RADIO TEST REPORT

Test Report No. 14781152S-C-R2

Customer	**Canon Inc.**
Description of EUT	**Wireless Module**
Model Number of EUT	**ES205**
FCC ID	**AZD248**
Test Regulation	**FCC Part 15 Subpart E**
Test Result	**Complied**
Issue Date	**June 26, 2024**
Remarks	**WLAN (5 GHz band) part** **Except for DFS test**

Representative Test Engineer	**Approved By**
Makoto Hosaka Engineer	Toyokazu Imamura Engineer

CERTIFICATE 1266.03

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.

☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 14781152S-C

This report is a revised version of 14781152S-C-R1. 14781152S-C-R1 is replaced with this report.

Revision	Test Report No.	Date	Revised Contents
- (Original)	14781152S-C	June 7, 2024	-
1	14781152S-C-R1	June 13, 2024	Section 2 Added rating: DC 1.8 V
2	14781152S-C-R2	June 26, 2024	Cover page Corrected FCC ID: AZD 248 to AZD248
			Section 2.2 Addition of the value and explanation of the Directional Gain.
			Section 3 Correction of FCC / ISED clause No. From / To 15.407 (b) (6) / 15.407 (b) (9) 6.2.4.1 / 6.2.4.2 6.2.4.2 / 6.2.4.3
			Section 3 Modification of FCC Part 15.31 (e) From: The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement. To: The module is constantly provided the stable voltage (DC 3.3 V / 1.8 V) from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.
			P15 and 16 Modification of cable length for No.1, No.2: 0.01 => 0.02
			P.22 to 24 Correction of Limit2(AV) line.
			P.92 Correction of frequency: 5500 MHz to 5550 MHz
			P.263, 264, 277, 278, 291, 292, 322, 323, 333, 334, 344, 345, 355, 356, 376, 382, 388, 394, 400 Deletion of “Sample Calculation: Result = PSD Antenna: ANT0 [mW/MHz] + PSD Antenna: ANT1 [mW/MHz]”
			P.574, 713, 715, 717, 719, 842 Replace of “Radiated Emission Spurious” data

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	ICES	Interference-Causing Equipment Standard
AC	Alternating Current	IEC	International Electrotechnical Commission
AFH	Adaptive Frequency Hopping	IEEE	Institute of Electrical and Electronics Engineers
AM	Amplitude Modulation	IF	Intermediate Frequency
Amp, AMP	Amplifier	ILAC	International Laboratory Accreditation Conference
ANSI	American National Standards Institute	ISED	Innovation, Science and Economic Development Canada
Ant, ANT	Antenna	ISO	International Organization for Standardization
AP	Access Point	JAB	Japan Accreditation Board
ASK	Amplitude Shift Keying	LAN	Local Area Network
Atten., ATT	Attenuator	LIMS	Laboratory Information Management System
AV	Average	MCS	Modulation and Coding Scheme
BPSK	Binary Phase-Shift Keying	MRA	Mutual Recognition Arrangement
BR	Bluetooth Basic Rate	N/A	Not Applicable
BT	Bluetooth	NIST	National Institute of Standards and Technology
BT LE	Bluetooth Low Energy	NS	No signal detect.
BW	BandWidth	NSA	Normalized Site Attenuation
Cal Int	Calibration Interval	NVLAP	National Voluntary Laboratory Accreditation Program
CCK	Complementary Code Keying	OBW	Occupied Band Width
Ch., CH	Channel	OFDM	Orthogonal Frequency Division Multiplexing
CISPR	Comite International Special des Perturbations Radioelectriques	P/M	Power meter
CW	Continuous Wave	PCB	Printed Circuit Board
DBPSK	Differential BPSK	PER	Packet Error Rate
DC	Direct Current	PHY	Physical Layer
D-factor	Distance factor	PK	Peak
DFS	Dynamic Frequency Selection	PN	Pseudo random Noise
DQPSK	Differential QPSK	PRBS	Pseudo-Random Bit Sequence
DSSS	Direct Sequence Spread Spectrum	PSD	Power Spectral Density
EDR	Enhanced Data Rate	QAM	Quadrature Amplitude Modulation
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	QP	Quasi-Peak
EMC	ElectroMagnetic Compatibility	QPSK	Quadri-Phase Shift Keying
EMI	ElectroMagnetic Interference	RBW	Resolution Band Width
EN	European Norm	RDS	Radio Data System
ERP, e.r.p.	Effective Radiated Power	RE	Radio Equipment
EU	European Union	RF	Radio Frequency
EUT	Equipment Under Test	RMS	Root Mean Square
Fac.	Factor	RSS	Radio Standards Specifications
FCC	Federal Communications Commission	Rx	Receiving
FHSS	Frequency Hopping Spread Spectrum	SA, S/A	Spectrum Analyzer
FM	Frequency Modulation	SG	Signal Generator
Freq.	Frequency	SVSWR	Site-Voltage Standing Wave Ratio
FSK	Frequency Shift Keying	TR	Test Receiver
GFSK	Gaussian Frequency-Shift Keying	Tx	Transmitting
GNSS	Global Navigation Satellite System	VBW	Video BandWidth
GPS	Global Positioning System	Vert.	Vertical
Hori.	Horizontal	WLAN	Wireless LAN

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SECTION 1: Customer Information

Company Name	Canon Inc.
Address	30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501 Japan
Telephone Number	+81-3-5482-4941
Contact Person	Yasuhito Yukita

The information provided from the customer is as follows;
- Customer, Description of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	Wireless Module
Model Number	ES205
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	May 8, 2023
Test Date	May 31, 2023 to May 15, 2024

2.2 Product Description

General Specification

Rating	DC 3.3 V / DC 1.8 V
Operating temperature	-40 deg. C to +85 deg. C

Radio Specification

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked “a)” in the table below.

Bluetooth (BR/EDR/BTLE)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS, GFSK / π/4-DQPSK, 8DPSK / GFSK
Antenna Type	Monopole Antenna
Antenna Gain a)	2.67 dBi

WLAN (IEEE802.11b/11g/11n-20/11ax-20)

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
	OFDMA: (20 MHz band): 26/52/106/242-tone RU	
Antenna Type	Monopole Antenna	
Antenna Gain a)	Antenna Gain	Directinal Gain *1)
	2.67 dBi	5.69 dBi

WLAN (IEEE802.11a/11n-20/11ac-20/11ax-20/11n-40/11ac-40/11ax-40/11ac-80/11ax-80)

Equipment Type	Transceiver		
Frequency of Operation	20 MHz Band:	5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5700 MHz 5745 MHz to 5825 MHz 5955 MHz to 6415 MHz 6435 MHz to 6515 MHz 6535 MHz to 6875 MHz (*6875 MHz:straddle ch) 6895 MHz to 7095 MHz	
	40 MHz Band	5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5670 MHz 5755 MHz to 5795 MHz 5965 MHz to 6405 MHz 6445 MHz to 6525 MHz (*6525 MHz:straddle ch) 6565 MHz to 6885 MHz (*6885 MHz:straddle ch) 6925 MHz to 7085 MHz	
	80 MHz band	5210 MHz 5290 MHz 5530 MHz to 5610 MHz 5775 MHz 5985 MHz to 6385 MHz 6465 MHz to 6545 MHz (*6545 MHz:straddle ch) 6625 MHz to 6865 MHz (*6865 MHz:straddle ch) 6945 MHz to 7025 MHz	
Type of Modulation	OFDM		
	OFDMA (IEEE802.11ax only)	(20 MHz band): 26/52/106/242-tone RU	
		(40 MHz band): 26/52/106/242/484-tone RU	
		(80 MHz band): 26/52/106/242/484/996-tone RU	
Antenna Type	Monopole Antenna		
Antenna Gain a)	Antenna Gain	Directinal Gain *1), *2)	Band
	5.14 dBi	8.16 dBi	(WLAN UNII-1 and UNII-2A band)
	3.53 dBi	6.55 dBi	(WLAN UNII-2C band)
	3.05 dBi	6.07 dBi	(WLAN UNII-3 band)
	1.61 dBi	4.63 dBi	(WLAN UNII-5 and UNII-6 band)
	0.60 dBi	3.62 dBi	(WLAN UNII-7 and UNII-8 band)

*1) Directional Gain = Antenna Gain + Arry Gain
Arry Gain = 10 * log (Number of transmit Antennas / Number of spatial streams)
Number of transmit Antennas = 2, Number of spatial streams = 1

*2) As a more stringent condition, the value of the Directional Gain was applied to 2 SS of Maximum Power Spectral Density.

SECTION 3: Test specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart E The latest version on the first day of the testing period
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices Section 15.407 General technical requirements

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 **ISED:** RSS-Gen 8.8	**FCC:** 15.407 (b) (9) / 15.207 **ISED:** RSS-Gen 8.8	26.9 dB 0.15000 MHz, QP, N Mode: Tx 11ax-40 (OFDM), 5510 MHz with 2M-PHY BT LE 2440 MHz	Complied	-
26 dB Emission Bandwidth	**FCC:** KDB Publication Number 789033 **ISED:** -	**FCC:** 15.407 (a) (1) (2) (3) **ISED:** -	See data	Complied	Conducted
Maximum Conducted Output Power	**FCC:** KDB Publication Number 789033 **ISED:** -	**FCC:** 15.407 (a) (1) (2) (3) **ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.2		Complied	Conducted
Maximum Power Spectral Density	**FCC:** KDB Publication Number 789033 **ISED:** -	**FCC :** 15.407 (a) (1) (2) (3) **ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.2		Complied	Conducted
Spurious Emission Restricted Band Edge	**FCC:** ANSI C63.10-2013 KDB Publication Number 789033 **ISED:** -	**FCC:** 15.407 (b), 15.205 and 15.209 **ISED:** RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.3	4.2 dB 5350.000 MHz, AV, Hori., Mode:Tx 11ax-80 (OFDM), 5290 MHz	Complied	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
6 dB Emission Bandwidth	**FCC:** ANSI C63.10-2013 **ISED:** -	**FCC:** 15.407 (e) **ISED:** RSS-247 6.2.4.2	See data	Complied	Conducted

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.
* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

*1) Radiated test was selected over 30 MHz based on FCC 15.407 (b) and KDB 789033 D02 G.3.b).

FCC Part 15.31 (e)
The module is constantly provided the stable voltage (DC 3.3 V / 1.8 V) from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The EUT has a unique coupling/antenna connector (MHF-4L (IPEX)). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99 % Occupied Band Width	**ISED:** RSS-Gen 6.7	**ISED:** -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k*=2.

Item	Frequency range	Uncertainty (+/-)
Conducted Emission (AC Mains) LISN	150 kHz to 30 MHz	3.2 dB
Radiated Emission (Measurement distance: 3 m)	9 kHz to 30 MHz	3.3 dB
	30 MHz to 200 MHz	4.9 dB
	200 MHz to 1 GHz	6.2 dB
	1 GHz to 6 GHz	4.7 dB
	6 GHz to 18 GHz	5.3 dB
	18 GHz to 40 GHz	5.5 dB
Radiated Emission (Measurement distance: 1 m)	1 GHz to 18 GHz	5.6 dB
	18 GHz to 40 GHz	5.8 dB

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector) SPM-06	1.1 dB
Power Measurement above 1 GHz (Peak Detector) SPM-06	1.8 dB
Power Measurement above 1 GHz (Average Detector) SPM-07	1.0 dB
Power Measurement above 1 GHz (Peak Detector) SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector) SPM-13	0.81 dB
Power Measurement above 1 GHz (Peak Detector) SPM-13	1.1 dB
Spurious Emission (Conducted) below 1 GHz	0.91 dB
Conducted Emissions Power Density Measurement 1 GHz to 3 GHz	1.3 dB
Conducted Emissions Power Density Measurement 3 GHz to 18 GHz	2.5 dB
Spurious Emission (Conducted) 18 GHz to 26.5 GHz	2.8 dB
Spurious Emission (Conducted) 26.5 GHz to 40 GHz	2.6 dB
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.96 deg.C.
Humidity_SCH-01	4.0 %
Temperature_SCH-02	2.2 deg.C.
Voltage	0.74 %

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 Japan
Telephone: +81-463-50-6400
A2LA Certificate Number: 1266.03
(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test room	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber (SAC1)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber (SAC2)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber (SAC3)	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber (SAC4)	8.1 x 5.1 x 3.55	8.1 x 5.1	-
Wireless anechoic chamber 1 (WAC1)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
Wireless anechoic chamber 2 (WAC2)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
No.1 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	2.55 x 4.1 x 2.5	-	-
No.2 Measurement room	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2	3.0 x 4.5 x 2.7	3.0 x 4.5	-

3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	Remarks*
IEEE 802.11a (11a)	54 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 13, PN9
IEEE 802.11ac MIMO 20 MHz BW (11ac-20)	MCS 5 (2SS), PN9
IEEE 802.11ax MIMO 20 MHz BW (11ax-20)	MCS 7 (2SS), PN9
IEEE 802.11n MIMO 40 MHz BW (11n-40)	MCS 13, PN9
IEEE 802.11ac MIMO 40 MHz BW (11ac-40)	MCS 7 (2SS), PN9
IEEE 802.11ax MIMO 40 MHz BW (11ax-40)	MCS 7 (2SS), PN9
IEEE 802.11ac MIMO 80 MHz BW (11ac-80)	MCS 7 (2SS), PN9
IEEE 802.11ax MIMO 80 MHz BW (11ax-80)	MCS 7 (2SS), PN9
The worst condition was determined based on the test result of Maximum Peak Output Power, including 1SS / 2SS. (SS: Spatial Stream)	
*Power of the EUT was set by the software as follows; Power Setting: Non-OFDMA: (UNII-1 / UNII-2A): 7 dBm, (UNII-2C): 9 dBm, (UNII-3): 6 dBm, OFDMA: See table (Power Setting for OFDMA) Software: 18.53 (For WLAN) 001.002.087.0186 (For Bluetooth) (Date: 2023.05 31, Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	
Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009 and also was judged the necessity of 802.11ac/ax mode by the pre-test.	

Power Setting for OFDMA (U-NII 1 & 2A)

	20 MHz BW	40 MHz BW	80 MHz BW
26-tone RU	-4 dBm	-7 dBm	-10 dBm
52-tone RU	-1 dBm	-4 dBm	-7 dBm
106-tone RU	2 dBm	-1 dBm	-4 dBm
242-tone RU	6 dBm	2 dBm	-1 dBm
484-tone RU	-	5 dBm	1 dBm
996-tone RU	-	-	4 dBm

pre-correction: -11 dBm

Power Setting for OFDMA (U-NII 2C)

	20 MHz BW	40 MHz BW	80 MHz BW
26-tone RU	-1 dBm	-4 dBm	-7 dBm
52-tone RU	2 dBm	-1 dBm	-4 dBm
106-tone RU	5 dBm	2 dBm	-1 dBm
242-tone RU	8 dBm	5 dBm	2 dBm
484-tone RU	-	8 dBm	4 dBm
996-tone RU	-	-	7 dBm

pre-correction: -11 dBm

Power Setting for OFDMA (U-NII 3)

	20 MHz BW	40 MHz BW	80 MHz BW
26-tone RU	-5 dBm	-8 dBm	-11 dBm
52-tone RU	-2 dBm	-5 dBm	-8 dBm
106-tone RU	1 dBm	-2 dBm	-5 dBm
242-tone RU	5 dBm	1 dBm	-2 dBm
484-tone RU	-	4 dBm	0 dBm
996-tone RU	-	-	3 dBm

pre-correction: -11 dBm

*The Details of Operation Mode(s) (1/2)

Test Item	Operating Mode	Tested Antenna	Tested Frequency			
			Lower Band	Middle Band	Additional Band	Upper Band
Conducted Emission, Radiated Spurious Emission (Below 1 GHz)	Tx 11ax-40 (OFDM) *1) Tx 11ax-40 (OFDM) with DH5 Hopping Tx 11ax-40 (OFDM) with 2M-PHY BT LE 2440 MHz	ANT 0 + ANT 1	-	-	5510 MHz	-
26 dB Emission Bandwidth	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) Tx 11ax-20 (OFDMA)	ANT 1 *2)	-	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz	-
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) Tx 11ax-40 (OFDMA)		-	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	-
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA)		-	5290 MHz	5530 MHz 5610 MHz	-
99 % Occupied Bandwidth	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) Tx 11ax-20 (OFDMA)	ANT 1 *2)	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5785 MHz 5825 MHz
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) Tx 11ax-40 (OFDMA)		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA)		5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
Maximum Conducted Output Power	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) Tx 11ax-20 (OFDMA)	ANT 0 + ANT 1	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5785 MHz 5825 MHz
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) Tx 11ax-40 (OFDMA)		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA)		5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
Maximum Power Spectral Density	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) , Tx 11ax-20 (OFDMA)	ANT 0 + ANT 1 *4)	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5785 MHz 5825 MHz
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) , Tx 11ax-40 (OFDMA)		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA)		5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz

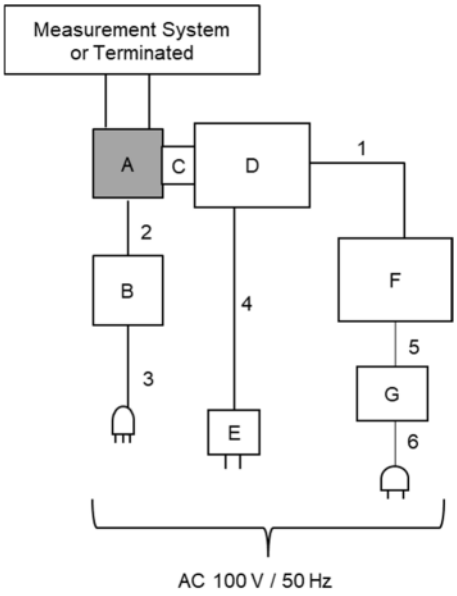
*The Details of Operation Mode(s) (2/2)

Test Item	Operating Mode	Tested Antenna	Tested Frequency			
			Lower Band	Middle Band	Additional Band	Upper Band
6 dB Bandwidth	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) Tx 11ax-20 (OFDMA)	ANT 1 *2)	-	-	-	5745 MHz 5785 MHz 5825 MHz
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) Tx 11ax-40 (OFDMA)		-	-	-	5755 MHz 5795 MHz
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA)		-	-	-	5775 MHz
Conducted Spurious Emission	Tx 11ax-40 (OFDM) *1)	ANT 1 *2)	-	-	5510 MHz	-
Radiated Spurious Emission (Band edge)	Tx 11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 (OFDM) Tx 11ax-20 (OFDMA) *3) Tx 11ax-20 (OFDM) with DH5 Hopping Tx 11ax-20 (OFDMA) with DH5 Hopping Tx 11ax-20 (OFDM) with 2M-PHY BT LE 2440 MHz Tx 11ax-20 (OFDMA) with 2M-PHY BT LE 2440 MHz	ANT 0 + ANT 1	5180 MHz	5320 MHz	5500 MHz 5700 MHz	5745 MHz 5825 MHz
	Tx 11n-40 Tx 11ac-40 Tx 11ax-40 (OFDM) Tx 11ax-40 (OFDMA) *3) Tx 11ax-40 (OFDM) with DH5 Hopping Tx 11ax-40 (OFDMA) with DH5 Hopping Tx 11ax-40 (OFDM) with 2M-PHY BT LE 2440 MHz Tx 11ax-40 (OFDMA) with 2M-PHY BT LE 2440 MHz		5190 MHz	5310 MHz	5510 MHz 5670 MHz	5755 MHz 5795 MHz
	Tx 11ac-80 Tx 11ax-80 (OFDM) Tx 11ax-80 (OFDMA) *3) Tx 11ax-80 (OFDM) with DH5 Hopping Tx 11ax-80 (OFDMA) with DH5 Hopping Tx 11ax-80 (OFDM) with 2M-PHY BT LE 2440 MHz Tx 11ax-80 (OFDMA) with 2M-PHY BT LE 2440 MHz		5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx 11ax-20 (OFDM)	ANT 0 + ANT 1	5180 MHz 5240 MHz	5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5825 MHz
	Tx 11ax-40 (OFDM)		5190 MHz 5230 MHz	5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	Tx 11ax-80 (OFDM)		5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
	Tx 11ax-40 (OFDM) with DH5 Hopping Tx 11ax-40 (OFDM) with 2M-PHY BT LE 2440 MHz		-	-	5510 MHz	-

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.
*2) The test was performed with the antenna that had higher power as a representative.
*3) OFDMA configuration tests were conducted only at the band edge since preliminary testing indicated that the other spurious emission was lower than OFDM.
*4) The worst combination of "1SS Directional gain" was applied to the test results.

4.2 Configuration and Peripherals

<For Antenna Terminal Conducted Tests>



Description of EUT and Support Equipment

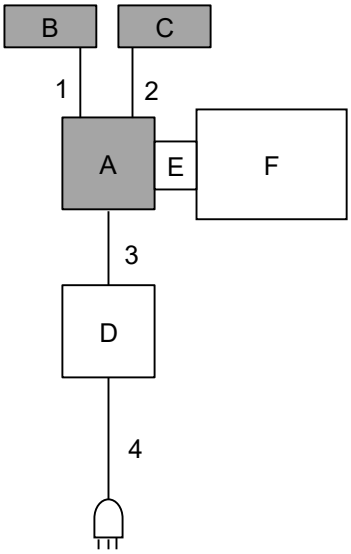
No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Wireless module	ES205	B1	Canon Inc.	EUT *1)
B	Power Supply (DC)	PW16-5ADP	19100034	GW Instek	-
C	Interface board	WJIG2021_2	A17	Canon Inc.	-
D	Raspberry Pi board	600-90768-01 REV2.0	2-4	Infineon Technologies AG	-
E	AC Adapter	QFWB-30-12-US01	07	Qualtek	-
F	Laptop PC	HP 250 G9/CT	JPH318LWC6	HP	-
G	AC Adapter	TPN-LA15	-	Lite-On Technorogy Corp.	-

*1) With Jig board

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	LAN	1.1	Unshielded	Unshielded	-
2	DC	0.9	Unshielded	Unshielded	-
3	AC	2.0	Unshielded	Unshielded	-
4	DC	1.5	Unshielded	Unshielded	-
5	DC	1.7	Unshielded	Unshielded	-
6	AC	0.9	Unshielded	Unshielded	-

<For Radiated Emission tests and Conducted Emission tests>



AC 100 V / 50 Hz
AC 120 V / 60 Hz *1)

*1) Only Conducted emission tests

* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support Equipment

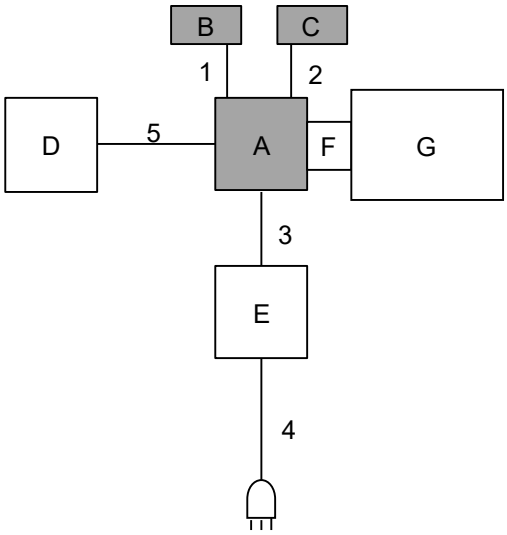
No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Wireless module	ES205	B4	Canon Inc.	EUT *2)
B	Antenna	19AA-10-tmp	1	Canon Inc.	EUT (Ant0)
C	Antenna	19AA-10-tmp	2	Canon Inc.	EUT (Ant1)
D	Power Supply (DC)	PAN35-10A	DE001677	Kikusui Electronics Corp.	-
E	Interface board	WJIG2021_2	A15	Canon Inc.	-
F	Raspberry Pi board	600-90768-01 REV2.0	2-2	Infineon Technologies AG	-

*2) With Jig board

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna	0.02	Shielded	Shielded	-
2	Antenna	0.02	Shielded	Shielded	-
3	DC	0.9 + 1.0	Unshielded	Unshielded	-
4	AC	2.0	Unshielded	Unshielded	-

< For Radiated Emission tests and Conducted Emission tests (Simultaneous transmission of BT/ BT LE and WLAN)>



AC 100 V / 50 Hz
AC 120 V / 60 Hz *1)

*1) Only Conducted emission tests

* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Wireless module	ES205	B4	Canon Inc.	EUT *2)
B	Antenna	19AA-10-tmp	1	Canon Inc.	EUT (Ant0)
C	Antenna	19AA-10-tmp	2	Canon Inc.	EUT (Ant1)
D	UART-USB converter board	-	BP006	Canon Inc.	-
E	Power Supply (DC)	PAN35-10A	DE001677	Kikusui Electronics Corp.	-
F	Interface board	WJIG2021_2	A15	Canon Inc.	-
G	Raspberry Pi board	600-90768-01 REV2.0	2-2	Infineon Technologies AG	-

*2) With Jig board

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna	0.02	Shielded	Shielded	-
2	Antenna	0.02	Shielded	Shielded	-
3	DC	0.9 + 1.0	Unshielded	Unshielded	-
4	AC	0.9	Unshielded	Unshielded	-
5	UART	0.1	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and Conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane.
The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

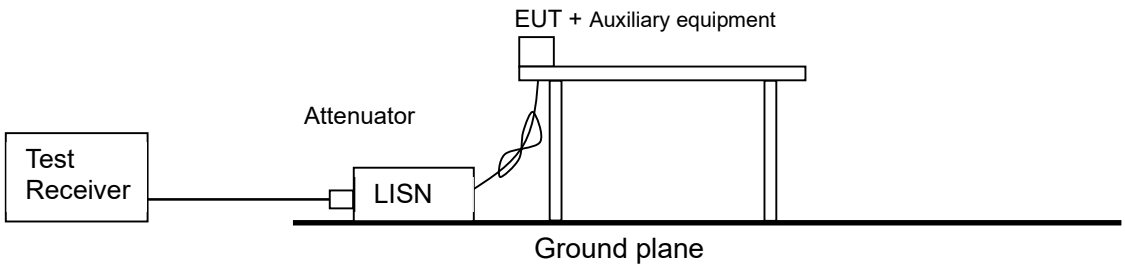
For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via Auxiliary equipment in a Shielded room.
The EUT via Auxiliary equipment was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	**: QP and CISPR Average**
Measurement Range	**: 0.15 MHz to 30 MHz**
Test Data	**: APPENDIX**
Test Result	**: Pass**

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission and Band Edge Compliance

Test Procedure

< Below 1 GHz >
-EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

< Above 1 GHz >
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane. Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

< Below 1 GHz >
The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1 GHz >
Inside of restricted bands (Section 15.205):
Apply to limit in the Section 15.209 (a).

Outside of the restricted bands:
Apply to limit 68.2 dBuV/m, 3 m (-27 dBm e.i.r.p.*) in the Section 15.407 (b) (1) (2) (3).

For W58 Bandedge
-27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge in the section 15.407(b)(4)(i).

Restricted band edge:
Apply to limit in the Section 15.209 (a).
Since this limit is severer than the limit of the inside of restricted bands.

*Electric field strength to e.i.r.p. conversion:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ (uV/m)}$$

:*P* is the e.i.r.p. (Watts)

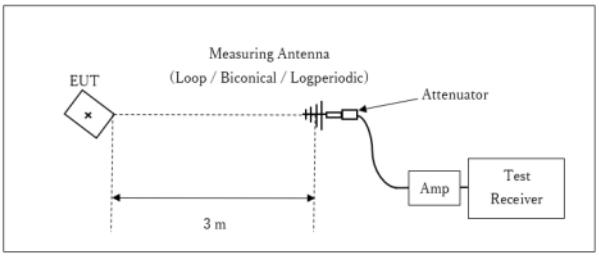
Test Antennas are used as below;

Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

Frequency	Below 1 GHz	Above 1 GHz	
Instrument Used	Test Receiver	Spectrum Analyzer	
Detector	QP	Peak	Average
IF Bandwidth	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 1/T (T: burst length, refer to Burst rate confirmation sheet) Detector: Peak

Figure 2: Test Setup

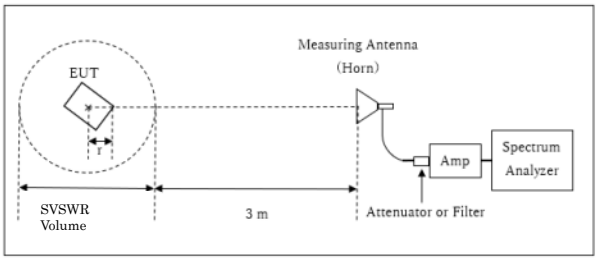
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz

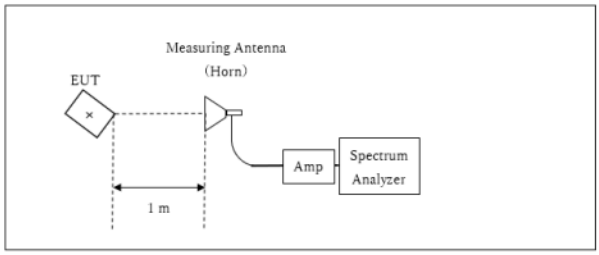


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.995 m / 3.0 m) = 2.49 dB
* Test Distance: (3 + SVSWR Volume /2) - r = 3.995 m

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r = 0.005 m

10 GHz to 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB
*Test Distance: 1 m

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT and Antenna to see the position of maximum noise, and the test was made at the position that has the maximum noise.

EUT

	Below 1 GHz	1 to10 GHz	10 to18 GHz	18 to 26.5 GHz	26.5 to 40 GHz
Horizontal	X	Y	X	X	X
Vertical	X	X	X	X	X

Antenna

	Below 1 GHz	1 to10 GHz	10 to18 GHz	18 to 26.5 GHz	26.5 to 40 GHz
Horizontal	X	X	X	X	X
Vertical	X	Z	X	X	X

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement Range : 30 MHz to 40 GHz
Test Data : APPENDIX
Test Result : Pass

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used and Test method
26 dB Bandwidth	Enough to capture the emission	Close to 1 % of EBW	> RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Peak	Max Hold	Spectrum Analyzer
6 dB Bandwidth	Enough to capture the emission	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 160 MHz BW) (Method PM-G)
Maximum Power Spectral Density	Encompass the entire EBW	1 MHz or 100 kHz *2)	≥ 3 RBW	Auto	RMS Power Averaging (200 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) KDB 789033 D02 says that RBW is set to be 500 kHz for 5.725 GHz to 5.850 GHz, but it is not possible with spectrum analyzer, so RBW Correction Factor (10 log(500 kHz / 100 kHz)) was added to the test result.
*3) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohmes. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to 45.5 – 51.5 = -6.0 dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

The test results and limit are rounded off to two decimals place, so some differences might be observed. The equipment and cables were not used for factor 0 dB of the data sheets.

Test Data : **APPENDIX**
Test Result : **Pass**

APPENDIX 1: Test Data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

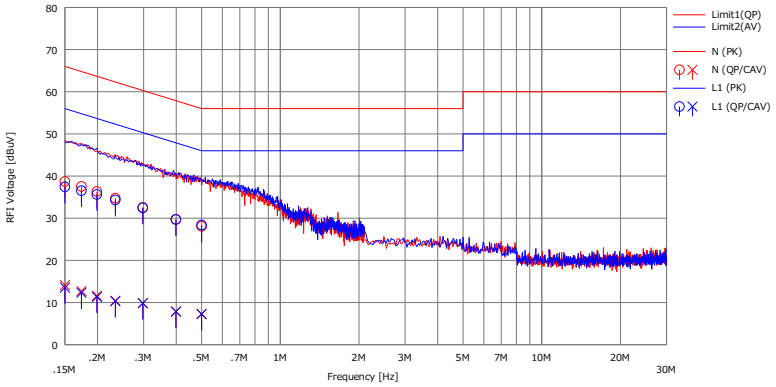
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2024/01/30

Mode : Tx 11ax-40 (OFDM), 5510 MHz
Order No. : 14781152

Temp./Humi. : 22 deg.C. / 27 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Makoto Hosaka



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<CAV>		<QP>	<CAV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	26.30	1.70	12.42	38.72	14.12	66.00	56.00	27.2	41.8	N	
2	0.17355	25.10	0.30	12.42	37.52	12.72	64.79	54.79	27.2	42.0	N	
3	0.19891	23.90	-0.80	12.42	36.32	11.62	63.66	53.66	27.3	42.0	N	
4	0.23392	22.30	-2.00	12.43	34.73	10.43	62.31	52.31	27.5	41.8	N	
5	0.29794	20.10	-2.60	12.45	32.55	9.85	60.30	50.30	27.7	40.4	N	
6	0.39883	17.30	-4.60	12.45	29.75	7.85	57.88	47.88	28.1	40.0	N	
7	0.50019	15.60	-5.20	12.46	28.06	7.26	56.00	46.00	27.9	38.7	N	
8	0.15000	25.00	1.10	12.43	37.43	13.53	66.00	56.00	28.5	42.4	L1	
9	0.17355	24.10	-0.10	12.42	36.52	12.32	64.79	54.79	28.2	42.4	L1	
10	0.19891	23.20	-1.10	12.43	35.63	11.33	63.66	53.66	28.0	42.3	L1	
11	0.23392	21.90	-2.10	12.42	34.32	10.32	62.31	52.31	27.9	41.9	L1	
12	0.29794	20.00	-2.60	12.44	32.44	9.84	60.30	50.30	27.8	40.4	L1	
13	0.39883	17.20	-4.60	12.46	29.66	7.86	57.88	47.88	28.2	40.0	L1	
14	0.50019	15.90	-5.20	12.47	28.37	7.27	56.00	46.00	27.6	38.7	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN): 145542

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2024/01/29

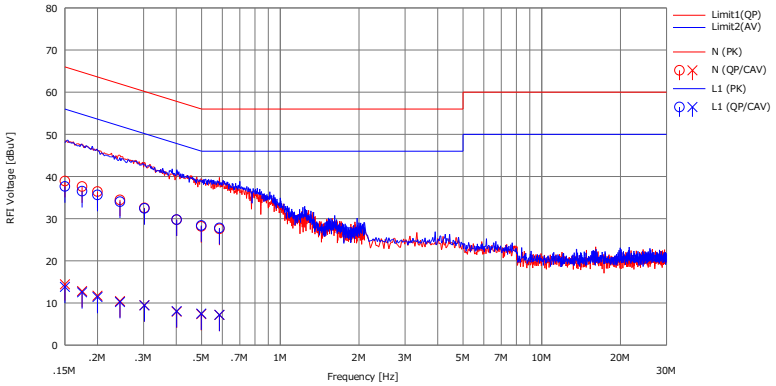
Mode : Refer to Remarks

Power : DC 3.3 V (AC 120 V / 60 Hz)
Temp./Humi. : 20 deg.C. / 27 %RH

Remarks : Tx 11ax-40, 5510 MHz with DH5 Hopping

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yusuke Tanikawara



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP)	(CAV)		(QP)	(CAV)	(QP)	(AV)	(QP)	(AV)		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	26.50	2.00	12.42	38.92	14.42	66.00	56.00	27.0	41.5	N	
2	0.17458	25.20	0.40	12.42	37.62	12.82	64.74	54.74	27.1	41.9	N	
3	0.19982	24.00	-0.70	12.42	36.42	11.72	63.62	53.62	27.2	41.9	N	
4	0.24370	22.00	-2.00	12.44	34.44	10.44	61.97	51.97	27.5	41.5	N	
5	0.30224	20.10	-3.00	12.45	32.55	9.45	60.18	50.18	27.6	40.7	N	
6	0.40155	17.30	-4.50	12.45	29.75	7.95	57.82	47.82	28.0	39.8	N	
7	0.49845	15.70	-5.10	12.46	28.16	7.36	56.03	46.03	27.8	38.6	N	
8	0.58485	15.10	-5.30	12.47	27.57	7.17	56.00	46.00	28.4	38.8	N	
9	0.15000	25.20	1.40	12.43	37.63	13.83	66.00	56.00	28.3	42.1	L1	
10	0.17458	24.10	0.10	12.42	36.52	12.52	64.74	54.74	28.2	42.2	L1	
11	0.19982	23.20	-1.00	12.43	35.63	11.43	63.62	53.62	27.9	42.1	L1	
12	0.24370	21.60	-2.20	12.42	34.02	10.22	61.97	51.97	27.9	41.7	L1	
13	0.30224	20.00	-3.00	12.44	32.44	9.44	60.18	50.18	27.7	40.7	L1	
14	0.40155	17.30	-4.40	12.46	29.76	8.06	57.82	47.82	28.0	39.7	L1	
15	0.49845	15.90	-5.00	12.47	28.37	7.47	56.03	46.03	27.6	38.5	L1	
16	0.58485	15.30	-5.30	12.49	27.79	7.19	56.00	46.00	28.2	38.8	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN): 145542

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2024/01/29

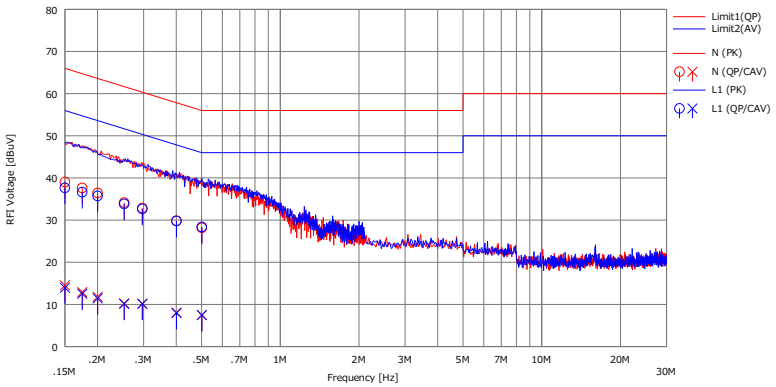
Mode : Refer to Remarks

Power : DC 3.3 V (AC 120 V / 60 Hz)
Temp./Humi. : 20 deg.C. / 27 %RH

Remarks : Tx 11ax-40 (OFDM), 5510 MHz with 2M-PHY BT LE 2440 MHz

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yusuke Tanikawara



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP)	(CAV)		(QP)	(CAV)	(QP)	(AV)	(QP)	(AV)		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	26.60	2.10	12.42	39.02	14.52	66.00	56.00	26.9	41.4	N	
2	0.17479	25.20	0.50	12.42	37.62	12.92	64.73	54.73	27.1	41.8	N	
3	0.20013	24.00	-0.60	12.42	36.42	11.82	63.61	53.61	27.1	41.7	N	
4	0.25287	21.70	-2.20	12.44	34.14	10.24	61.66	51.66	27.5	41.4	N	
5	0.29664	20.40	-2.30	12.45	32.85	10.15	60.34	50.34	27.4	40.1	N	
6	0.40075	17.40	-4.40	12.45	29.85	8.05	57.84	47.84	27.9	39.7	N	
7	0.50101	15.70	-5.00	12.46	28.16	7.46	56.00	46.00	27.8	38.5	N	
8	0.15000	25.20	1.50	12.43	37.63	13.93	66.00	56.00	28.3	42.0	L1	
9	0.17479	24.20	0.10	12.42	36.62	12.52	64.73	54.73	28.1	42.2	L1	
10	0.20013	23.30	-1.00	12.43	35.73	11.43	63.61	53.61	27.8	42.1	L1	
11	0.25287	21.40	-2.30	12.42	33.82	10.12	61.66	51.66	27.8	41.5	L1	
12	0.29664	20.20	-2.30	12.44	32.64	10.14	60.34	50.34	27.7	40.2	L1	
13	0.40075	17.30	-4.50	12.46	29.76	7.96	57.84	47.84	28.0	39.8	L1	
14	0.50101	15.90	-5.00	12.47	28.37	7.47	56.00	46.00	27.6	38.5	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN): 145542

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room		
Date	June 6, 2023	July 12, 2023	July 13, 2023
Temperature / Humidity	22 deg. C / 40 % RH	24 deg. C / 50 % RH	23 deg. C / 46 % RH
Engineer	Akihiro Oda	Miku Ikudome	Miku Ikudome
Mode	Tx		

11a

Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
5180	-	17140.0
5220	-	17064.2
5240	-	***17169.6***
5260	21.387	17156.5
5300	21.364	***17193.4***
5320	21.243	17168.3
5500	21.249	17159.4
5580	21.405	17139.5
5700	21.345	***17163.3***
5745	-	***17192.1***
5785	-	17116.5
5825	-	17004.4

11n-20

Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
5180	-	***18113.3***
5220	-	18083.9
5240	-	18101.0
5260	21.442	18123.2
5300	21.373	18128.3
5320	21.393	***18157.8***
5500	21.507	18104.6
5580	21.744	***18143.3***
5700	21.694	18111.7
5745	-	18141.9
5785	-	18106.7
5825	-	***18145.5***

11ac-20

Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
5180	-	***18134.4***
5220	-	18097.2
5240	-	18116.3
5260	21.453	18124.5
5300	21.451	***18147.4***
5320	21.485	18105.1
5500	21.371	***18130.0***
5580	21.268	18115.4
5700	21.339	18116.6
5745	-	***18139.7***
5785	-	18118.1
5825	-	18083.9

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room		
Date	June 11, 2023	July 12, 2023	July 13, 2023
Temperature / Humidity	25 deg. C / 52 % RH	24 deg. C / 50 % RH	23 deg. C / 46 % RH
Engineer	Shiro Kobayashi	Miku Ikudome	Miku Ikudome
Mode	Tx		

11ax-20 (OFDM)

Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
5180	-	***19211.9***
5220	-	19188.1
5240	-	19151.4
5260	21.719	19200.0
5300	21.577	19177.9
5320	21.717	***19203.3***
5500	21.430	***19198.0***
5580	21.538	19197.8
5700	21.762	19150.4
5745	-	19199.7
5785	-	19154.1
5825	-	***19246.1***

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	January 16, 2024	January 18, 2024
Temperature / Humidity	23 deg. C / 23 % RH	25 deg. C / 36 % RH
Engineer	Kouki Yamada	Kouki Yamada
Mode	Tx 11ax-20 (OFDMA) 26-tone RU	

11ax-20(OFDMA)

RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
26-tone RU	5180	0	-	18496.0
		4	-	17106.5
		8	-	18734.6
	5220	0	-	18508.3
		4	-	17097.6
		8	-	***18753.4***
	5240	0	-	18498.9
		4	-	17089.7
		8	-	18748.5
	5260	0	19.767	18486.2
		4	18.019	17083.3
		8	19.837	***18724.6***
	5300	0	19.651	18478.7
		4	18.036	17080.2
		8	19.749	18504.4
	5320	0	19.737	18486.3
		4	18.057	17004.8
		8	19.675	18705.4
	5500	0	19.755	18505.8
		4	18.081	16969.0
		8	19.624	18552.8
	5580	0	19.757	18533.4
		4	18.059	16994.7
		8	19.733	***18735.5***
	5700	0	19.713	18523.2
		4	18.064	16992.9
		8	19.675	18560.7
	5745	0	-	18561.3
		4	-	17010.4
		8	-	***18574.2***
	5785	0	-	18525.5
		4	-	16971.4
		8	-	18565.0
	5825	0	-	18529.7
		4	-	16970.1
		8	-	18546.3

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	January 16, 2024	January 18, 2024
Temperature / Humidity	23 deg. C / 23 % RH	25 deg. C / 36 % RH
Engineer	Kouki Yamada	Kouki Yamada
Mode	Tx 11ax-20 (OFDMA) 52-tone RU	

11ax-20(OFDMA)

RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
52-tone RU	5180	37	-	18348.1
		38	-	17028.4
		40	-	18428.7
	5220	37	-	18368.1
		38	-	17023.5
		40	-	18432.2
	5240	37	-	18361.7
		38	-	17022.3
		40	-	***18440.9***
	5260	37	19.949	18339.3
		38	18.388	17006.2
		40	19.883	18418.0
	5300	37	19.937	18319.7
		38	18.257	17026.8
		40	19.846	***18438.9***
	5320	37	20.063	18358.4
		38	18.335	17008.7
		40	19.912	18421.7
	5500	37	20.050	18378.3
		38	18.334	17029.3
		40	19.984	18423.7
	5580	37	20.081	18378.9
		38	18.452	17018.5
		40	19.949	18413.7
	5700	37	20.503	***18479.2***
		38	18.352	17022.1
		40	20.054	18422.3
	5745	37	-	18404.3
		38	-	17036.5
		40	-	***18408.0***
	5785	37	-	18381.5
		38	-	17004.6
		40	-	18402.7
	5825	37	-	18377.2
		38	-	17015.4
		40	-	18406.0

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	January 16, 2024	January 18, 2024
Temperature / Humidity	23 deg. C / 23 % RH	25 deg. C / 36 % RH
Engineer	Kouki Yamada	Kouki Yamada
Mode	Tx 11ax-20 (OFDMA) 106-tone RU	

11ax-20(OFDMA)

RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
106-tone RU	5180	53	-	***18314.3***
		54	-	18252.7
	5220	53	-	18291.2
		54	-	18272.0
	5240	53	-	18295.0
		54	-	18274.5
	5260	53	20.304	18329.1
		54	19.978	18265.2
	5300	53	20.233	18320.2
		54	19.973	18253.3
	5320	53	20.407	***18343.0***
		54	20.041	18254.7
	5500	53	20.390	18320.9
		54	19.990	18248.0
	5580	53	20.172	18325.2
		54	20.017	18274.3
	5700	53	20.298	***18332.2***
		54	20.074	18250.1
	5745	53	-	***18321.0***
		54	-	18240.5
	5785	53	-	18298.4
		54	-	18256.7
	5825	53	-	18318.6
		54	-	18241.7

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	January 16, 2024	January 18, 2024
Temperature / Humidity	23 deg. C / 23 % RH	25 deg. C / 36 % RH
Engineer	Kouki Yamada	Kouki Yamada
Mode	Tx 11ax-20 (OFDMA) 242-tone RU	

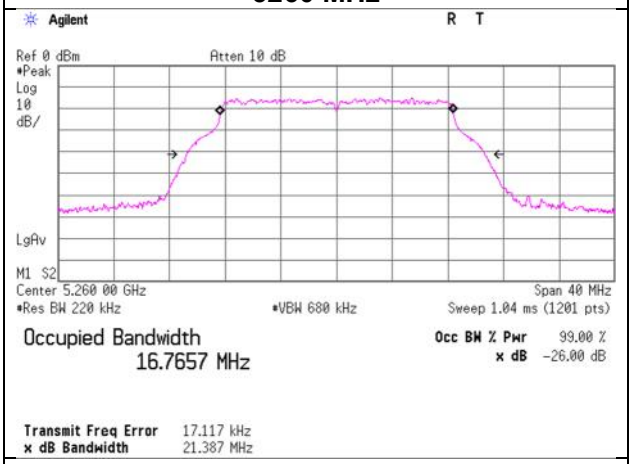
11ax-20(OFDMA)

RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
242-tone RU	5180	61	-	19243.9
	5220	61	-	19243.2
	5240	61	-	***19247.9***
	5260	61	21.622	19213.7
	5300	61	21.637	19242.9
	5320	61	21.612	***19258.5***
	5500	61	21.768	19214.1
	5580	61	21.634	19218.1
	5700	61	21.672	***19218.7***
	5745	61	-	***19235.1***
	5785	61	-	19226.2
	5825	61	-	19221.5

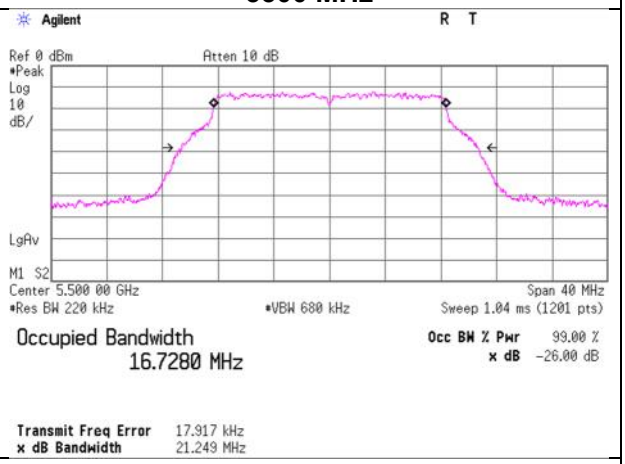
26 dB Emission Bandwidth

11a

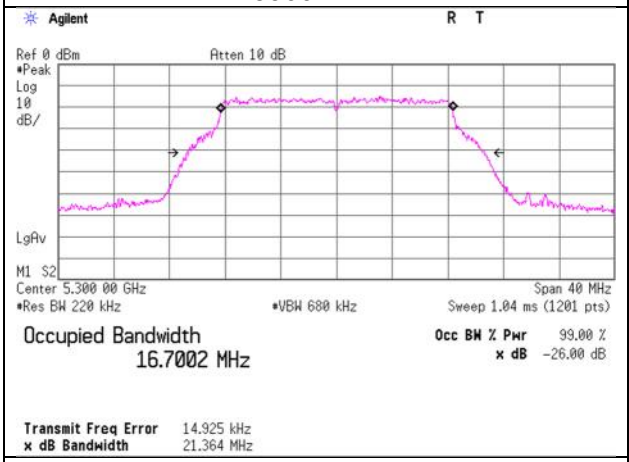
5260 MHz



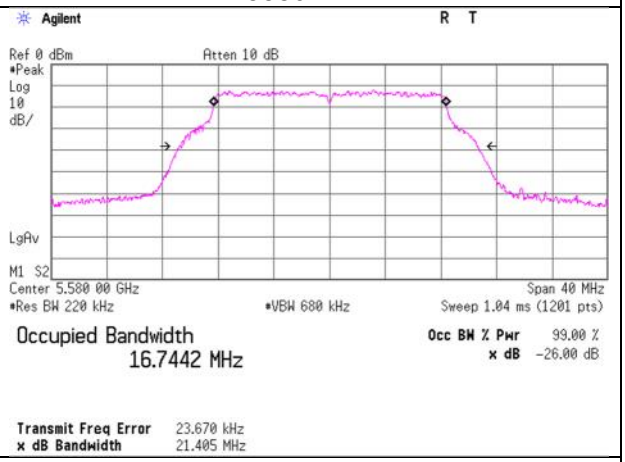
5500 MHz



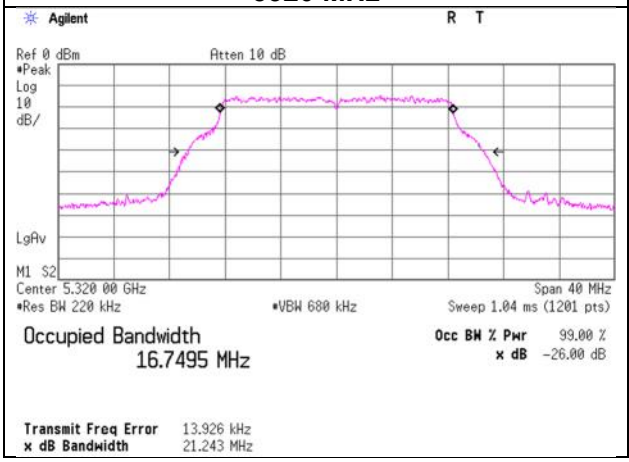
5300 MHz



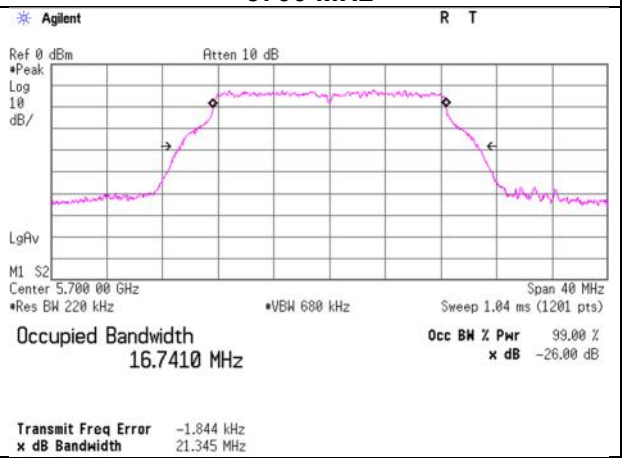
5580 MHz



5320 MHz



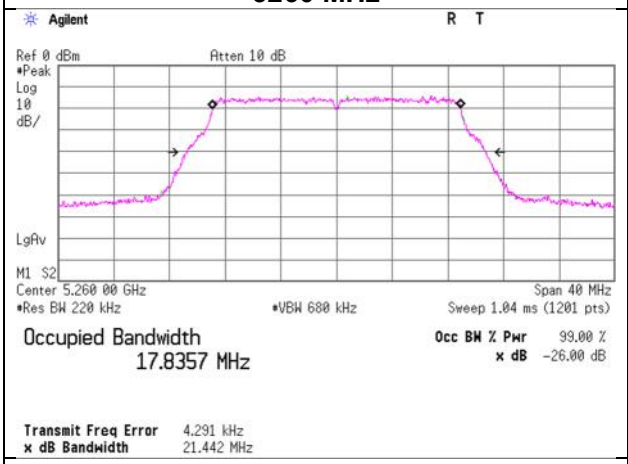
5700 MHz



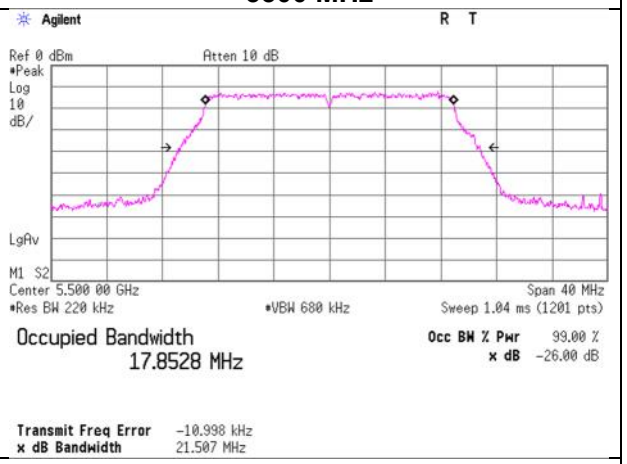
26 dB Emission Bandwidth

11n-20

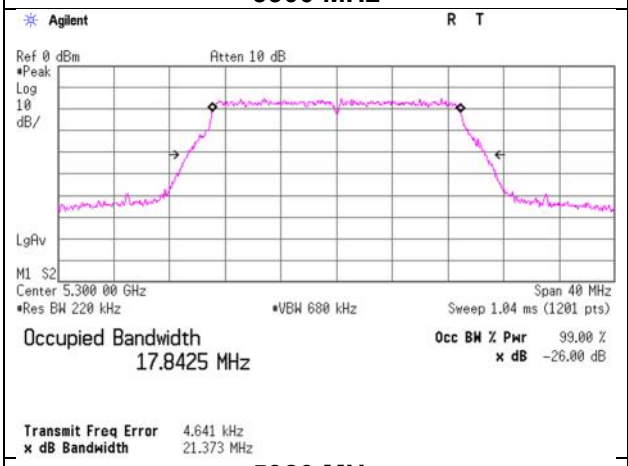
5260 MHz



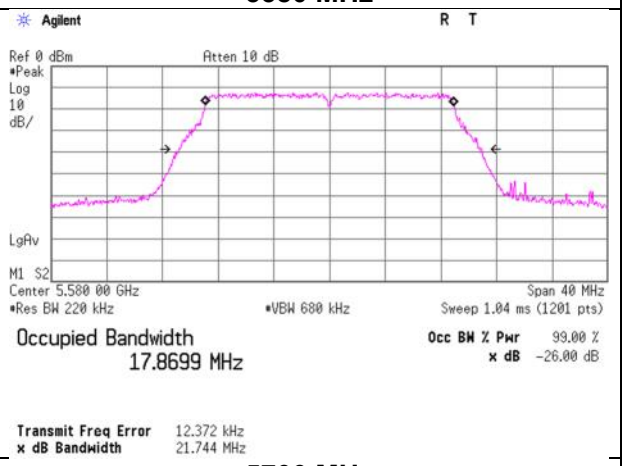
5500 MHz



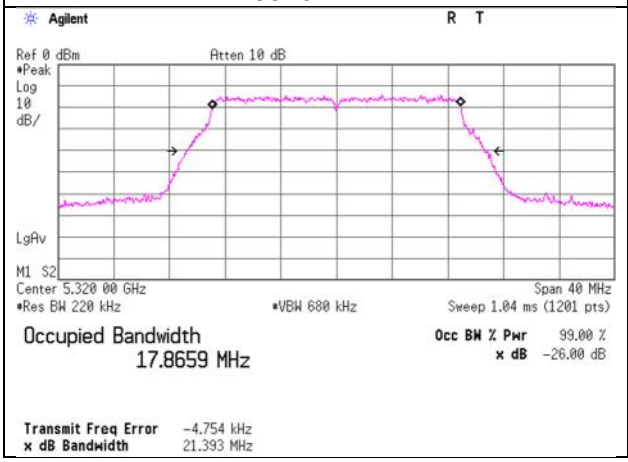
5300 MHz



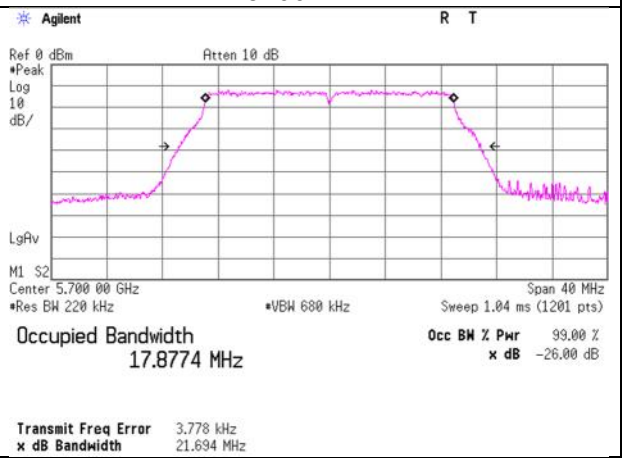
5580 MHz



5320 MHz



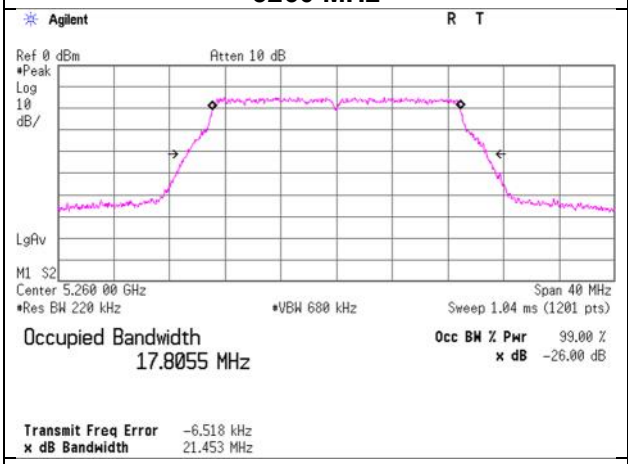
5700 MHz



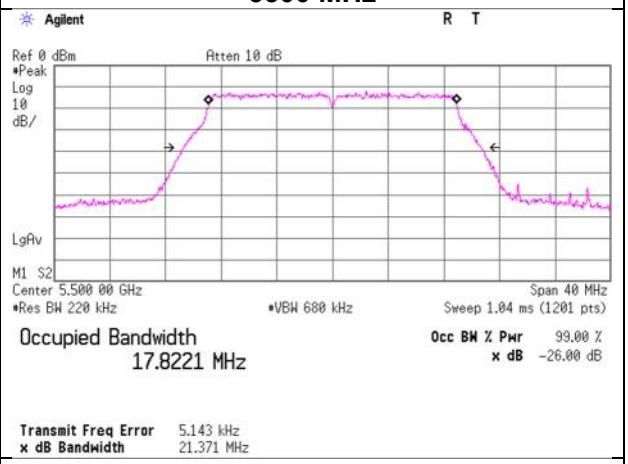
26 dB Emission Bandwidth

11ac-20

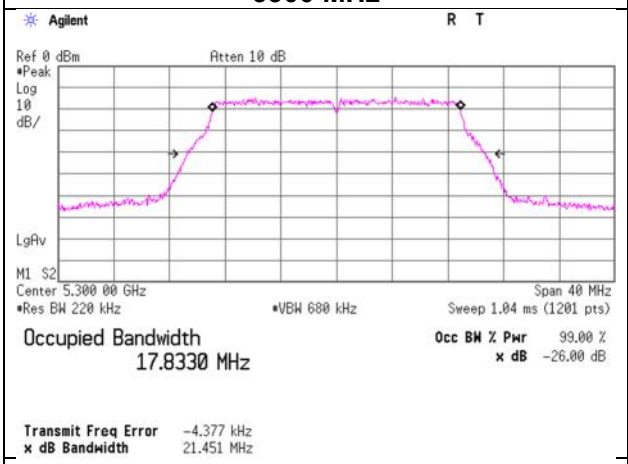
5260 MHz



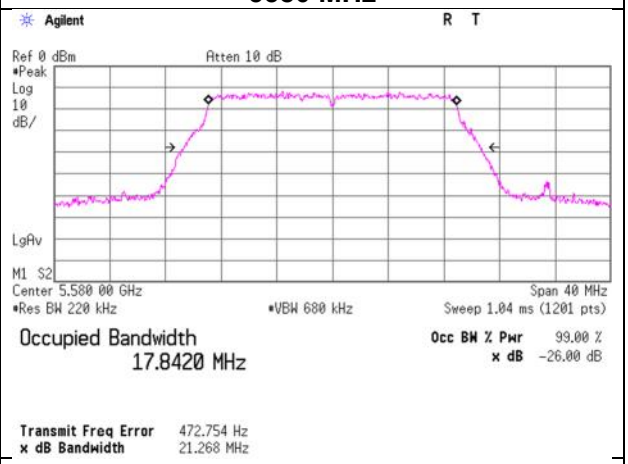
5500 MHz



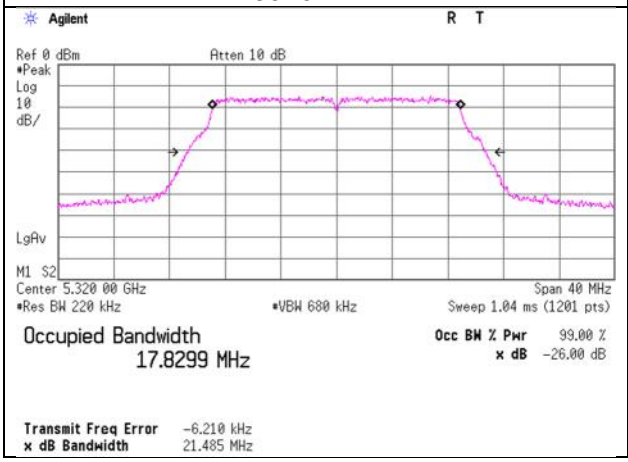
5300 MHz



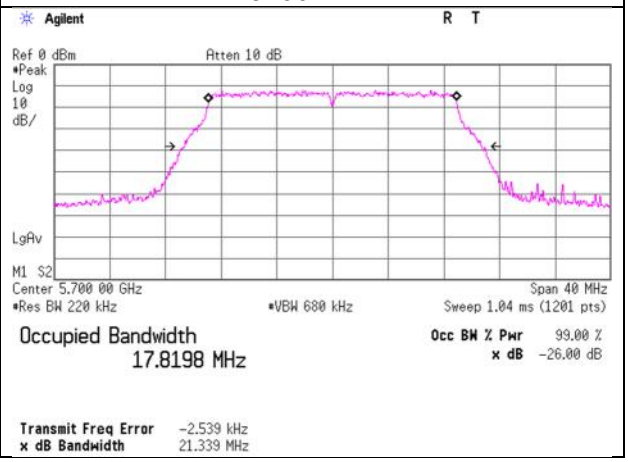
5580 MHz



5320 MHz



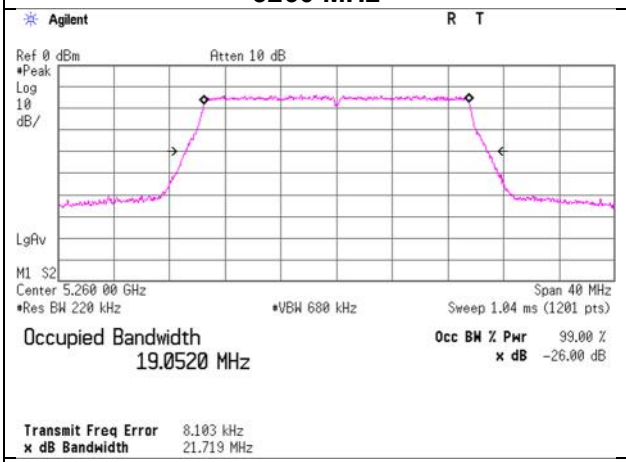
5700 MHz



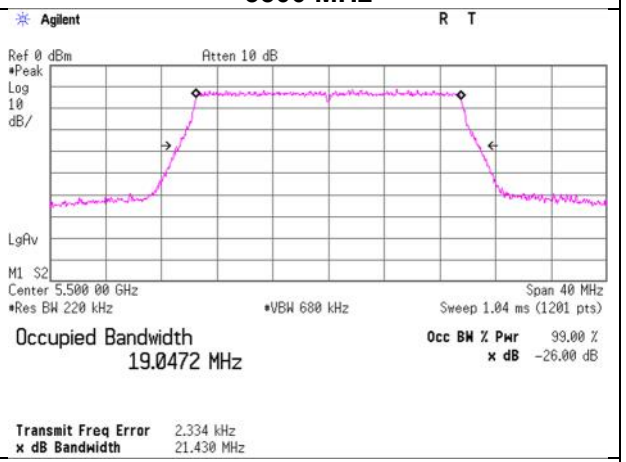
26 dB Emission Bandwidth

11ax-20 (OFDM)

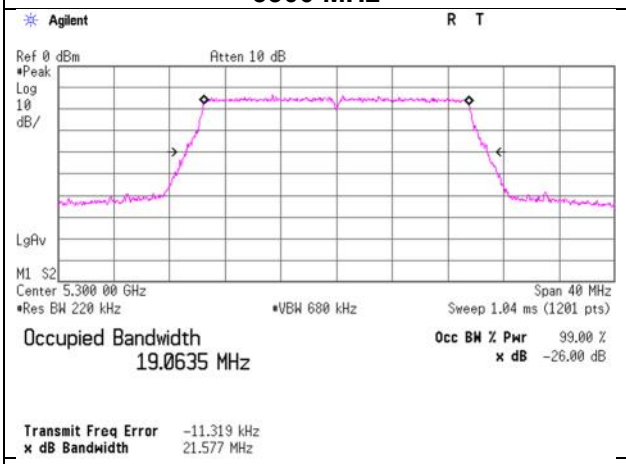
5260 MHz



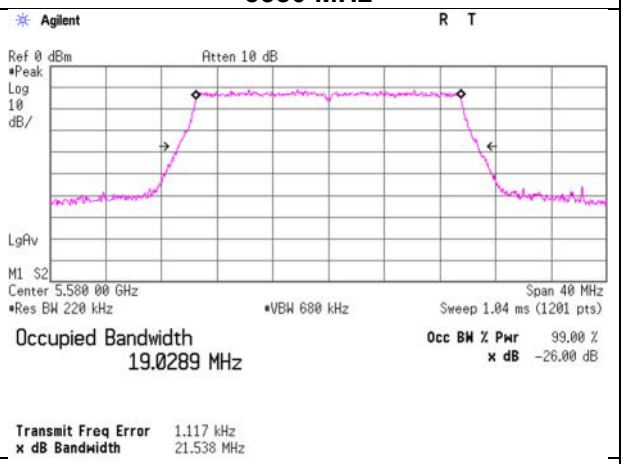
5500 MHz



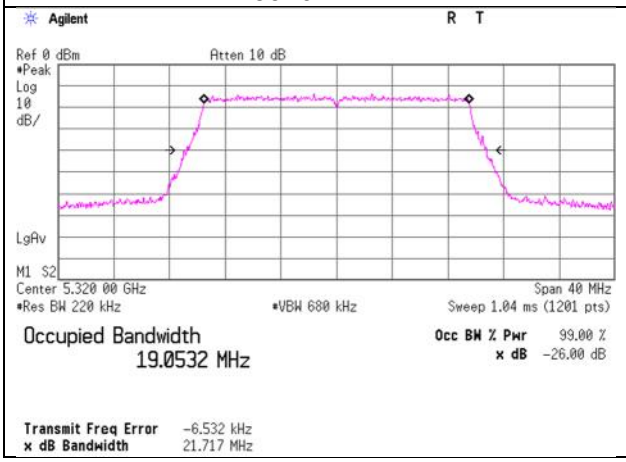
5300 MHz



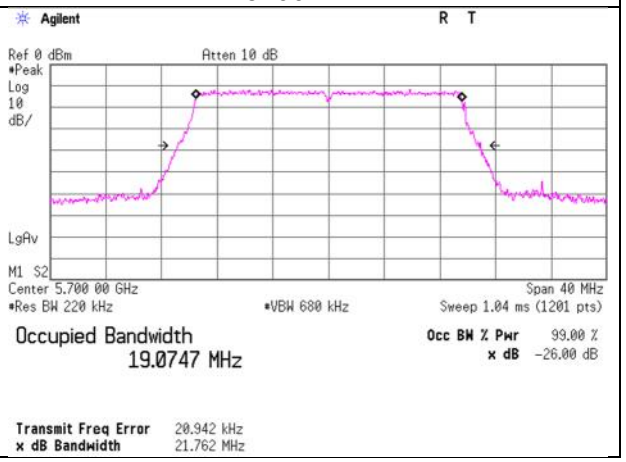
5580 MHz



5320 MHz

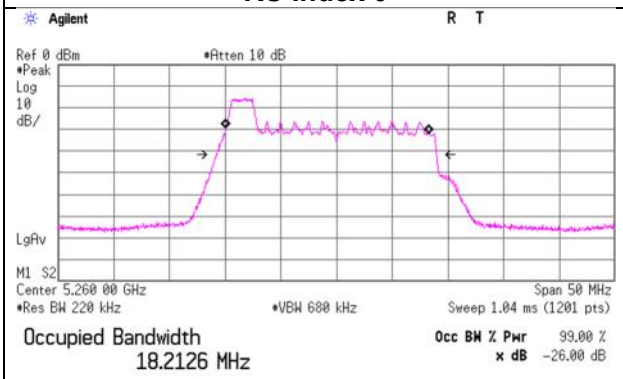
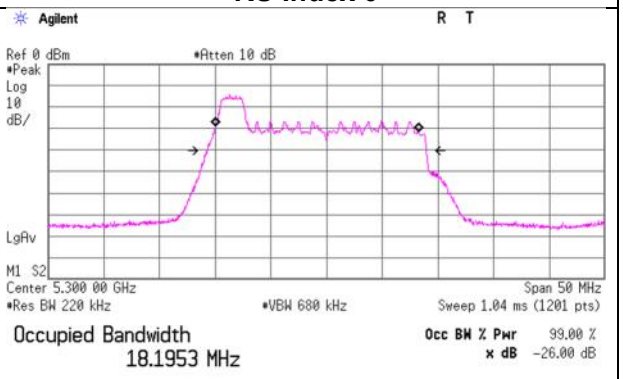


5700 MHz



26 dB Emission Bandwidth

11ax-20 (OFDMA) 26-tone RU

5260 MHz	5300 MHz
RU Index 0	**RU Index 0**
	
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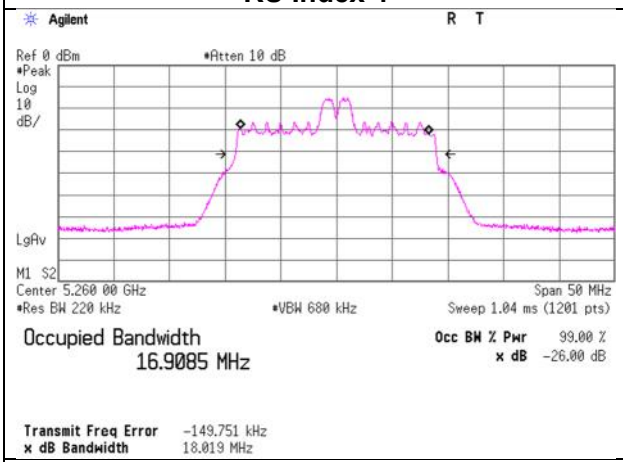
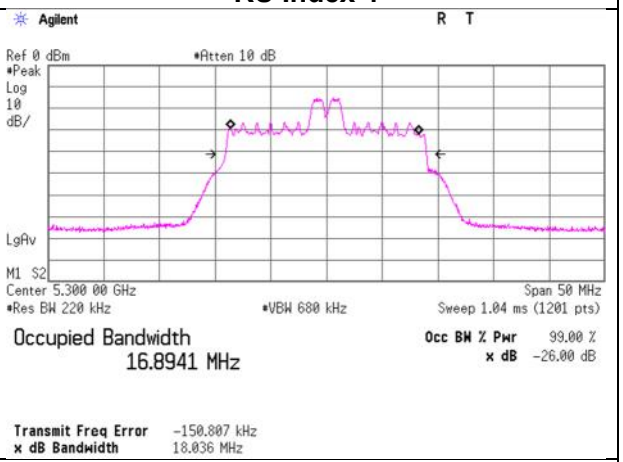
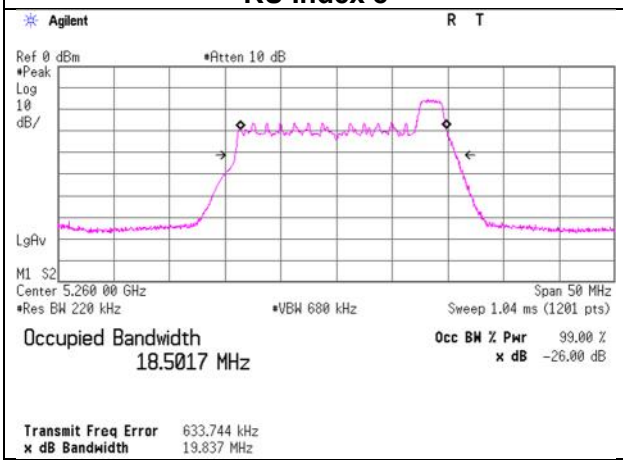
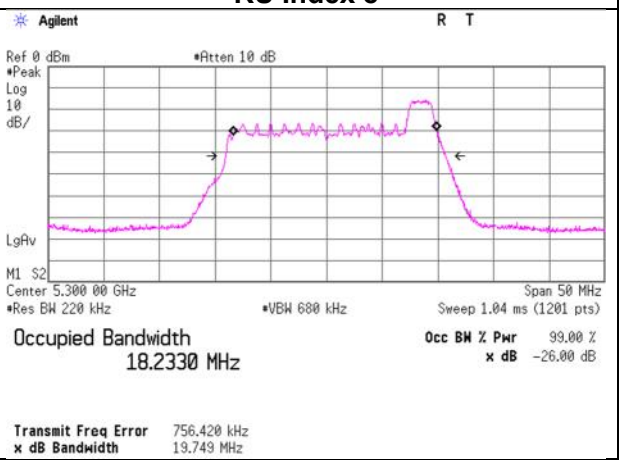
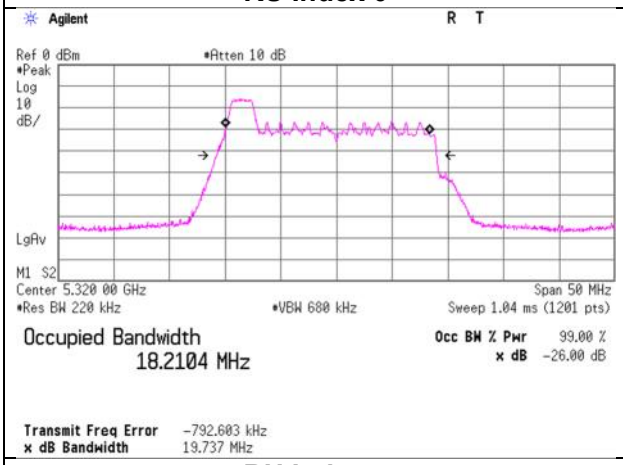
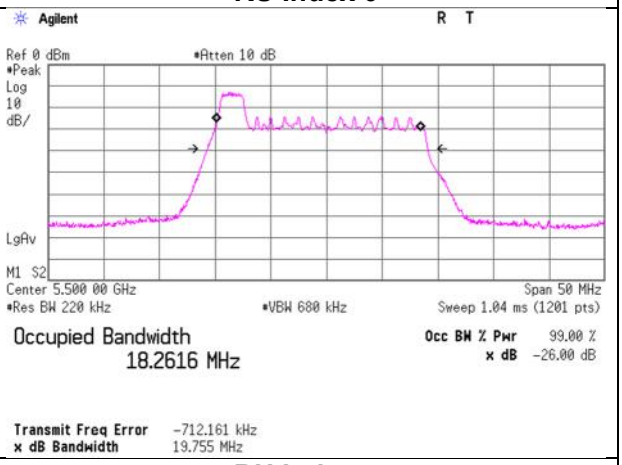
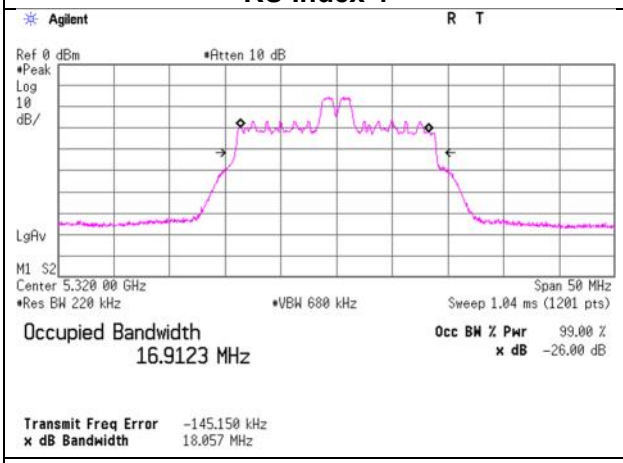
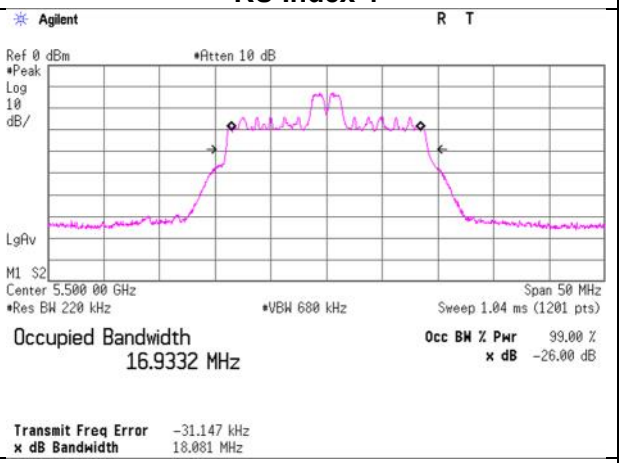
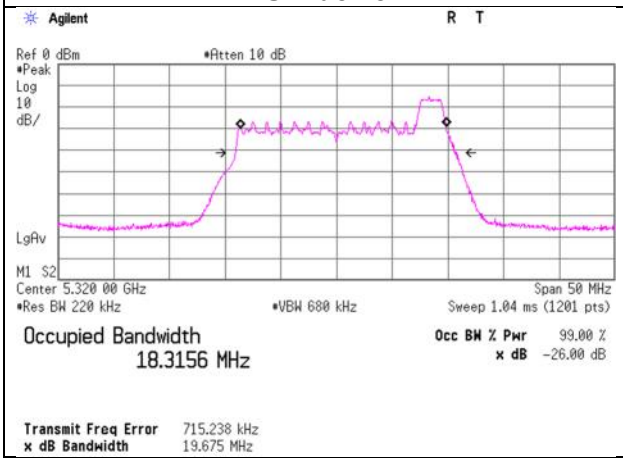
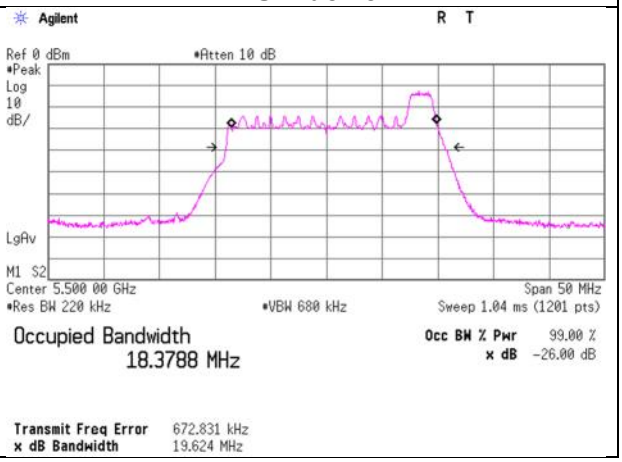
	
RU Index 8	**RU Index 8**
	

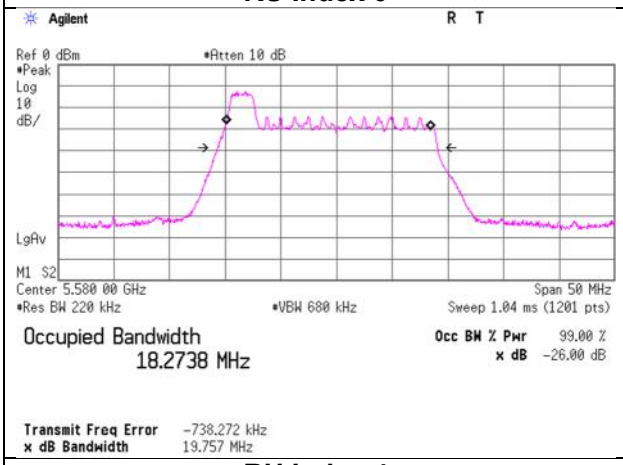
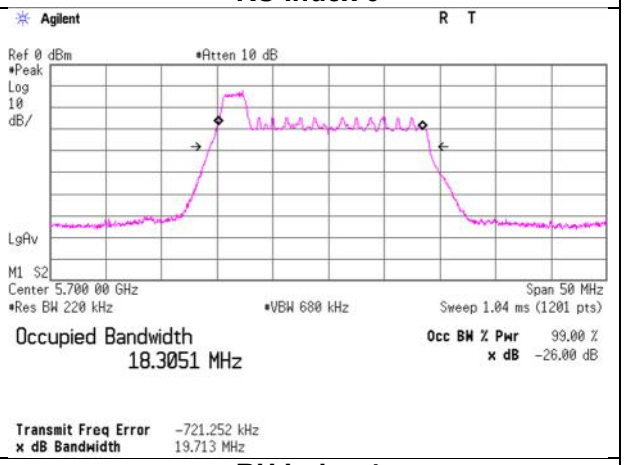
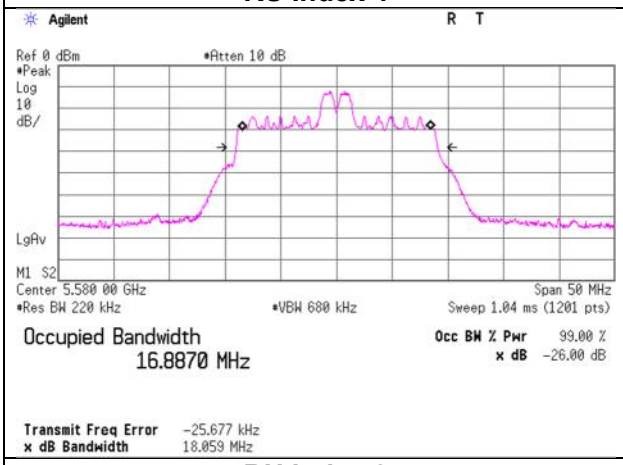
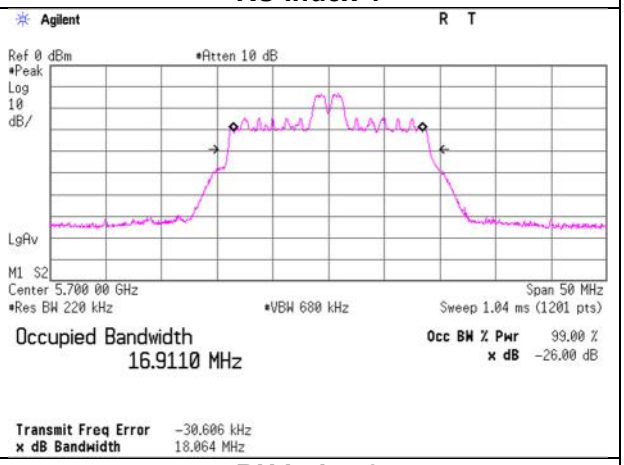
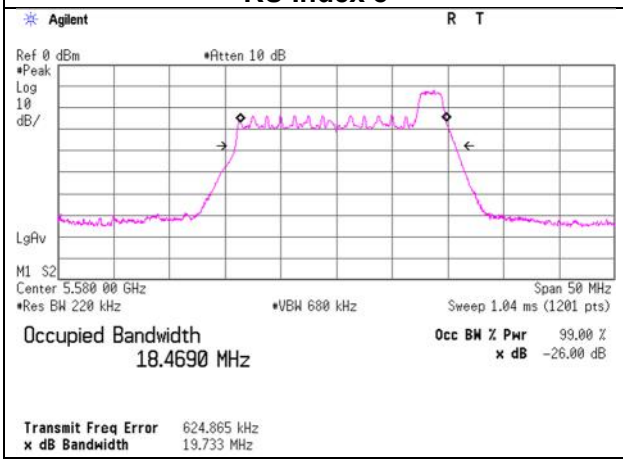
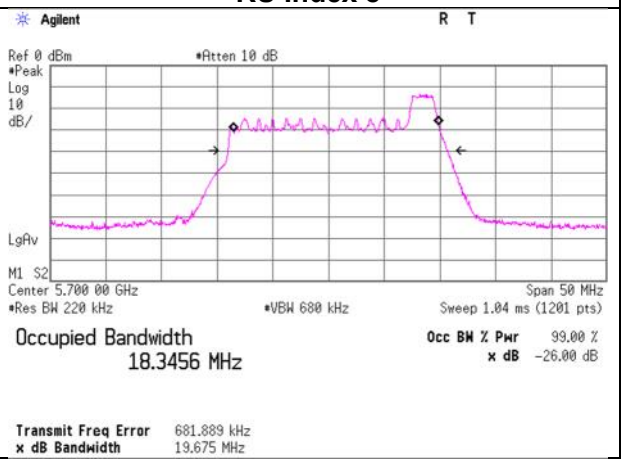
26 dB Emission Bandwidth

11ax-20 (OFDMA) 26-tone RU

5320 MHz	5500 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

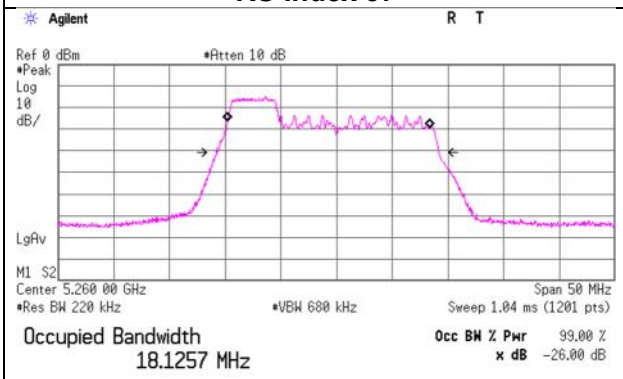
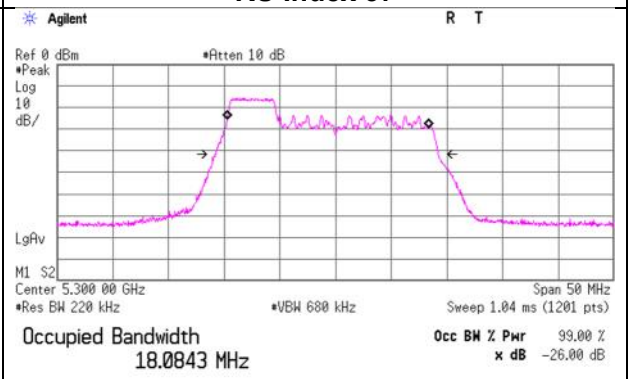
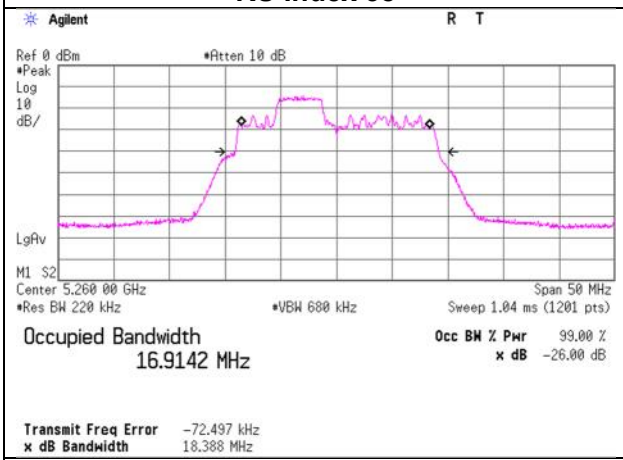
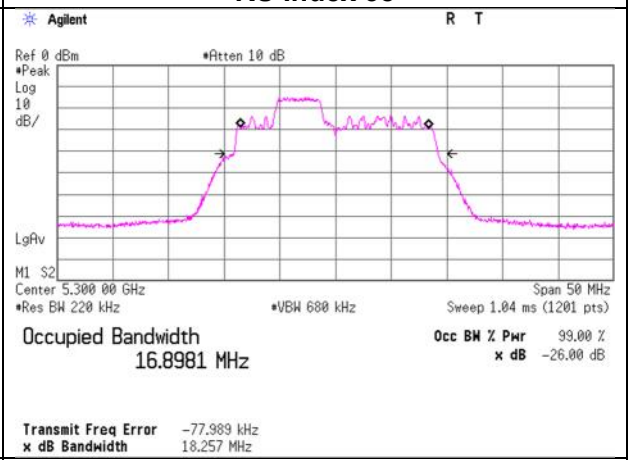
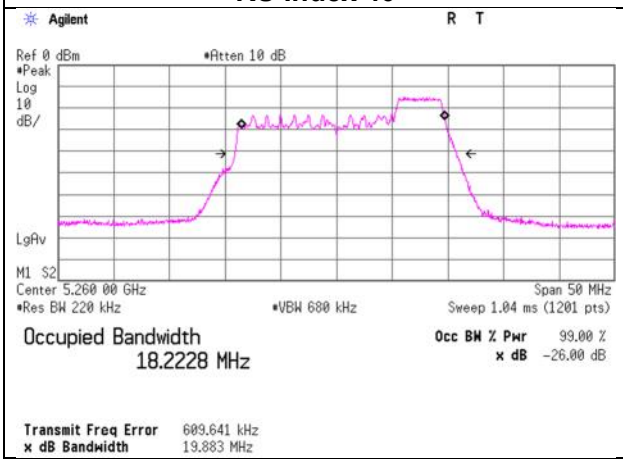
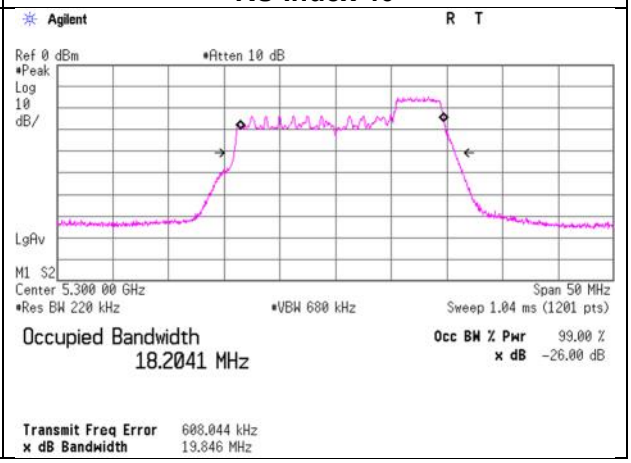
26 dB Emission Bandwidth

11ax-20 (OFDMA) 26-tone RU

5580 MHz	5700 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

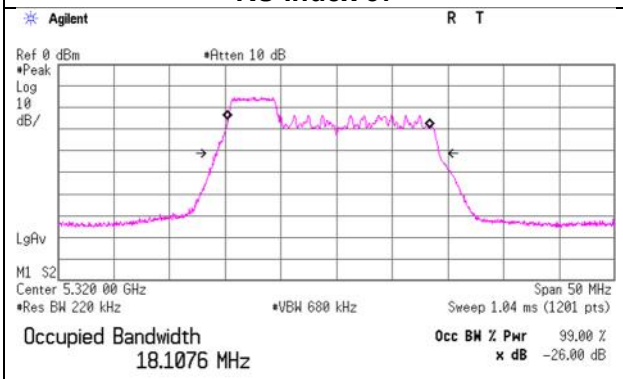
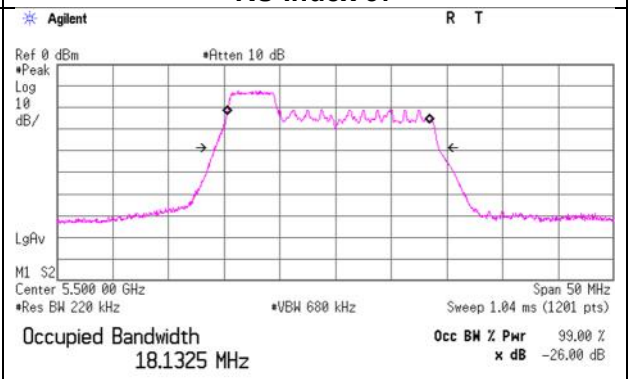
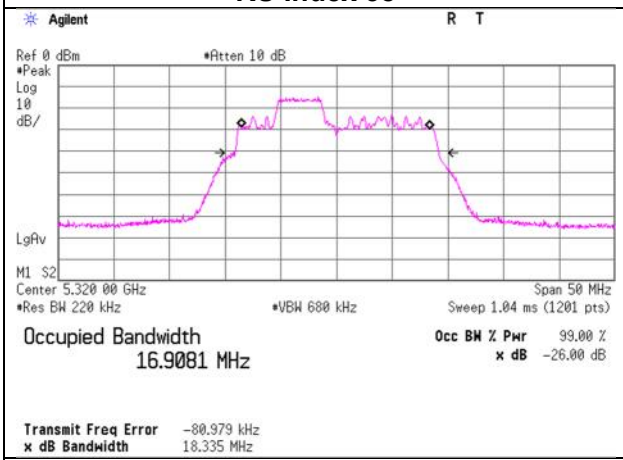
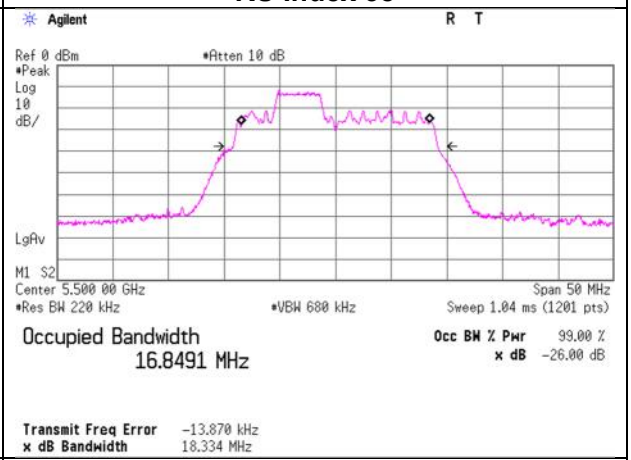
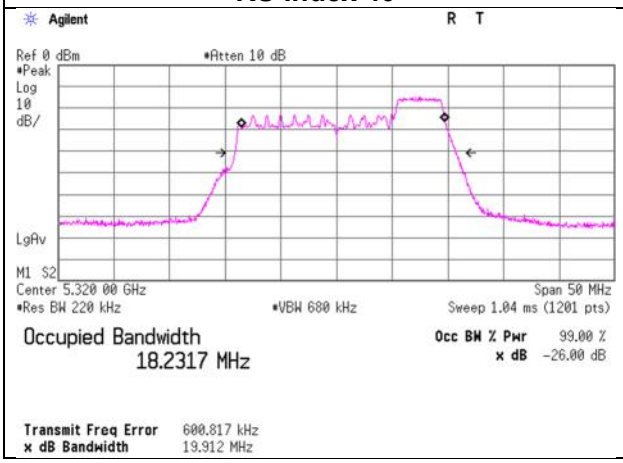
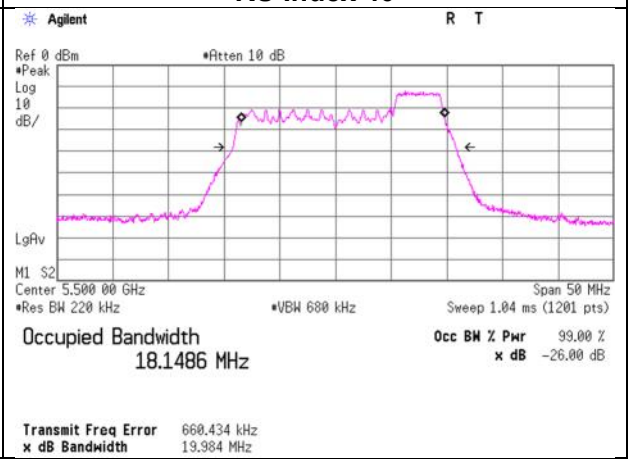
26 dB Emission Bandwidth

11ax-20 (OFDMA) 52-tone RU

5260 MHz	5300 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

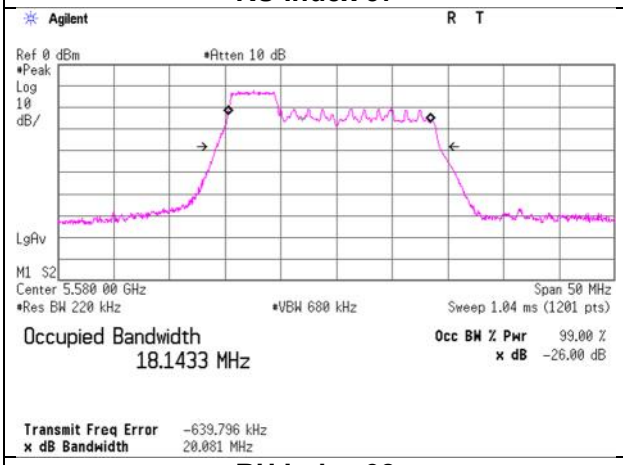
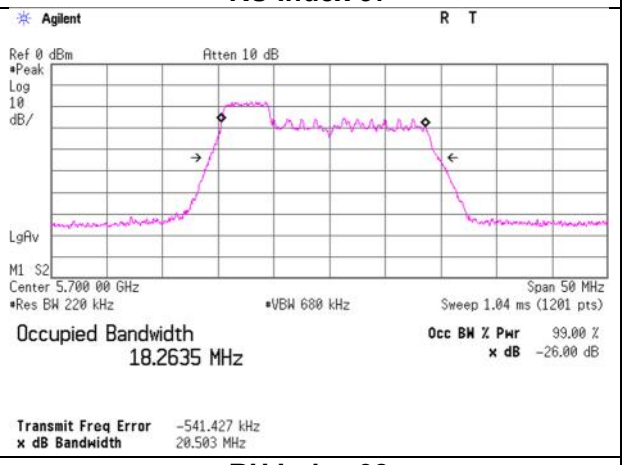
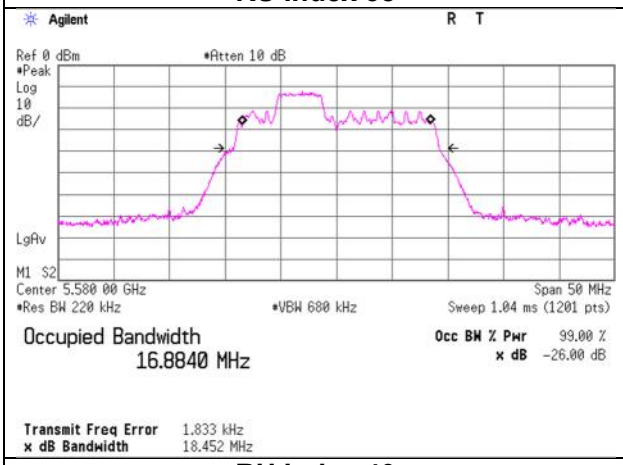
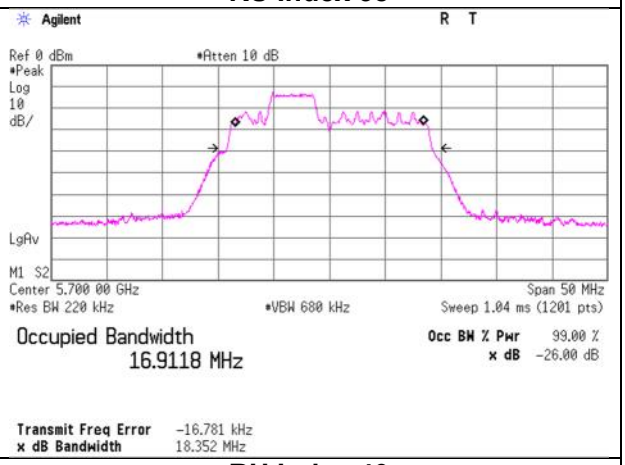
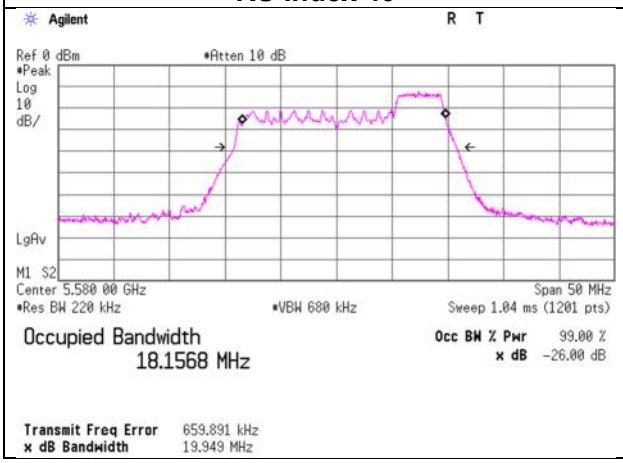
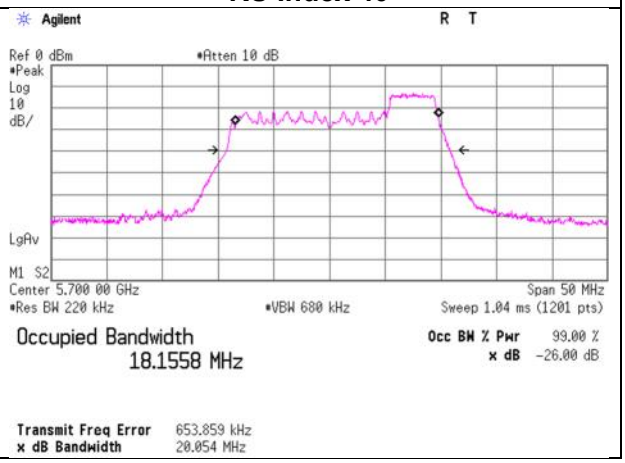
26 dB Emission Bandwidth

11ax-20 (OFDMA) 52-tone RU

5320 MHz	5500 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

26 dB Emission Bandwidth

11ax-20 (OFDMA) 52-tone RU

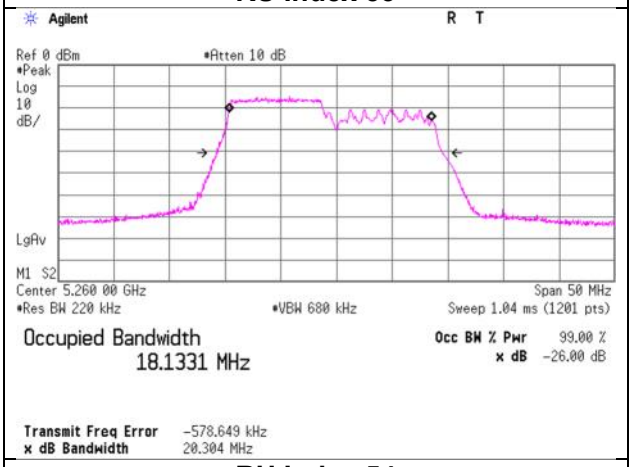
5580 MHz	5700 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

26 dB Emission Bandwidth

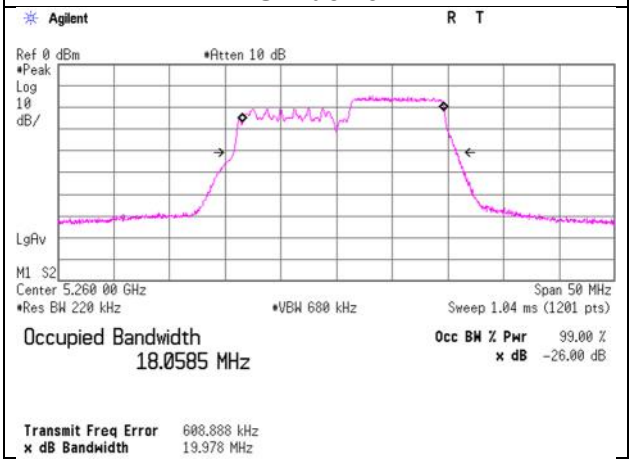
11ax-20 (OFDMA) 106-tone RU

5260 MHz

RU Index 53

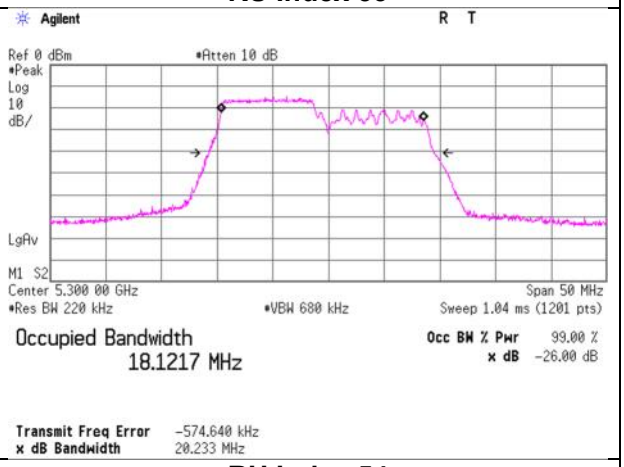


RU Index 54

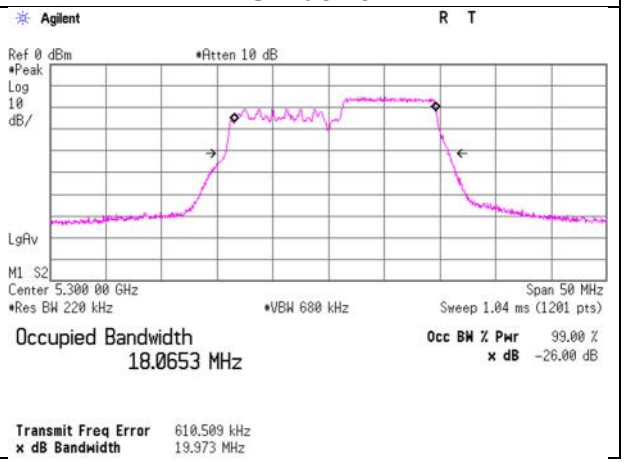


5300 MHz

RU Index 53



RU Index 54

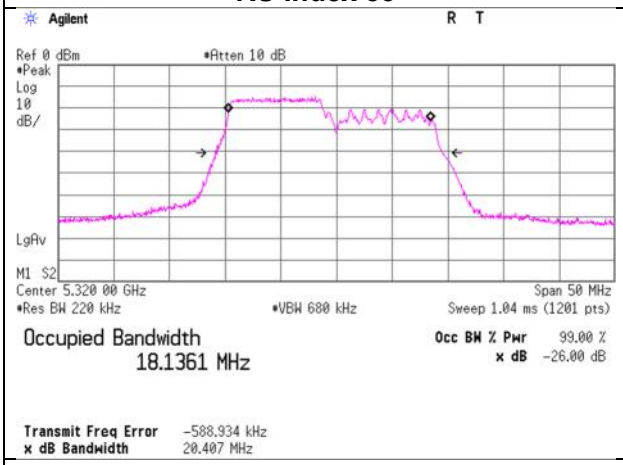


26 dB Emission Bandwidth

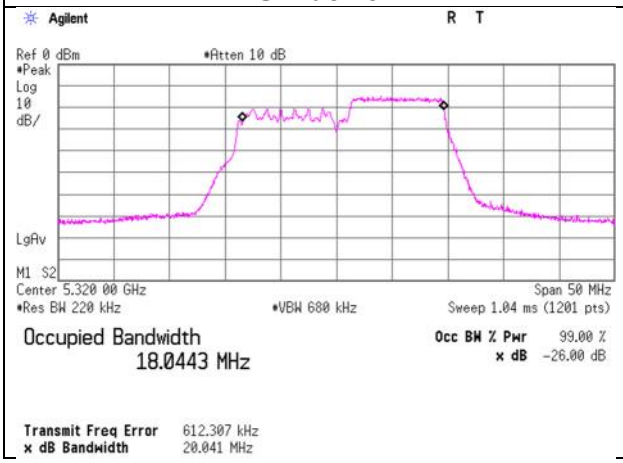
11ax-20 (OFDMA) 106-tone RU

5320 MHz

RU Index 53

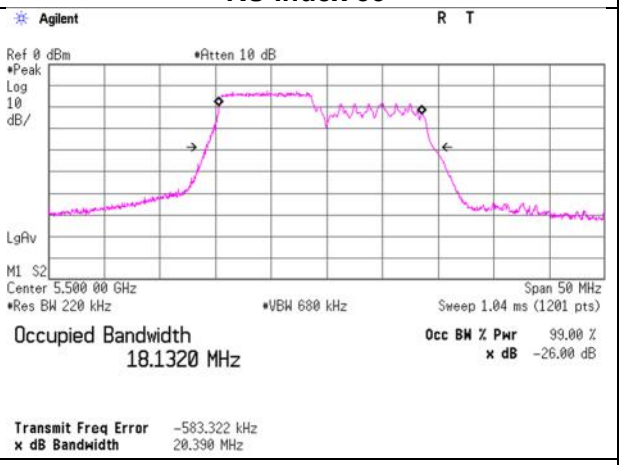


RU Index 54

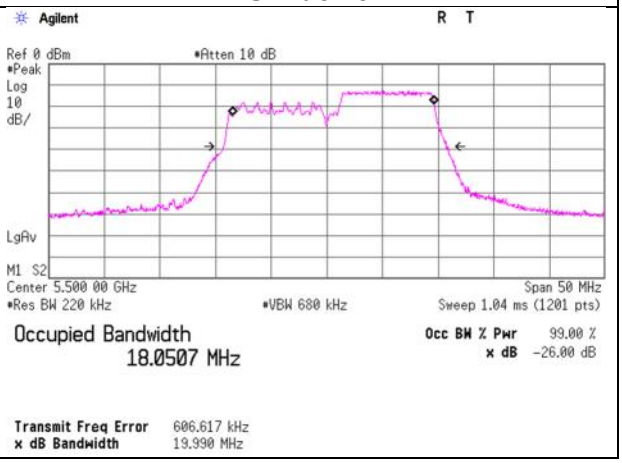


5500 MHz

RU Index 53

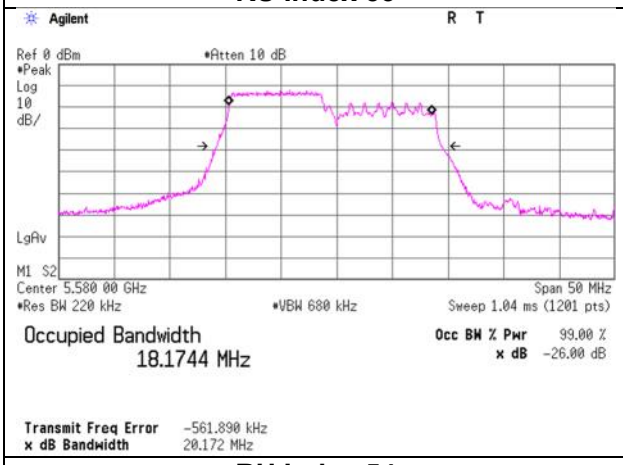
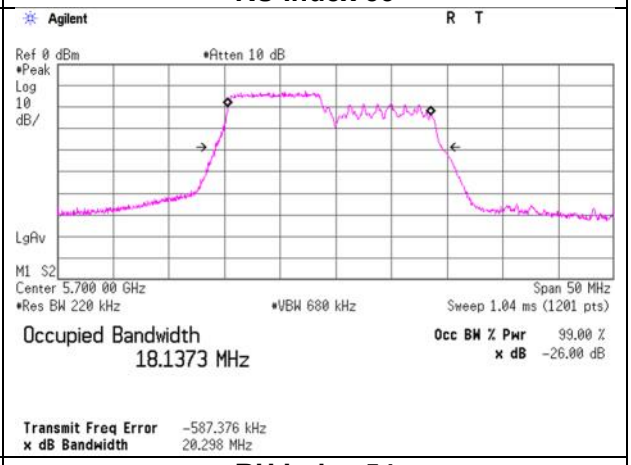
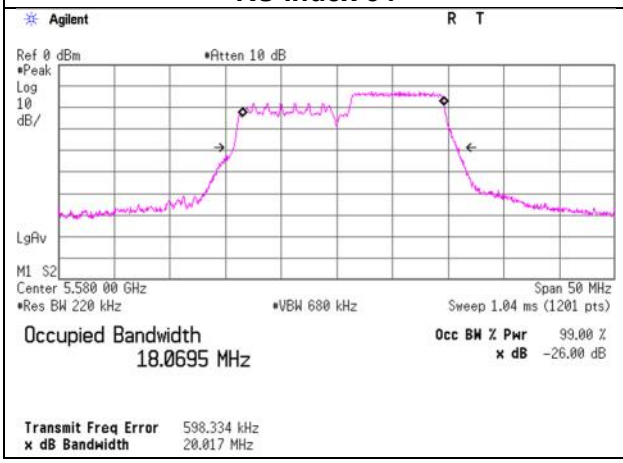
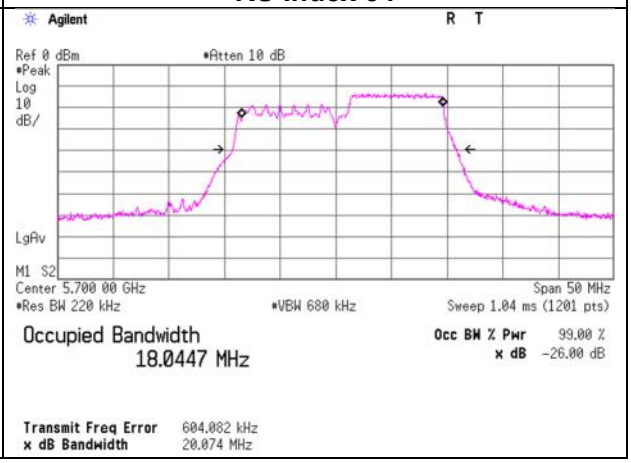


RU Index 54



26 dB Emission Bandwidth

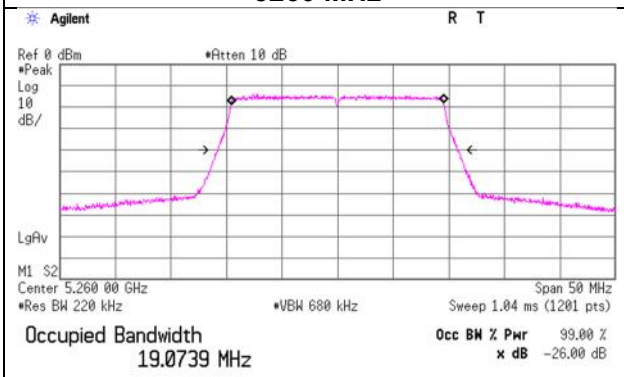
11ax-20 (OFDMA) 106-tone RU

5580 MHz	5700 MHz
RU Index 53	**RU Index 53**
	
RU Index 54	**RU Index 54**
	

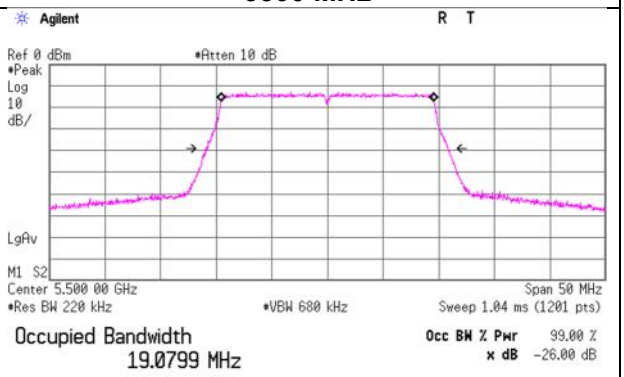
26 dB Emission Bandwidth

11ax-20 (OFDMA) 242-tone RU
RU Index 61

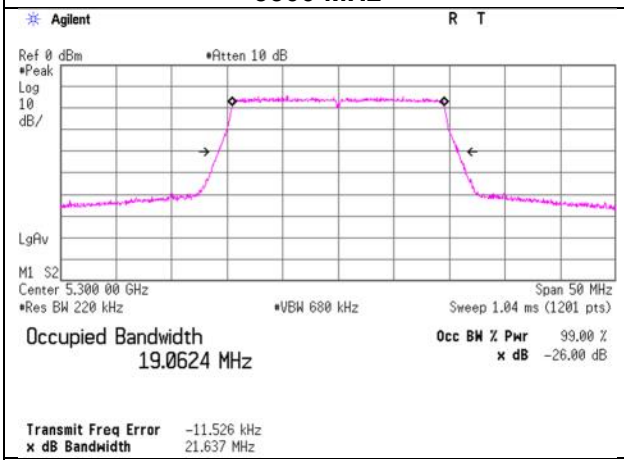
5260 MHz



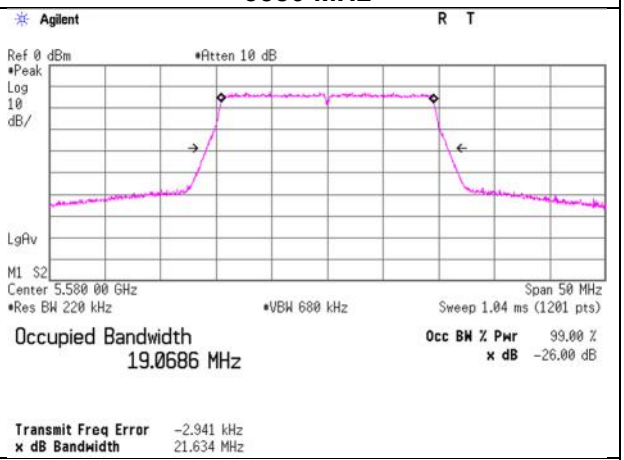
5500 MHz



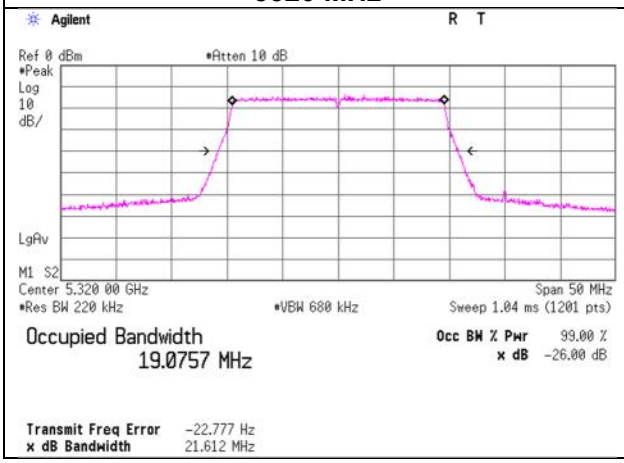
5300 MHz



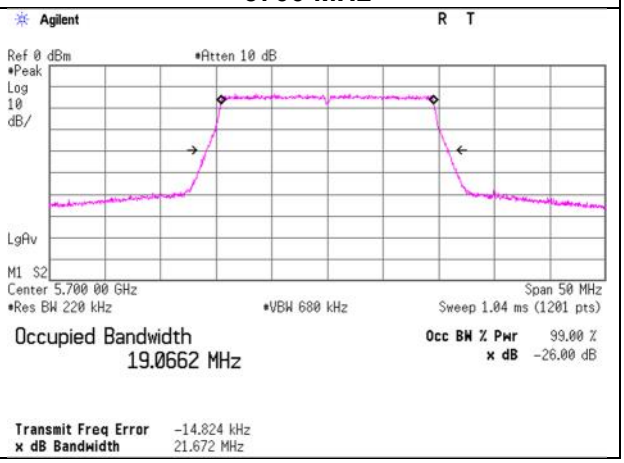
5580 MHz



5320 MHz



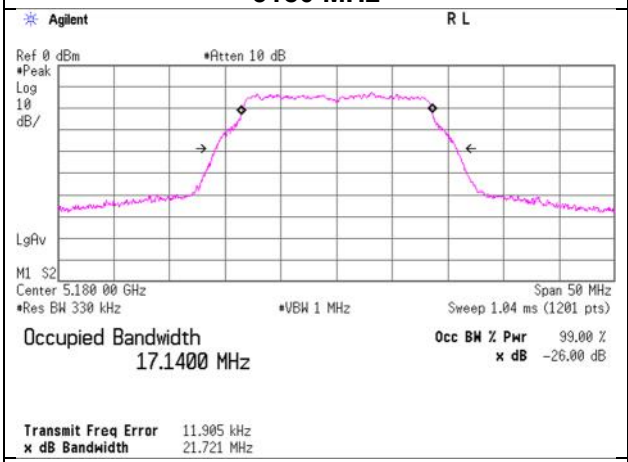
5700 MHz



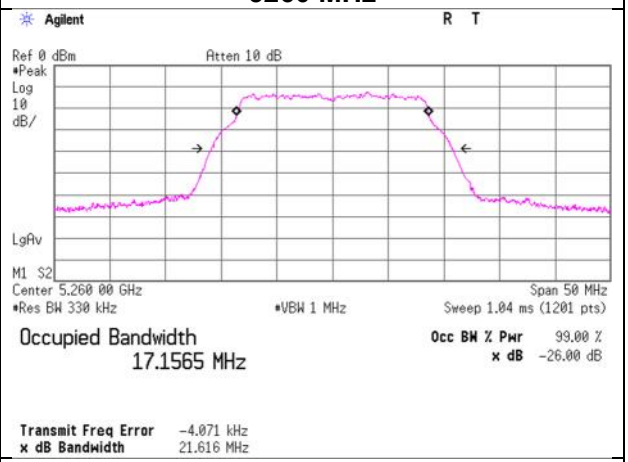
99 % Occupied Bandwidth

11a

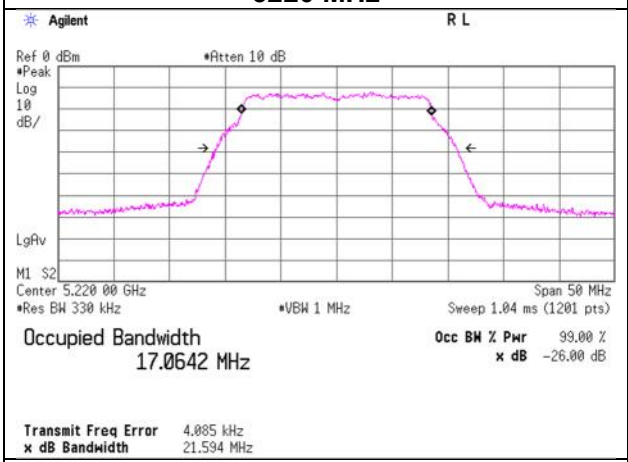
5180 MHz



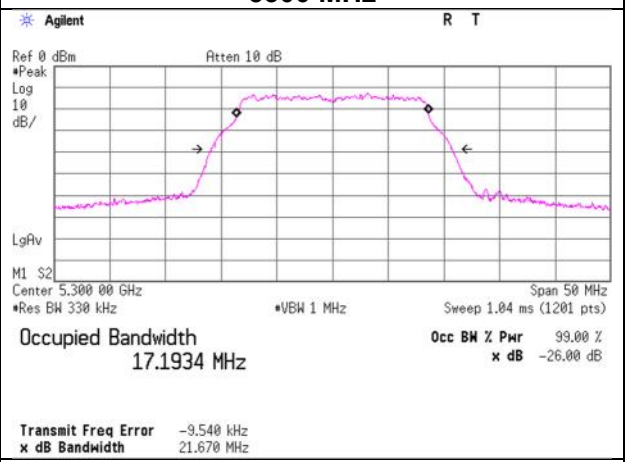
5260 MHz



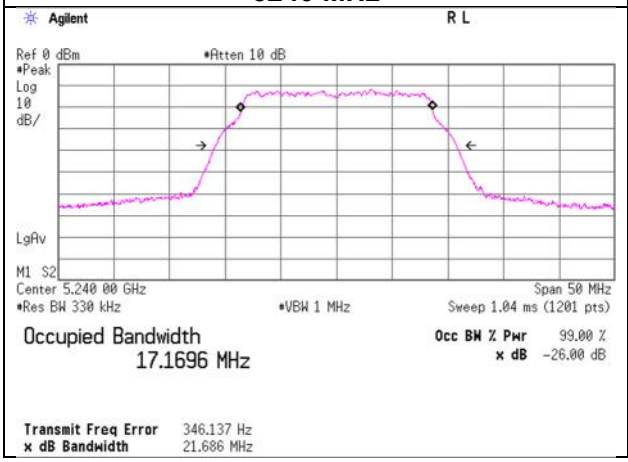
5220 MHz



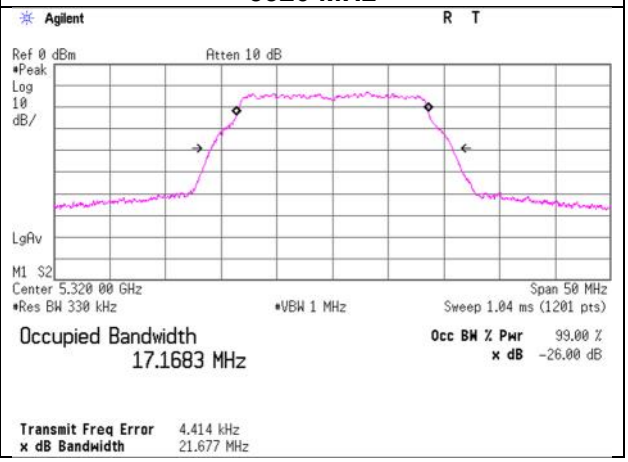
5300 MHz



5240 MHz



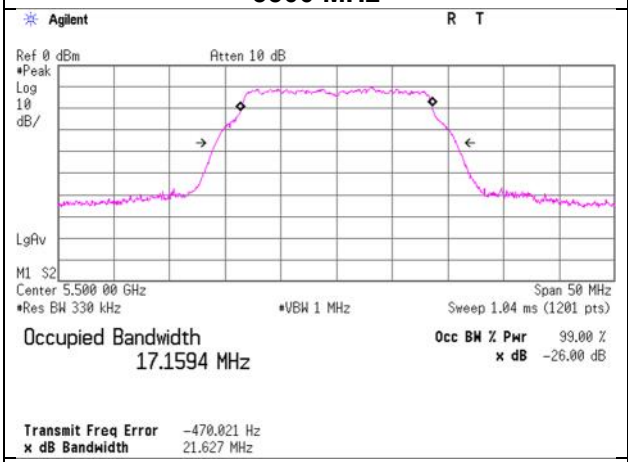
5320 MHz



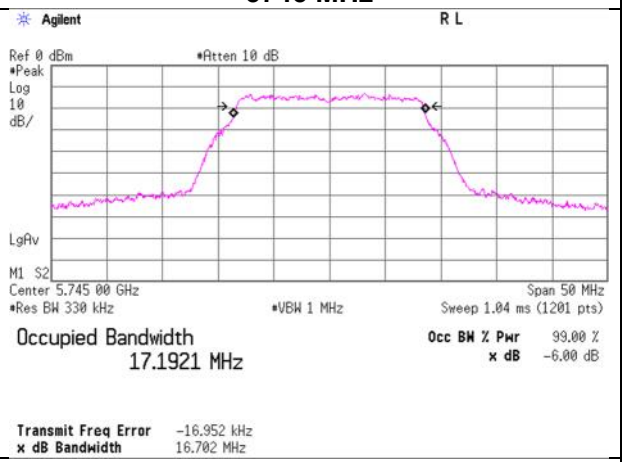
99 % Occupied Bandwidth

11a

5500 MHz



5745 MHz



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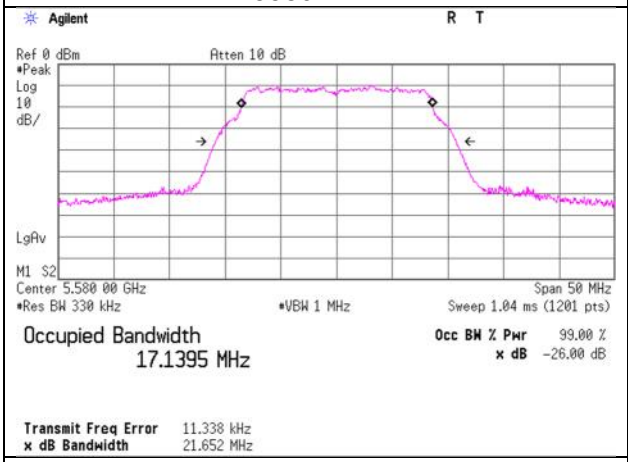

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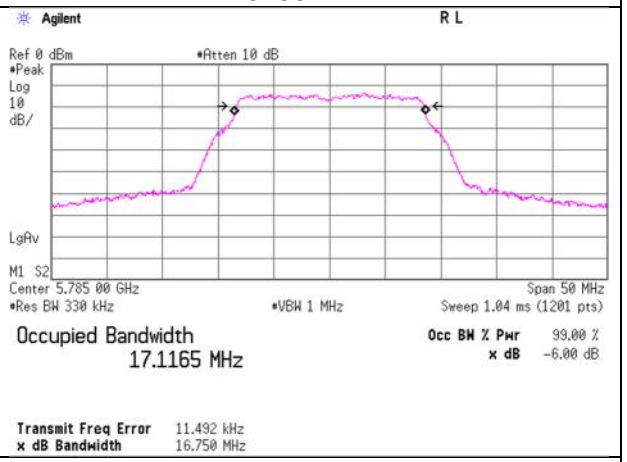

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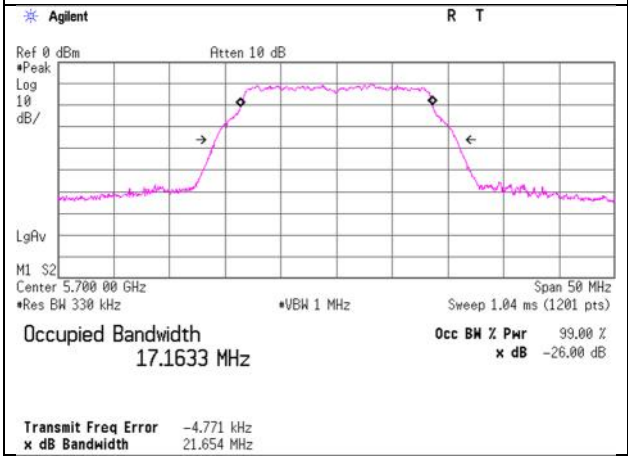

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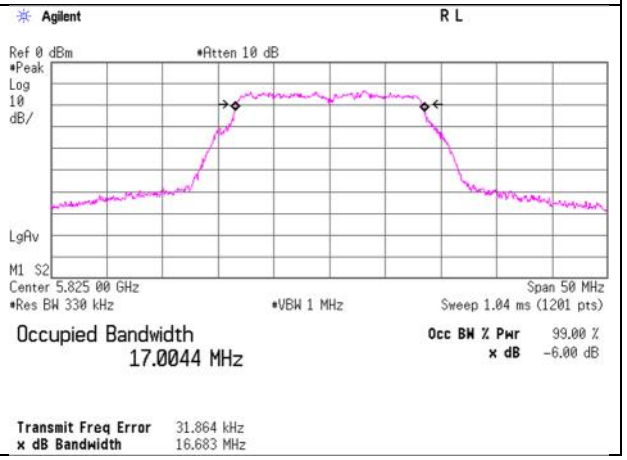
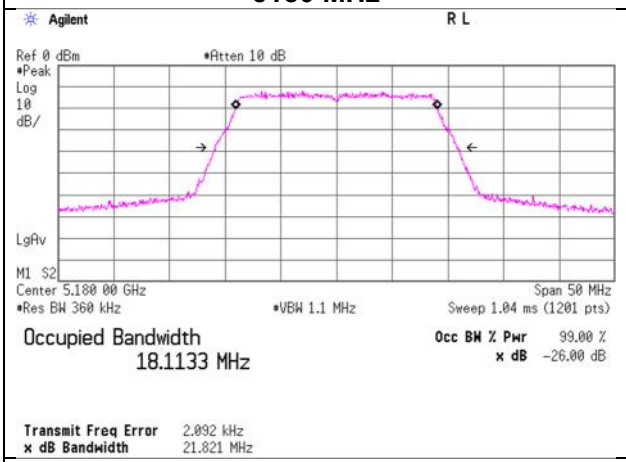


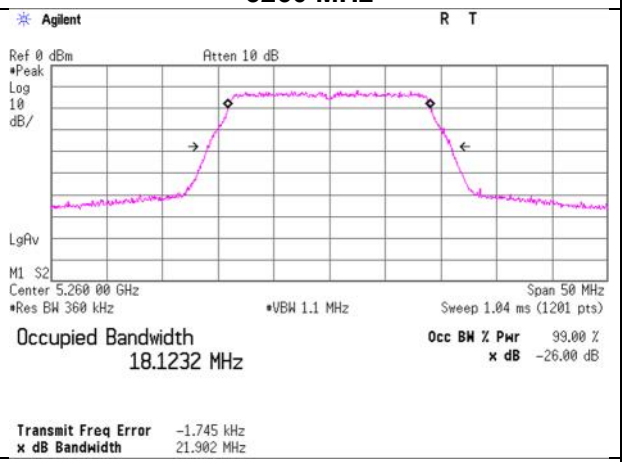
99 % Occupied Bandwidth

11n-20

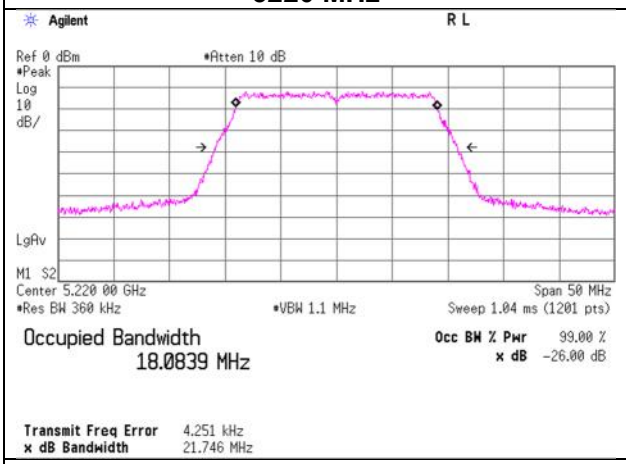
5180 MHz



5260 MHz



5220 MHz



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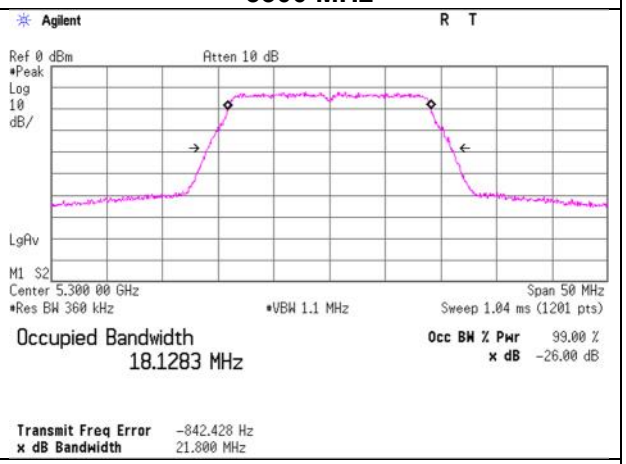
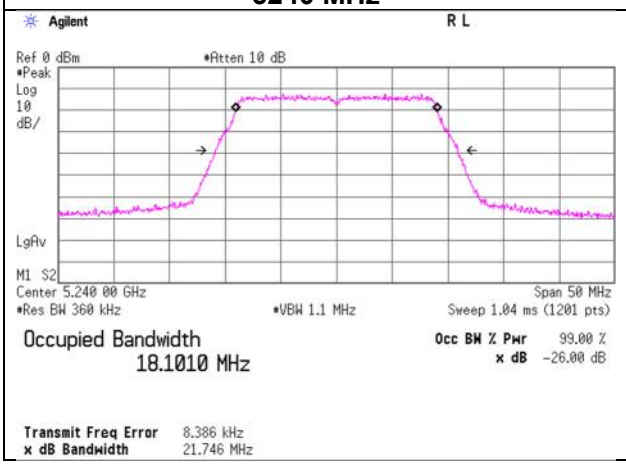


5240 MHz



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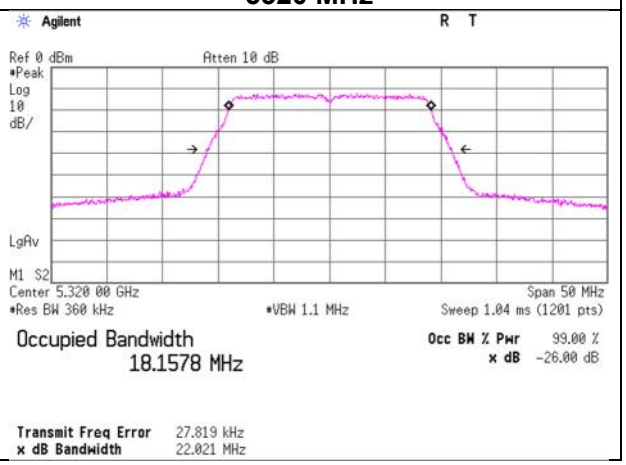
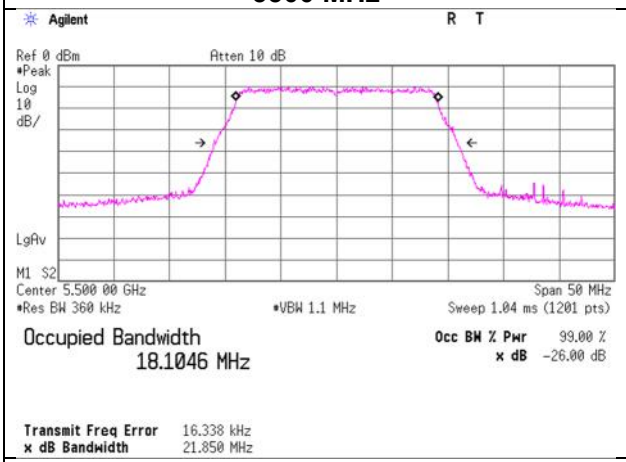


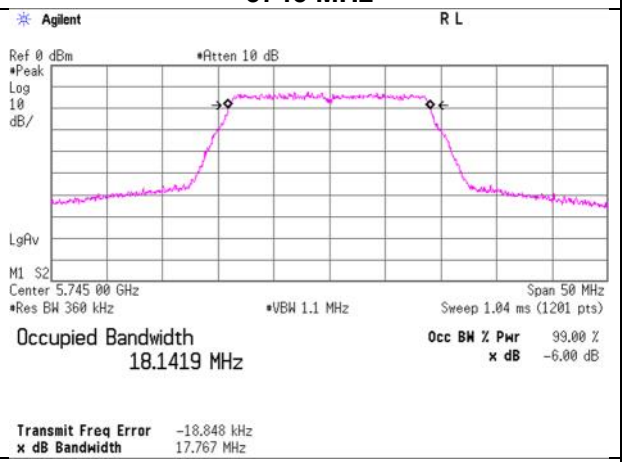
99 % Occupied Bandwidth

11n-20

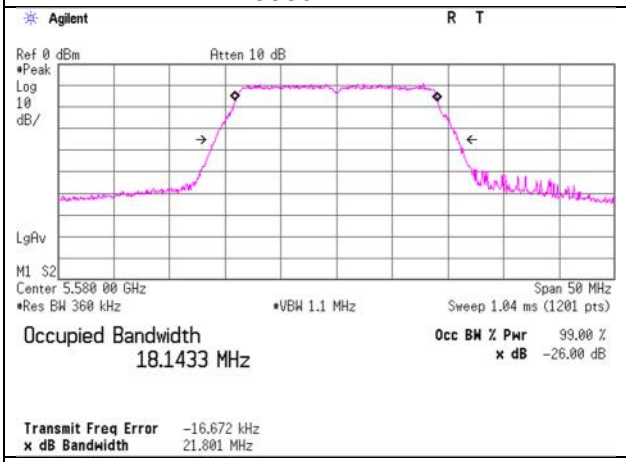
5500 MHz



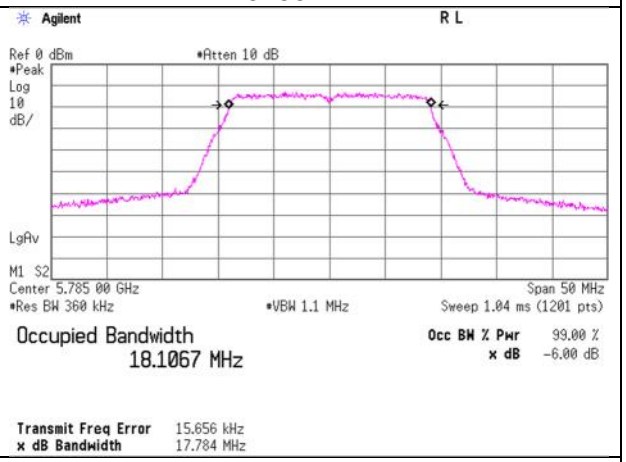
5745 MHz



5580 MHz



5785 MHz



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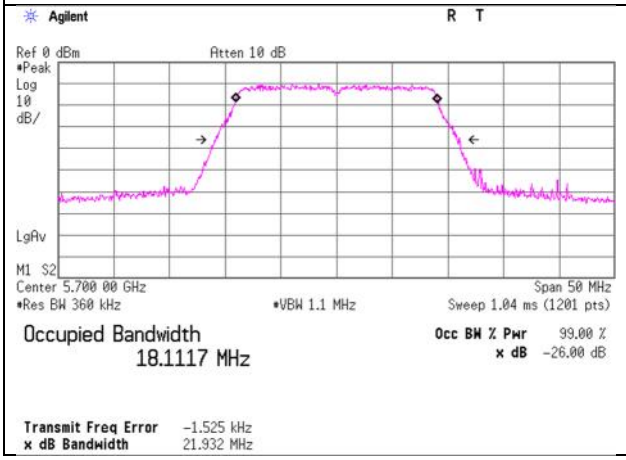
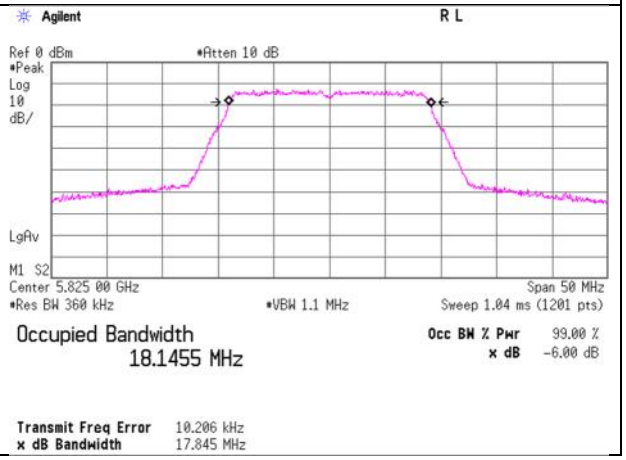


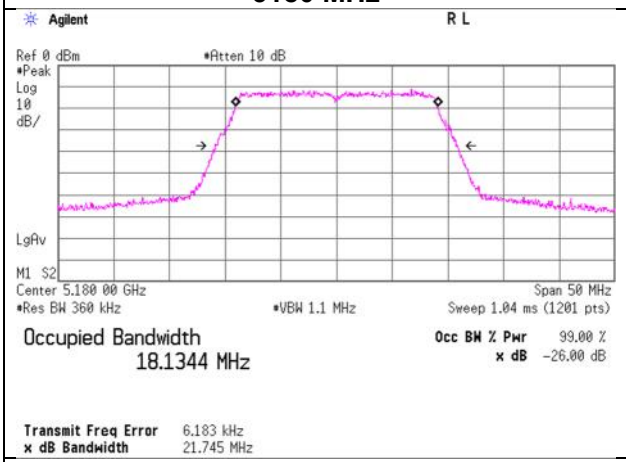
5825 MHz



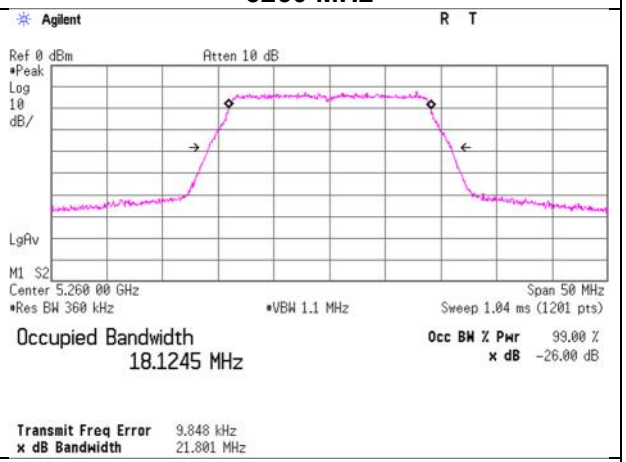
99 % Occupied Bandwidth

11ac-20

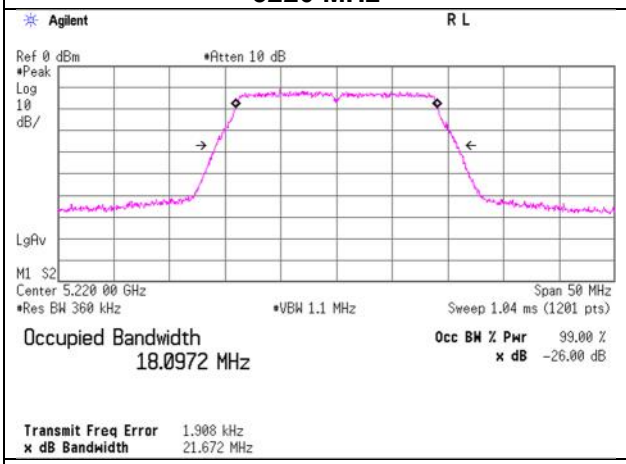
5180 MHz



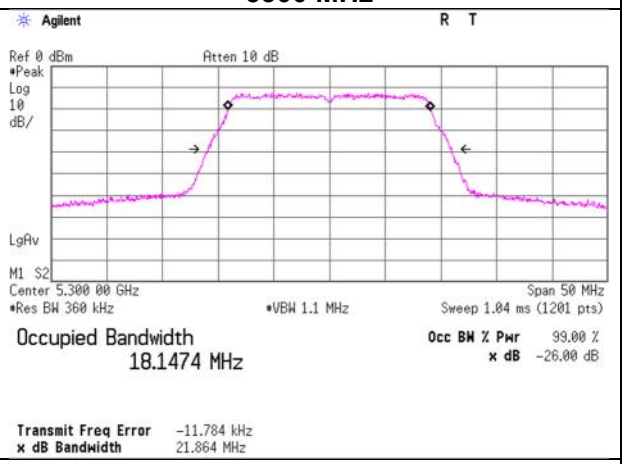
5260 MHz



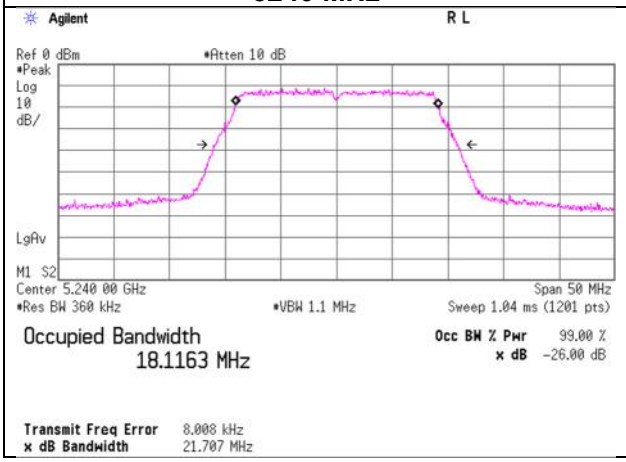
5220 MHz



5300 MHz



5240 MHz



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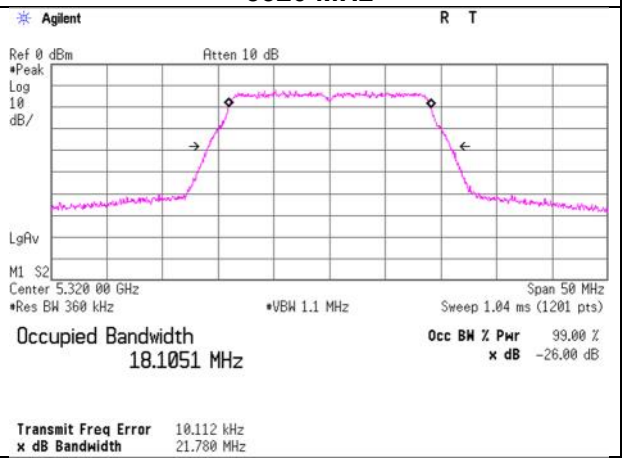
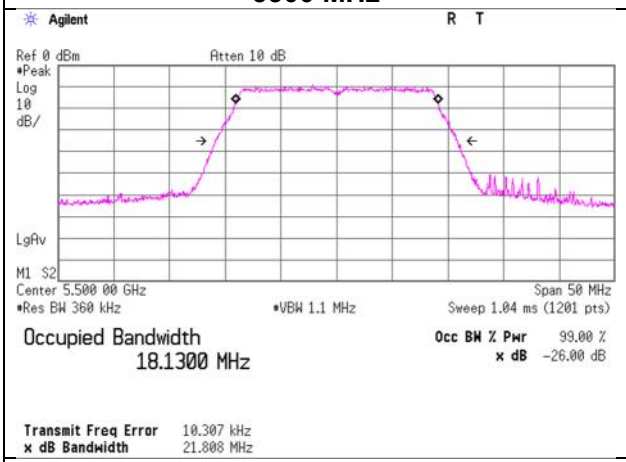


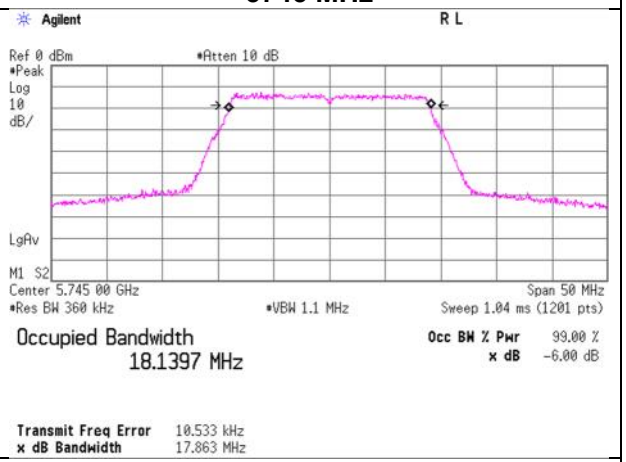
99 % Occupied Bandwidth

11ac-20

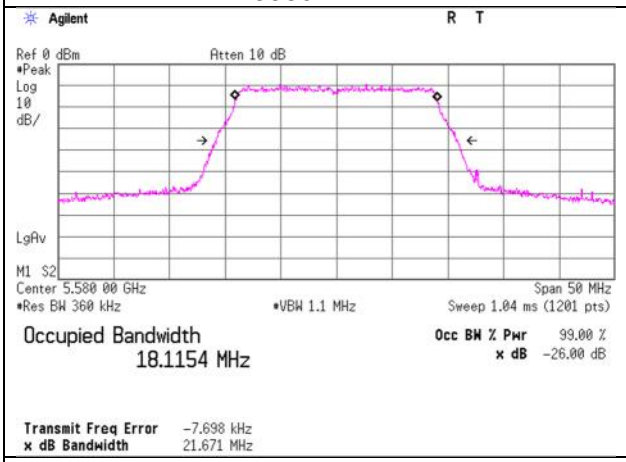
5500 MHz



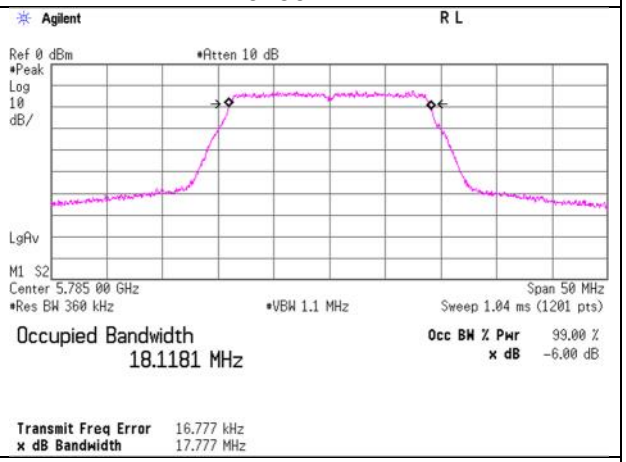
5745 MHz



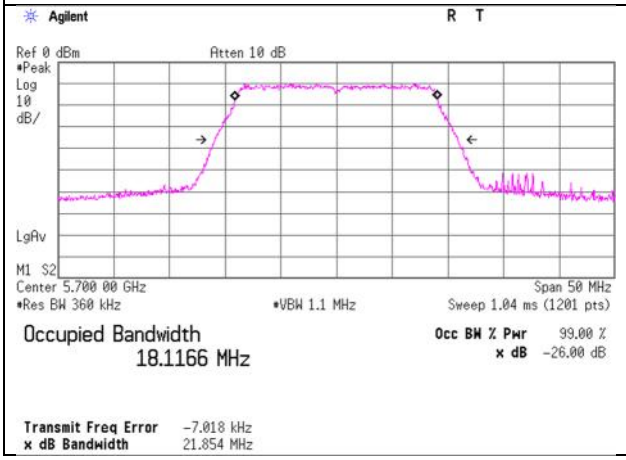
5580 MHz



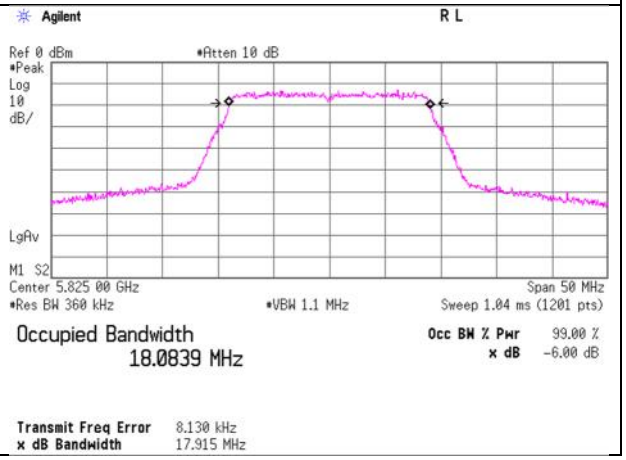
5785 MHz



5700 MHz



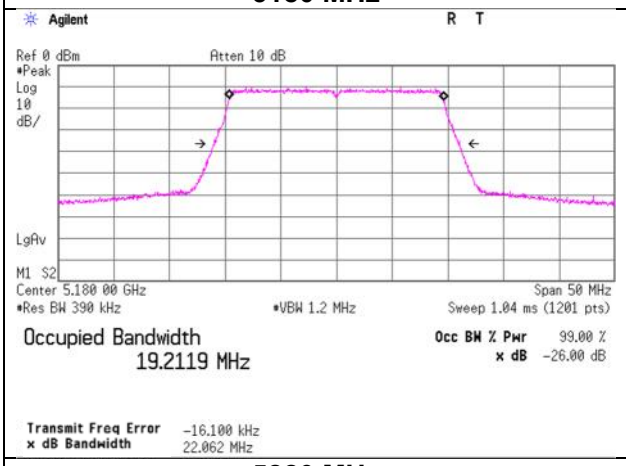
5825 MHz



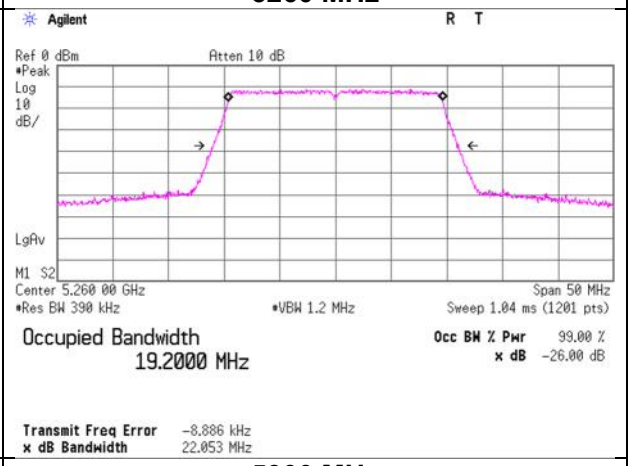
99 % Occupied Bandwidth

11ax-20 (OFDM)

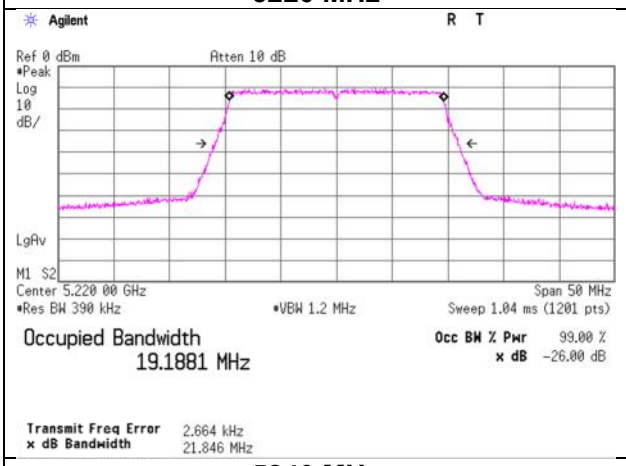
5180 MHz



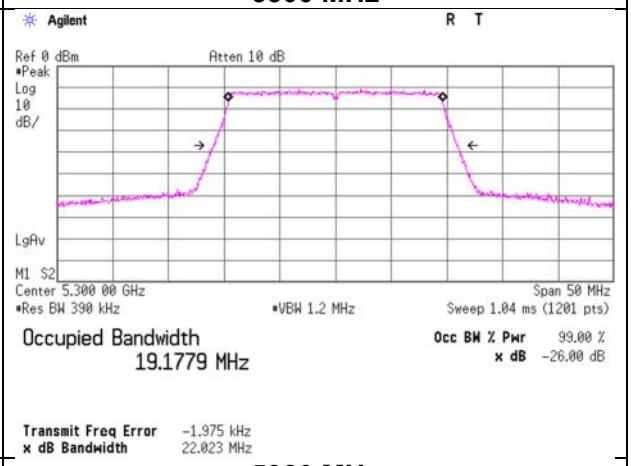
5260 MHz



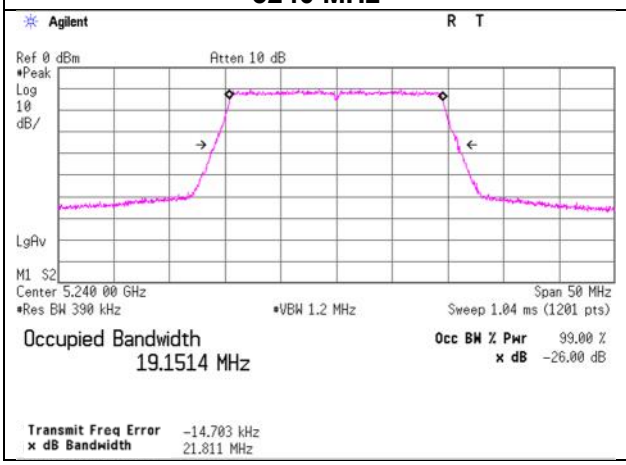
5220 MHz



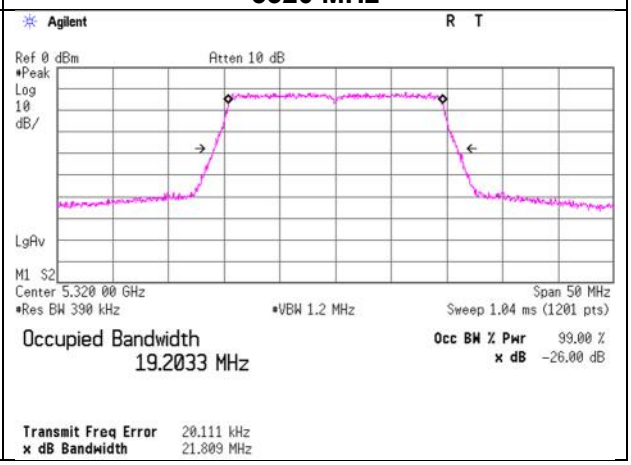
5300 MHz



5240 MHz



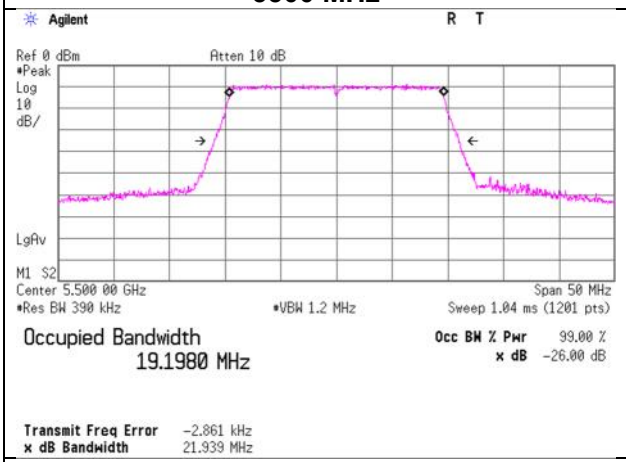
5320 MHz



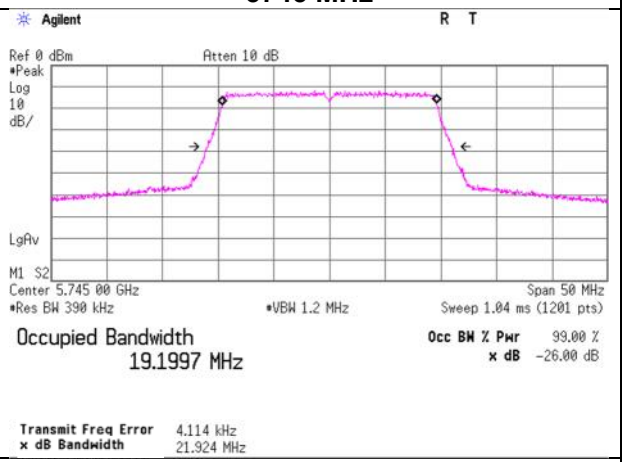
99 % Occupied Bandwidth

11ax-20 (OFDM)

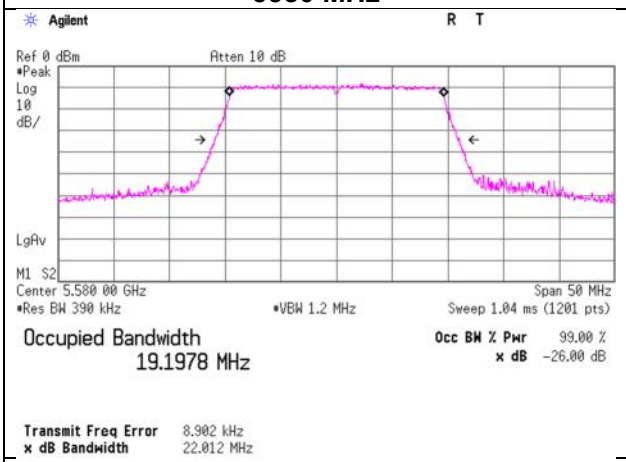
5500 MHz



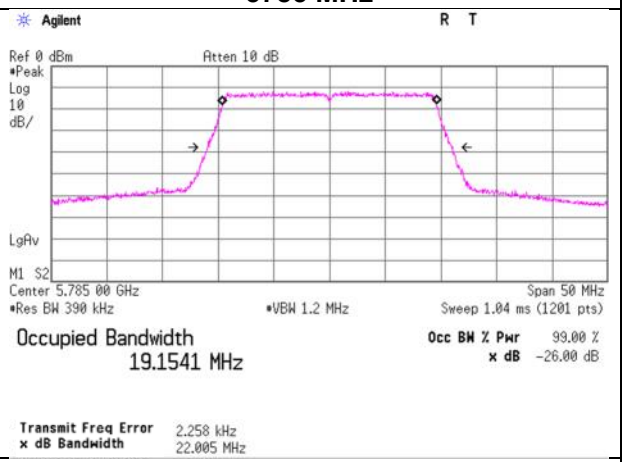
5745 MHz



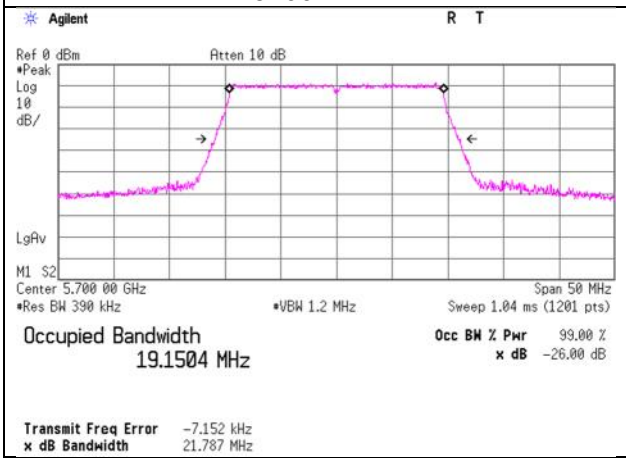
5580 MHz



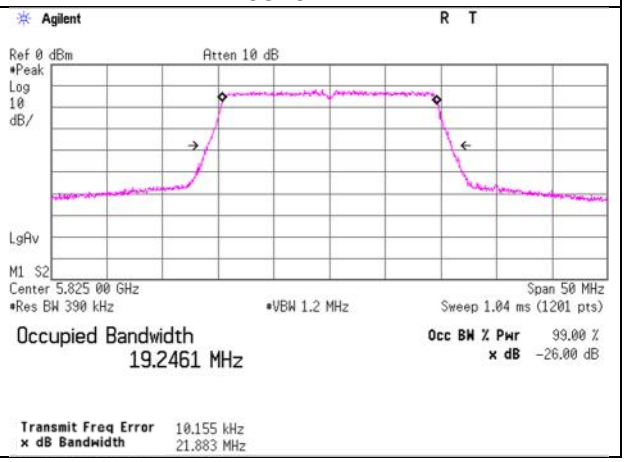
5785 MHz



5700 MHz

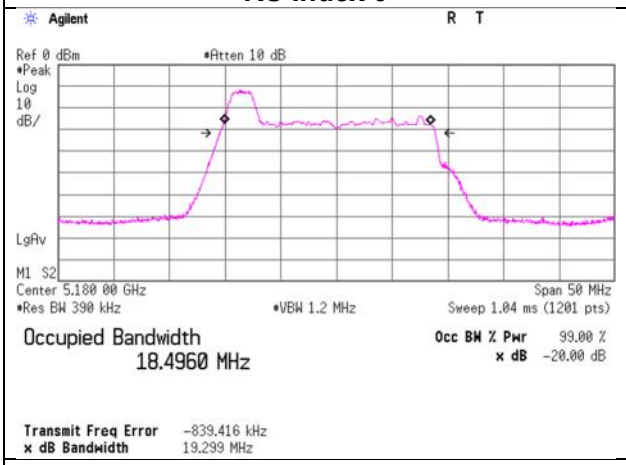
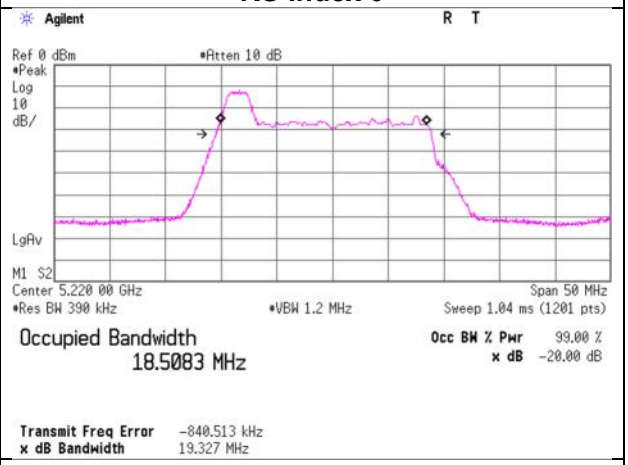
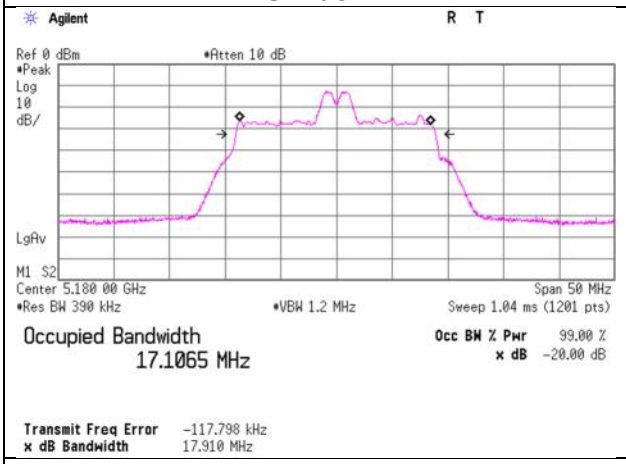
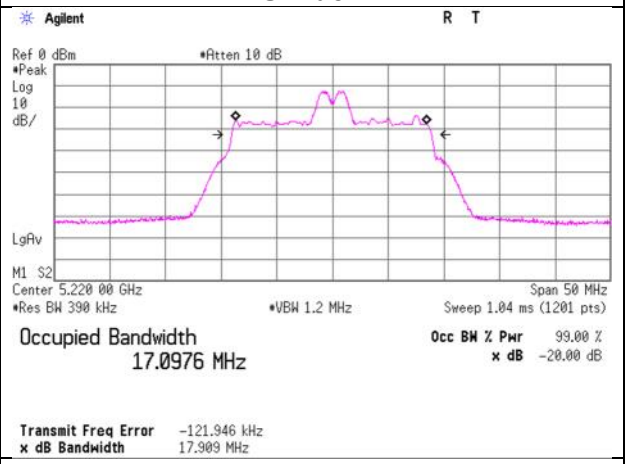
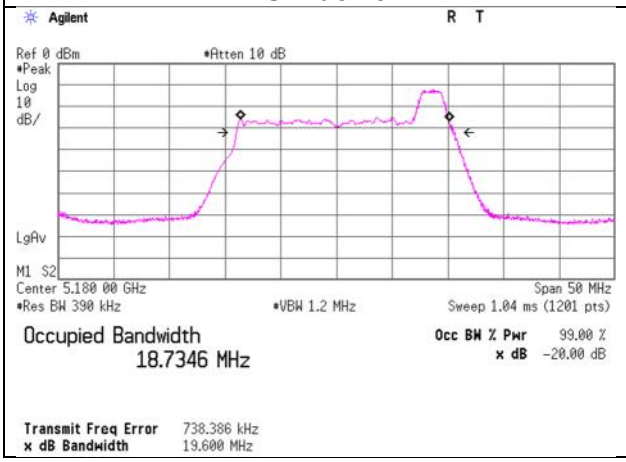
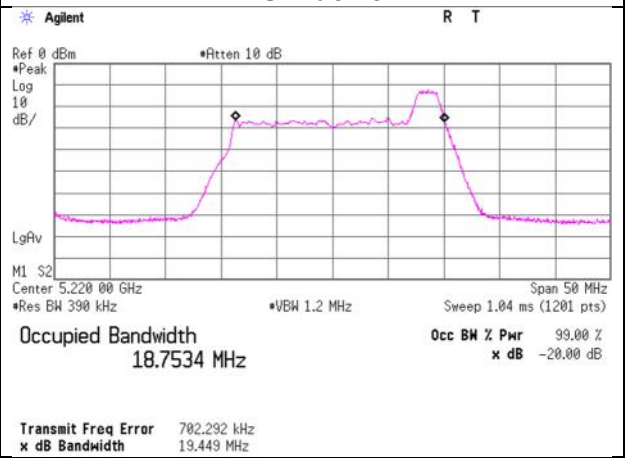


5825 MHz



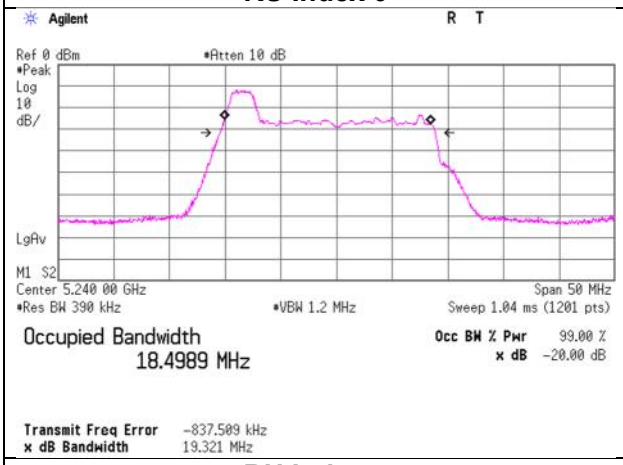
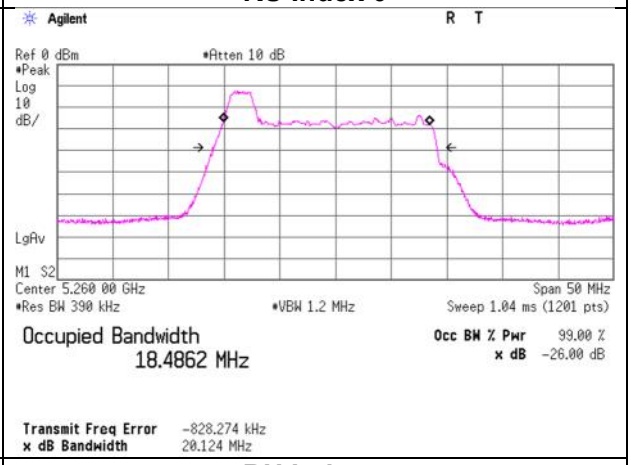
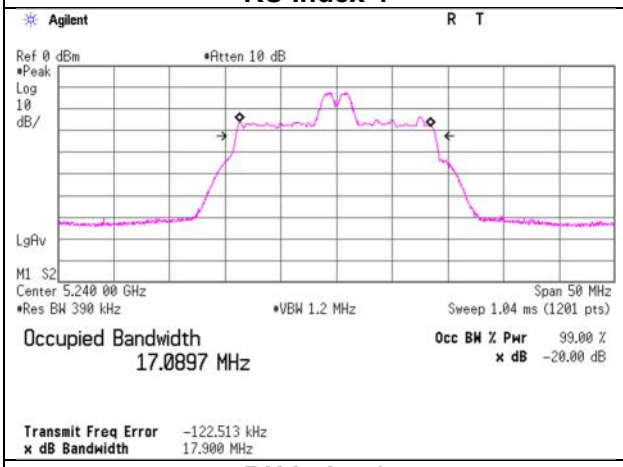
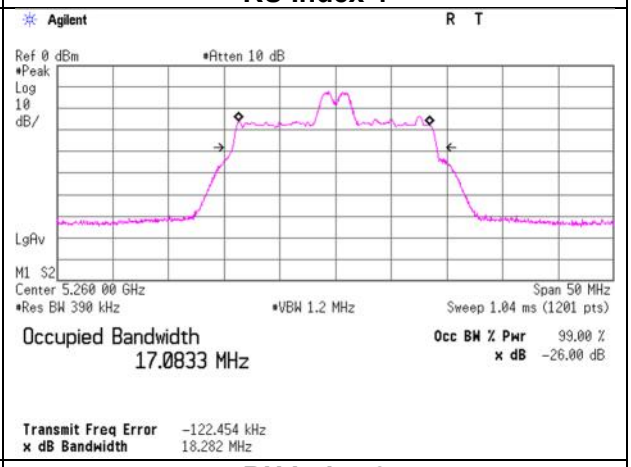
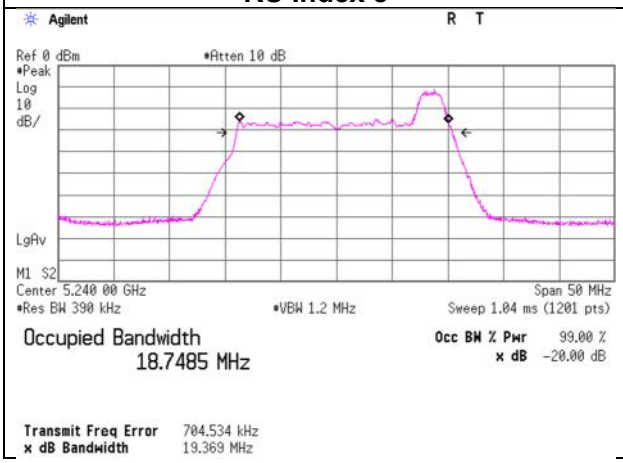
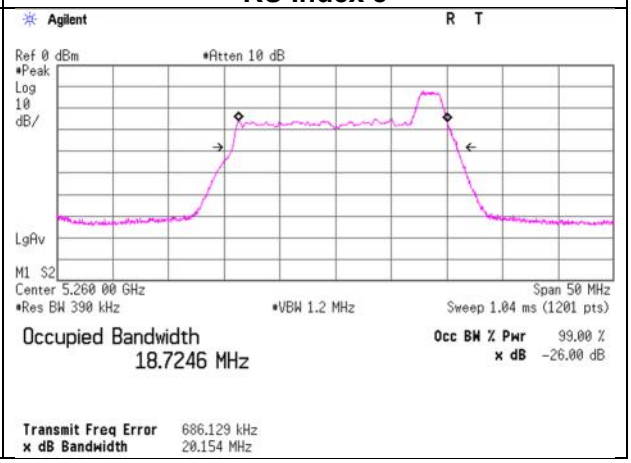
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5180 MHz	5220 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

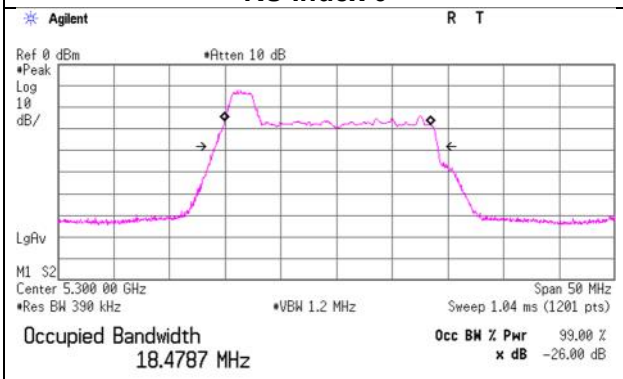
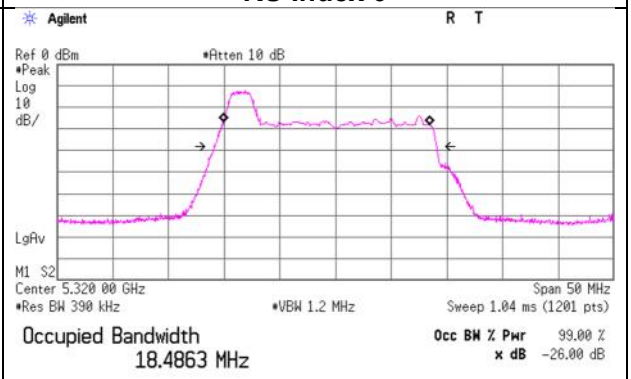
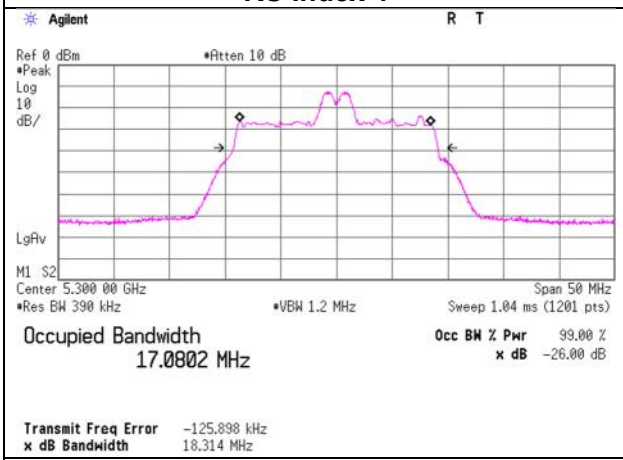
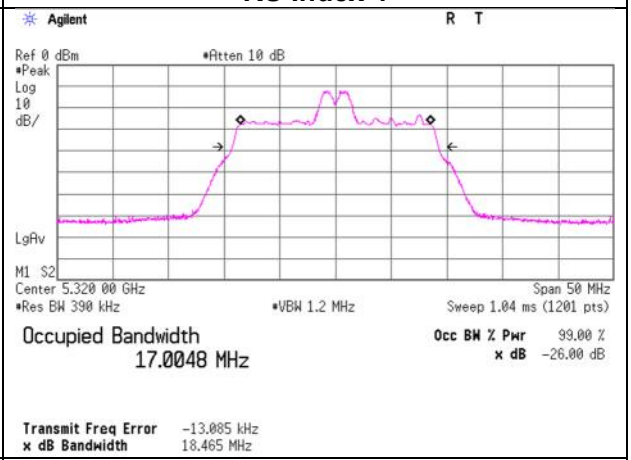
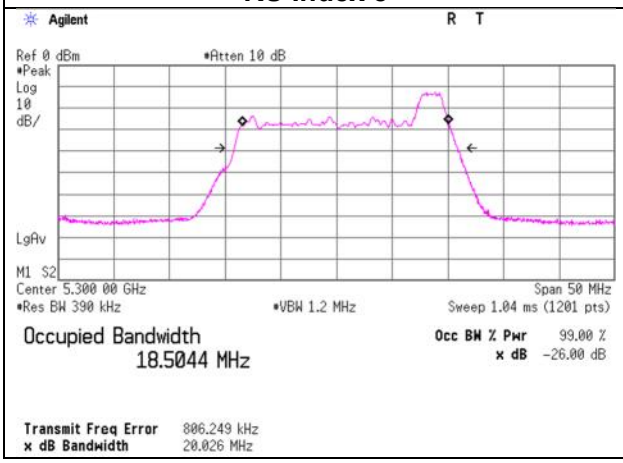
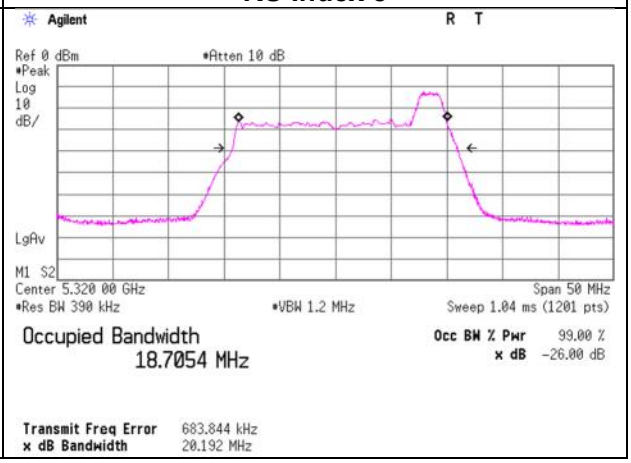
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5240 MHz	5260 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

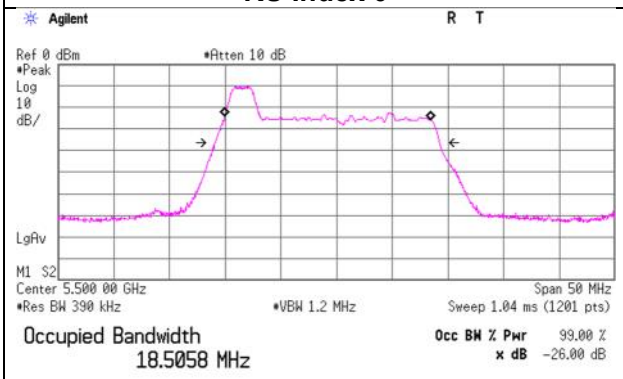
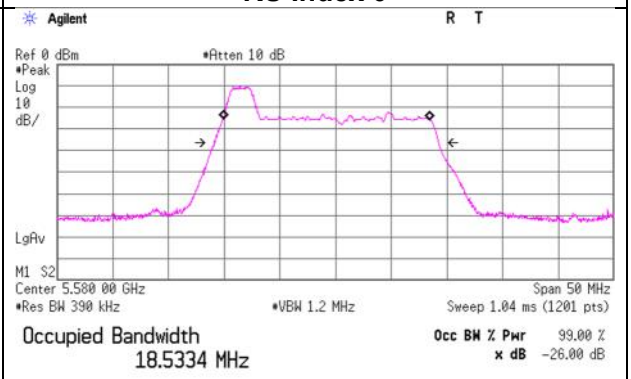
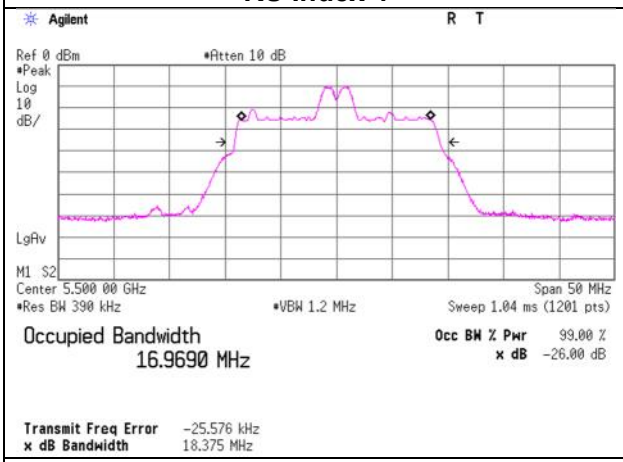
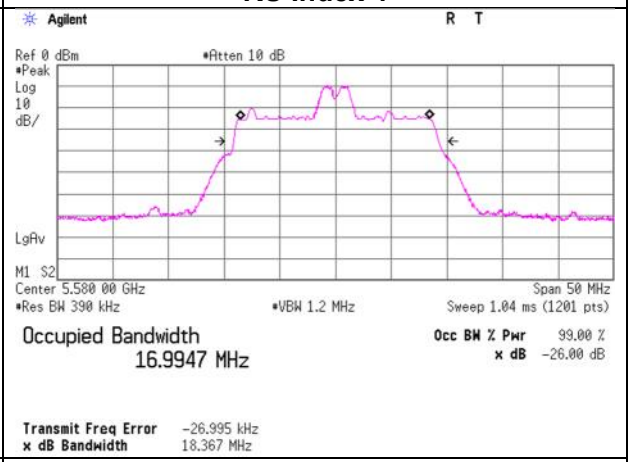
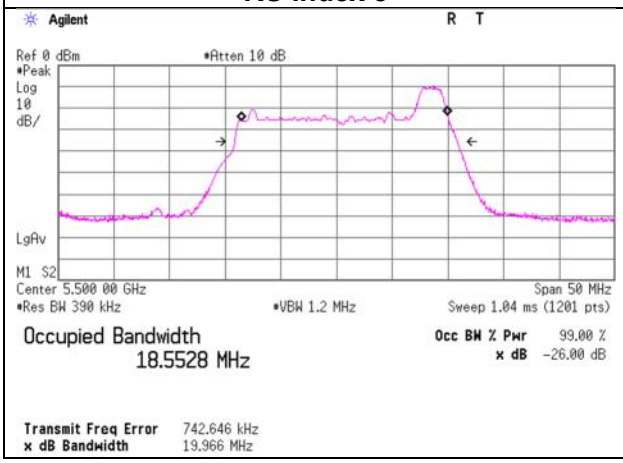
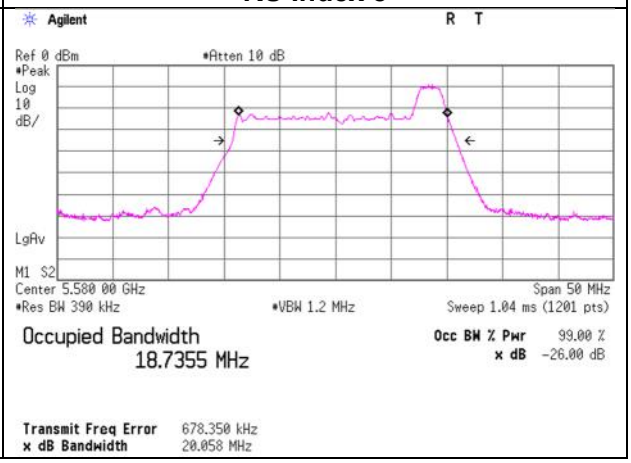
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5300 MHz	5320 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

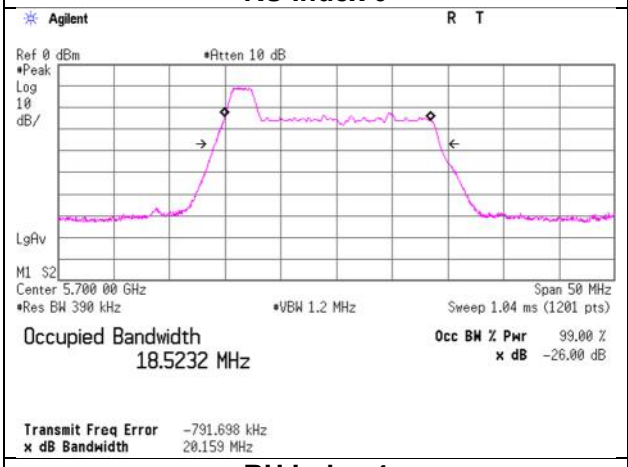
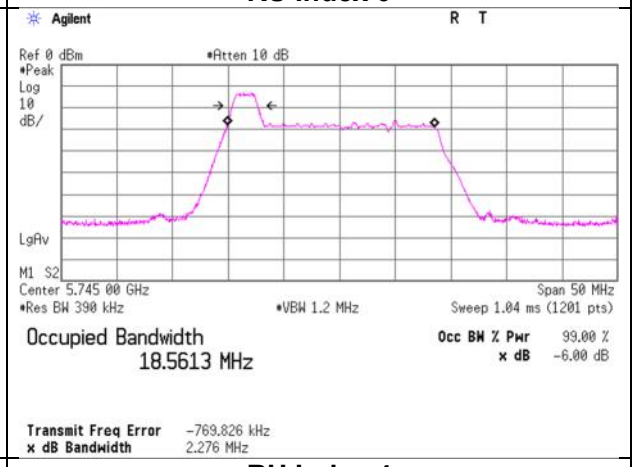
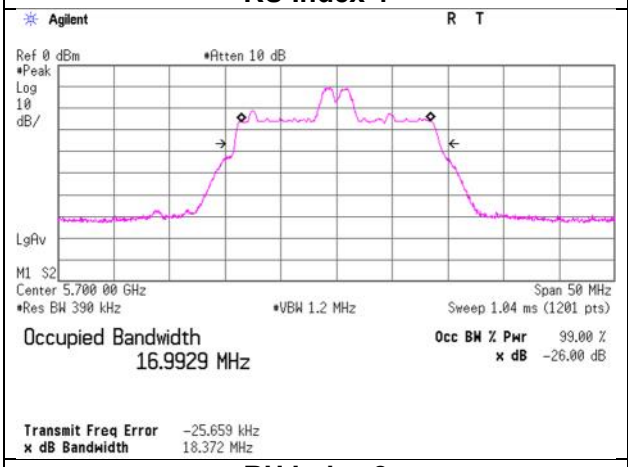
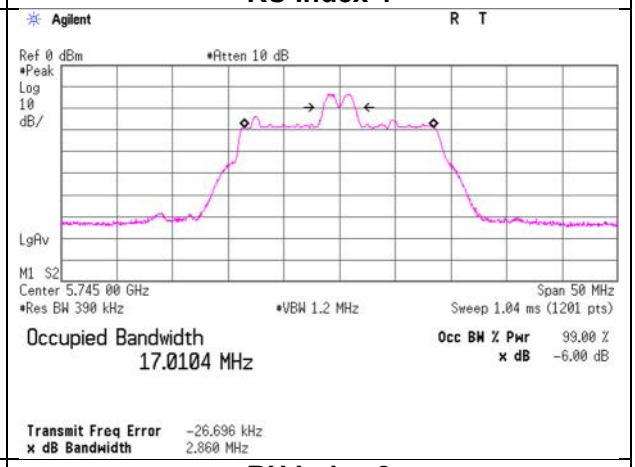
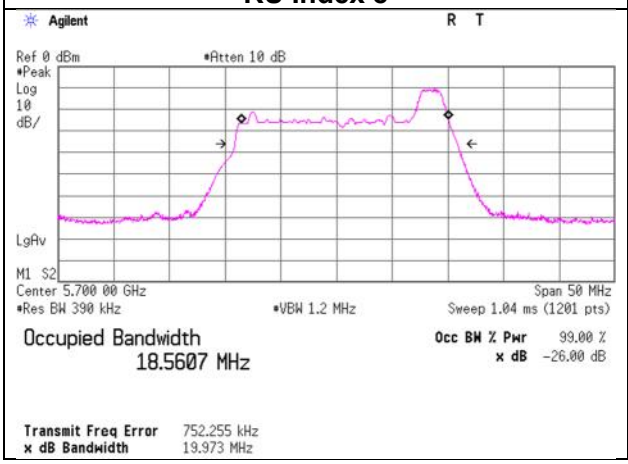
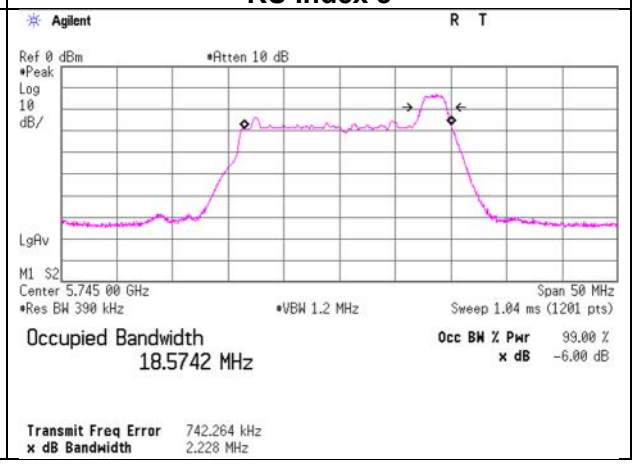
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5500 MHz	5580 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

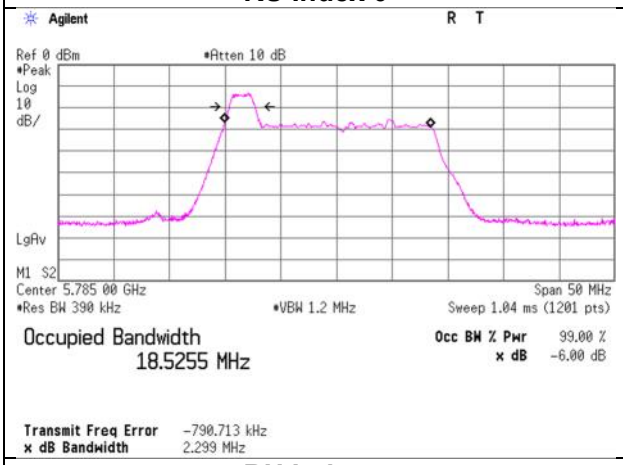
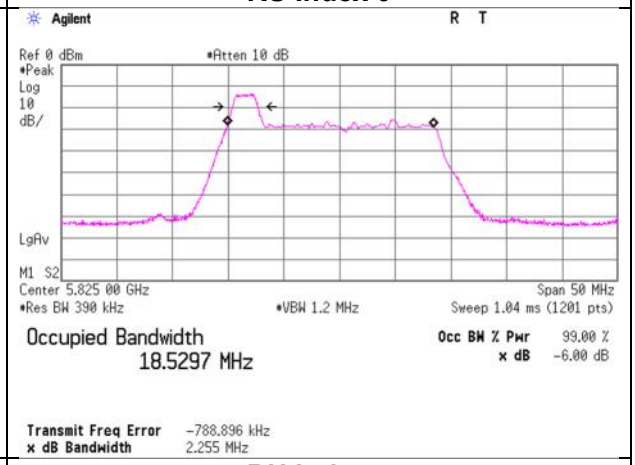
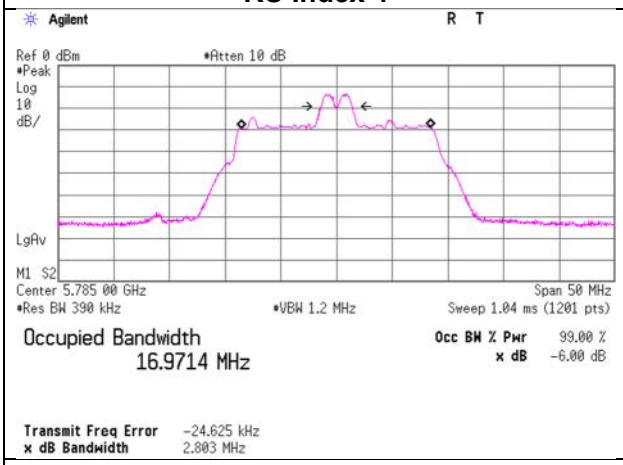
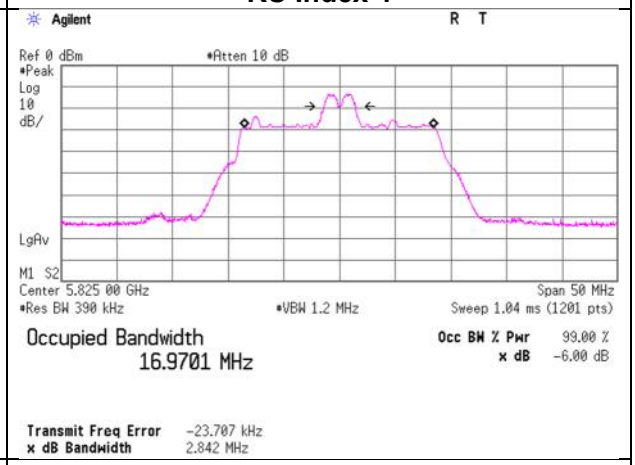
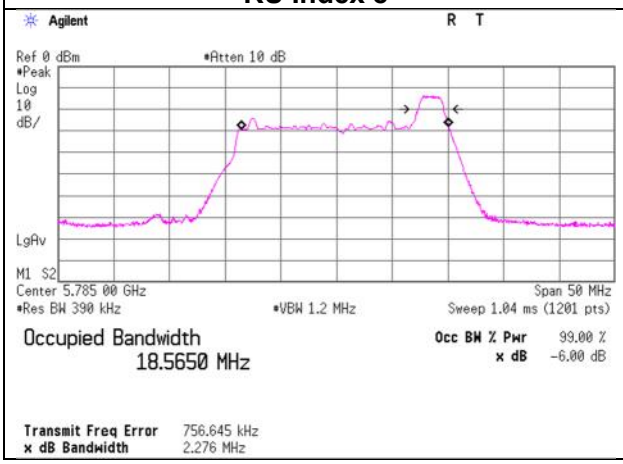
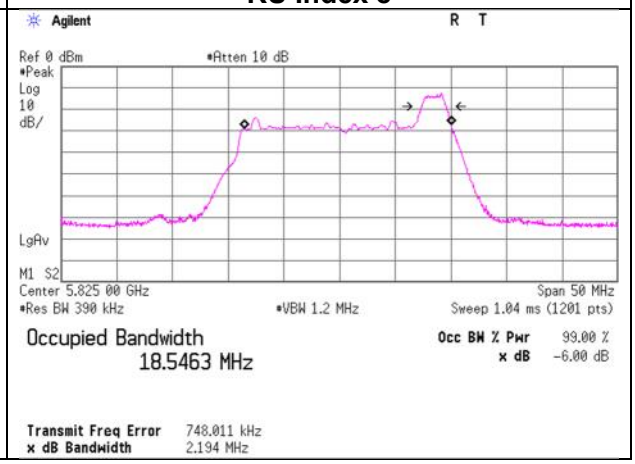
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5700 MHz	5745 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

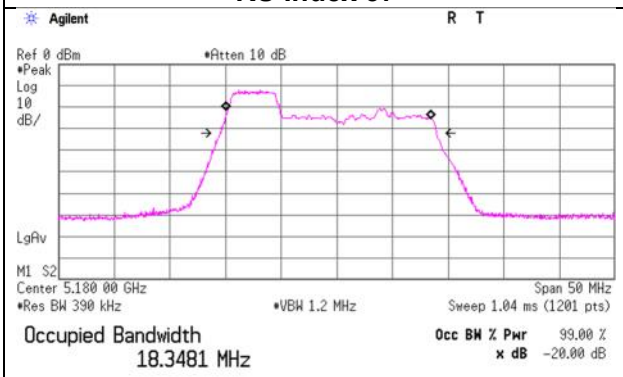
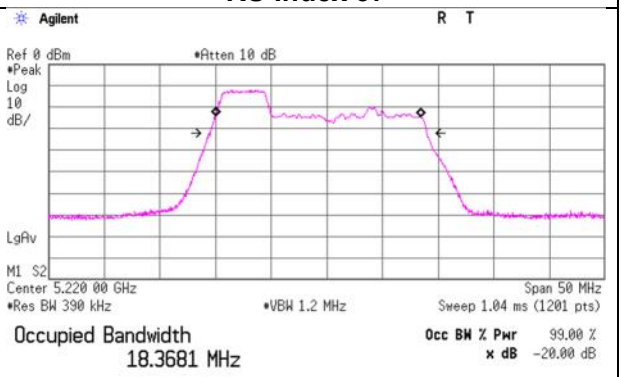
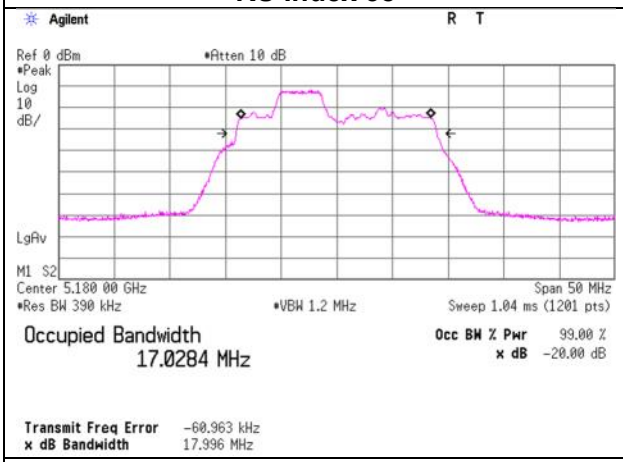
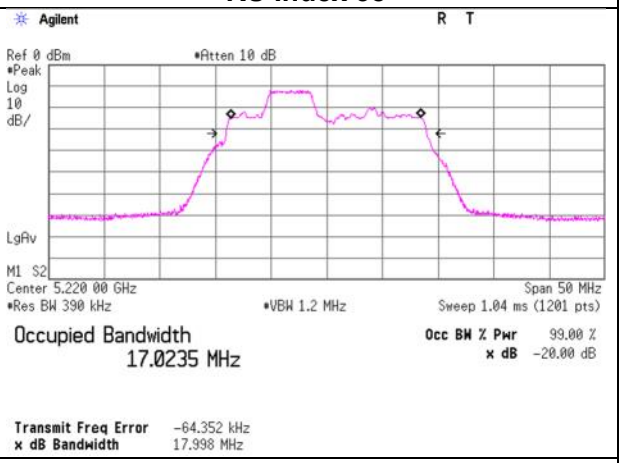
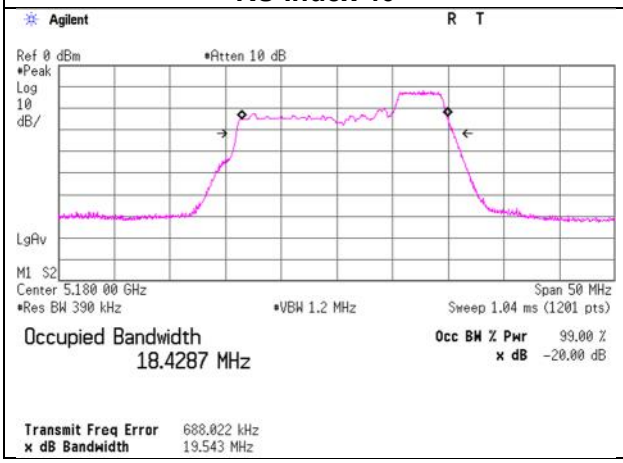
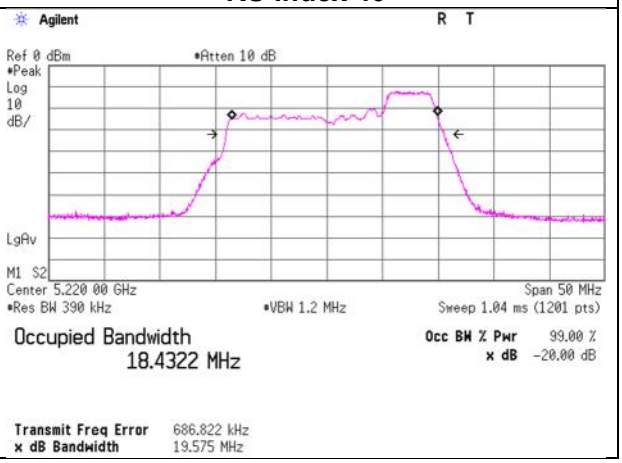
99 % Occupied Bandwidth

11ax-20 (OFDMA) 26-tone RU

5785 MHz	5825 MHz
RU Index 0	**RU Index 0**
	
RU Index 4	**RU Index 4**
	
RU Index 8	**RU Index 8**
	

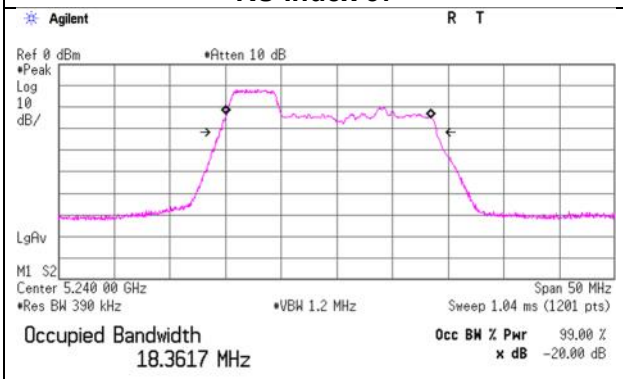
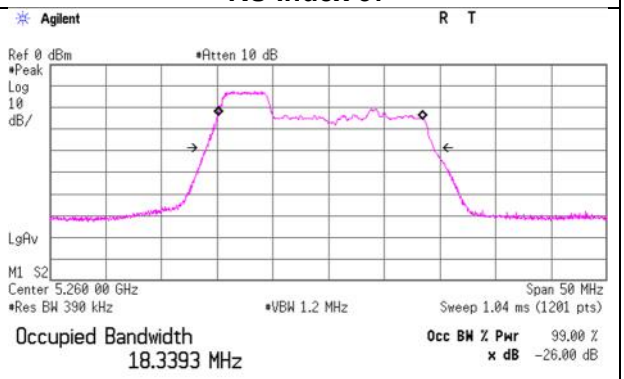
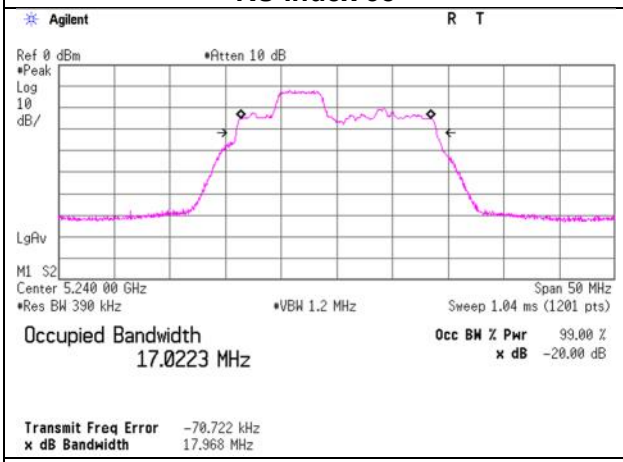
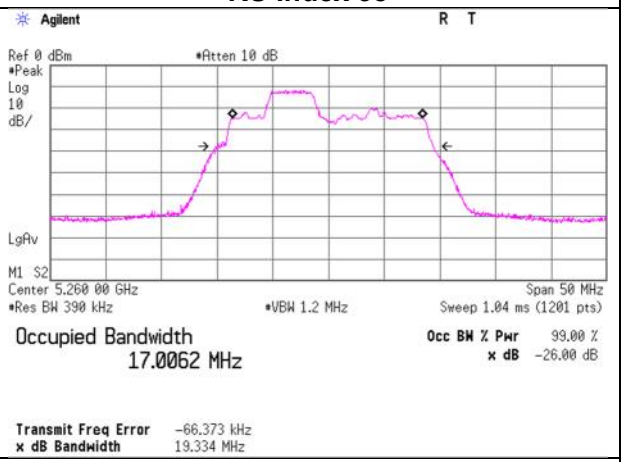
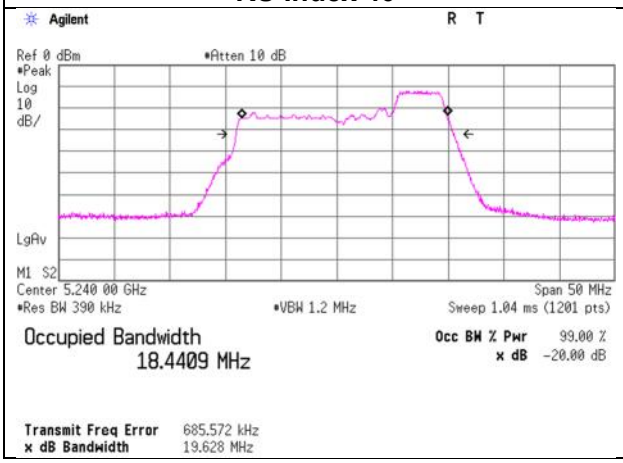
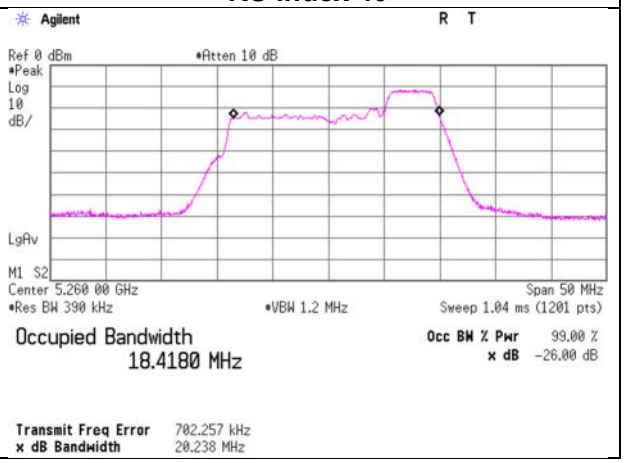
99 % Occupied Bandwidth

11ax-20 (OFDMA) 52-tone RU

5180 MHz	5220 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

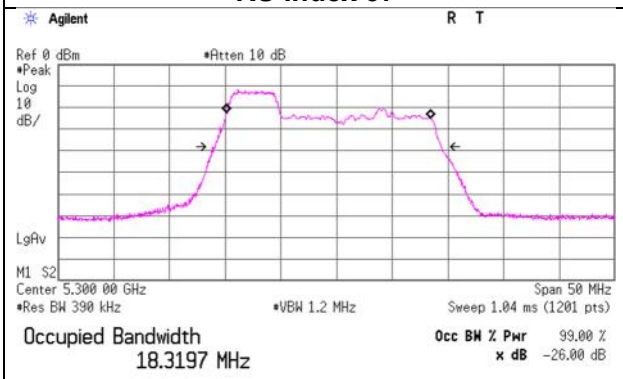
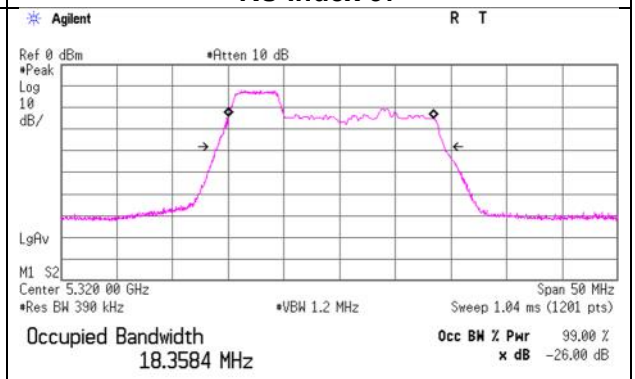
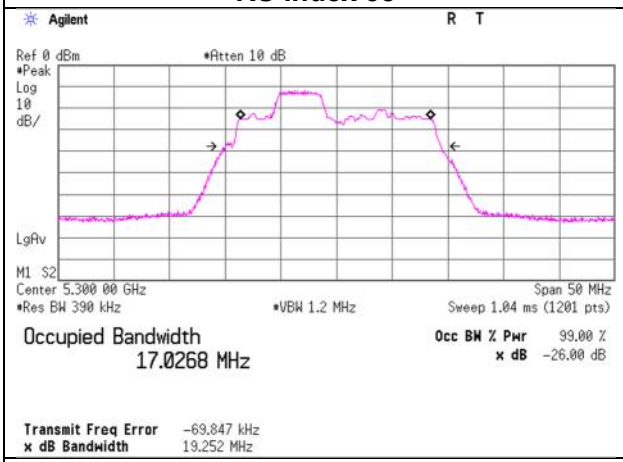
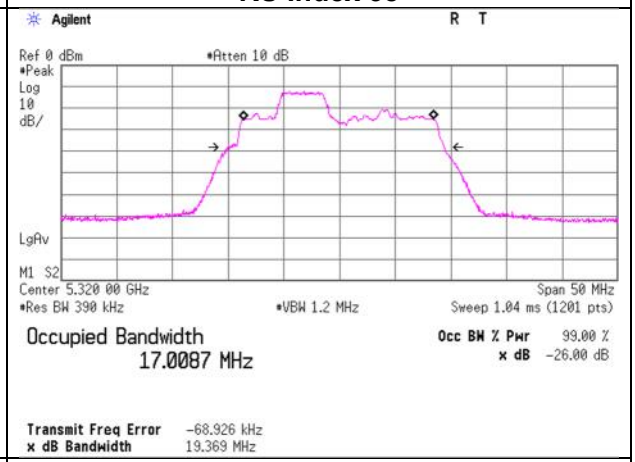
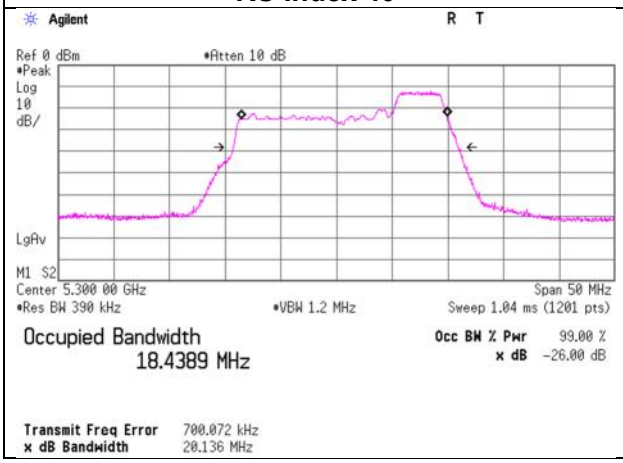
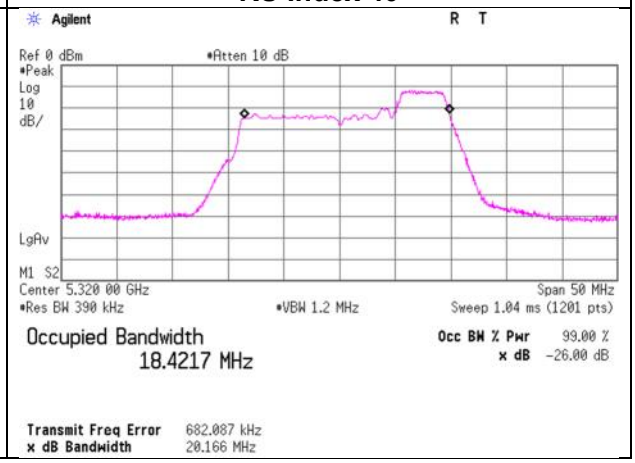
99 % Occupied Bandwidth

11ax-20 (OFDMA) 52-tone RU

5240 MHz	5260 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

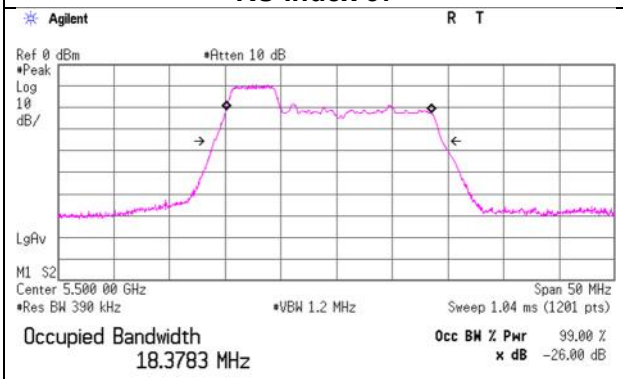
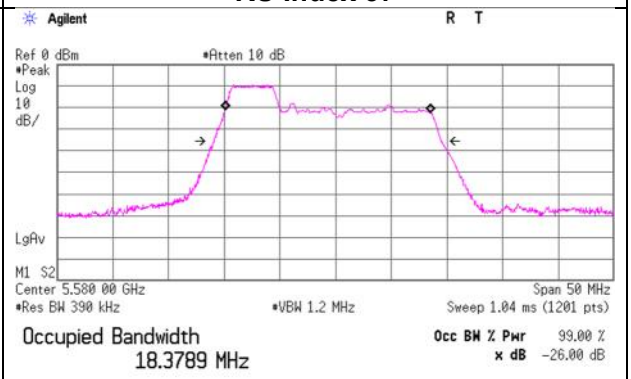
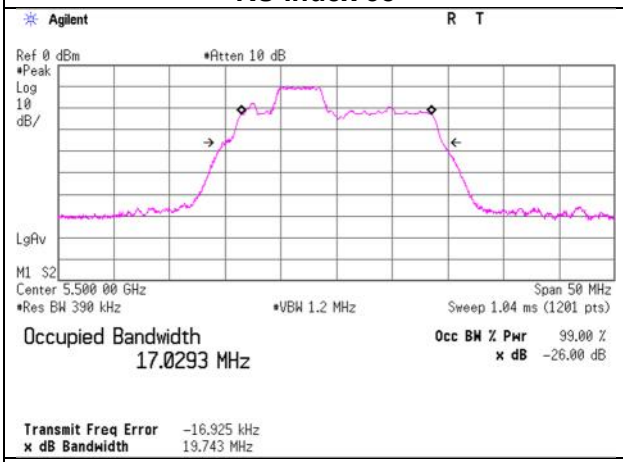
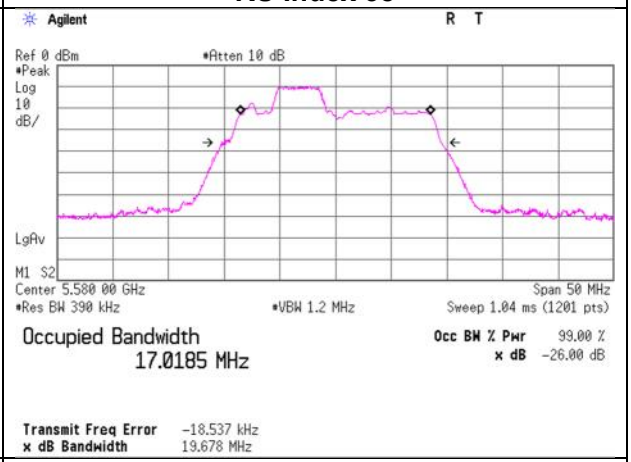
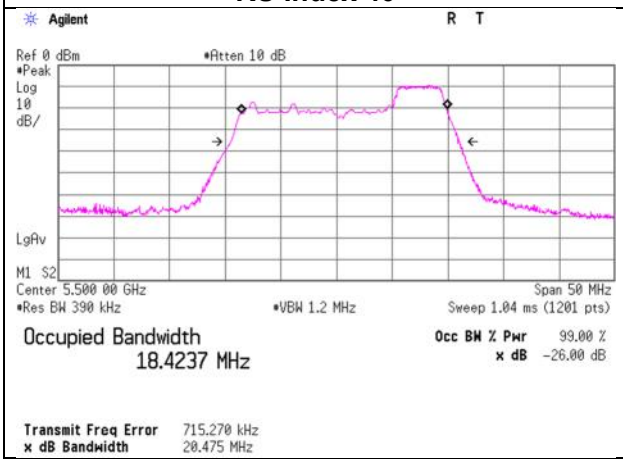
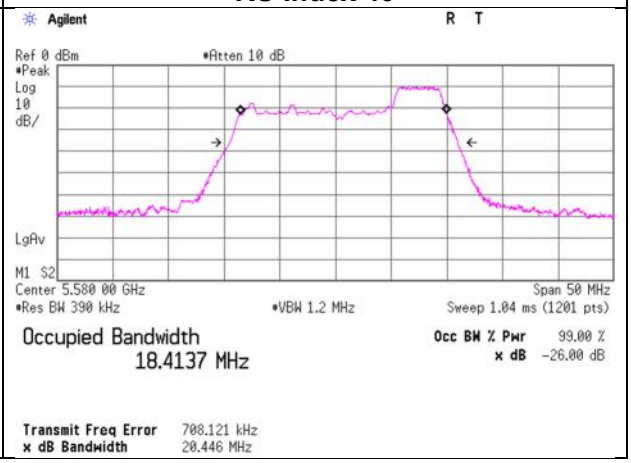
99 % Occupied Bandwidth

11ax-20 (OFDMA) 52-tone RU

5300 MHz	5320 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**
	

99 % Occupied Bandwidth

11ax-20 (OFDMA) 52-tone RU

5500 MHz	5580 MHz
RU Index 37	**RU Index 37**
	
RU Index 38	**RU Index 38**
	
RU Index 40	**RU Index 40**