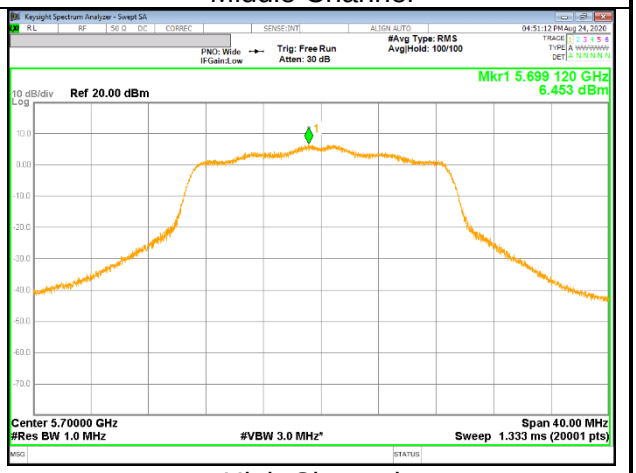
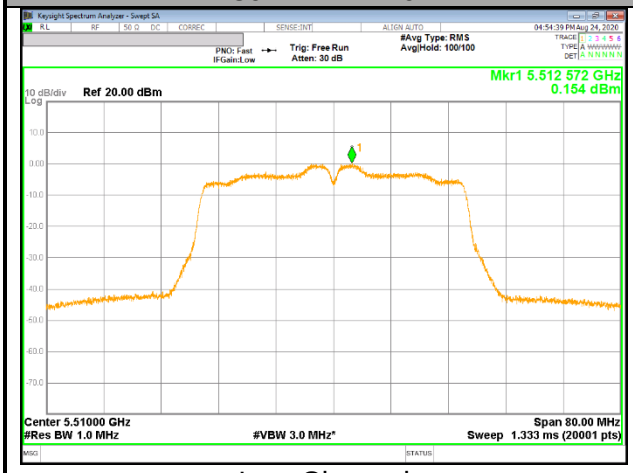
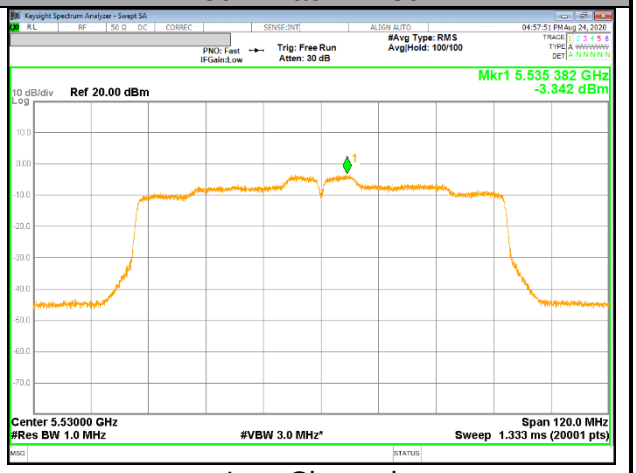
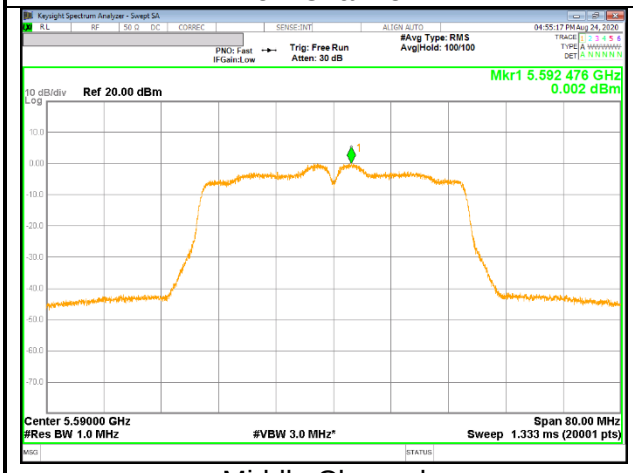
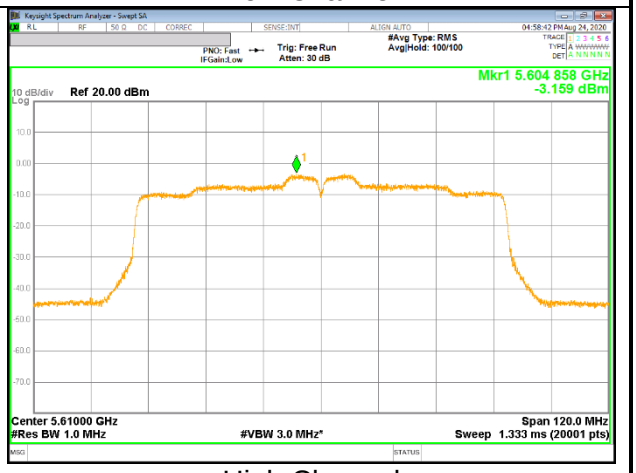
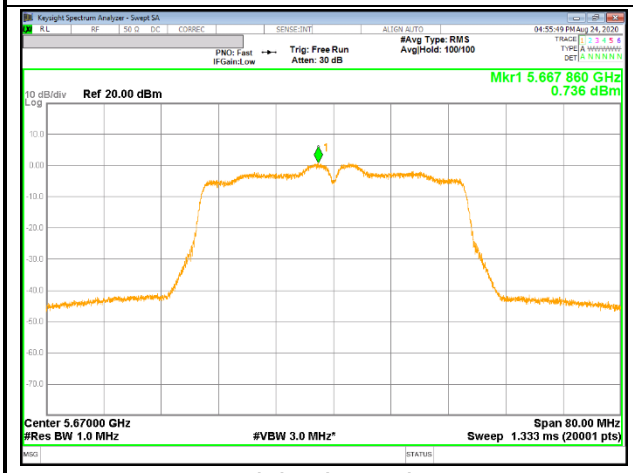
	
High Channel	High Channel

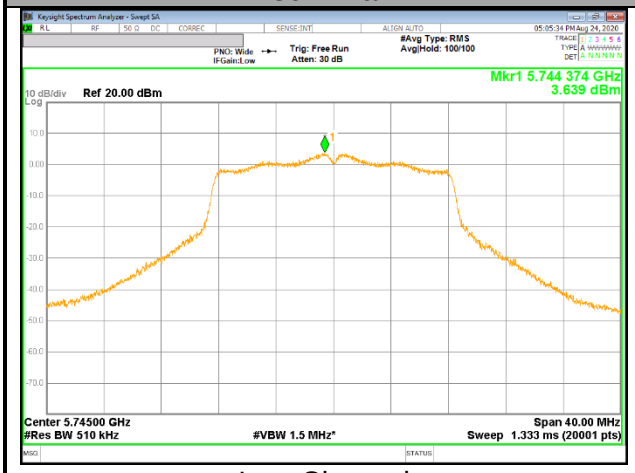
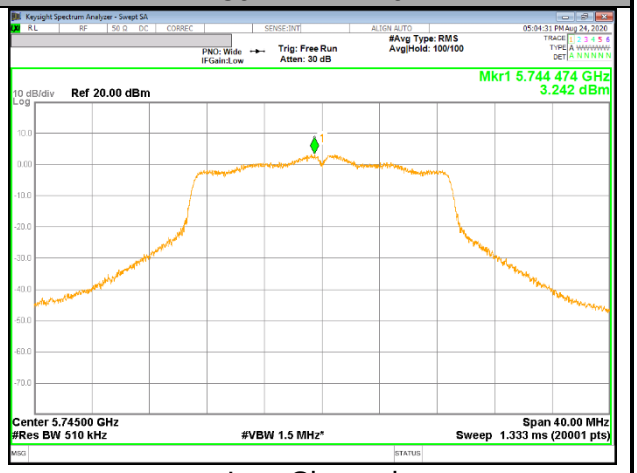
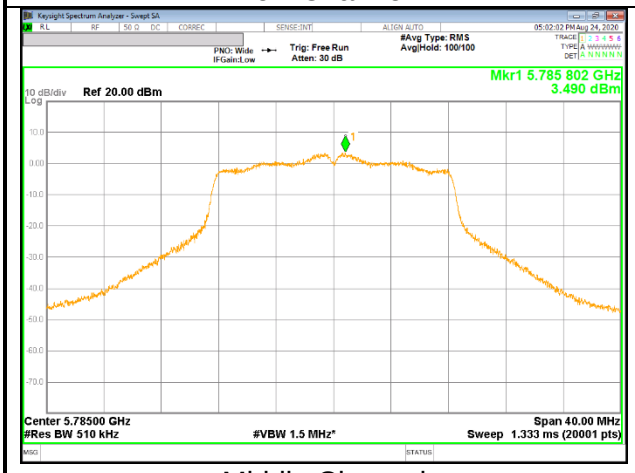
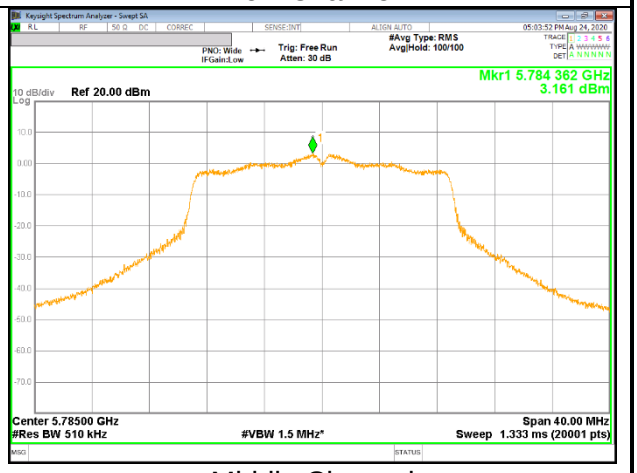
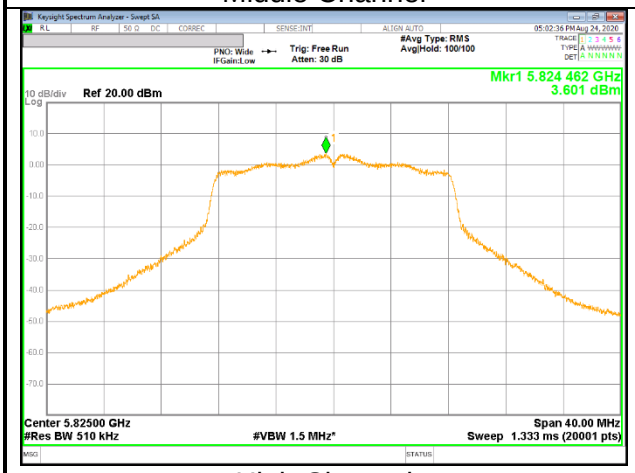
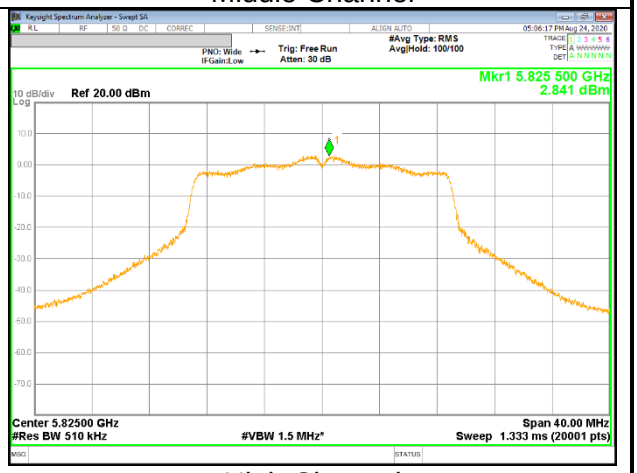
802.11n HT40	802.11ac VHT80
 Low Channel	 Middle Channel
 High Channel	

UNII 5.5 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel

802.11n HT40	802.11ac VHT80
	
Low Channel	Low Channel
	
Middle Channel	High Channel
	
High Channel	

UNII 5.8 GHz Band

802.11a	802.11n HT20
	
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel