



RADIO TEST REPORT

Test Report No. : 13170804H-C-R1

Applicant : Sony Interactive Entertainment Inc.
Type of EUT : Wireless communication module
Model Number of EUT : J20H100
FCC ID : AK8M19DFR1
Test regulation : FCC Part 15 Subpart E: 2020
(Except for DFS test)
Test Result : Complied (Refer to SECTION 3.2)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.
8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 13170804H-C. 13170804H-C is replaced with this report.

Date of test: December 17, 2019 to May 20, 2020

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

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REVISION HISTORY

Original Test Report No.: 13170804H-C

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13170804H-C	June 3, 2020	-	-
1	13170804H-C-R1	June 10, 2020	P19	Corrected the Test setup; Frequency range 10 GHz - 26.5 GHz ↓ 10 GHz - 40 GHz
1	13170804H-C-R1	June 10, 2020	P932 - 933	Added Item H: DC Power supply and Cable No.7: AC Cable

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Reference: Abbreviations (Including words undescribed in this report)

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

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CONTENTS	PAGE
SECTION 1: Customer information.....	5
SECTION 2: Equipment under test (EUT).....	5
SECTION 3: Test specification, procedures & results.....	8
SECTION 4: Operation of EUT during testing.....	12
SECTION 5: Conducted Emission.....	16
SECTION 6: Radiated Spurious Emission and Band Edge Compliance.....	17
SECTION 7: Antenna Terminal Conducted Tests.....	20
APPENDIX 1: Test data	21
Conducted Emission	21
26 dB Emission Bandwidth and 99 % Occupied Bandwidth.....	22
6 dB Bandwidth	172
Maximum Conducted Output Power	198
Average Output Power.....	267
Maximum Power Spectral Density	289
Radiated Spurious Emission (PIFA Antenna).....	482
Radiated Spurious Emission (IFA Antenna).....	702
Conducted Spurious Emission	922
APPENDIX 2: Test instruments	923
APPENDIX 3: Photographs of test setup	926
Conducted Emission	926
Radiated Spurious Emission	927
Worst Case Position.....	929
Test Configuration and peripherals.....	932

SECTION 1: Customer information

Company Name	Sony Interactive Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-50-3807-5639
Facsimile Number	+81-50-3807-9594
Contact Person	Miho Nakamura

***Remarks:**

Sony Interactive Entertainment Inc. designates Foxconn Industrial Internet Co Ltd as manufacturer of the product (Wireless communication module).

The information provided from the customer is as follows;

- Applicant, Type 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
- SECTION 4: Operation of EUT during testing
- * The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type	Wireless communication module
Model Number	J20H100
Serial Number	Refer to SECTION 4.2
Country of Manufacture	China
Receipt Date	December 16, 2019
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No modification by the test lab.

2.2 Product Description

Model: J20H100 (referred to as the EUT in this report) is a Wireless communication module.

Product Specification

Operating Temperature	-5 deg. C to 85 deg. C
Power Supply	DC 3.3 V, DC 1.8 V

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Radio Specification

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 (IEEE802.11ax only)	20 MHz: 26/52/106/242-tone RU
Bandwidth & Channel spacing	Less than 20 MHz & 5 MHz	
Method of frequency generation	Synthesizer	
Antenna Type *1)	PIFA	IFA
Antenna Gain: G_{ANT}	Antenna 1: 6.0 dBi Antenna 2: 6.0 dBi	Antenna 1: 4.0 dBi Antenna 2: 3.5 dBi
Directional Gain *2)	9.01 dBi	6.76 dBi
Maximum clock frequency	320 MHz	

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 M Band: 5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz ----- 40 M Band: 5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz ----- 80 M Band: 5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz	
Type of Modulation	OFDM	
	OFDMA (IEEE802.11ax only)	20 MHz: 26/52/106/242-tone RU
		40 MHz: 26/52/106/242/484-tone RU 80 MHz: 26/52/106/242/484/996-tone RU
Bandwidth & Channel spacing	Less than 20 MHz / 40 MHz / 80 MHz & 20 MHz / 40 MHz / 80 MHz	
Method of frequency generation	Synthesizer	
Antenna Type *1)	PIFA	IFA
Antenna Gain: G_{ANT}	Antenna 1: 5.0 dBi Antenna 3: 3.5 dBi	Antenna 1: 5.0 dBi Antenna 3: 2.0 dBi
Directional Gain *2)	7.29 dBi	6.64 dBi
Maximum clock frequency	512 MHz	

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BT1: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver	
Frequency of Operation	2402 MHz to 2480 MHz	
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK	
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz	
Method of frequency generation	Synthesizer	
Antenna Type *2)	PIFA	IFA
Antenna Gain	Antenna 3: 5.8 dBi	Antenna 3: 3.0 dBi
Maximum clock frequency	128 MHz	

BT2: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver	
Frequency of Operation	2402 MHz to 2480 MHz	
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK	
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz	
Method of frequency generation	Synthesizer	
Antenna Type *2)	PIFA	IFA
Antenna Gain	Antenna 4: 5.8 dBi	Antenna 4: 4.0 dBi
Maximum clock frequency	128 MHz	

*1) Details for the antenna combinations are as follows.

	WLAN	BT1	BT2
Combination 1	PIFA	PIFA	PIFA
Combination 2	IFA	IFA	IFA

*2) Directional antenna gain = $10 \log \left(\frac{G_{ANT1}}{10^{20}} + \frac{G_{ANT2}}{10^{20}} \right)^2 / 2$

*This test report applies to WLAN (5 GHz band) part.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart E
FCC Part 15 final revised on May 26, 2020 and effective July 27, 2020 except 15.258

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart E
Unlicensed National Information Infrastructure Devices
Section 15.407 General technical requirements

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013	FCC: 15.407 (b) (6) / 15.207	27.91 dB 0.92532 MHz, Phase: N	Complied a)	-
	ISED: RSS-Gen 8.8	ISED: RSS-Gen 8.8			
26 dB Emission Bandwidth	FCC: KDB Publication Number 789033	FCC: 15.407 (a) (1) (2) (3)	See data	Complied b)	Conducted
	ISED: -	ISED: -			
Maximum Conducted Output Power	FCC: KDB Publication Number 789033	FCC: 15.407 (a) (1) (2) (3)			
	ISED: -	ISED: RSS-247 6.2.1.1		Complied c)	Conducted
		6.2.2.1			
		6.2.3.1			
6.2.4.1					
Maximum Power Spectral Density	FCC: KDB Publication Number 789033	FCC : 15.407 (a) (1) (2) (3)		Complied d)	Conducted
	ISED: -	ISED: RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1			
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 789033	FCC: 15.407 (b), 15.205 and 15.209	1.6 dB 5350.000MHz, Vertical, AV (PIFA Antenna)	Complied# e) / f)	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
	ISED: -	ISED: RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.2			
6 dB Emission Bandwidth	FCC: ANSI C63.10-2013	FCC: 15.407 (e)	See data	Complied g)	Conducted
	ISED: -	ISED: RSS-247 6.2.4.1			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

* For DFS tests, please see the test report number 13170804H-D issued by UL Japan, Inc.

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

- a) Refer to APPENDIX 1 (data of Conducted Emission)
- b) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)
- c) Refer to APPENDIX 1 (data of Maximum Conducted Output Power)
- d) Refer to APPENDIX 1 (data of Maximum Power Spectral Density)
- e) Refer to APPENDIX 1 (data of Radiated Spurious Emission)
- f) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
- g) Refer to APPENDIX 1 (data of 6 dB Bandwidth)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

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FCC Part 15.31 (e)

The stable voltage will be supplied by the end product, which will be required to have a power supply regulator. Therefore, the EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector (U.FL). 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	RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)					

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

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

using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.4 dB
	0.15 MHz to 30 MHz	2.9 dB

Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)	
3 m	9 kHz to 30 MHz	3.3 dB	
10 m		3.2 dB	
3 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	5.0 dB
	200 MHz to 1000 MHz	(Horizontal)	5.2 dB
		(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	4.8 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB
		(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz	4.9 dB	
	6 GHz to 18 GHz	5.2 dB	
1 m	10 GHz to 26.5 GHz	5.5 dB	
	26.5 GHz to 40 GHz	5.5 dB	
10 m	1 GHz to 18 GHz	5.2 dB	

Antenna Terminal test

Test Item	Uncertainty (+/-)
26 dB Emission Bandwidth / 6 dB Emission Bandwidth /	0.96 %
Maximum Conducted Output Power / Average Output Power	1.4 dB
Burst Rate	0.10 %
Maximum Power Spectral Density	2.6 dB
Spurious Emission (Conducted)	2.6 dB

3.5 Test Location

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*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

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 mode by the pre-test.

Mode	Remarks*
IEEE 802.11a (11a)	54 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 15, PN9
IEEE 802.11ac MIMO 20 MHz BW (11ac-20)	MCS 8 (2TX), PN9
IEEE 802.11ax MIMO 20 MHz BW (11ax-20)	MCS 9 (2TX), PN9
IEEE 802.11n MIMO 40 MHz BW (11n-40)	MCS 15, PN9
IEEE 802.11ac MIMO 40 MHz BW (11ac-40)	MCS 9 (2TX), PN9
IEEE 802.11ax MIMO 40 MHz BW (11ax-40)	MCS 10 (2TX), PN9
IEEE 802.11ac MIMO 80 MHz BW (11ac-80)	MCS 9 (2TX), PN9
IEEE 802.11ax MIMO 80 MHz BW (11ax-80)	MCS 10 (1TX), PN9
*The worst antenna and condition was determined based on the test result of Maximum Conducted Output Power.	
*Power of the EUT was set by the software as follows; - Power Setting: See the table below - Software: Dut labtool - Version: 1.0.0.101 (Date: December 16, 2019, 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.	

High Power Setting

		W52			W53/W56/W58		
		20 MHz BW	40 MHz BW	80 MHz BW	20 MHz BW	40 MHz BW	80 MHz BW
OFDM		6.5			8.0		
OFDMA	26-tone RU	-3.5	-6.5	-9.5	-2.0	-5.0	-8.0
	52-tone RU	-0.5	-3.5	-6.5	1.0	-2.0	-5.0
	106-tone RU	2.5	0	-3.5	4.5	1.0	-2.0
	242-tone RU	6.5	3.5	0	8.0	5.0	2.0
	484-tone RU	-	6.5	3.0	-	8.0	5.0
	996-tone RU	-	-	6.5	-	-	8.0

(dBm)

Low Power Setting

		W52/ W53/W56			W58		
		20 MHz BW	40 MHz BW	80 MHz BW	20 MHz BW	40 MHz BW	80 MHz BW
OFDM		6.5			3.0		
OFDMA	26-tone RU	-3.5	-6.5	-9.5	-7.0	-10.0	-10.0
	52-tone RU	-0.5	-3.5	-6.5	-4.0	-7.0	-10.0
	106-tone RU	2.5	0	-3.5	-1.0	-4.0	-7.0
	242-tone RU	6.5	3.5	0	3.0	-1.0	-4.0
	484-tone RU	-	6.5	3.0	-	3.0	-1.0
	996-tone RU	-	-	6.5	-	-	3.0

(dBm)

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*The details of Operation mode(s) (1/2)

Test Item	Operating Mode	Tested Antenna		Tested Frequency			
		Antenna type	Antenna No.	Lower Band	Middle Band	Additional Band	Upper Band
Conducted emission *1), Radiated Spurious Emission (Below 1 GHz)	11ax-40 OFDM Tx *2)	PIFA	Antenna 1 + 3	-	-	-	5755 MHz
26 dB Emission Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 OFDMA Tx 11ax-20 OFDM Tx	-	Antenna 1 *5)	-	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	-
	11n-40 Tx 11ac-40 Tx 11ax-40 OFDMA Tx 11ax-40 OFDM Tx			-	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	-
	11ac-80 Tx 11ax-80 OFDMA Tx 11ax-80 OFDM Tx			-	5290 MHz	5530 MHz 5610 MHz 5690 MHz	-
99 % Occupied Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 OFDMA Tx 11ax-20 OFDM Tx	-	Antenna 1 *5)	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx 11ax-40 OFDMA Tx 11ax-40 OFDM Tx			5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	5755 MHz 5795 MHz
	11ac-80 Tx 11ax-80 OFDMA Tx 11ax-80 OFDM Tx			5210 MHz	5290 MHz	5530 MHz 5610 MHz 5690 MHz	5775 MHz
Maximum Conducted Output Power, Maximum Power Spectral Density	11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 OFDMA Tx 11ax-20 OFDM Tx	-	Antenna 1 Antenna 3 Antenna 1 + 3	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx 11ax-40 OFDMA Tx 11ax-40 OFDM Tx		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	5755 MHz 5795 MHz	
	11ac-80 Tx 11ax-80 OFDMA Tx 11ax-80 OFDM Tx		5210 MHz	5290 MHz	5530 MHz 5610 MHz 5690 MHz	5775 MHz	

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*The details of Operation mode(s) (2/2)

Test Item	Operating Mode	Tested Antenna		Tested Frequency			
		Antenna type	Antenna No.	Lower Band	Middle Band	Additional Band	Upper Band
6 dB Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx 11ax-20 OFDMA Tx 11ax-20 OFDM Tx	-	Antenna 1 *5)	-	-	-	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx 11ax-40 OFDMA Tx 11ax-40 OFDM Tx			-	-	-	5755 MHz 5795 MHz
	11ac-80 Tx 11ax-80 OFDMA Tx 11ax-80 OFDM Tx			-	-	-	5775 MHz
Radiated Spurious Emission (Above 1 GHz)	11ax-20 OFDMA Tx *3) 11ax-20 OFDM Tx *4)	PIFA IFA	Antenna 1 + 3	5180 MHz	5260 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5785 MHz 5825 MHz
	11ax-40 OFDMA Tx *3) 11ax-40 OFDM Tx *4)			5190 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	11ax-80 OFDMA Tx *3) 11ax-80 OFDM Tx *4)			5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
Conducted Spurious Emission	11ax-40 OFDM Tx *2)	-	Antenna 1 + 3	-	-	-	5775 MHz

*1) The test was conducted with PIFA Antenna which had higher antenna gain.
*2) The mode was tested as a representative, because it had the highest power at antenna terminal test.
*3) OFDMA configuration tests were conducted only at the band edge since they had lower power and density than OFDM.
*4) Since each of 20 MHz BW (11n-20 / 11ac-20 / 11ax-20), 40 MHz BW (11n-40 / 11ac-40 / 11ax-40) and 80 MHz BW (11ac-80 / 11ax-80) have the same modulation method and no differences in transmitting specification, the test was performed on the representative mode that had the highest output power.
*5) After the comparison between Antenna 1 and Antenna 2, the test was performed with the antenna that had higher power as a representative.

Simultaneous transmission (Only Antenna 3 simultaneously transmits BT1 and WLAN 5 GHz on a single antenna.)

Test Item	Mode *1)	Antenna type
Radiated Spurious Emission	Tx 11ax-80 5290 MHz (OFDM / 996-tone RU) + BT1 3DH5 Hopping	PIFA IFA

*1) The test was performed on the mode as a representative, because it had the highest power of BT1 at antenna terminal test.

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4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40cm 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 80cm 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. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

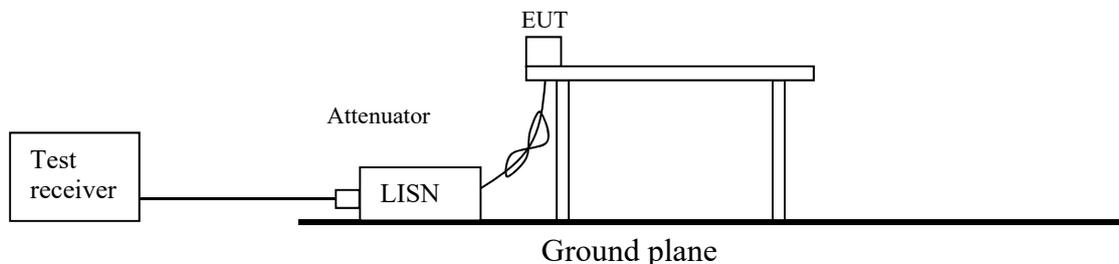
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

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 - 30 MHz
Test data : APPENDIX
Test result : Pass

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission and Band Edge Compliance

Test Procedure

< Below 1GHz >

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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 1GHz >

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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.

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.

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 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 1GHz >

The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1GHz >

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:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ (uV/m)} \quad :P \text{ is the e.i.r.p. (Watts)}$$

Test Antennas are used as below;

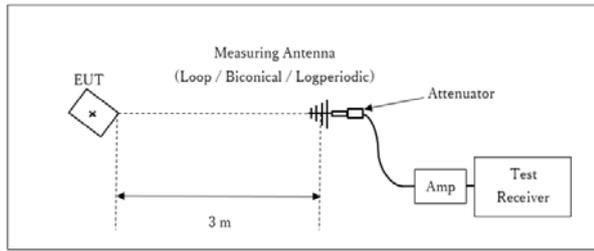
Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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	Method AD *1) RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: ≥ 100 traces If duty cycle was less than 98%, a duty factor was added to the results.

*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

Figure 2: Test Setup

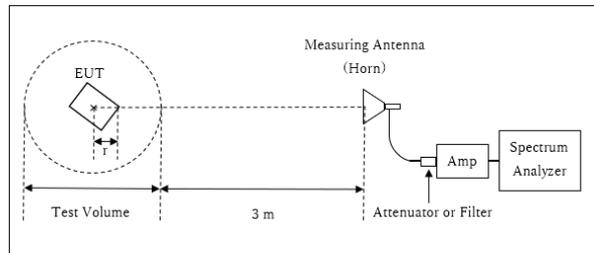
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



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

**[Other than Simultaneously transmission]
(No.3 Semi Anechoic Chamber)**

Distance Factor: $20 \times \log(3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.9 \text{ m}$

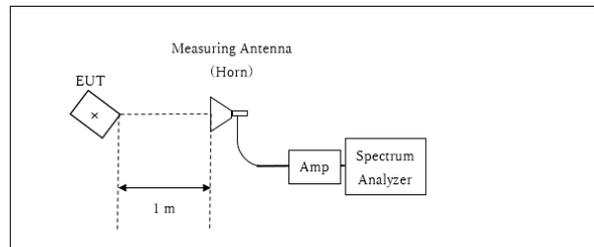
Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.1 m

**[Simultaneously transmission]
(No.2 Semi Anechoic Chamber)**

Distance Factor: $20 \times \log(3.65 \text{ m} / 3.0 \text{ m}) = 1.71 \text{ dB}$
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.65 \text{ m}$

Test Volume : 1.5 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.1 m

10 GHz - 40 GHz



× : Center of turn table

Distance Factor: $20 \times \log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$
*Test Distance: 1 m

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

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

Measurement range : 30 MHz - 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 470 kHz *2)	≥ 3 RBW	Auto	RMS Power Averaging (200 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission*3) *4)	9 kHz – 150 kHz 150 kHz – 30 MHz	200 Hz 9.1 kHz	620 Hz 27 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

* The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*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-5.850 GHz, but it is not possible with spectrum analyzer, so RBW Correction Factor ($10 \log(500 \text{ kHz} / 470 \text{ kHz})$) was added to the test result.

*3) In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart. (9 kHz-150 kHz: RBW = 200 Hz, 150 kHz-30 MHz: RBW = 9.1 kHz).

*4) 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 Ohms. 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

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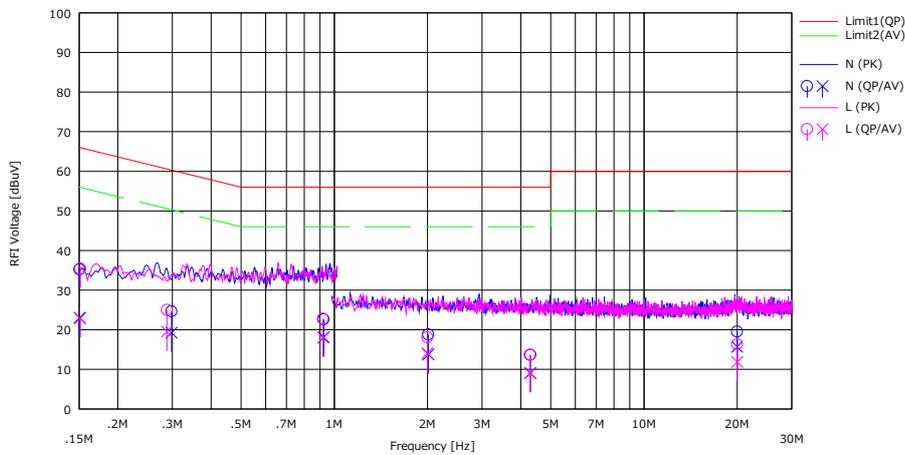
Facsimile : +81 596 24 8124

APPENDIX 1: Test data

Conducted Emission

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 15, 2020
Temperature / Humidity 20 deg. C / 33 % RH
Engineer Junki Nagatomi
Mode Tx 11ax-40 (OFDM) 5755MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]				
1	0.15051	22.00	9.80	0.07	13.14	35.21	23.01	66.00	56.00	30.79	32.99	N	
2	0.29824	11.40	6.00	0.07	13.16	24.63	19.23	60.30	50.30	35.67	31.07	N	
3	0.92532	9.30	4.80	0.08	13.21	22.59	18.09	56.00	46.00	33.41	27.91	N	
4	2.01121	5.40	0.40	0.09	13.28	18.77	13.77	56.00	46.00	37.23	32.23	N	
5	4.29971	0.10	-4.50	0.13	13.40	13.63	9.03	56.00	46.00	42.37	36.97	N	
6	19.99070	5.30	1.50	0.37	13.83	19.50	15.70	60.00	50.00	40.50	34.30	N	
7	0.15131	22.20	9.70	0.07	13.14	35.41	22.91	65.90	55.90	30.49	32.99	L	
8	0.28824	11.80	6.30	0.06	13.16	25.02	19.52	60.60	50.60	35.58	31.08	L	
9	0.91942	9.50	4.70	0.06	13.21	22.77	17.97	56.00	46.00	33.23	28.03	L	
10	1.99904	4.70	0.70	0.10	13.28	18.08	14.08	56.00	46.00	37.92	31.92	L	
11	4.28314	0.10	-4.50	0.14	13.40	13.64	9.04	56.00	46.00	42.36	36.96	L	
12	19.99582	2.00	-2.40	0.45	13.83	16.28	11.88	60.00	50.00	43.72	38.12	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)
Except for the above table: adequate margin data below the limits.

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019 December 22, 2019
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 38 % RH
Engineer Akihiko Maeda Akihiko Maeda
Mode Tx

11a

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	16844.1
	5220	-	16841.8
	5240	-	16885.1
	5260	19.512	16864.9
	5300	19.543	16898.5
	5320	19.764	16880.2
	5500	19.301	16807.4
	5580	19.360	16884.1
	5700	19.407	16886.1
	5720	19.273	16847.2
	5745	-	16882.8
	5785	-	16859.0
	5825	-	16870.0

11n-20

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	17814.2
	5220	-	17882.7
	5240	-	17859.3
	5260	19.599	17784.9
	5300	19.863	17850.0
	5320	19.859	17890.8
	5500	19.622	17816.3
	5580	20.051	17808.5
	5700	20.113	17819.5
	5720	19.797	17851.2
	5745	-	17839.5
	5785	-	17879.8
	5825	-	17820.1

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019 December 22, 2019
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 38 % RH
Engineer Akihiko Maeda Akihiko Maeda
Mode Tx

11ac-20

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	17890.8
	5220	-	17844.0
	5240	-	17843.8
	5260	20.055	17851.6
	5300	19.827	17887.2
	5320	20.034	17832.5
	5500	19.655	17861.4
	5580	19.709	17820.7
	5700	19.669	17866.2
	5720	19.765	17873.1
	5745	-	17830.6
	5785	-	17834.6
	5825	-	17825.8

11ax-20 (OFDM)

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	18850.9
	5220	-	18842.7
	5240	-	18852.8
	5260	20.339	18821.4
	5300	20.547	18811.3
	5320	20.408	18851.6
	5500	20.408	18841.1
	5580	20.417	18883.8
	5700	20.180	18869.1
	5720	20.436	18821.0
	5745	-	18813.8
	5785	-	18823.4
	5825	-	18851.1

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No.	13170804H		
Test place	Ise EMC Lab. No.3 Measurement Room		
Date	February 28, 2020	March 3, 2020	March 5, 2020
Temperature / Humidity	23 deg. C / 35 % RH	24 deg. C / 31 % RH	24 deg. C / 30 % RH
Engineer	Takafumi Noguchi	Takafumi Noguchi	Takafumi Noguchi
Mode	Tx		

11ax-20

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	26-tone RU	5180	0	-	18310.9
			4	-	17069.2
			8	-	18398.9
		5220	0	-	18273.3
			4	-	17030.3
			8	-	18381.9
		5240	0	-	18285.1
			4	-	17039.1
			8	-	18352.6
		5260	0	19.227	18268.4
			4	18.235	16997.6
			8	19.389	18397.8
		5300	0	19.295	18294.2
			4	18.242	17050.4
			8	19.414	18357.0
		5320	0	19.282	18229.4
			4	18.187	16985.1
			8	19.404	18381.9
		5500	0	19.303	18279.5
			4	18.345	17107.4
			8	19.426	18390.7
		5580	0	19.268	18265.5
			4	18.267	16997.5
			8	19.395	18367.3
		5700	0	19.284	18268.5
			4	18.275	17019.6
			8	19.409	18377.6
		5720	0	19.342	18299.5
			4	18.303	17005.7
			8	19.433	18391.6
		5745	0	-	18242.6
			4	-	17041.1
			8	-	18364.7
		5785	0	-	18241.0
			4	-	17042.7
			8	-	18374.4
		5825	0	-	18215.3
			4	-	17011.6
			8	-	18360.9

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 3, 2020 March 5, 2020
Temperature / Humidity 23 deg. C / 35 % RH 24 deg. C / 31 % RH 24 deg. C / 30 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takafumi Noguchi
Mode Tx

11ax-20

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	52-tone RU	5180	37	-	18178.7
			38	-	17050.6
			40	-	18300.3
		5220	37	-	18152.8
			38	-	17003.3
			40	-	18278.0
		5240	37	-	18196.9
			38	-	17044.3
			40	-	18245.4
		5260	37	19.461	18166.7
			38	18.392	17010.5
			40	19.578	18237.3
		5300	37	19.435	18200.0
			38	18.483	17007.3
			40	19.471	18217.6
		5320	37	19.456	18138.0
			38	18.479	16979.3
			40	19.582	18253.7
		5500	37	19.346	18209.9
			38	18.411	17025.9
			40	19.454	18249.6
		5580	37	19.438	18188.2
			38	18.311	17011.7
			40	19.463	18226.7
		5700	37	19.415	18159.1
			38	18.446	17030.1
			40	19.632	18265.1
		5720	37	19.373	18179.2
			38	18.473	17021.4
			40	19.574	18252.3
		5745	37	-	18128.7
			38	-	17014.7
			40	-	18206.2
		5785	37	-	18125.5
			38	-	17001.4
			40	-	18249.4
		5825	37	-	18119.9
			38	-	16978.2
			40	-	18197.9

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 3, 2020 March 5, 2020
Temperature / Humidity 23 deg. C / 35 % RH 24 deg. C / 31 % RH 24 deg. C / 30 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takafumi Noguchi
Mode Tx

11ax-20

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	106-tone RU	5180	53	-	18052.2
			54	-	18185.6
		5220	53	-	18042.4
			54	-	18178.9
		5240	53	-	18082.6
			54	-	18178.0
		5260	53	19.560	18052.0
			54	19.755	18145.9
		5300	53	19.493	18079.3
			54	19.850	18142.3
		5320	53	19.643	18030.9
			54	19.774	18176.0
		5500	53	19.718	18100.6
			54	19.847	18193.7
		5580	53	19.863	18049.3
			54	19.840	18174.7
		5700	53	19.488	18050.6
			54	19.880	18171.9
		5720	53	19.588	18042.5
			54	19.842	18189.6
		5745	53	-	18050.6
			54	-	18183.6
		5785	53	-	18047.3
			54	-	18200.3
5825	53	-	18006.6		
	54	-	18184.5		

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date March 31, 2020
Temperature / Humidity 21 deg. C / 47 % RH
Engineer Takafumi Noguchi
Mode Tx

11ax-20

Antenna	RU Type	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	242-tone RU	5180	-	18820.0
		5220	-	18793.8
		5240	-	18818.2
		5260	20.287	18807.0
		5300	20.406	18798.1
		5320	20.203	18785.5
		5500	20.046	18824.3
		5580	20.106	18879.8
		5700	20.153	18854.5
		5720	20.200	18794.5
		5745	-	18812.1
		5785	-	18804.0
		5825	-	18847.9

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 20, 2019 December 22, 2019
Temperature / Humidity 24 deg. C / 45 % RH 22 deg. C / 38 % RH
Engineer Akihiko Maeda Akihiko Maeda
Mode Tx

11n-40

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5190	-	36272.1
	5230	-	36297.0
	5270	40.143	36294.5
	5310	40.142	36436.5
	5510	40.111	36401.0
	5550	39.924	36329.2
	5670	39.698	36282.2
	5710	39.957	36256.9
	5755	-	36420.1
	5795	-	36309.6

11ac-40

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5190	-	36348.7
	5230	-	36308.6
	5270	39.888	36320.7
	5310	40.399	36286.9
	5510	39.772	36288.5
	5550	39.960	36272.5
	5670	40.045	36306.4
	5710	39.760	36344.0
	5755	-	36314.9
	5795	-	36267.2

11ax-40 (OFDM)

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5190	-	37644.9
	5230	-	37674.4
	5270	40.849	37594.9
	5310	40.657	37585.9
	5510	40.777	37599.3
	5550	40.729	37651.3
	5670	40.799	37644.4
	5710	40.879	37538.7
	5755	-	37589.9
	5795	-	37669.2

UL Japan, Inc.

Ise EMC Lab.

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26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020, March 5, 2020, March 6, 2020, March 9, 2020, March 10, 2020, March 13, 2020
Temperature / Humidity 23 deg. C / 35 % RH, 24 deg. C / 30 % RH, 20 deg. C / 29 % RH, 23 deg. C / 35 % RH, 24 deg. C / 35 % RH, 23 deg. C / 32 % RH
Engineer Takafumi Noguchi, Takafumi Noguchi, Takafumi Noguchi, Takumi Shimada, Takumi Shimada, Takumi Shimada
Mode Tx

11ax-40

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	26-tone RU	5190	0	-	37359.0
			8	-	35953.6
			17	-	37328.3
		5230	0	-	37251.5
			8	-	35938.8
			17	-	37352.4
		5270	0	39.032	37154.3
			8	37.552	35789.0
			17	39.109	37399.4
		5310	0	39.065	37261.6
			8	37.614	35802.4
			17	39.027	37307.1
		5510	0	38.938	37437.1
			8	37.755	35969.5
			17	39.164	37256.1
		5550	0	38.913	37292.0
			8	37.580	35935.5
			17	38.364	37405.1
		5670	0	39.032	37250.7
			8	37.587	35723.7
			17	39.075	37298.5
		5710	0	39.040	37241.4
			8	37.702	35864.1
			17	39.078	37373.4
		5755	0	-	37319.3
			8	-	35969.5
			17	-	37313.2
		5795	0	-	37221.2
			8	-	36028.1
			17	-	37536.7

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No.	13170804H					
Test place	Ise EMC Lab. No.3 Measurement Room					
Date	February 28, 2020	March 5, 2020	March 6, 2020	March 9, 2020	March 10, 2020	March 13, 2020
Temperature / Humidity	23 deg. C / 35 % RH	24 deg. C / 30 % RH	20 deg. C / 29 % RH	23 deg. C / 35 % RH	24 deg. C / 35 % RH	23 deg. C / 32 % RH
Engineer	Takafumi Noguchi	Takafumi Noguchi	Takafumi Noguchi	Takumi Shimada	Takumi Shimada	Takumi Shimada
Mode	Tx					

11ax-40

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	52-tone RU	5190	37	-	36930.5
			40	-	35924.5
			44	-	36967.6
		5230	37	-	36912.6
			40	-	35862.1
			44	-	37036.5
		5270	37	39.093	36833.4
			40	37.972	35676.1
			44	39.264	37145.9
		5310	37	38.995	36912.0
			40	37.988	35693.0
			44	39.248	36968.3
		5510	37	39.025	37039.3
			40	38.070	35851.3
			44	39.140	36895.2
		5550	37	39.109	37015.8
			40	38.134	35842.0
			44	39.274	36930.6
		5670	37	39.035	36958.4
			40	37.880	35824.1
			44	38.814	37007.6
		5710	37	39.162	36928.9
			40	38.021	35782.3
			44	39.266	36951.1
		5755	37	-	36909.3
			40	-	35810.1
			44	-	36945.1
		5795	37	-	36923.5
			40	-	35889.4
			44	-	37141.8

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020, March 5, 2020, March 6, 2020, March 9, 2020, March 10, 2020, March 13, 2020
Temperature / Humidity 23 deg. C / 35 % RH, 24 deg. C / 30 % RH, 20 deg. C / 29 % RH, 23 deg. C / 35 % RH, 24 deg. C / 35 % RH, 23 deg. C / 32 % RH
Engineer Takafumi Noguchi, Takafumi Noguchi, Takafumi Noguchi, Takumi Shimada, Takumi Shimada, Takumi Shimada
Mode Tx

11ax-40

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	106-tone RU	5190	53	-	36748.0
			54	-	35881.4
			56	-	36716.0
		5230	53	-	36680.9
			54	-	35932.1
			56	-	36799.6
		5270	53	39.156	36654.2
			54	38.164	35679.0
			56	39.527	36782.1
		5310	53	39.184	36694.6
			54	38.077	35772.7
			56	39.371	36661.8
		5510	53	39.232	36833.7
			54	38.369	35961.4
			56	39.389	36671.3
		5550	53	39.111	36711.0
			54	38.237	35945.1
			56	39.400	36708.3
		5670	53	39.278	36657.6
			54	38.178	35877.2
			56	39.427	36742.3
		5710	53	39.184	36735.2
			54	38.138	35782.4
			56	39.437	36759.3
		5755	53	-	36699.4
			54	-	35881.6
			56	-	36718.6
		5795	53	-	36764.6
			54	-	35908.4
			56	-	36783.7

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 5, 2020 March 6, 2020 March 9, 2020 March 10, 2020 March 13, 2020
Temperature / Humidity 23 deg. C / 35 % RH 24 deg. C / 30 % RH 20 deg. C / 29 % RH 23 deg. C / 35 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takumi Shimada Takumi Shimada
Mode Tx

11ax-40

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	242-tone RU	5190	61	-	36556.5
			62	-	36618.0
		5230	61	-	36545.7
			62	-	36635.4
		5270	61	39.623	36513.2
			62	39.896	36621.5
		5310	61	39.528	36434.1
			62	39.763	36559.8
		5510	61	39.678	36608.5
			62	39.711	36549.6
		5550	61	39.719	36593.0
			62	39.986	36577.2
		5670	61	39.839	36452.9
			62	39.760	36573.4
		5710	61	39.737	36526.5
			62	39.737	36554.3
		5755	61	-	36573.5
			62	-	36582.0
		5795	61	-	36529.8
			62	-	36679.9

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date April 1, 2020
Temperature / Humidity 24 deg. C / 47 % RH
Engineer Takafumi Noguchi
Mode Tx

11ax-40

Antenna	RU Type	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	484-tone RU	5190	-	37622.8
		5230	-	37640.4
		5270	40.347	37566.1
		5310	39.686	37505.8
		5510	40.423	37581.5
		5550	40.483	37605.7
		5670	40.518	37573.5
		5710	40.461	37526.8
		5755	-	37587.8
		5795	-	37653.8

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 20, 2019
Temperature / Humidity 24 deg. C / 45 % RH
Engineer Akihiko Maeda
Mode Tx

11ac-80

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5210	-	76606.7
	5290	81.622	76493.6
	5530	81.484	76534.0
	5610	81.857	76625.9
	5690	81.449	76397.1
	5775	-	76392.4

11ax-80 (OFDM)

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5210	-	77661.7
	5290	80.274	77819.7
	5530	80.290	77795.1
	5610	80.264	77790.8
	5690	80.307	77771.7
	5775	-	77823.2

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 6, 2020 March 10, 2020 March 11, 2020 March 12, 2020
Temperature / Humidity 23 deg. C / 35 % RH 20 deg. C / 29 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH 24 deg. C / 33 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takafumi Noguchi Takumi Shimada
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	26-tone RU	5210	0	-	78947.8
			18	-	56503.6
			36	-	78895.9
		5290	0	80.309	78792.6
			18	58.277	56765.6
			36	80.400	79019.4
		5530	0	80.473	79192.8
			18	58.070	56578.0
			36	80.271	78705.6
		5610	0	80.451	78948.7
			18	58.148	56928.8
			36	80.341	78810.3
		5690	0	80.359	78916.0
			18	58.167	56647.9
			36	80.422	78909.0
		5775	0	-	78903.9
			18	-	56410.9
			36	-	78932.2

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 6, 2020 March 10, 2020 March 11, 2020 March 12, 2020
Temperature / Humidity 23 deg. C / 35 % RH 20 deg. C / 29 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH 24 deg. C / 33 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takafumi Noguchi Takumi Shimada
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	52-tone RU	5210	37	-	78363.0
			44	-	48032.6
			52	-	78477.7
		5290	37	80.361	78150.1
			44	44.108	48840.0
			52	80.542	78601.8
		5530	37	80.504	78740.8
			44	43.222	49292.4
			52	80.414	78169.8
		5610	37	80.443	78334.8
			44	43.844	49456.7
			52	80.424	78412.2
		5690	37	80.419	78232.9
			44	41.946	48158.8
			52	80.531	78445.4
		5775	37	-	78312.0
			44	-	47348.4
			52	-	78511.6

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 6, 2020 March 10, 2020 March 11, 2020 March 12, 2020
Temperature / Humidity 23 deg. C / 35 % RH 20 deg. C / 29 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH 24 deg. C / 33 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takafumi Noguchi Takumi Shimada
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	106-tone RU	5210	53	-	77353.6
			56	-	48997.6
			60	-	77696.8
		5290	53	80.431	77113.6
			56	45.346	49644.1
			60	80.415	77721.2
		5530	53	80.559	77705.9
			56	44.971	49804.7
			60	80.399	77170.1
		5610	53	80.494	77600.1
			56	45.297	50375.1
			60	80.421	77553.9
		5690	53	80.308	77194.2
			56	44.960	48742.9
			60	80.365	77664.9
		5775	53	-	77444.3
			56	-	48083.8
			60	-	77427.8

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 6, 2020 March 10, 2020 March 11, 2020 March 12, 2020
Temperature / Humidity 23 deg. C / 35 % RH 20 deg. C / 29 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH 24 deg. C / 33 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takafumi Noguchi Takumi Shimada
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	242-tone RU	5210	61	-	75016.1
			62	-	49044.2
			64	-	74947.5
		5290	61	80.389	73489.3
			62	48.806	49251.2
			64	80.485	75365.4
		5530	61	80.508	75848.4
			62	45.565	50285.5
			64	80.587	73003.8
		5610	61	80.448	74779.1
			62	48.712	50801.9
			64	80.541	74709.0
		5690	61	80.457	74318.3
			62	48.022	48676.1
			64	80.428	75162.6
		5775	61	-	74488.9
			62	-	48104.4
			64	-	75551.7

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date February 28, 2020 March 6, 2020 March 10, 2020 March 11, 2020 March 12, 2020
Temperature / Humidity 23 deg. C / 35 % RH 20 deg. C / 29 % RH 24 deg. C / 35 % RH 23 deg. C / 32 % RH 24 deg. C / 33 % RH
Engineer Takafumi Noguchi Takafumi Noguchi Takumi Shimada Takafumi Noguchi Takumi Shimada
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	484-tone RU	5210	65	-	73208.1
			66	-	70302.8
		5290	65	80.457	70438.0
			66	80.404	71637.0
		5530	65	80.582	74127.6
			66	80.421	67480.5
		5610	65	80.667	73330.3
			66	80.428	70429.9
		5690	65	80.507	72730.8
			66	80.606	71412.5
		5775	65	-	73093.2
			66	-	71638.1

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

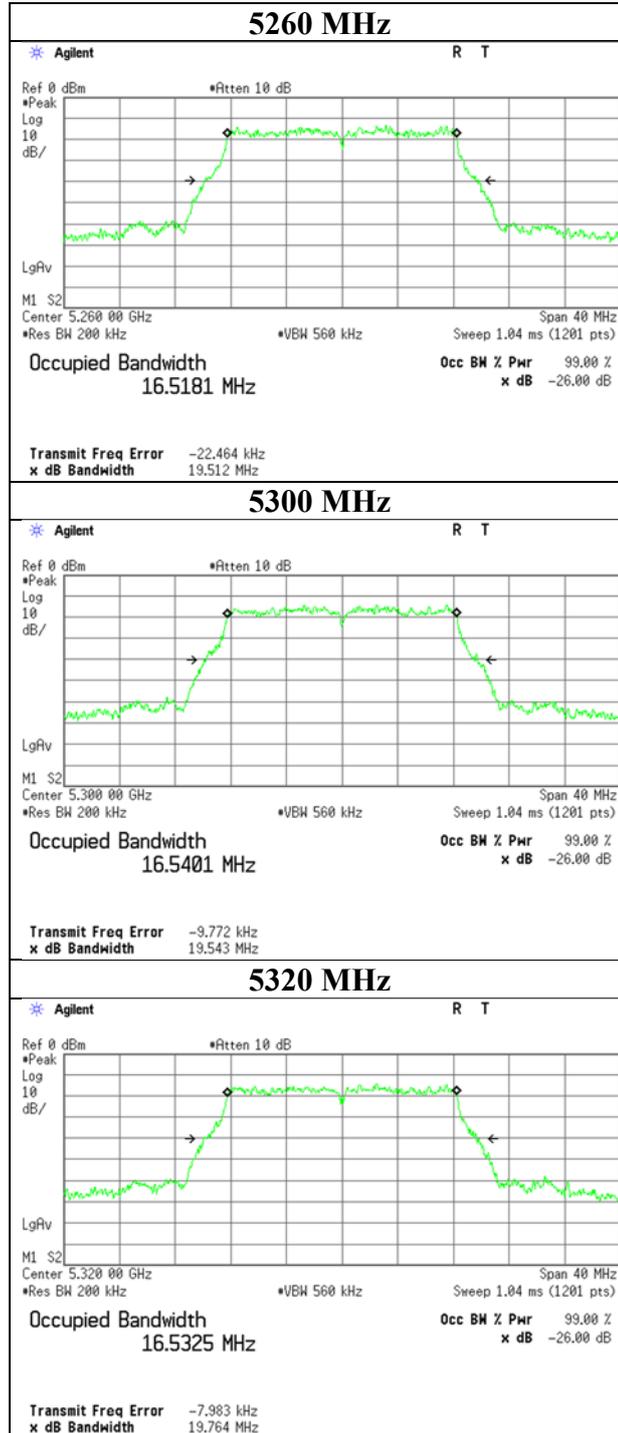
Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date April 1, 2020
Temperature / Humidity 24 deg. C / 47 % RH
Engineer Takafumi Noguchi
Mode Tx

11ax-80

Antenna	RU Type	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	996-tone RU	5210	-	77641.4
		5290	80.131	77649.4
		5530	80.154	77750.8
		5610	80.236	77714.9
		5690	80.295	77740.4
		5775	-	77663.4

26 dB Emission Bandwidth

11a



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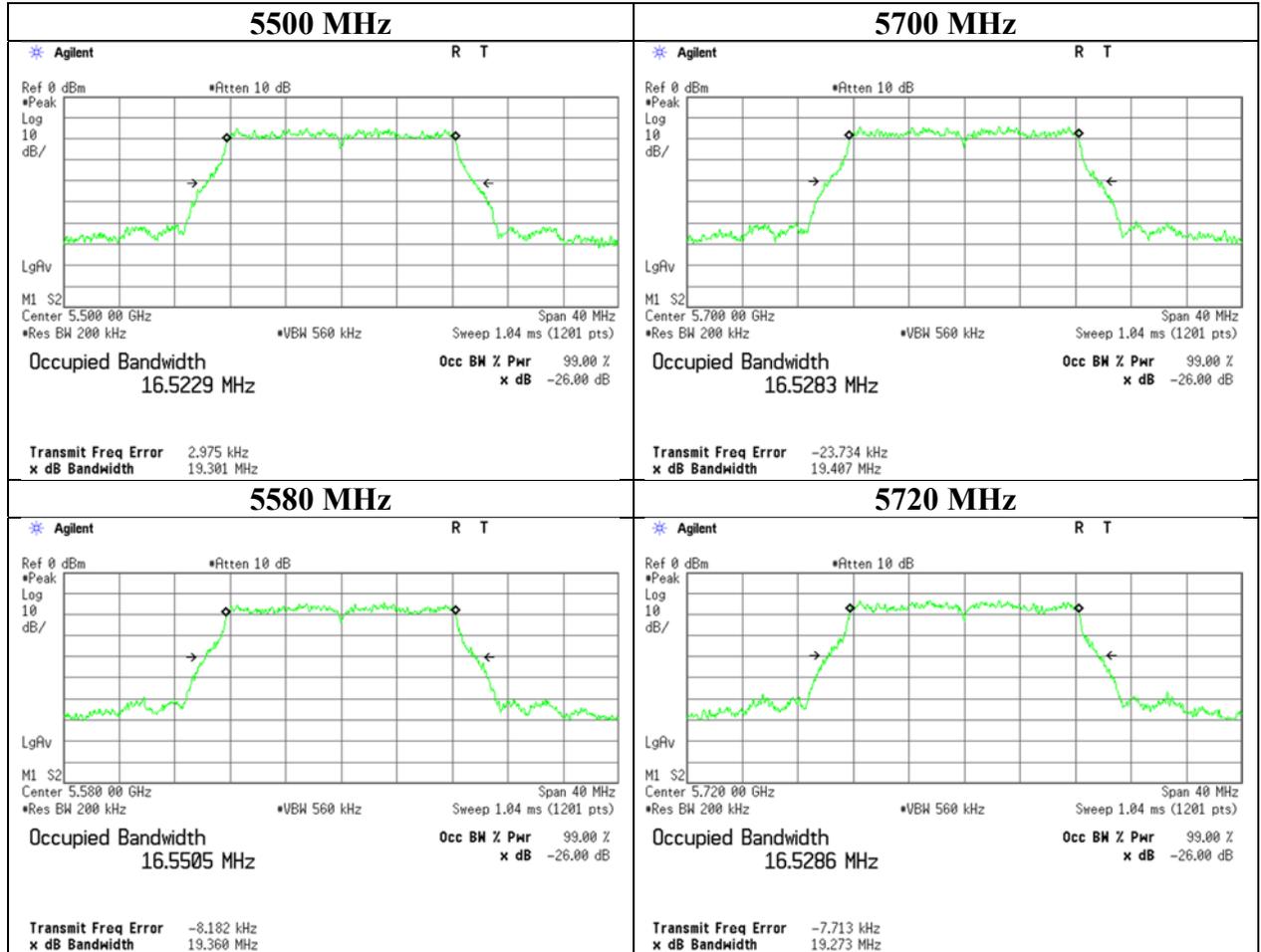
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26 dB Emission Bandwidth

11a



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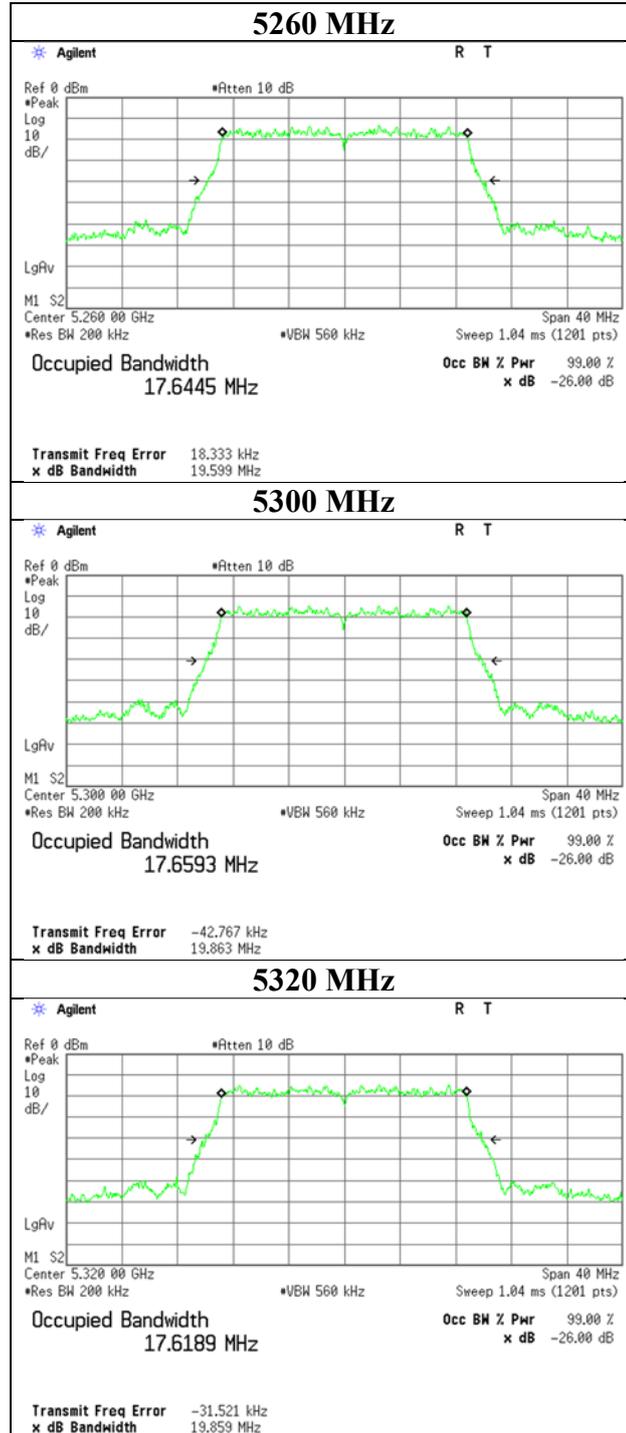
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26 dB Emission Bandwidth

11n-20



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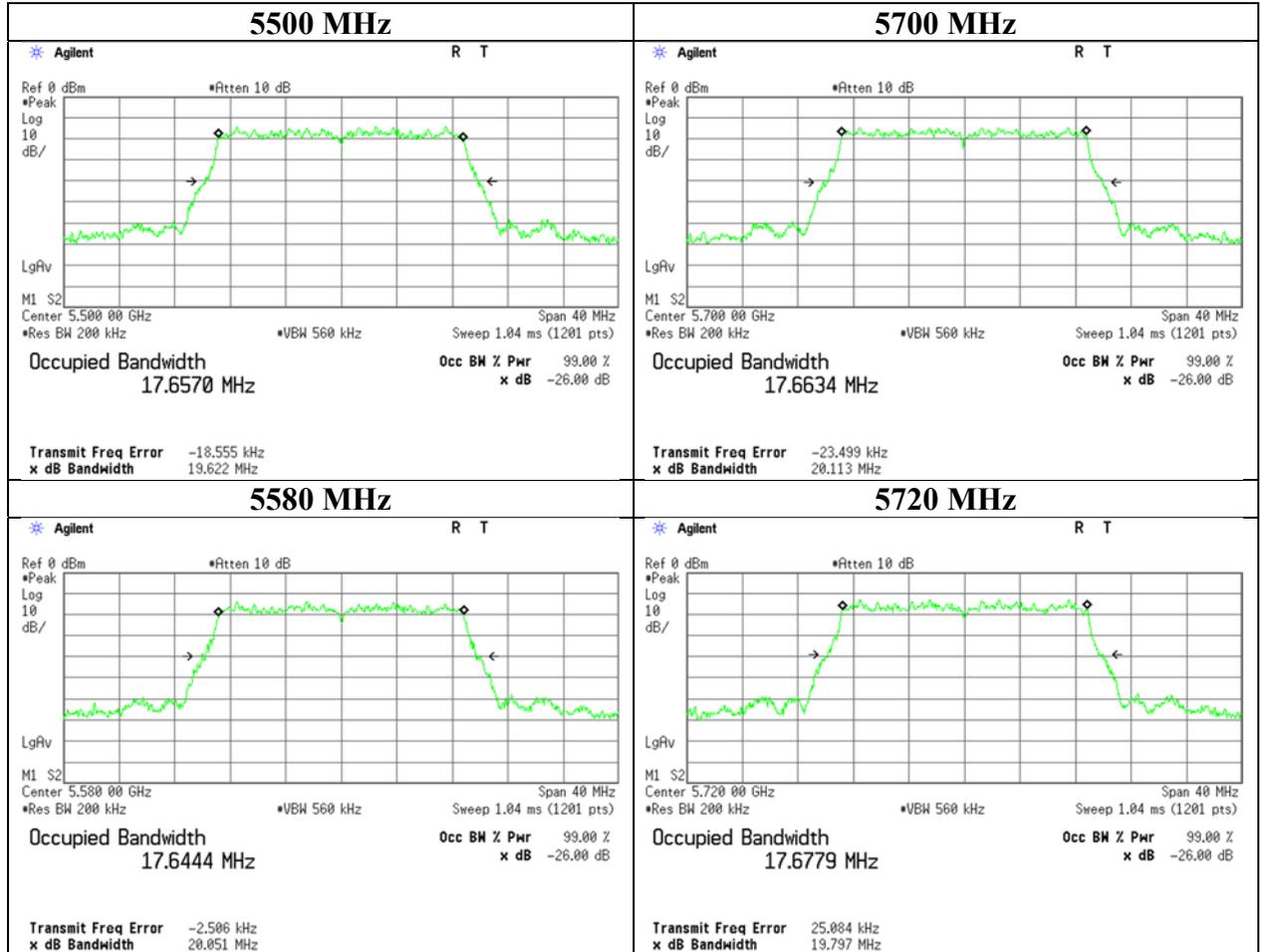
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26 dB Emission Bandwidth

11n-20



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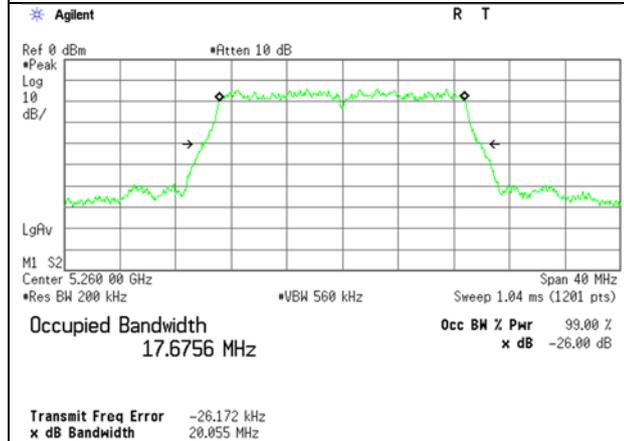
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Facsimile : +81 596 24 8124

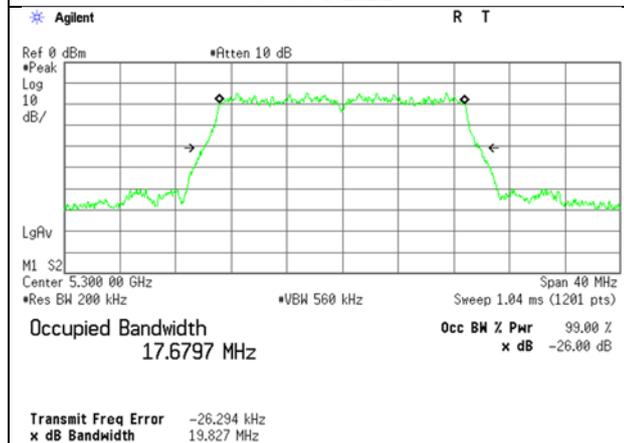
26 dB Emission Bandwidth

11ac-20

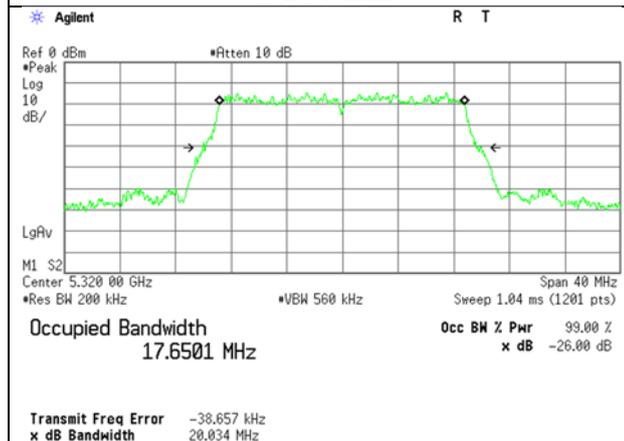
5260 MHz



5300 MHz



5320 MHz



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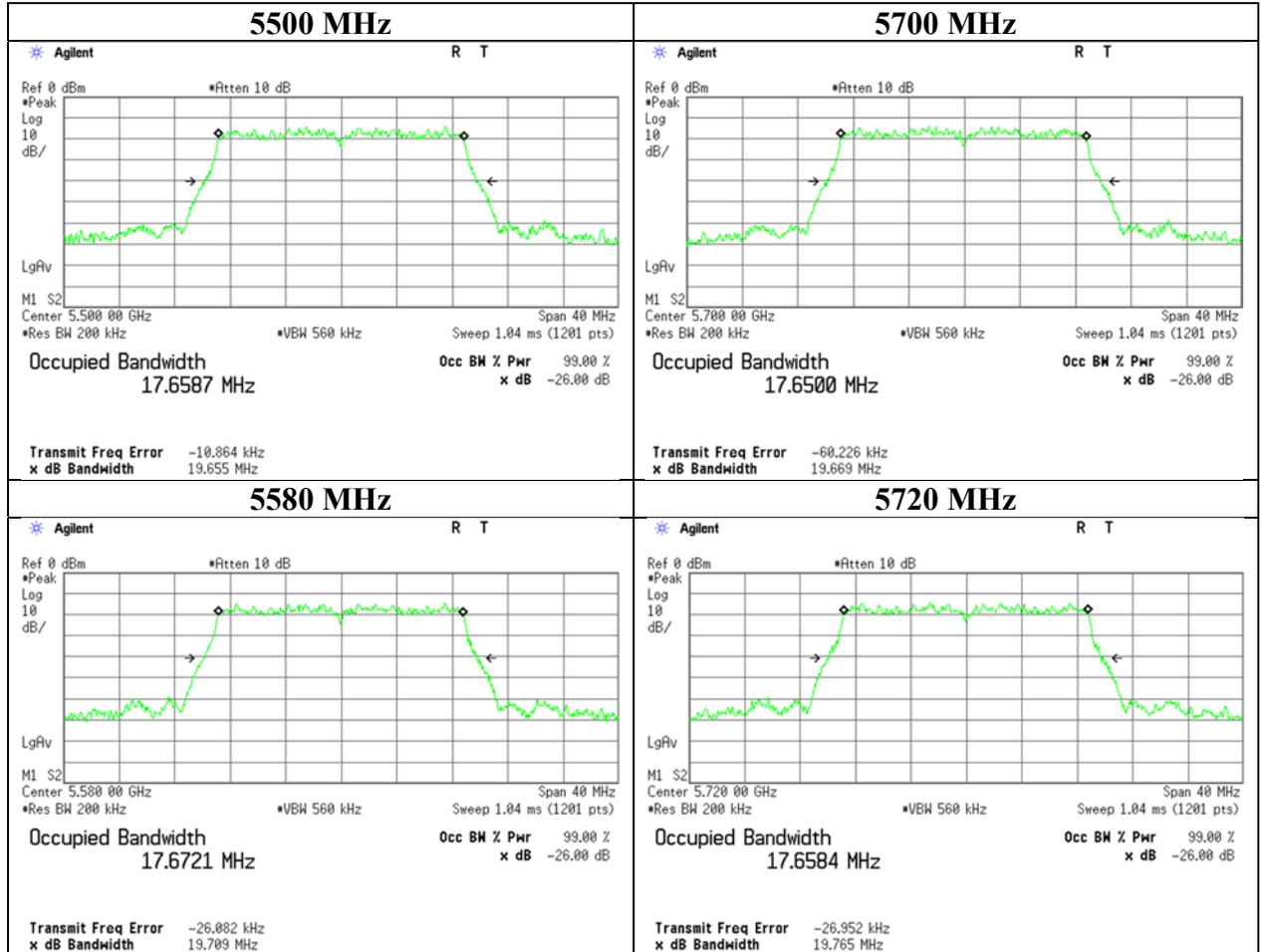
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26 dB Emission Bandwidth

11ac-20



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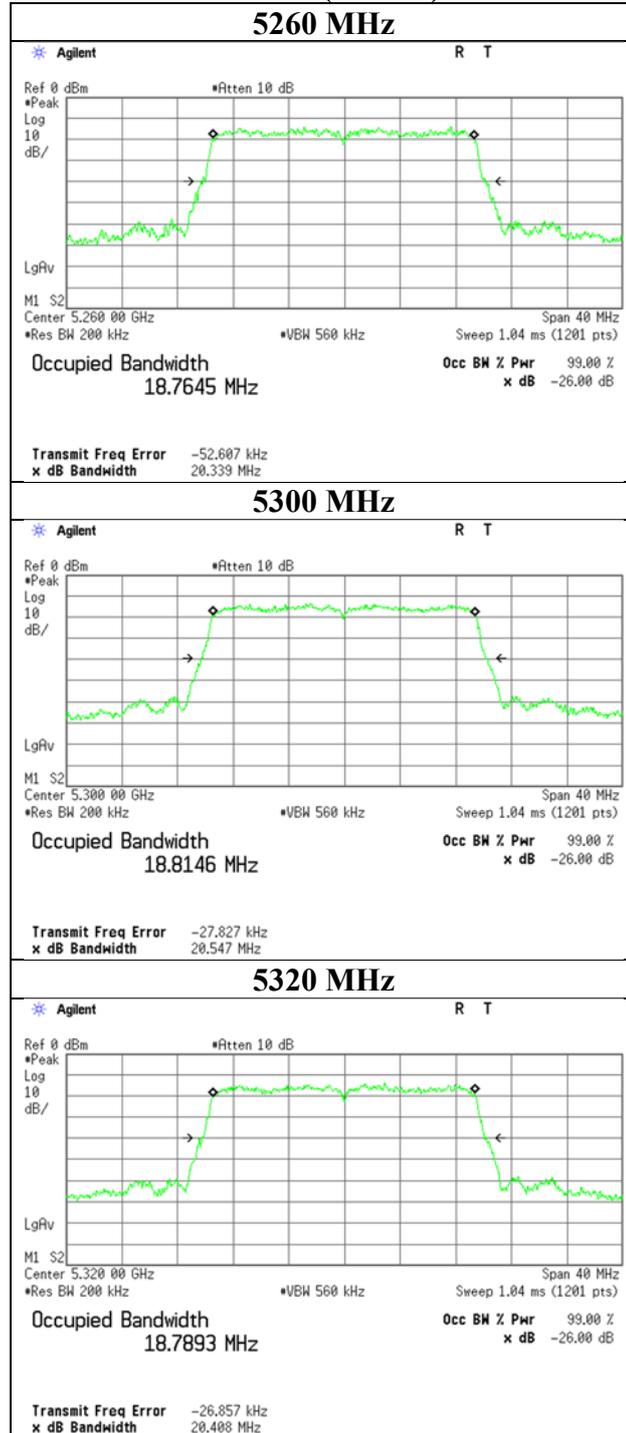
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26 dB Emission Bandwidth

11ax-20 (OFDM)



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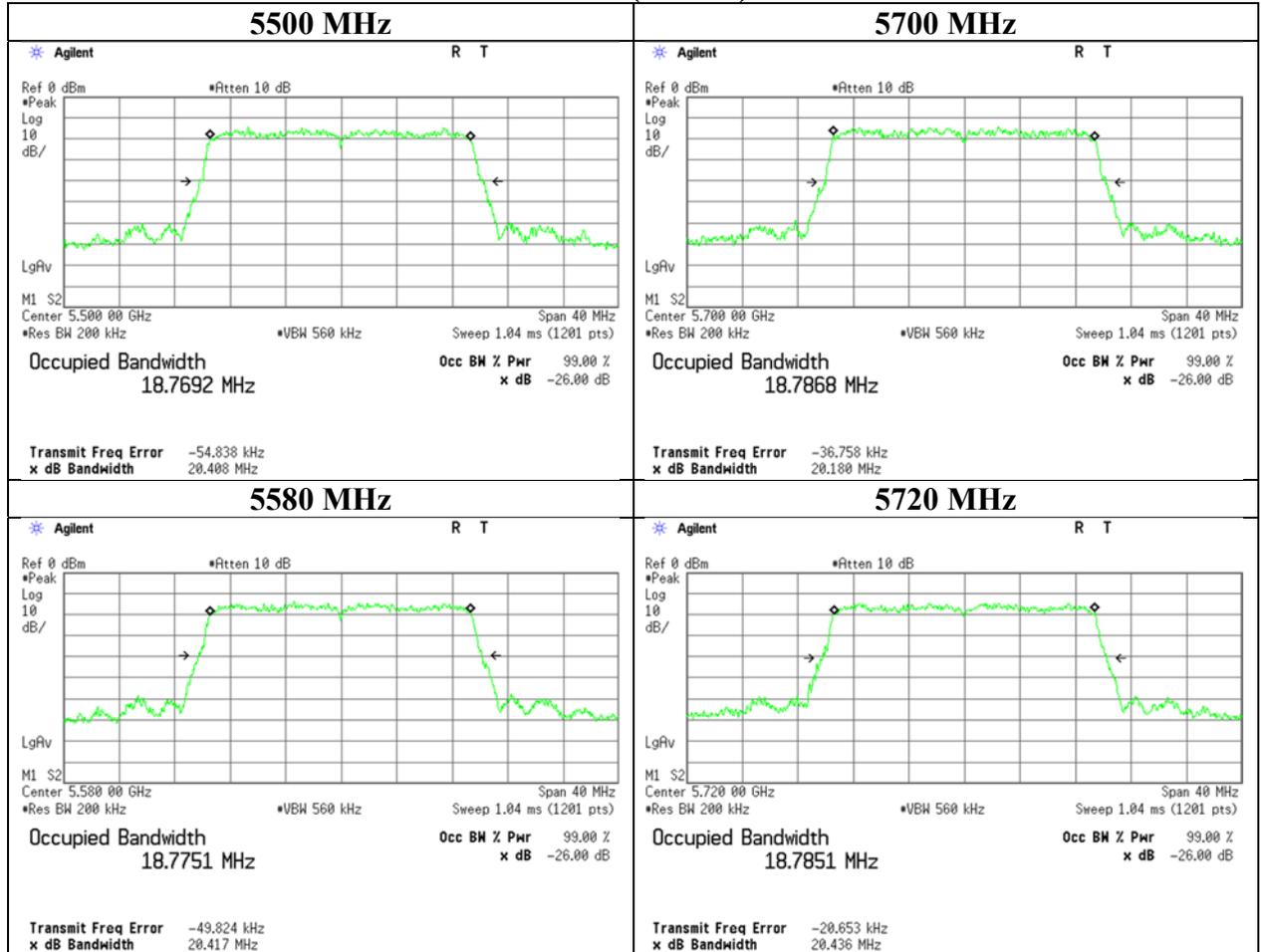
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26 dB Emission Bandwidth

11ax-20 (OFDM)



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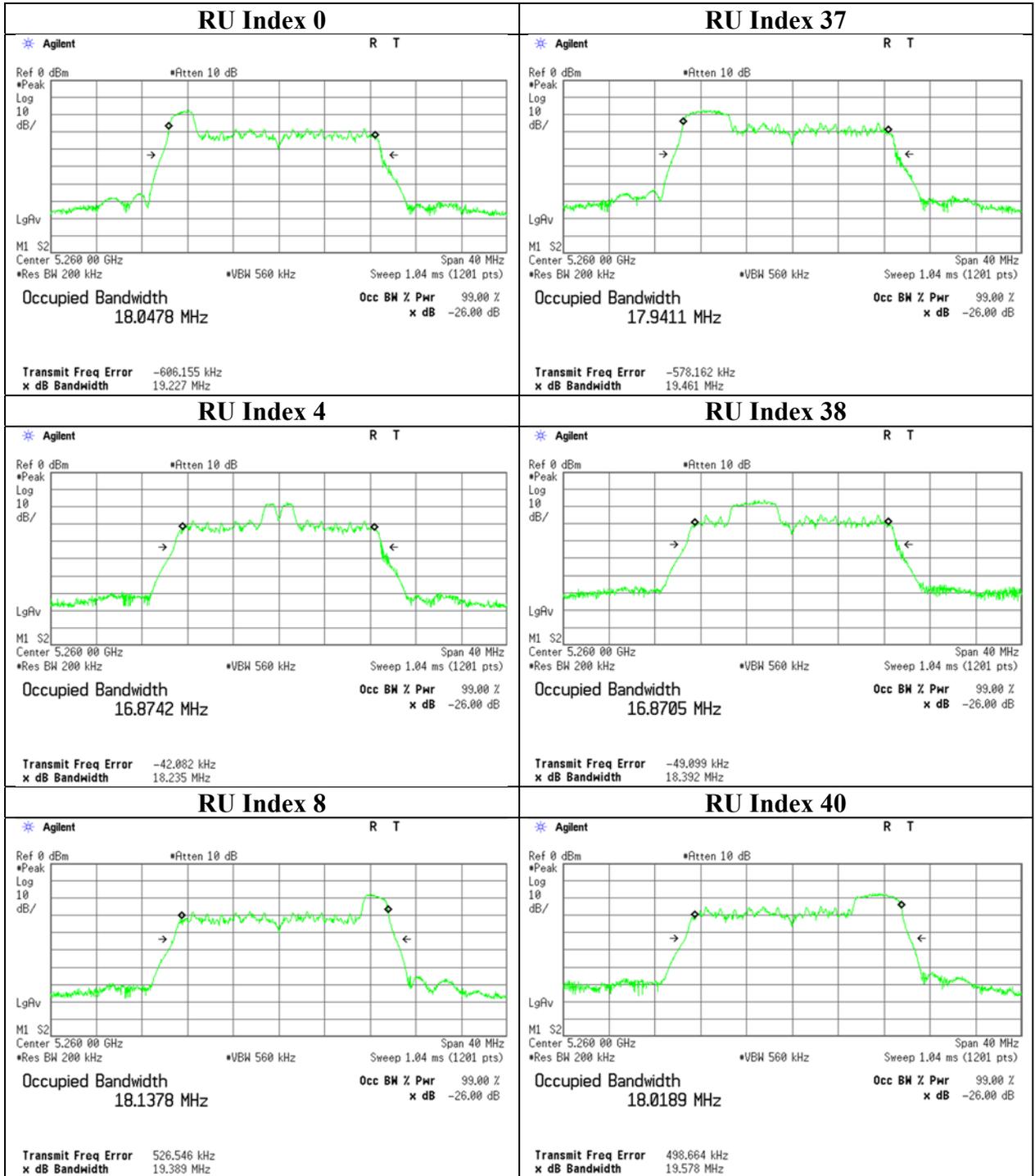
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26 dB Emission Bandwidth

11ax-20

26-tone RU 5260 MHz

52-tone RU 5260 MHz



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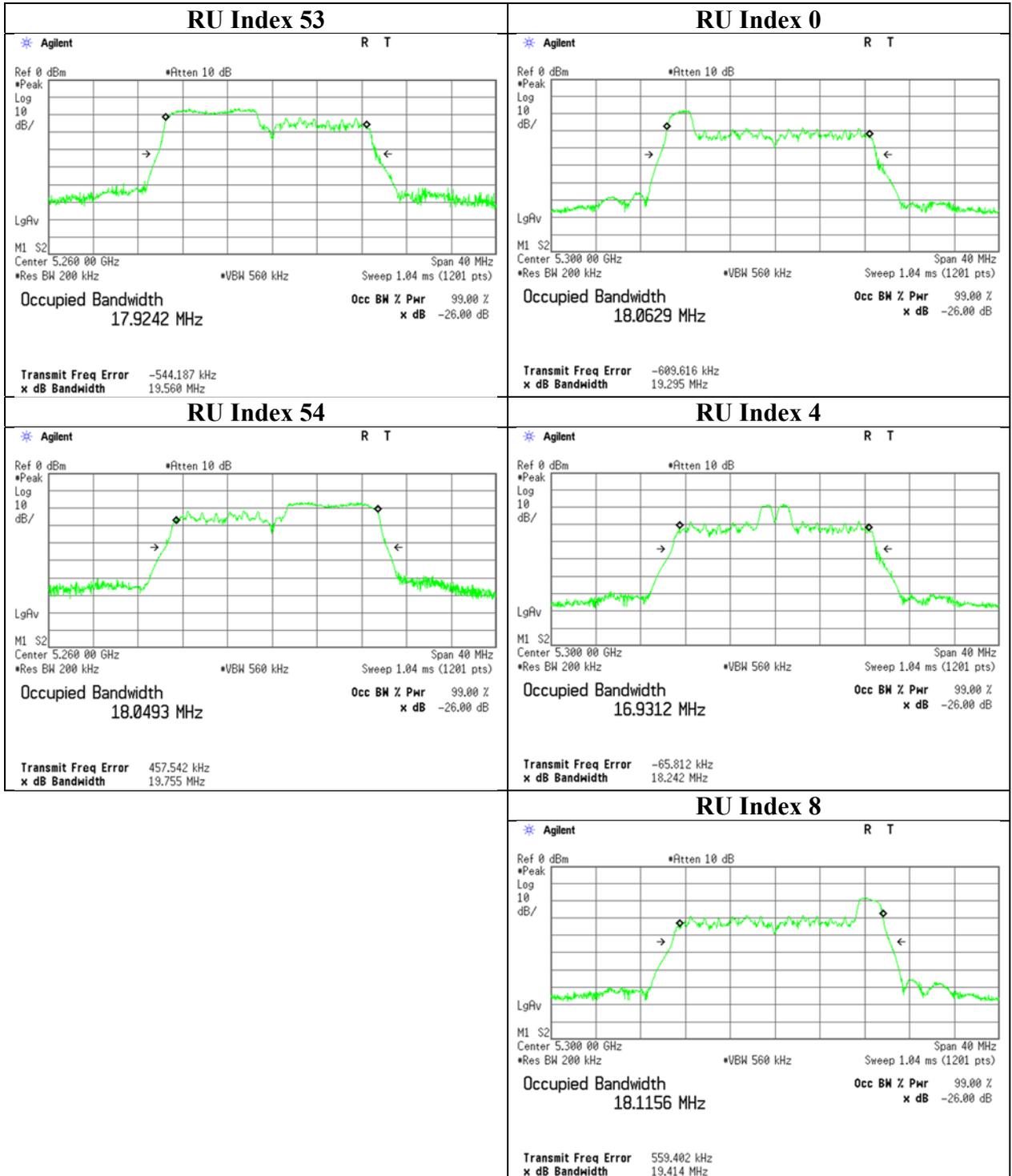
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26 dB Emission Bandwidth

11ax-20

106-tone RU 5260 MHz

26-tone RU 5300 MHz



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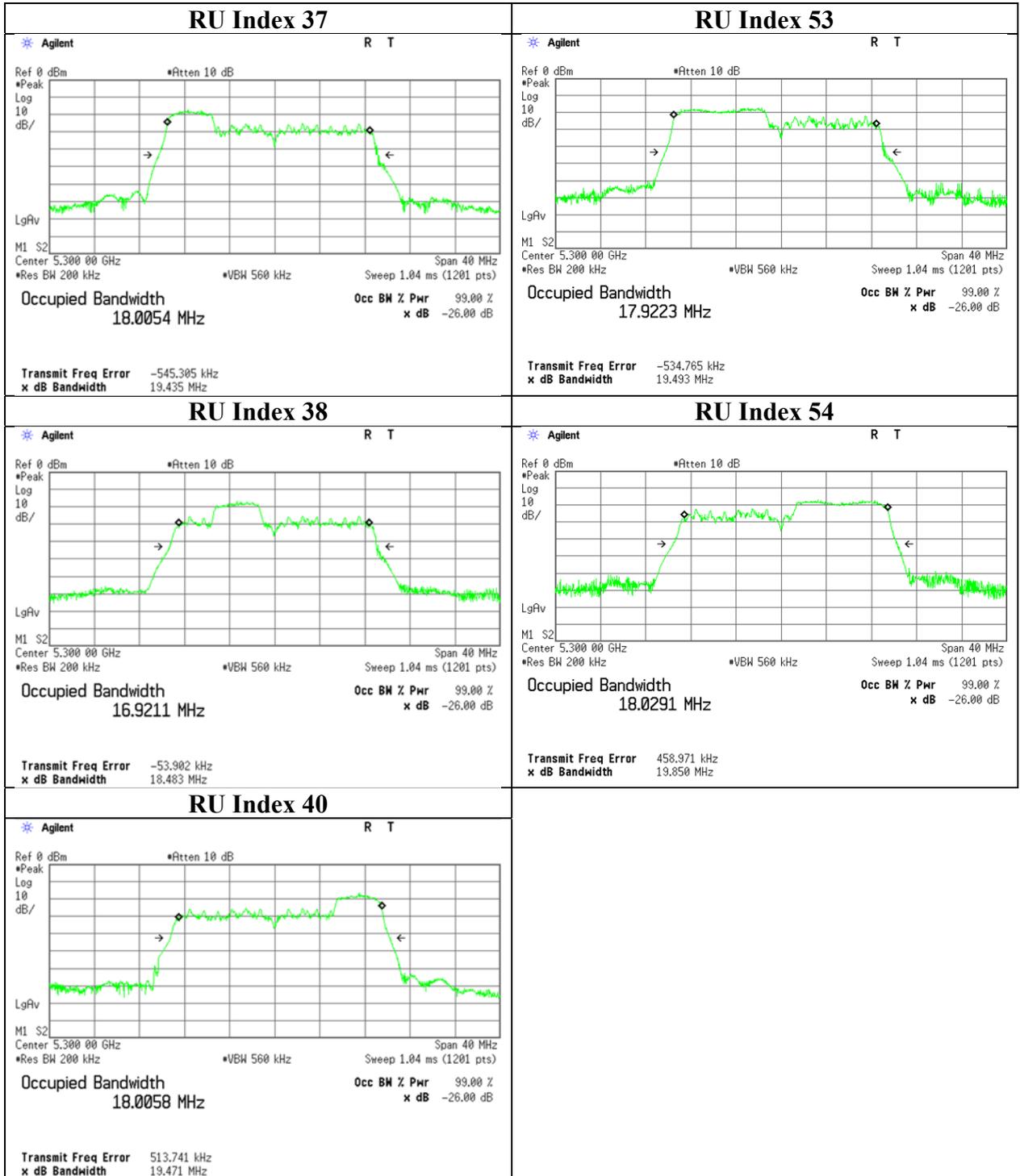
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26 dB Emission Bandwidth

11ax-20

52-tone RU 5300 MHz

106-tone RU 5300 MHz



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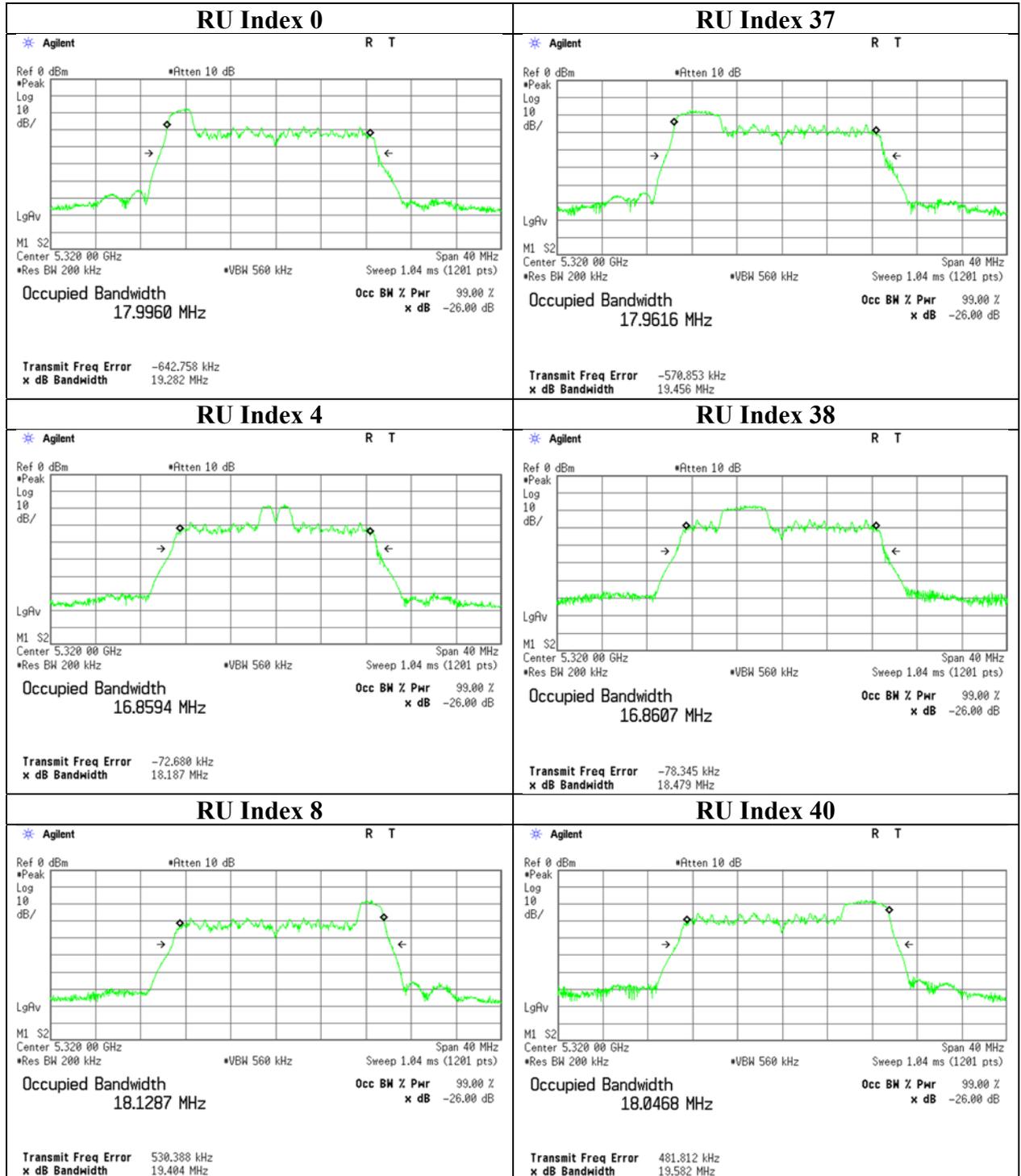
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26 dB Emission Bandwidth

11ax-20

26-tone RU 5320 MHz

52-tone RU 5320 MHz



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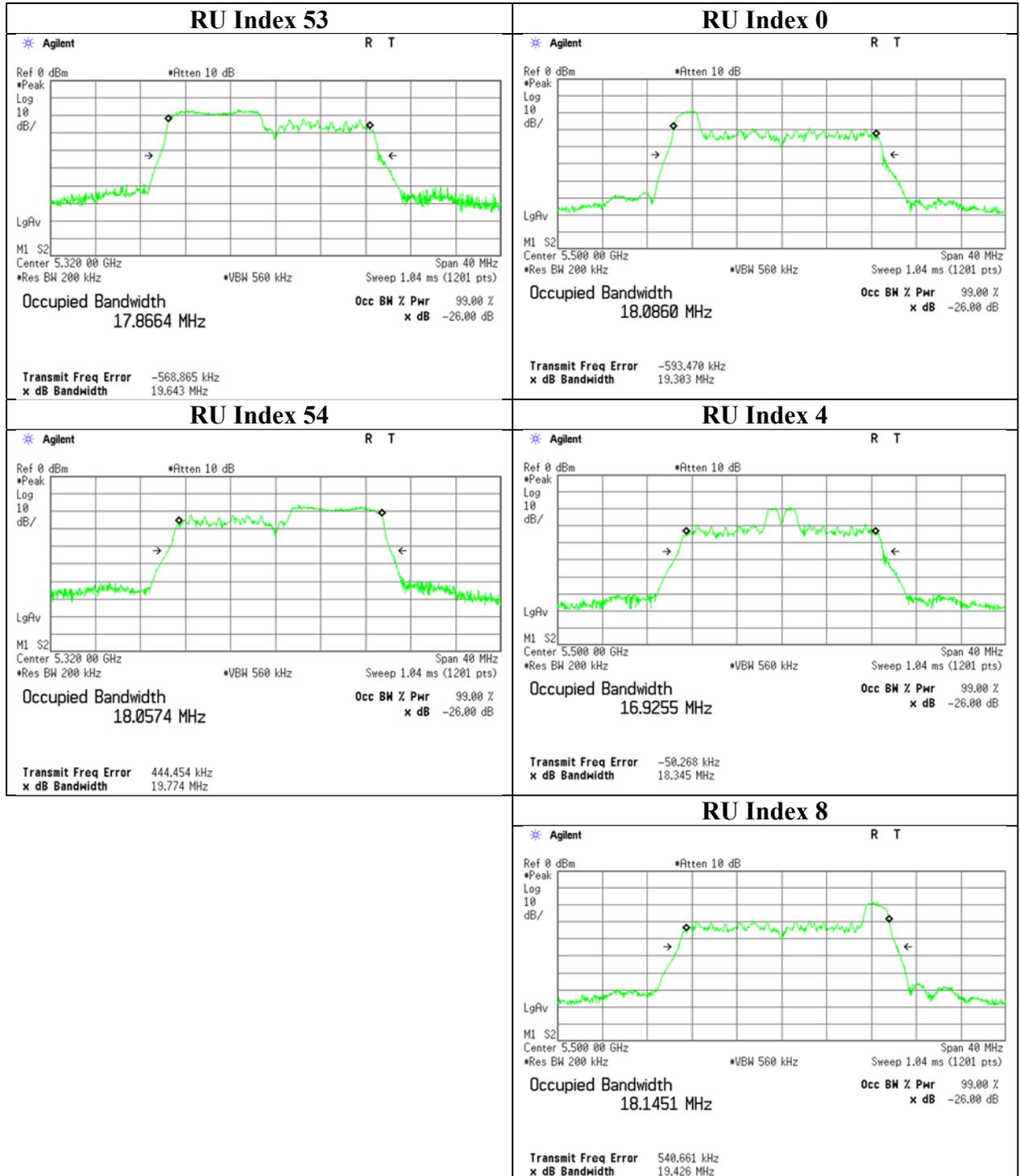
Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-20

106-tone RU 5320 MHz

26-tone RU 5500 MHz



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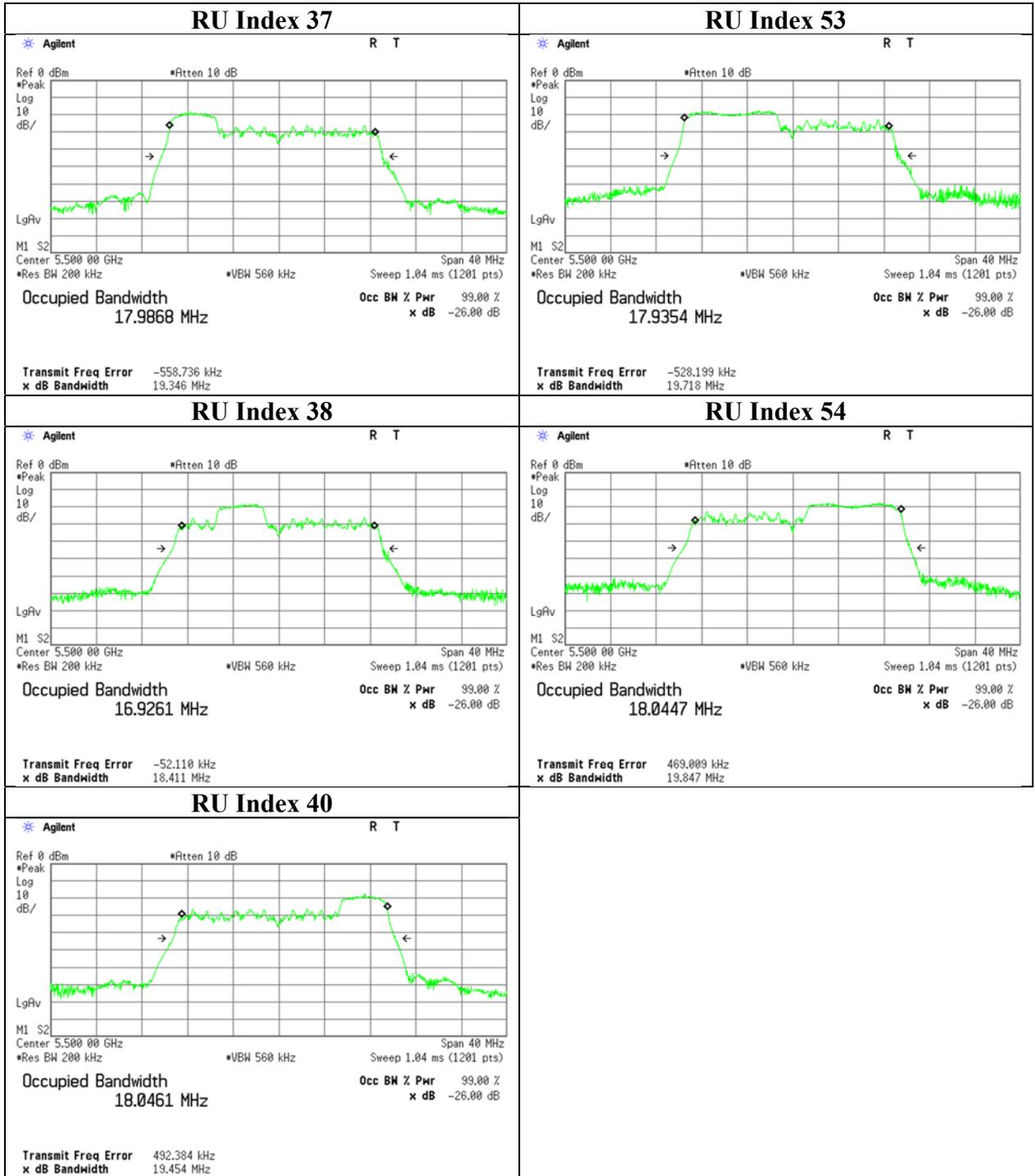
Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-20

52-tone RU 5500 MHz

106-tone RU 5500 MHz



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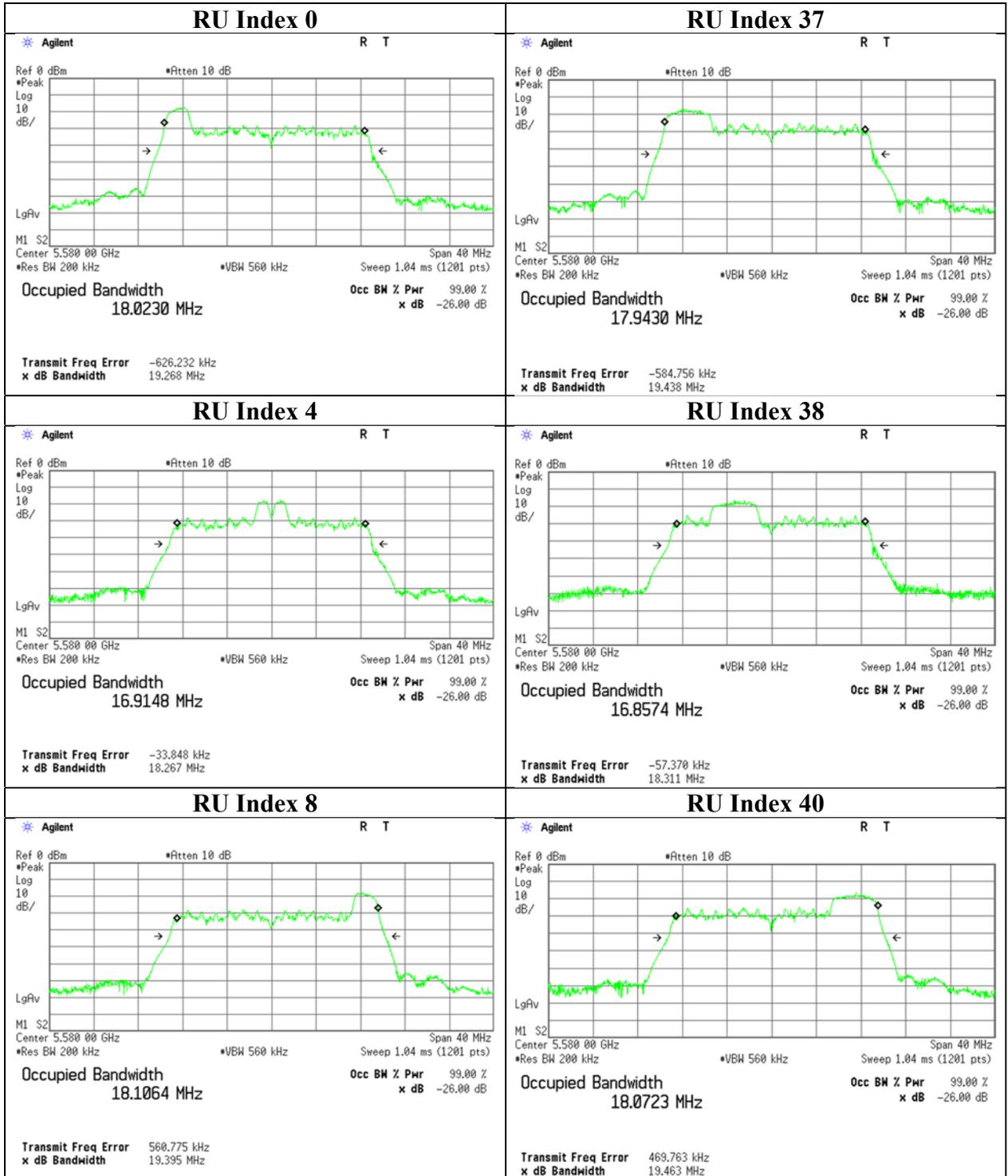
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Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-20

26-tone RU 5580 MHz

52-tone RU 5580 MHz



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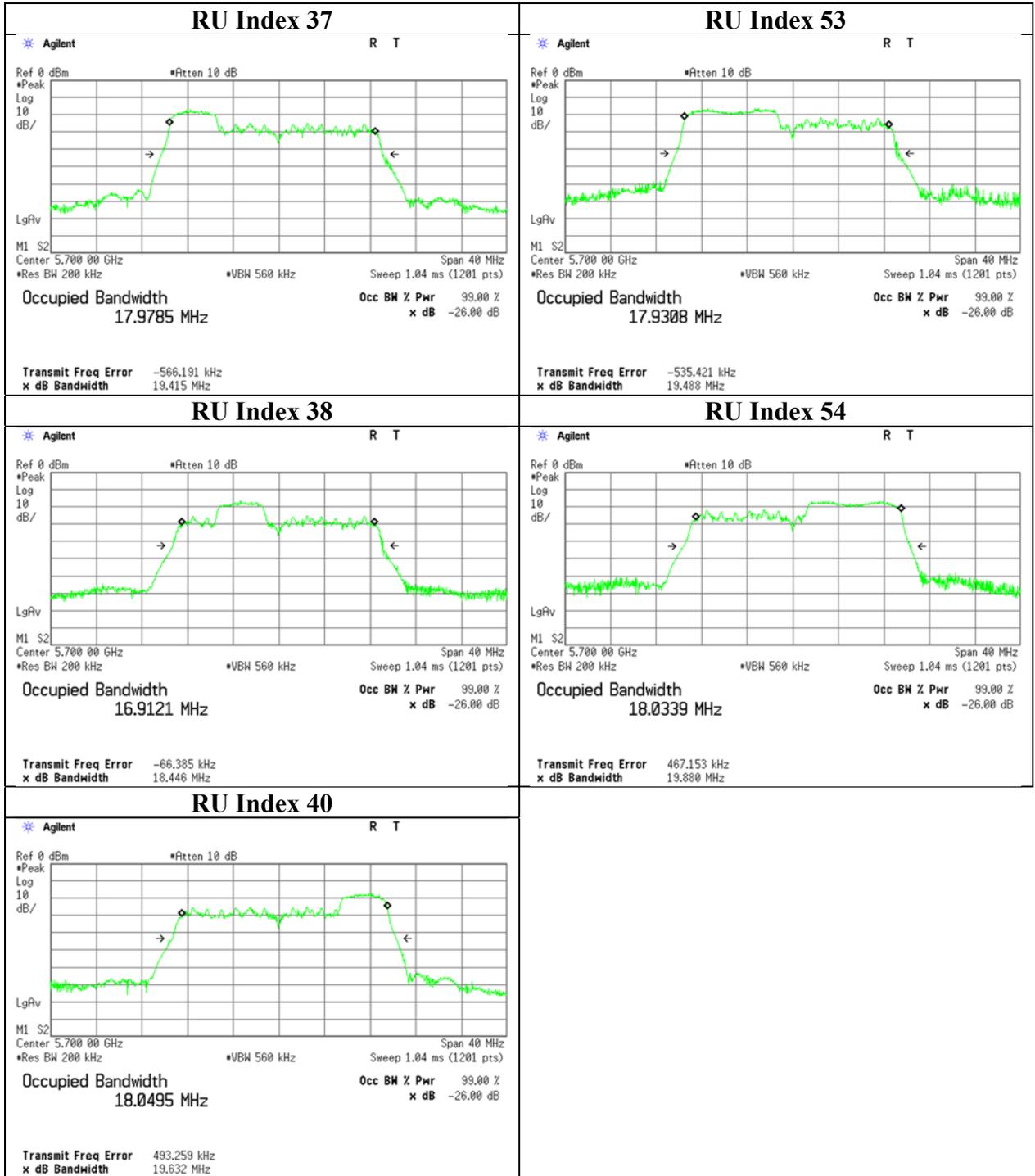
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 Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-20

52-tone RU 5700 MHz

106-tone RU 5700 MHz



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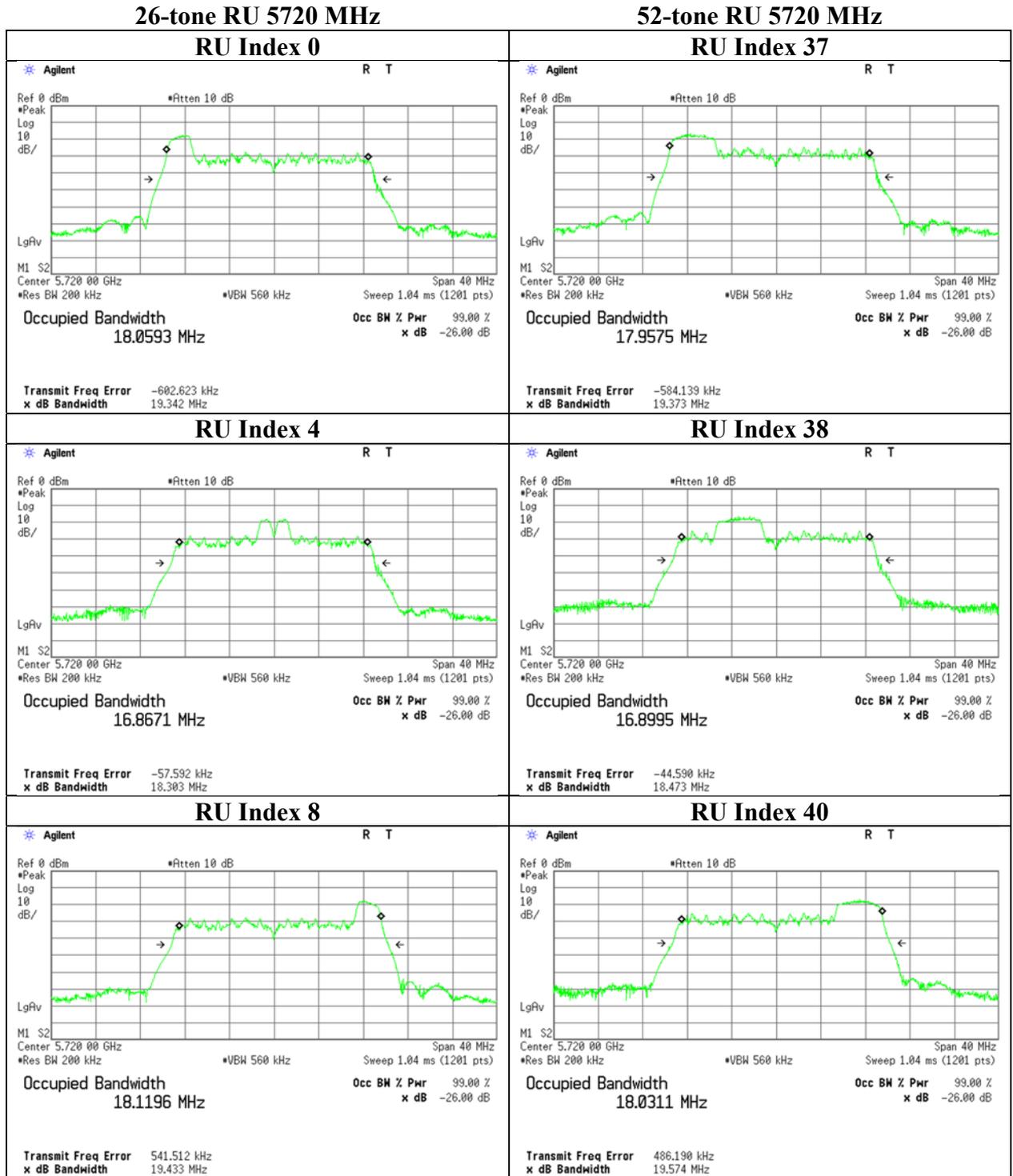
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Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-20



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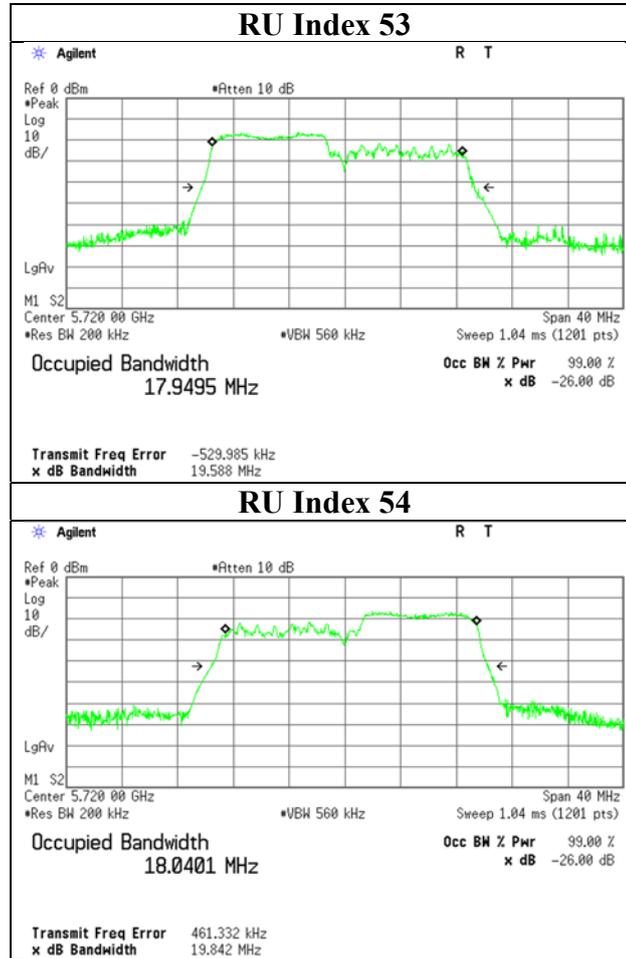
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Facsimile : +81 596 24 8124

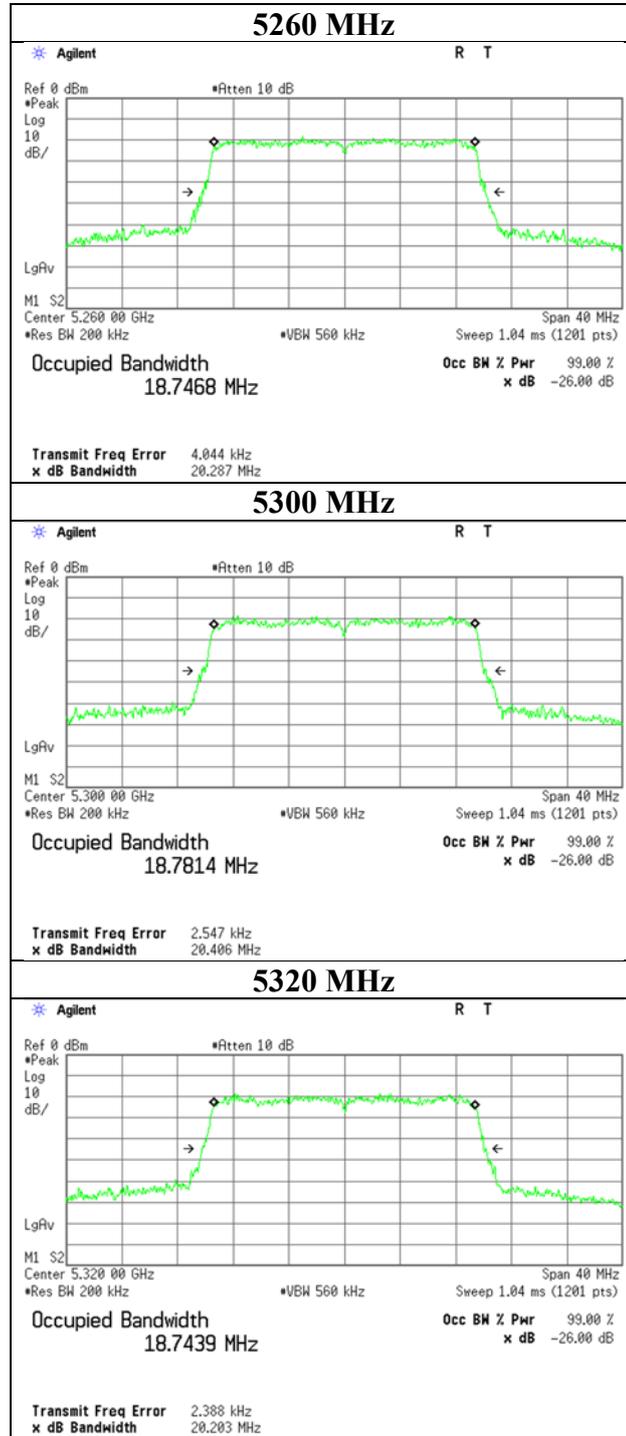
26 dB Emission Bandwidth

**11ax-20
106-tone RU 5720 MHz**



26 dB Emission Bandwidth

**11ax-20
242-tone RU**



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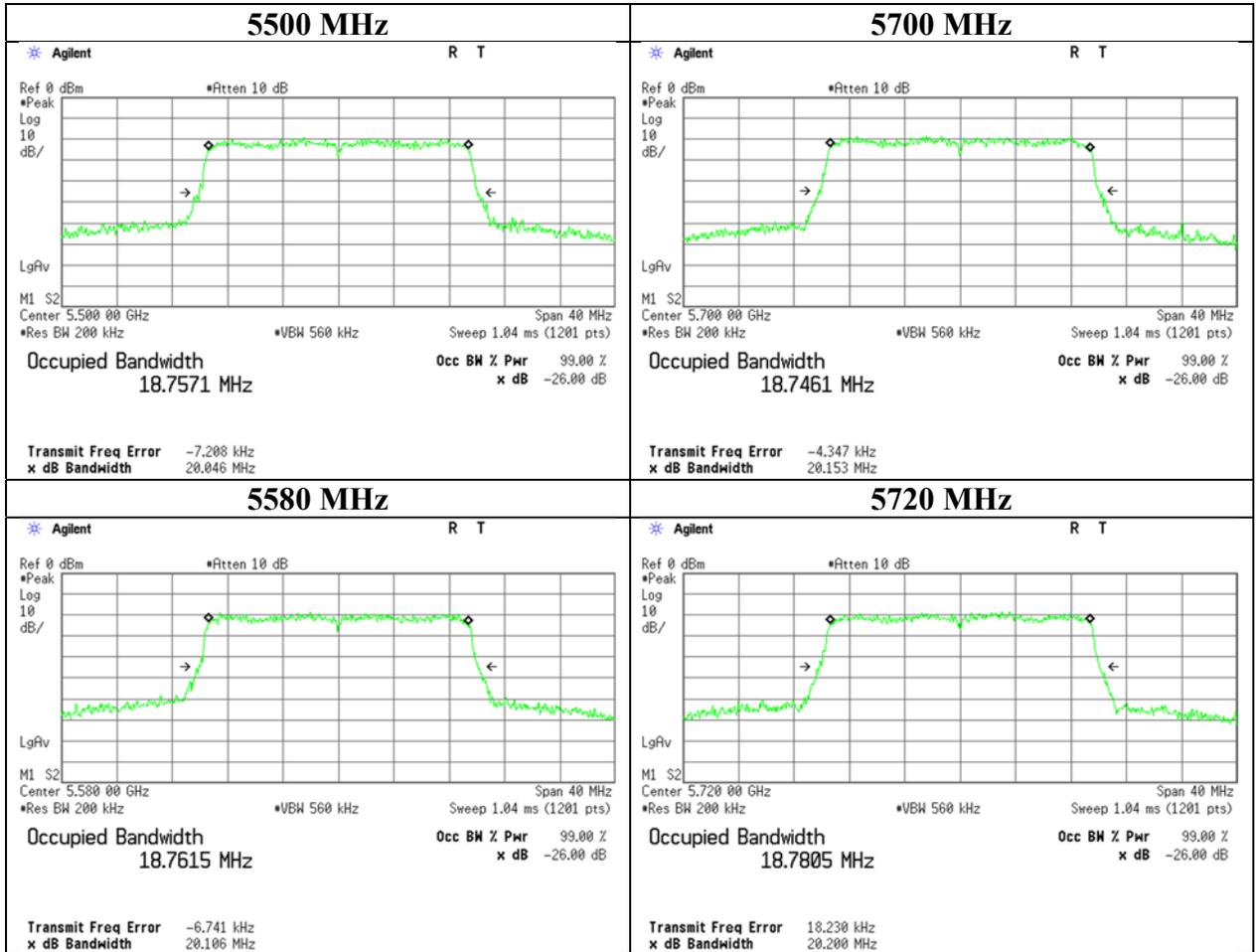
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Facsimile : +81 596 24 8124

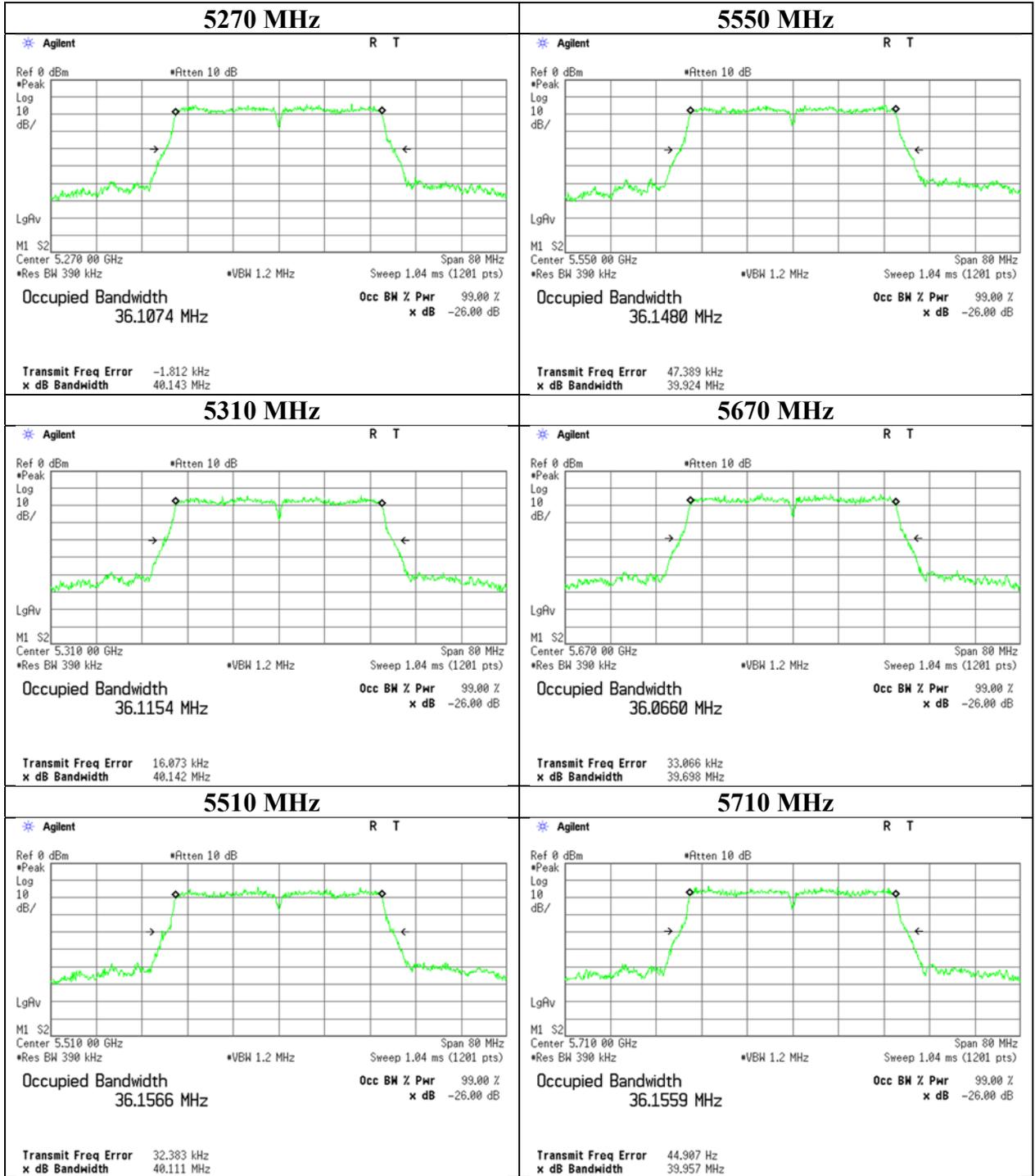
26 dB Emission Bandwidth

**11ax-20
242-tone RU**



26 dB Emission Bandwidth

11n-40



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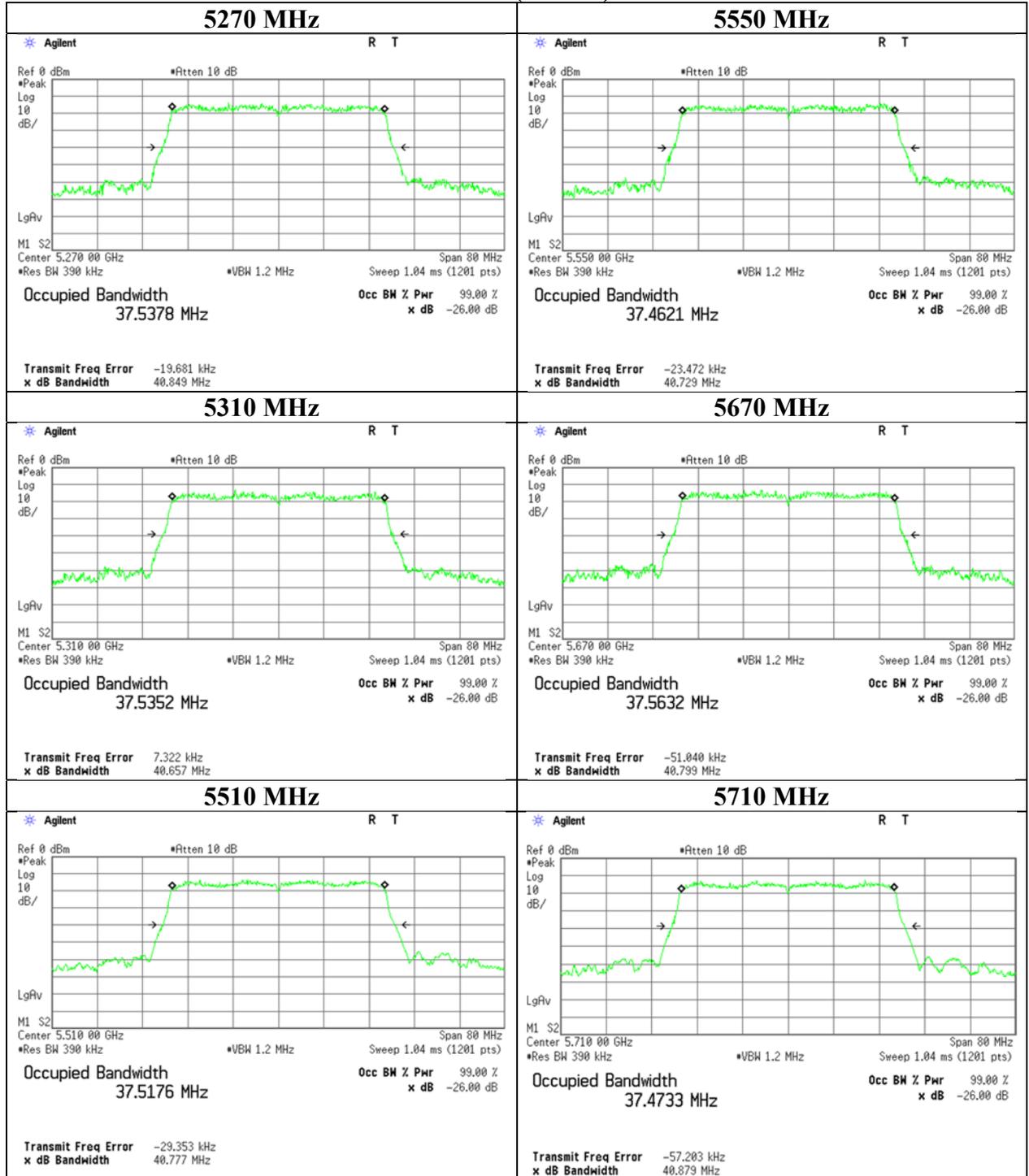
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26 dB Emission Bandwidth

11ax-40 (OFDM)



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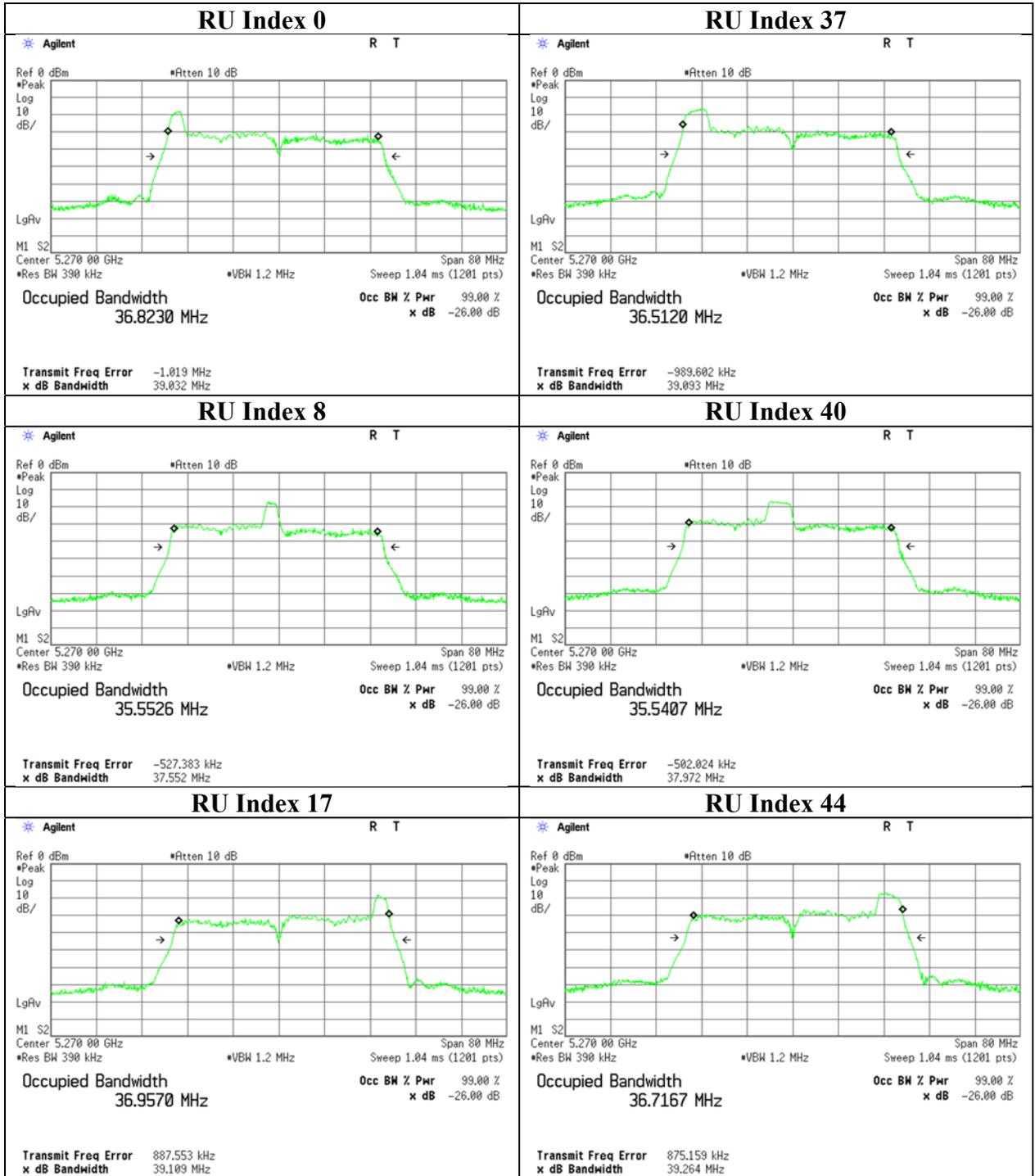
Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-40

26-tone RU 5270 MHz

52-tone RU 5270 MHz



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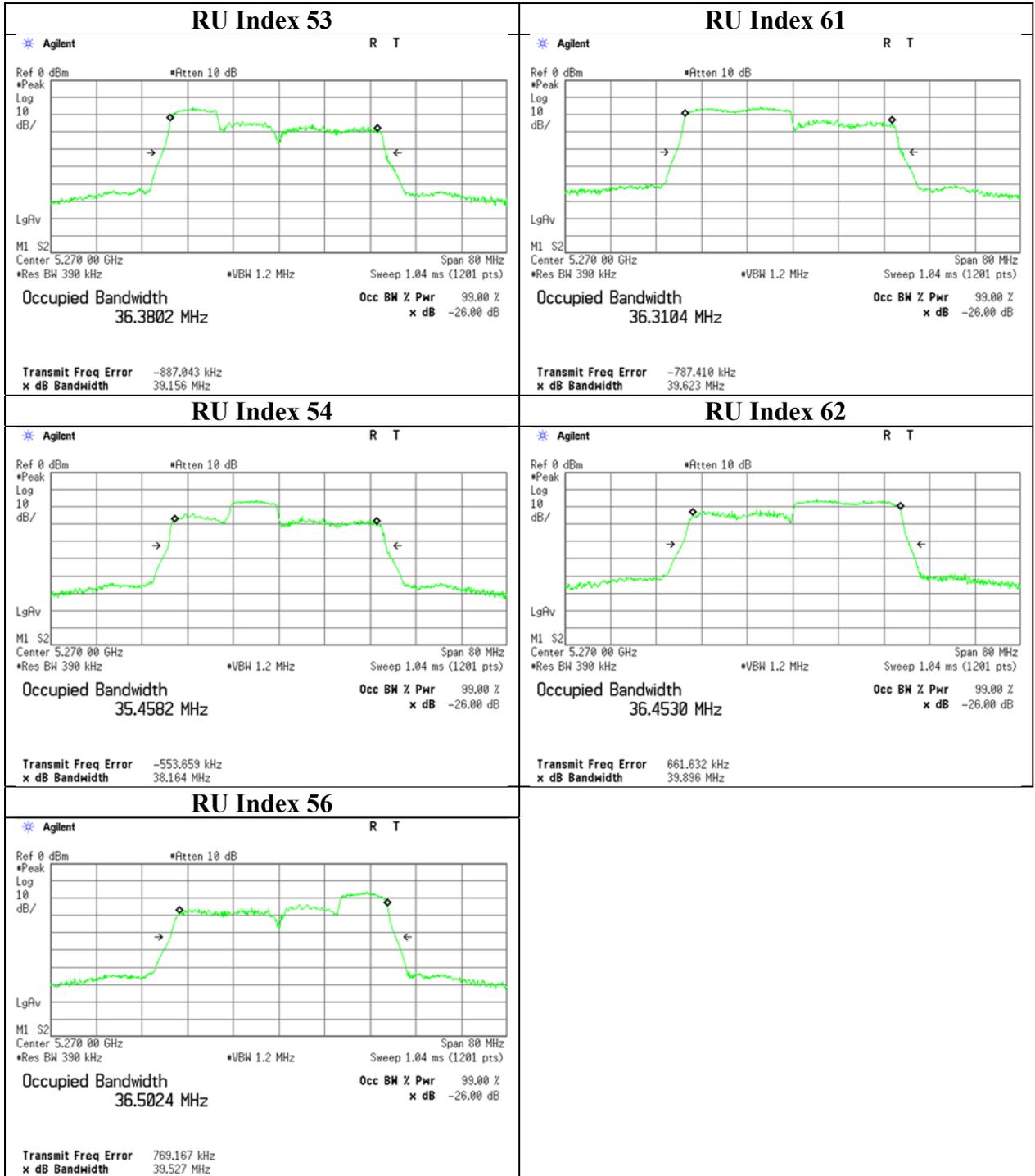
Facsimile : +81 596 24 8124

26 dB Emission Bandwidth

11ax-40

106-tone RU 5270 MHz

242-tone RU 5270 MHz



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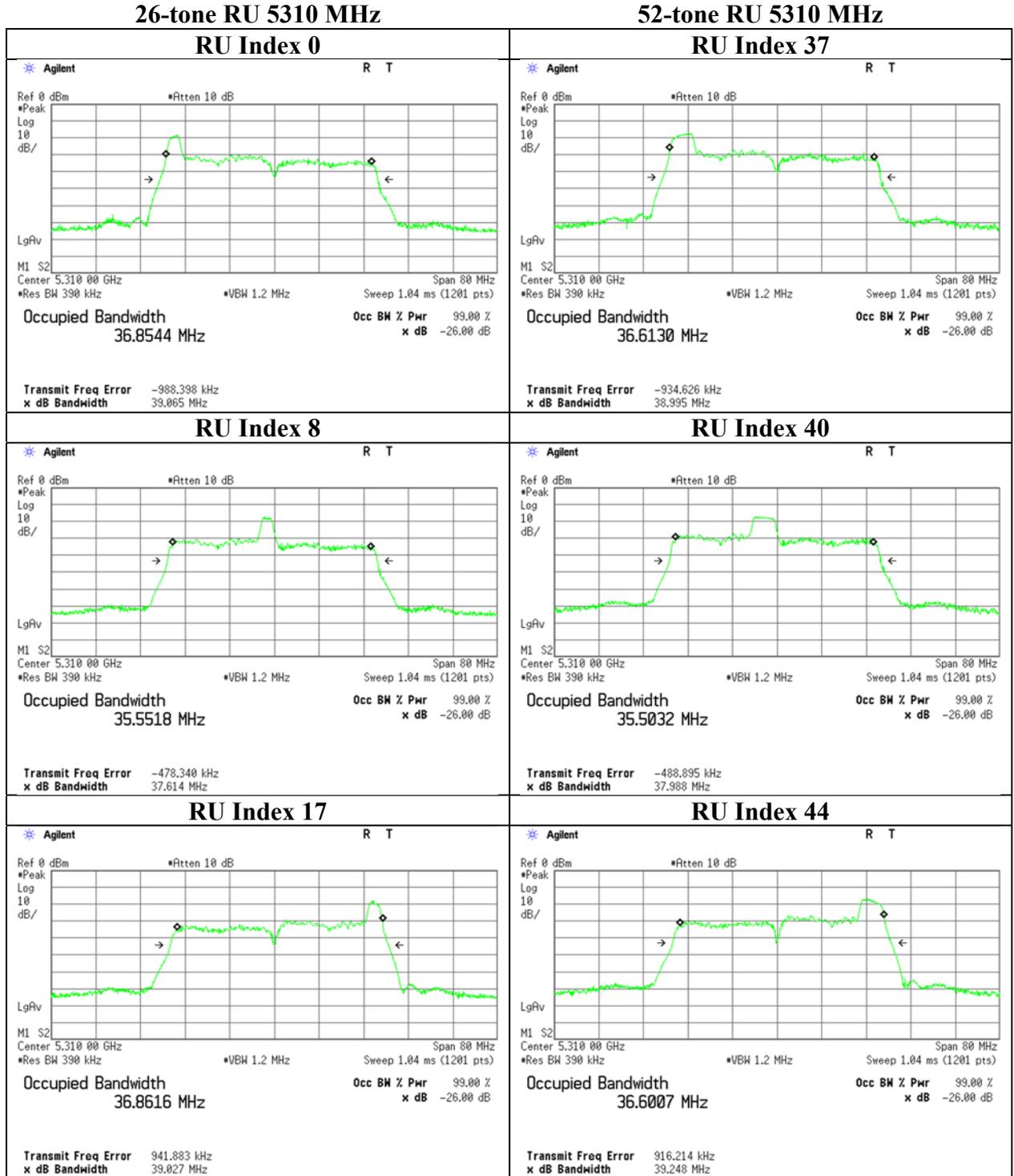
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26 dB Emission Bandwidth

11ax-40



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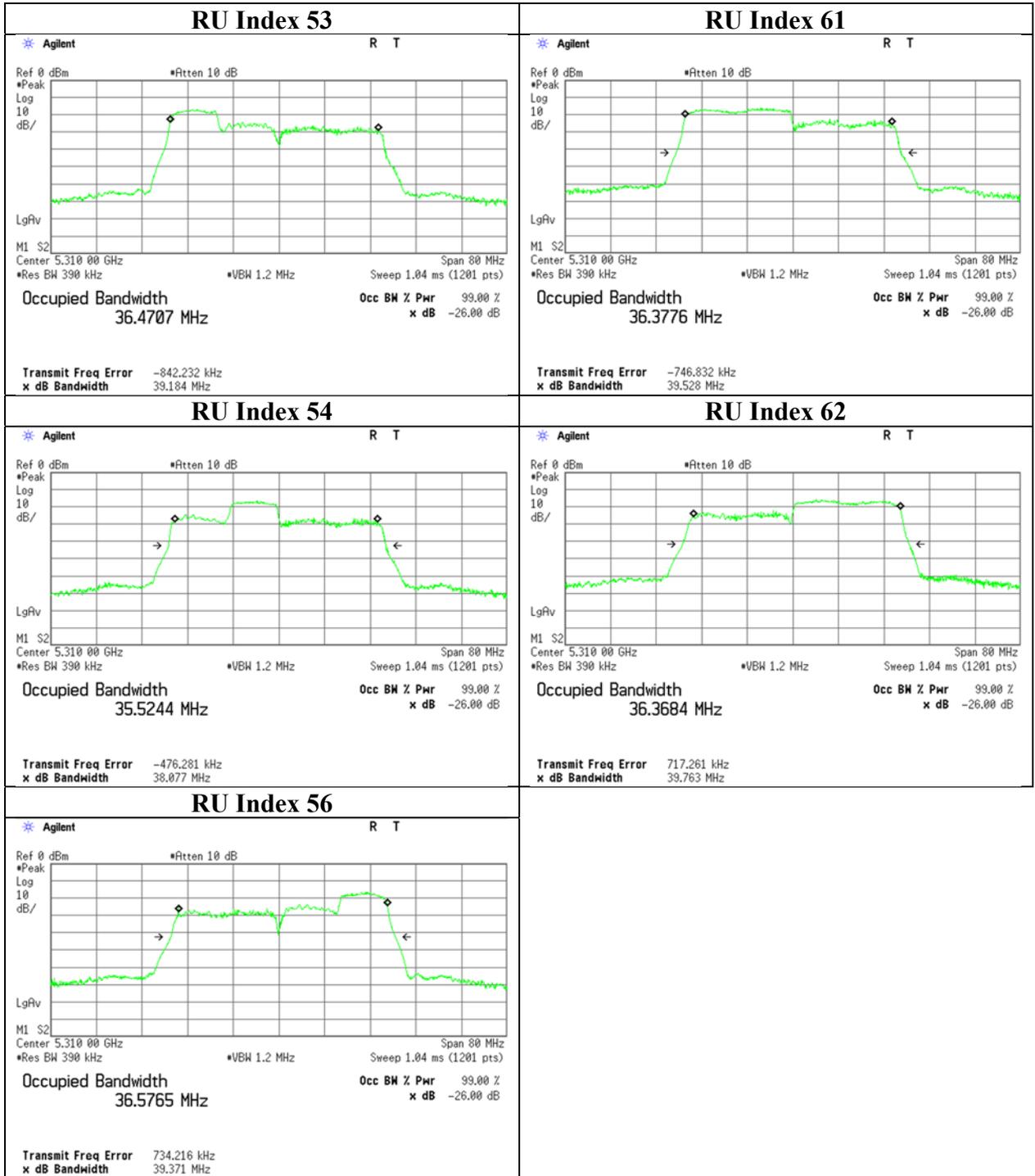
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26 dB Emission Bandwidth

11ax-40

106-tone RU 5310 MHz

242-tone RU 5310 MHz



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