

RADIO TEST REPORT

Test Report No. 15148509H-E-R2

Customer	Sony Interactive Entertainment Inc.
Description of EUT	Wireless communication module
Model Number of EUT	J20H106
FCC ID	AK8M23TFU1
Test Regulation	FCC Part 15 Subpart E
Test Result	Complied
Issue Date	July 3, 2024
Remarks	WLAN (6 GHz band) part Low-power indoor client

Representative Test EngineerTakafumi Noguchi
Engineer**Approved By**Takayuki Shimada
Leader

CERTIFICATE 5107.02

- ☐ 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. 15148509H-E

This report is a revised version of 15148509H-E-R1. 15148509H-E-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15148509H-E	March 11, 2024	-
1	15148509H-E-R1	March 27, 2024	SECTION 6 Figure 2 - Corrected SVSWR Volume for 1 GHz to 10 GHz: 2.0 m → 1.5 m APPENDIX 1 Contention Based Protocol - Added the sentence to following the table for Incumbent signal detection results: “The testing was performed with the AWGN signal until the EUT detected and stopped transmitting (Ceased level).” APPENDIX 2 - Added LIMS ID: 141901 to AT APPENDIX 4 - Divided “Configuration and Peripherals” into Conducted Emission and Radiated Spurious Emission
2	15148509H-E-R2	July 3, 2024	Clause 2.2 Radio Specification (WLAN 6 GHz) - Added row for 6 GHz Contention Based Protocol Incumbent avoidance - Deleted the sentence: “* Preamble puncturing options are not supported.”

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

The information provided by 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 communication module
Model Number	J20H106
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	January 22, 2024
Test Date	January 23 to February 20, 2024

2.2 Product Description

General Specification

Rating	DC 3.3 V
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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.

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

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
	OFDMA	20 MHz: 26/52/106/242-tone RU
Antenna Type	PIFA	
Antenna Gain	Antenna 1: 4.0 dBi	
	Antenna 2: 4.0 dBi	
Directional Gain *1)	7.01 dBi	

WLAN (IEEE802.11a/11n-20/11ac-20/11ax-20/11be-20/11n-40/11ac-40/11ax-40/11be-40/11ac-80/11ax-80/11be-80/11ac-160/11ax-160/11be-160)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band:	5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz
	40 MHz Band:	5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz
	80 MHz Band:	5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz
	160 MHz Band:	5250 MHz 5570 MHz
Type of Modulation	OFDM	
	OFDMA	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
Antenna Type	PIFA	IFA
	Antenna 1: 5.5 dBi	Antenna 3: 5.0 dBi
Directional Gain *1)	8.26 dBi	

WLAN (IEEE802.11ax-20/11be-20/11ax-40/11be-40/11ax-80/11be-80/11ax-160/11be-160)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band:	5955 MHz to 7095 MHz
	40 MHz Band:	5965 MHz to 7085 MHz
	80 MHz Band:	5985 MHz to 7025 MHz
	160 MHz Band:	6025 MHz to 6985 MHz
Type of Modulation	OFDM	
	OFDMA	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
Antenna Type	PIFA	IFA
	Antenna 1: 6.5 dBi	Antenna 3: 6.8 dBi
Directional Gain ^{a)} *1)	9.66 dBi	
6 GHz Contention Based Protocol Incumbent avoidance	Channel puncturing: Not supported	
	Bandwidth reduction: Not supported	

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
Antenna Type	IFA
Antenna Gain	Antenna 3: 4.0 dBi

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
Antenna Type	IFA
Antenna Gain	Antenna 4: 3.5 dBi

*1) Directional antenna gain = $10 \log \left(\left(10^{\frac{Gain(Ant1)}{20}} + 10^{\frac{Gain(Ant2 \text{ or } Ant3)}{20}} \right)^2 / 2 \right)$

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	7.17 dB, 0.23840 MHz, N, QP	Complied	-
26 dB Emission Bandwidth	FCC: KDB Publication Number 987594 ISED: -	FCC: 15.407 (a) (10) ISED: -	See data	Complied	Conducted
Maximum Conducted Output Power	FCC: KDB Publication Number 987594 ISED: -	FCC: 15.407 (a) (8) ISED: RSS-248 4.5.3		Complied	Conducted
Maximum Power Spectral Density	FCC: KDB Publication Number 987594 ISED: -	FCC: 15.407 (a) (8) ISED: RSS-248 4.5.3		Complied	Conducted
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 987594 ISED: -	FCC: 15.407 (b), 15.205 and 15.209 ISED: RSS-248 4.6.2	4.9 dB 106.8 MHz, QP, Vertical	Complied	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
In-Band Emissions	FCC: KDB Publication Number 987594 ISED: -	FCC: 15.407 (b) (7) ISED: RSS-248 4.6.2	See data	Complied	Conducted
Contention Based Protocol	FCC: KDB Publication Number 987594 ISED: -	FCC: 15.407 (d) (6) ISED: RSS-248 4.7		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 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

[Antenna 1 and 2] The EUT has unique coupling/antenna connector (U.FL).

[Antenna 3 and 4] The antenna is not removable from the EUT.

Therefore, the equipment complies with the antenna requirement of Section 15.203/212.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99 % Occupied Band Width	ISED: RSS-Gen 6.7	ISED: RSS-248 4.4	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 $k = 2$.

Conducted emission

Item	Frequency range	Unit	Calculated Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	dB	3.7
	0.15 MHz to 30 MHz	dB	3.3

Radiated emission

Measurement distance	Frequency range		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	4.8
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.1
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	4.8
		Vertical	dB	4.8
	200 MHz to 1000 MHz	Horizontal	dB	4.9
		Vertical	dB	5.0
3 m	1 GHz to 6 GHz	Spectrum analyzer	dB	4.9
	6 GHz to 18 GHz	Spectrum analyzer	dB	5.2
1 m	10 GHz to 18 GHz	Spectrum analyzer	dB	5.0
	18 GHz to 26.5 GHz	Spectrum analyzer	dB	5.6
	26.5 GHz to 40 GHz	Spectrum analyzer	dB	4.9
0.5 m	26.5 GHz to 40 GHz	Spectrum analyzer	dB	4.9
10 m	1 GHz to 18 GHz	Test Receiver	dB	5.4

Antenna Terminal Conducted tests

Item	Unit	Calculated Uncertainty (+/-)
Antenna terminated conducted emission / Power density / Burst power	dB	3.47
Adjacent channel power (ACP)	dB	2.28
Bandwidth (OBW)	%	0.96
Time readout (time span upto 100 msec)	%	0.11
Time readout (time span upto 1000 msec)	%	0.11
Time readout (time span upto 60 sec)	%	0.02
Power measurement (Power meter < 8 GHz)	dB	1.46
Power measurement (Call box < 6 GHz)	dB	1.69
Frequency readout (Frequency counter)	ppm	0.67
Frequency readout (Spectrum analyzer frequency readout function)	ppm	2.13
Temperature (constant temperature bath)	deg.C	0.69
Humidity (constant temperature bath)	%RH	2.98
Modulation characteristics	%	6.93
Frequency for mobile	ppm	0.08
Contention-based protocol	dB	2.26

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

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Telephone: +81-596-24-8999

A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

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.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

* Size of vertical conducting plane (for Conducted Emission test): 2.0 x 2.0 m for No.1, No.2, No.3, No.4, and No.5 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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 802.11ax MIMO 20 MHz BW (11ax-20)	MCS 0 (1TX), PN9
IEEE 802.11be MIMO 20 MHz BW (11be-20)	MCS 0 (1TX), PN9
IEEE 802.11ax MIMO 40 MHz BW (11ax-40)	MCS 0 (1TX), PN9
IEEE 802.11be MIMO 40 MHz BW (11be-40)	MCS 0 (1TX), PN9
IEEE 802.11ax MIMO 80 MHz BW (11ax-80)	MCS 0 (1TX), PN9
IEEE 802.11be MIMO 80 MHz BW (11be-80)	MCS 0 (1TX), PN9
IEEE 802.11ax MIMO 160 MHz BW (11ax-160)	MCS 0 (1TX), PN9
IEEE 802.11be MIMO 160 MHz BW (11be-160)	MCS 0 (1TX), PN9
*The worst antenna and condition were determined based on the test result of Maximum Conducted Output Power.	
*Power of the EUT was set by the software as follows; Power Setting: Refer to Power setting column of Test Data for Maximum Conducted Output Power Software: autotest.sh Version: R1.01 (Date: January 22, 2024 / 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 802.11ax/be mode by the pre-test.	

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

Test Item	Operating Mode *1)	Tested Antenna	Tested Frequency			
			U-NII-5	U-NII-6	U-NII-7	U-NII-8
Conducted emission, Radiated Spurious Emission (Below 1 GHz)	Tx 11be-160 [OFDM] *2)	Antenna 1 + 3	-	-	6825 MHz	-
26 dB Emission Bandwidth, 99 % Occupied Bandwidth, In-Band Emissions	Tx 11be-20 [OFDM] Tx 11be-20 [OFDMA]	Antenna 3 *3)	5955 MHz 6175 MHz 6415 MHz	6435 MHz 6475 MHz 6515 MHz	6535 MHz 6695 MHz 6855 MHz 6875 MHz*	6895 MHz 6995 MHz 7095 MHz
	Tx 11be-40 [OFDM] Tx 11be-40 [OFDMA]		5965 MHz 6165 MHz 6405 MHz	6445 MHz 6485 MHz 6525 MHz*	6565 MHz 6685 MHz 6845 MHz 6885 MHz*	6925 MHz 7005 MHz 7085 MHz
	Tx 11be-80 [OFDM] Tx 11be-80 [OFDMA]		5985 MHz 6145 MHz 6385 MHz	6465 MHz 6545 MHz*	6625 MHz 6705 MHz 6785 MHz 6865 MHz*	6945 MHz 7025 MHz
	Tx 11be-160 [OFDM] Tx 11be-160 [OFDMA]		6025 MHz 6185 MHz 6345 MHz	6505 MHz*	6665 MHz 6825 MHz*	6985 MHz
Maximum Conducted Output Power, Maximum Power Spectral Density	Tx 11be-20 [OFDM] Tx 11be-20 [OFDMA]	Antenna 1 Antenna 3 Antenna 1 + 3	5955 MHz 6175 MHz 6415 MHz	6435 MHz 6475 MHz 6515 MHz	6535 MHz 6695 MHz 6855 MHz 6875 MHz*	6895 MHz 6995 MHz 7095 MHz
	Tx 11be-40 [OFDM] Tx 11be-40 [OFDMA]		5965 MHz 6165 MHz 6405 MHz	6445 MHz 6485 MHz 6525 MHz*	6565 MHz 6685 MHz 6845 MHz 6885 MHz*	6925 MHz 7005 MHz 7085 MHz
	Tx 11be-80 [OFDM] Tx 11be-80 [OFDMA]		5985 MHz 6145 MHz 6385 MHz	6465 MHz 6545 MHz*	6625 MHz 6705 MHz 6785 MHz 6865 MHz*	6945 MHz 7025 MHz
	Tx 11be-160 [OFDM] Tx 11be-160 [OFDMA]		6025 MHz 6185 MHz 6345 MHz	6505 MHz*	6665 MHz 6825 MHz*	6985 MHz

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

Radiated Spurious Emission (Above 1 GHz)	Tx 11be-20 [OFDM] Tx 11be-20 [OFDMA] *4)	Antenna 1 + 3	5955 MHz 6175 MHz 6415 MHz	6435 MHz 6475 MHz 6515 MHz	6535 MHz 6695 MHz 6855 MHz 6875 MHz*	6895 MHz 6995 MHz 7095 MHz
	Tx 11be-40 [OFDM] Tx 11be-40 [OFDMA] *4)		5965 MHz 6165 MHz 6405 MHz	6445 MHz 6485 MHz 6525 MHz*	6565 MHz 6685 MHz 6845 MHz 6885 MHz*	6925 MHz 7005 MHz 7085 MHz
	Tx 11be-80 [OFDM] Tx 11be-80 [OFDMA] *4)		5985 MHz 6145 MHz 6385 MHz	6465 MHz 6545 MHz*	6625 MHz 6705 MHz 6785 MHz 6865 MHz*	6945 MHz 7025 MHz
	Tx 11be-160 [OFDM] Tx 11be-160 [OFDMA] *4)		6025 MHz 6185 MHz 6345 MHz	6505 MHz*	6665 MHz 6825 MHz*	6985 MHz
Contention Based Protocol *5)	Communication 11ax-20	Antenna 1 + 3	6175 MHz	6475 MHz	6695 MHz	6995 MHz
	Communication 11ax-160		6185 MHz	6505 MHz*	6665 MHz	6985 MHz
Conducted Spurious Emission	Tx 11be-160 [OFDM] *2)	Antenna 3 *3)	-	-	6825 MHz	-

*Straddle channel

- *1) Since 11ax and 11be 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 except for Contention Based Protocol.
 *2) The mode was tested as a representative because it had the highest power at antenna terminal test.
 *3) After the comparison between Antenna 1 and Antenna 3, the test was performed with the antenna that had higher power as a representative.
 *4) OFDMA configuration tests were conducted only at the band edge since preliminary testing indicated that the other spurious emission was lower than OFDM.
 *5) Since 11ax and 11be have the same modulation method and no differences in transmitting specification, the test was performed on the representative mode.

Simultaneous transmission

(Only Antenna 3 simultaneously transmits BT1 and WLAN 6 GHz on a signal antenna.)

Test Item	Mode *1)	Antenna type
Radiated Spurious Emission	Tx 11be-40 [242 tone RU Index 62] 7085 MHz + BT1 3DH5 Hopping	Antenna 3
*1) The test was conducted on representative mode, the worst mode of GHz band at Spurious emission test for WLAN 6 GHz and the mode had the highest power at Antenna terminal conducted test for BT1.		

4.2 Configuration and Peripherals

This clause has been submitted for separate exhibit (refer to APPENDIX 4).

SECTION 5: Conducted Emission

Test Procedure and Conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 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 was 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.

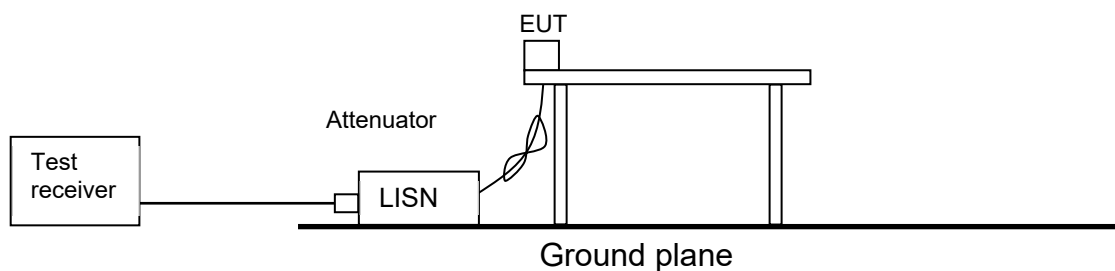
The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

Test results are rounded off and limit are rounded down, 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, 1.0 m by 1.5 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) (6).

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:

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

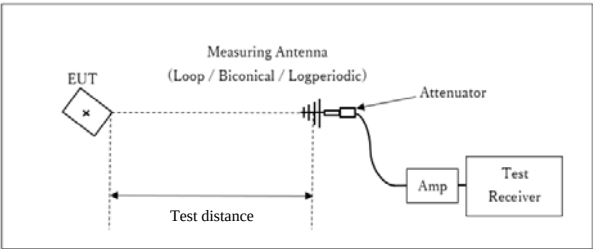
Test Antennas are used as below;

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 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.

Figure 2: Test Setup

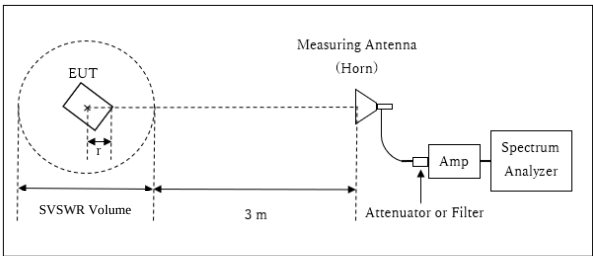
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz

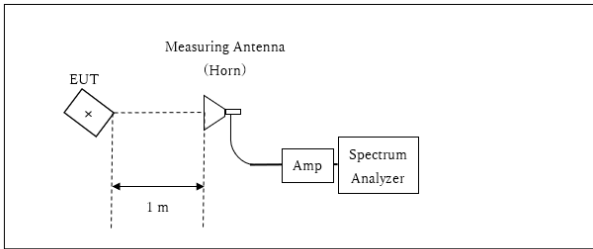


r : Radius of an outer periphery of EUT
x : Center of turn table

Distance Factor: $20 \times \log (3.7 \text{ m} / 3.0 \text{ m}) = 1.83 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.7 \text{ m}$

SVSWR Volume : 1.5 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.05 \text{ m}$

10 GHz to 40 GHz



x : 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.

Test results are rounded off and limit are rounded down, 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. (Contention Based Protocol is described in SECTION 8.)

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	≥ 3 RBW	Auto	RMS Power Averaging (200 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission*2) *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				
In-Band Emissions	Enough to capture the emission	same RBW used for 26 dB Bandwidth measurement	≥ 3 RBW	Auto	RMS Power Averaging (≥ 100 traces)	Clear Write	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.
 *2) 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 to 150 kHz: RBW = 200 Hz, 150 kHz to 30 MHz: RBW = 10 kHz).
 *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 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.

Test results are rounded off and limit are rounded down, 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

SECTION 8: Contention Based Protocol

Operating Modes

The EUT operates in the following band / bands: U-NII-5 (5925 MHz to 6425 MHz), U-NII-6 (6425 MHz to 6525 MHz), U-NII-7 (6525 MHz to 6875 MHz) and U-NII-8 (6875 MHz to 7125 MHz).

The EUT is classified as a 6 GHz Low power Indoor Client.

The lowest gain antenna assembly utilized with the EUT has a gain of 6.5 dBi in the U-NII 5 band, 6.5 dBi in the U-NII 6 band, 6.5 dBi in the U-NII 7 band and 6.5 dBi in the U-NII 8 band.

Two sets of two antennas, one set per chain, are utilized to meet the diversity and MIMO operational requirements.

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. All antenna ports are connected to the test system via a power divider to perform conducted tests.

The maximum allowable AWGN Incumbent Detection Threshold level is -62 dBm/MHz.

WLAN traffic was generated by transferring a data stream from the EUT to the Companion Device using iPerf version 2.0.5 software package.

(Date: January 22, 2024 / Storage location: Driven by connected PC)

The EUT utilizes the 802.11ax/be architecture, with a 20 MHz, 40 MHz, 80 MHz and 160 MHz channel bandwidth.

System Overview

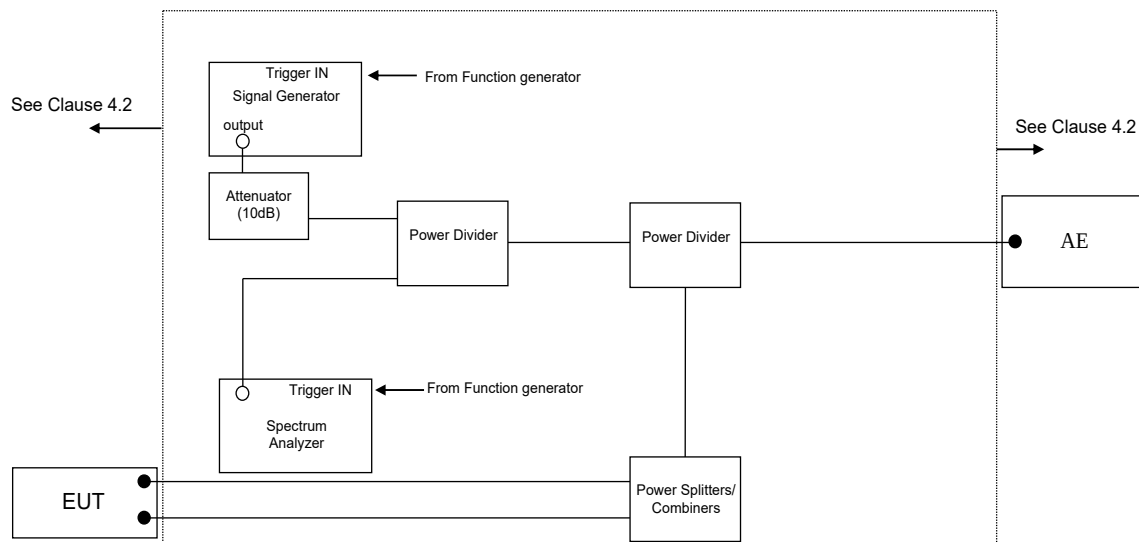
Should multiple RF ports be utilized for the EUT and/or Companion devices (for example, for diversity or MIMO implementations), combiner/dividers are inserted between the EUT MIMO Combiner/Divider and the attenuator connected to the EUT (and/or between the Companion MIMO Combiner/Divider and the attenuator connected to the Companion Device). Additional attenuators may be utilized such that there is one attenuator at each RF port on each device.

The Test setup is different from 987594 D02 U-NII 6 GHz EMC Measurement v02r01, but it is equivalent.

SYSTEM CALIBRATION

The monitoring cable is disconnected from the spectrum analyzer and a 50-ohm load is connected to the end of the monitoring cable in place of the spectrum analyzer. The cable connected to the EUT is then attached to the spectrum analyzer in place of the monitoring cable. A signal generator is then set to produce a modulated AWGN Incumbent Signal that has a 99% occupied power bandwidth of 10 MHz. The output amplitude of the signal generator is adjusted to yield the allowable maximum AWGN Incumbent Signal level as measured on the spectrum analyzer. The EUT and monitoring cables are then returned to their original configurations to perform the test.

Conducted Methods System Block Diagram



Test Data : APPENDIX
Test Result : Pass

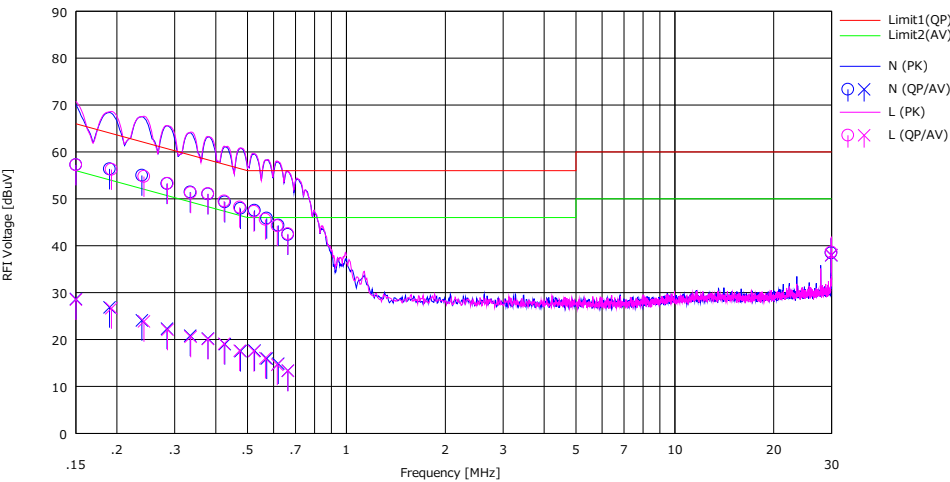
APPENDIX 1: Test Data

Conducted Emission

Test place
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab. No.2 Semi Anechoic Chamber
February 8, 2024
20 deg. C /40 % RH
Ken Fujita
Tx 11be-160 [OFDM] 6825 MHz

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> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	44.10	15.50	0.06	13.10	57.26	28.66	66.00	56.00	8.74	27.34	N	
2	0.18995	43.20	13.70	0.06	13.11	56.37	26.87	64.04	54.04	7.67	27.17	N	
3	0.23840	41.80	10.90	0.06	13.12	54.98	24.08	62.15	52.15	7.17	28.07	N	
4	0.28430	40.03	9.10	0.06	13.14	53.23	22.30	60.69	50.69	7.46	28.39	N	
5	0.33445	38.20	7.60	0.06	13.15	51.41	20.81	59.34	49.34	7.93	28.53	N	
6	0.37865	37.80	7.00	0.06	13.15	51.01	20.21	58.31	48.31	7.30	28.10	N	
7	0.42625	36.10	5.80	0.06	13.16	49.32	19.02	57.33	47.33	8.01	28.31	N	
8	0.47555	34.70	4.30	0.06	13.17	47.93	17.53	56.42	46.42	8.49	28.89	N	
9	0.52485	34.30	4.40	0.06	13.17	47.53	17.63	56.00	46.00	8.47	28.37	N	
10	0.57160	32.60	2.70	0.06	13.18	45.84	15.94	56.00	46.00	10.16	30.06	N	
11	0.62005	31.10	1.60	0.06	13.19	44.35	14.85	56.00	46.00	11.65	31.15	N	
12	0.66340	29.10	0.10	0.07	13.19	42.36	13.36	56.00	46.00	13.64	32.64	N	
13	29.92000	23.30	22.80	0.58	14.60	38.48	37.98	60.00	50.00	21.52	12.02	N	
14	0.15000	44.10	15.40	0.03	13.10	57.23	28.53	66.00	56.00	8.77	27.47	L	
15	0.19250	43.10	13.50	0.04	13.11	56.25	26.65	63.93	53.93	7.68	27.28	L	
16	0.24180	41.60	10.70	0.04	13.12	54.76	23.86	62.03	52.03	7.27	28.17	L	
17	0.28515	40.10	8.90	0.04	13.14	53.28	22.08	60.66	50.66	7.38	28.58	L	
18	0.33530	38.10	7.40	0.04	13.15	51.29	20.59	59.32	49.32	8.03	28.73	L	
19	0.37865	37.90	6.90	0.04	13.15	51.09	20.09	58.31	48.31	7.22	28.22	L	
20	0.42455	36.30	5.90	0.04	13.16	49.50	19.10	57.36	47.36	7.86	28.26	L	
21	0.47300	35.00	4.40	0.04	13.17	48.21	17.61	56.46	46.46	8.25	28.85	L	
22	0.52315	34.10	4.30	0.04	13.17	47.31	17.51	56.00	46.00	8.69	28.49	L	
23	0.56650	32.40	2.80	0.04	13.18	45.62	16.02	56.00	46.00	10.38	29.98	L	
24	0.61580	31.00	1.40	0.04	13.19	44.23	14.63	56.00	46.00	11.77	31.37	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.

Conducted Emission

Test place
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab. No.2 Semi Anechoic Chamber
February 8, 2024
20 deg. C /40 % RH
Ken Fujita
Tx 11be-160 [OFDM] 6825 MHz

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> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
25	0.66340	29.30	0.10	0.04	13.19	42.53	13.33	56.00	46.00	13.47	32.67	L	
26	29.94000	23.40	22.80	0.62	14.60	38.62	38.02	60.00	50.00	21.38	11.98	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

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 29, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Yuta Moriya
Mode	Tx 11be-20 [OFDM]

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5955	19.934	18921.7	320
	6175	19.855	18925.5	320
	6415	19.867	18915.0	320
	6435	19.871	18927.9	320
	6475	19.901	18908.3	320
	6515	19.889	18916.9	320
	6535	19.903	18900.3	320
	6695	19.898	18932.1	320
	6855	19.933	18898.7	320
	6875	19.884	18908.9	320
	6895	19.941	18905.3	320
	6995	19.884	18941.5	320
	7095	19.892	18905.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place Ise EMC Lab. No.8 Measurement Room
Date January 30, 2024
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Yuta Moriya
Mode Tx 11be-20 [26-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5955	0	19.464	18108.5	320
	6175	4	18.104	17017.7	320
	6415	8	19.215	18174.1	320
	6435	0	19.424	18219.2	320
	6475	4	18.207	17050.0	320
	6515	8	19.372	18157.9	320
	6535	0	19.331	18190.9	320
	6695	4	18.178	17114.9	320
	6855	8	19.445	18171.8	320
	6875	8	19.279	18222.9	320
	6895	0	19.247	18218.3	320
	6995	4	18.120	17001.7	320
	7095	8	19.199	18136.5	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-20 [52-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5955	37	19.487	17997.6	320
	6175	38	18.236	16806.5	320
	6415	40	19.313	17985.8	320
	6435	37	19.533	18021.4	320
	6475	38	18.218	16845.4	320
	6515	40	19.325	17936.6	320
	6535	37	19.479	18039.9	320
	6695	38	18.226	16802.2	320
	6855	40	19.262	17966.5	320
	6875	40	19.381	17981.3	320
	6895	37	19.458	18052.6	320
	6995	38	18.243	16826.1	320
	7095	40	19.315	17952.7	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2024
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-20 [106-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5955	53	19.635	18068.4	320
	6175	53	19.614	18066.0	320
	6415	54	19.507	18108.1	320
	6435	53	19.572	18073.3	320
	6475	53	19.583	18050.1	320
	6515	54	19.470	18082.2	320
	6535	53	19.673	18160.3	320
	6695	53	19.758	18157.1	320
	6855	54	19.721	18075.1	320
	6875	54	19.852	18102.3	320
	6895	53	19.637	18165.8	320
	6995	53	19.693	18136.9	320
	7095	54	19.860	18064.9	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place Ise EMC Lab. No.8 Measurement Room
Date January 30, 2024
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Takafumi Noguchi
Mode Tx 11be-20 [242-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5955	61	19.827	18886.6	320
	6175	61	19.856	18899.4	320
	6415	61	19.860	18895.8	320
	6435	61	19.866	18904.8	320
	6475	61	19.874	18896.8	320
	6515	61	19.879	18931.2	320
	6535	61	19.855	18908.5	320
	6695	61	19.950	18894.5	320
	6855	61	19.829	18903.1	320
	6875	61	19.902	18906.2	320
	6895	61	19.826	18903.4	320
	6995	61	19.836	18907.4	320
	7095	61	19.892	18900.0	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 29, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Yuta Moriya
Mode	Tx 11be-40 [OFDM]

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	39.679	37758.2	320
	6165	39.803	37815.7	320
	6405	39.626	37807.9	320
	6445	39.529	37834.3	320
	6485	39.529	37803.1	320
	6525	39.780	37819.3	320
	6565	39.761	37734.6	320
	6685	39.705	37787.5	320
	6845	39.673	37744.9	320
	6885	39.542	37832.4	320
	6925	39.526	37758.0	320
	7005	39.620	37786.5	320
	7085	39.579	37772.6	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 30, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-40 [26-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	0	19.291	17916.6	320
	6165	8	22.885	20722.2	320
	6405	17	19.180	18001.8	320
	6445	0	19.254	17922.0	320
	6485	8	23.019	20679.9	320
	6525	17	19.204	18024.3	320
	6565	0	19.141	17906.9	320
	6685	8	22.952	20696.7	320
	6845	17	19.210	18023.4	320
	6885	17	19.150	17980.3	320
	6925	0	19.234	17925.7	320
	7005	8	23.085	20702.3	320
	7085	17	19.128	17980.6	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-40 [52-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	37	19.345	17790.4	320
	6165	40	23.366	20242.4	320
	6405	44	19.276	17812.2	320
	6445	37	19.425	17814.7	320
	6485	40	23.372	20071.6	320
	6525	44	19.258	17767.4	320
	6565	37	19.380	17800.6	320
	6685	40	23.154	20172.8	320
	6845	44	19.255	17797.3	320
	6885	44	19.114	17777.1	320
	6925	37	19.301	17809.1	320
	7005	40	23.144	20021.0	320
	7085	44	19.241	17779.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2024
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-40 [106-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	53	19.879	17652.8	320
	6165	54	27.464	19860.5	320
	6405	56	19.913	17762.1	320
	6445	53	19.925	17672.0	320
	6485	54	26.511	20029.2	320
	6525	56	19.912	17752.5	320
	6565	53	19.955	17705.7	320
	6685	54	29.546	20099.1	320
	6845	56	19.935	17752.9	320
	6885	56	19.835	17736.2	320
	6925	53	19.825	17699.7	320
	7005	54	28.138	20021.0	320
	7085	56	19.804	17660.4	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-40 [242-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	61	23.539	18956.2	320
	6165	61	22.455	18922.4	320
	6405	62	23.523	18976.0	320
	6445	61	23.492	19026.7	320
	6485	61	24.171	19116.2	320
	6525	62	24.885	19323.9	320
	6565	61	22.783	19044.4	320
	6685	61	24.866	19275.4	320
	6845	62	24.053	19078.3	320
	6885	62	25.251	19109.0	320
	6925	61	28.720	19784.4	320
	7005	61	24.763	19106.2	320
	7085	62	24.223	19102.7	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 30, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-40 [484-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5965	65	39.834	37755.1	320
	6165	65	40.113	37752.2	320
	6405	65	39.965	37790.1	320
	6445	65	39.827	37767.4	320
	6485	65	39.890	37753.1	320
	6525	65	40.064	37758.3	320
	6565	65	39.650	37749.3	320
	6685	65	39.899	37768.5	320
	6845	65	39.869	37775.4	320
	6885	65	39.957	37748.9	320
	6925	65	39.722	37724.9	320
	7005	65	39.873	37737.1	320
	7085	65	39.728	37759.6	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 29, 2024
Temperature / Humidity	21 deg. C / 39 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-80 [OFDM]

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	80.070	77280.6	320
	6145	80.054	77343.4	320
	6385	80.100	77450.9	320
	6465	80.125	77341.3	320
	6545	80.056	77300.6	320
	6625	79.995	77435.0	320
	6705	80.106	77426.6	320
	6785	79.994	77332.0	320
	6865	80.023	77333.8	320
	6945	79.983	77375.2	320
	7025	80.092	77312.4	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place Ise EMC Lab. No.8 Measurement Room
Date January 31, 2024
Temperature / Humidity 22 deg. C / 41 % RH
Engineer Yuta Moriya
Mode Tx 11be-80 [26-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	0	20.114	18753.5	320
	6145	18	38.348	36595.2	320
	6385	36	19.957	18880.8	320
	6465	0	20.052	18798.9	320
	6545	36	19.886	18933.7	320
	6625	0	19.861	18424.3	320
	6705	18	38.825	37211.0	320
	6785	36	19.862	19033.2	320
	6865	36	20.073	19018.2	320
	6945	0	19.950	19391.4	320
	7025	36	20.124	19764.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-80 [52-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	37	20.215	18348.9	320
	6145	44	24.799	22741.0	320
	6385	52	20.303	18429.6	320
	6465	37	20.234	18377.5	320
	6545	52	20.064	18463.8	320
	6625	37	20.266	18401.6	320
	6705	44	24.684	22933.2	320
	6785	52	20.311	18511.5	320
	6865	52	20.235	18448.8	320
	6945	37	20.354	18549.4	320
	7025	52	20.231	18533.7	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2024
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-80 [106-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	53	21.389	18173.6	320
	6145	56	27.487	22105.9	320
	6385	60	21.419	18408.3	320
	6465	53	21.328	18214.9	320
	6545	60	21.236	18402.8	320
	6625	53	21.383	18264.3	320
	6705	56	26.769	21997.3	320
	6785	60	21.507	18425.0	320
	6865	60	21.068	18384.6	320
	6945	53	21.709	18254.7	320
	7025	60	21.570	18501.3	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-80 [242-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	61	36.283	22453.5	320
	6145	62	32.889	21884.7	320
	6385	64	28.700	20592.6	320
	6465	61	30.025	21236.4	320
	6545	64	29.048	20557.2	320
	6625	61	27.644	20344.3	320
	6705	62	36.442	22505.6	320
	6785	64	27.488	20486.0	320
	6865	64	28.439	20327.4	320
	6945	61	29.453	21071.4	320
	7025	64	29.451	20966.7	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 2, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-80 [484-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	65	58.036	38678.0	320
	6145	65	57.225	38697.2	320
	6385	66	57.357	38785.2	320
	6465	65	56.791	38562.6	320
	6545	66	56.280	38810.9	320
	6625	65	55.995	38496.0	320
	6705	65	56.474	38488.7	320
	6785	66	58.472	38842.5	320
	6865	66	58.683	38853.6	320
	6945	65	55.109	38790.6	320
	7025	66	57.582	39014.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 30, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-80 [996-tone RU]

Antenna	Tested Frequency [MHz]	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	5985	67	79.951	77423.8	320
	6145	67	79.951	77473.9	320
	6385	67	80.029	77365.0	320
	6465	67	80.074	77472.0	320
	6545	67	79.997	77348.8	320
	6625	67	80.066	77347.1	320
	6705	67	79.993	77489.5	320
	6785	67	80.032	77442.4	320
	6865	67	79.968	77418.2	320
	6945	67	79.942	77408.1	320
	7025	67	79.935	77521.9	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 29, 2024
Temperature / Humidity	21 deg. C / 39 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-160 [OFDM]

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	161.887	156498.9	320
	6185	161.870	156391.4	320
	6345	161.883	156858.3	320
	6505	162.107	156409.5	320
	6665	161.988	156295.8	320
	6825	162.028	156433.6	320
	6985	161.992	156518.1	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-160 [26-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	0	22.253	41948.9	320
	6185	0	36	27.798	33311.3	320
	6345	1	36	21.674	38742.3	320
	6505	0	0	21.984	50548.8	320
	6665	0	0	21.948	47645.9	320
	6825	1	36	21.354	39679.0	320
	6985	1	36	21.638	47669.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2024
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Takafumi Noguchi
Mode	Tx 11be-160 [52-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	37	21.821	26859.5	320
	6185	0	52	29.303	32351.5	320
	6345	1	52	21.933	26724.0	320
	6505	0	37	21.909	27731.2	320
	6665	0	37	27.217	33139.2	320
	6825	1	52	21.511	24952.3	320
	6985	1	52	21.598	29238.7	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab. No.8 Measurement Room
February 1, 2024
23 deg. C / 43 % RH
Takafumi Noguchi
Tx 11be-160 [106-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	53	25.261	23282.0	320
	6185	0	60	35.381	33486.4	320
	6345	1	60	24.423	22959.2	320
	6505	0	53	24.243	22980.6	320
	6665	0	53	23.349	22686.7	320
	6825	1	60	22.498	21723.5	320
	6985	1	60	24.534	24065.9	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab. No.8 Measurement Room
February 1, 2024
23 deg. C / 43 % RH
Takafumi Noguchi
Tx 11be-160 [242-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	61	41.850	31520.7	320
	6185	0	64	49.374	37795.5	320
	6345	1	64	35.683	29544.1	320
	6505	0	61	34.778	26294.5	320
	6665	0	61	33.658	26713.6	320
	6825	1	64	37.052	28974.7	320
	6985	1	64	40.338	30041.0	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 2, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-160 [484-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	65	60.304	42299.9	320
	6185	0	66	142.819	50444.9	320
	6345	1	66	55.656	42542.9	320
	6505	0	65	60.481	43482.4	320
	6665	0	65	60.160	41622.4	320
	6825	1	66	60.059	41459.0	320
	6985	1	66	59.782	43225.2	320

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

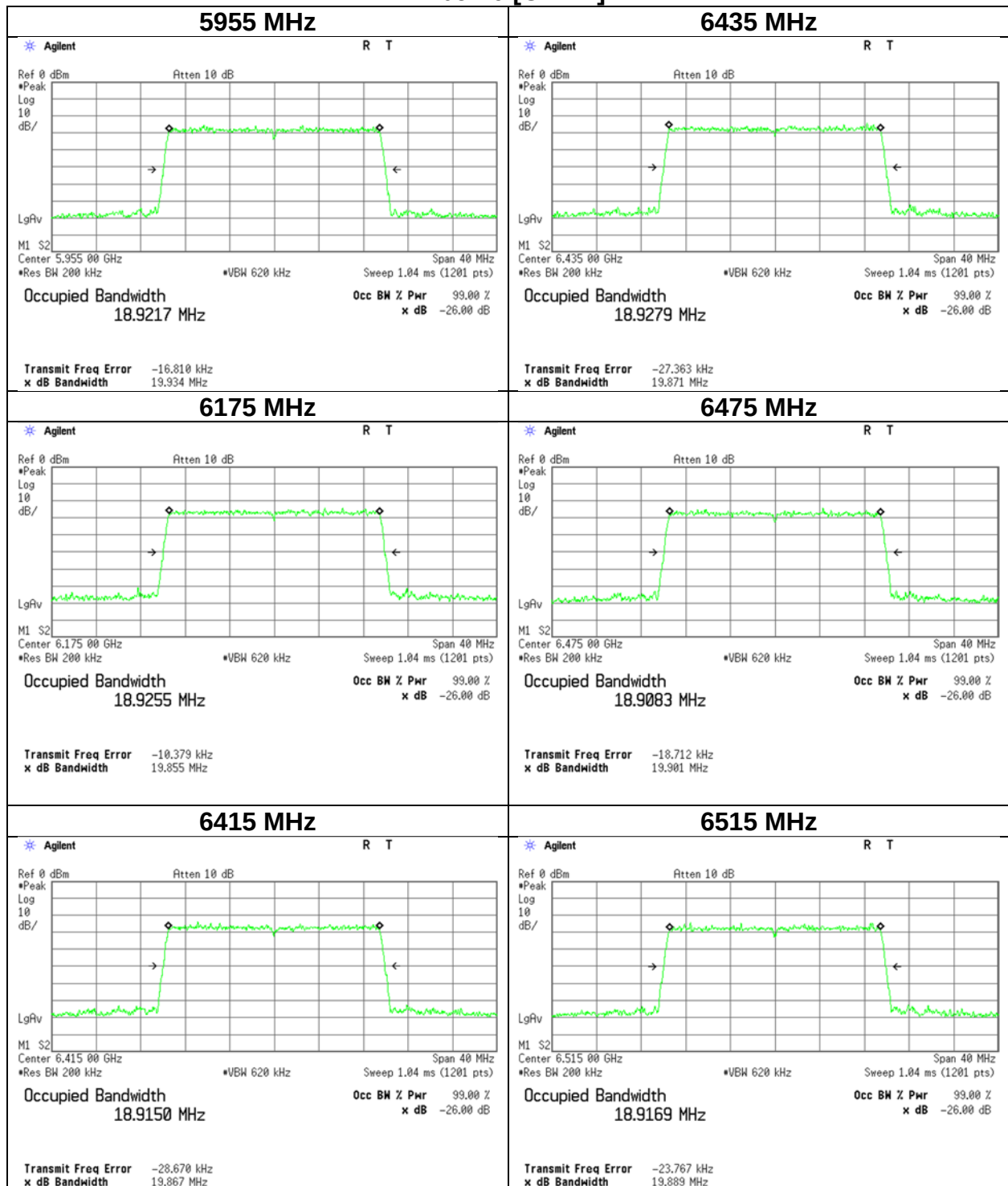
Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 2, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Takumi Nishida
Mode	Tx 11be-160 [996-tone RU]

Antenna	Tested Frequency [MHz]	Segment	RU Index	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
Antenna 3	6025	0	67	116.426	78925.9	320
	6185	0	67	113.866	78781.7	320
	6345	1	67	114.707	79236.5	320
	6505	0	67	115.657	78849.2	320
	6665	0	67	113.730	78914.5	320
	6825	1	67	115.734	79162.4	320
	6985	1	67	113.393	79180.8	320

Ise EMC Lab. No.8 Measurement Room
January 30, 2024
22 deg. C / 40 % RH
Takafumi Noguchi
Tx 11be-160 [2x996-tone RU]

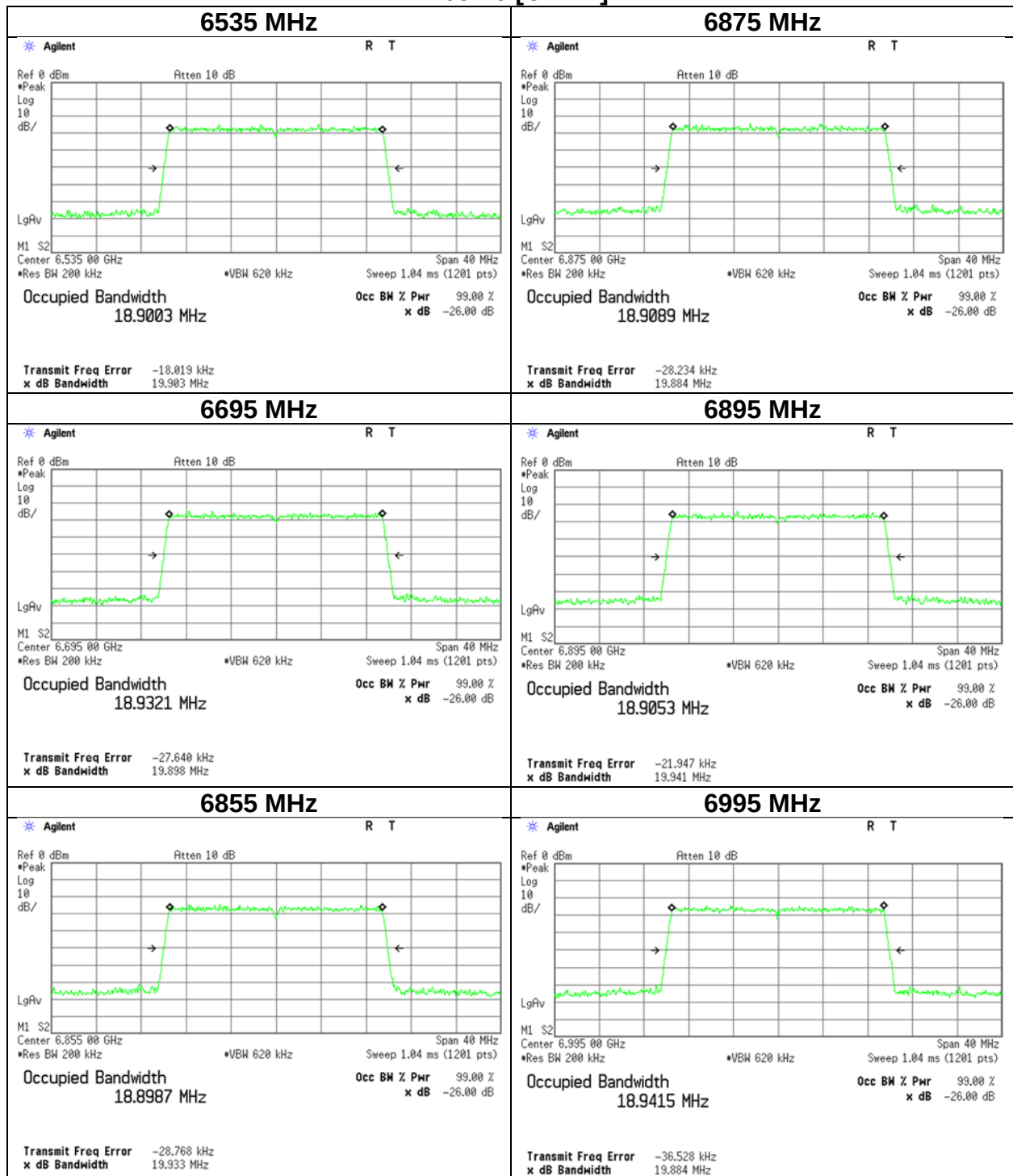
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [OFDM]

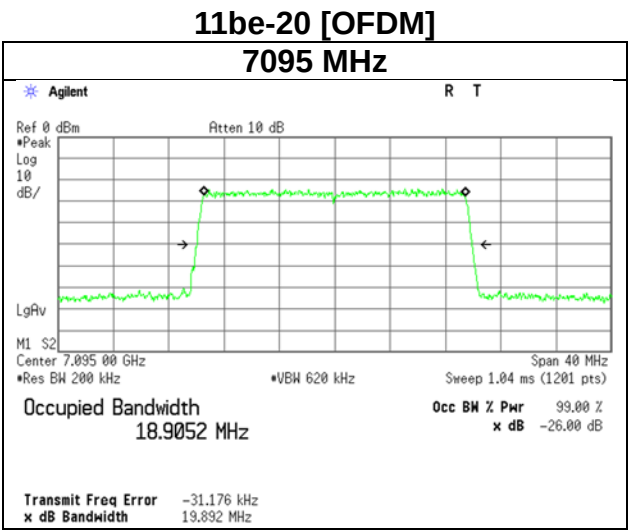


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [OFDM]

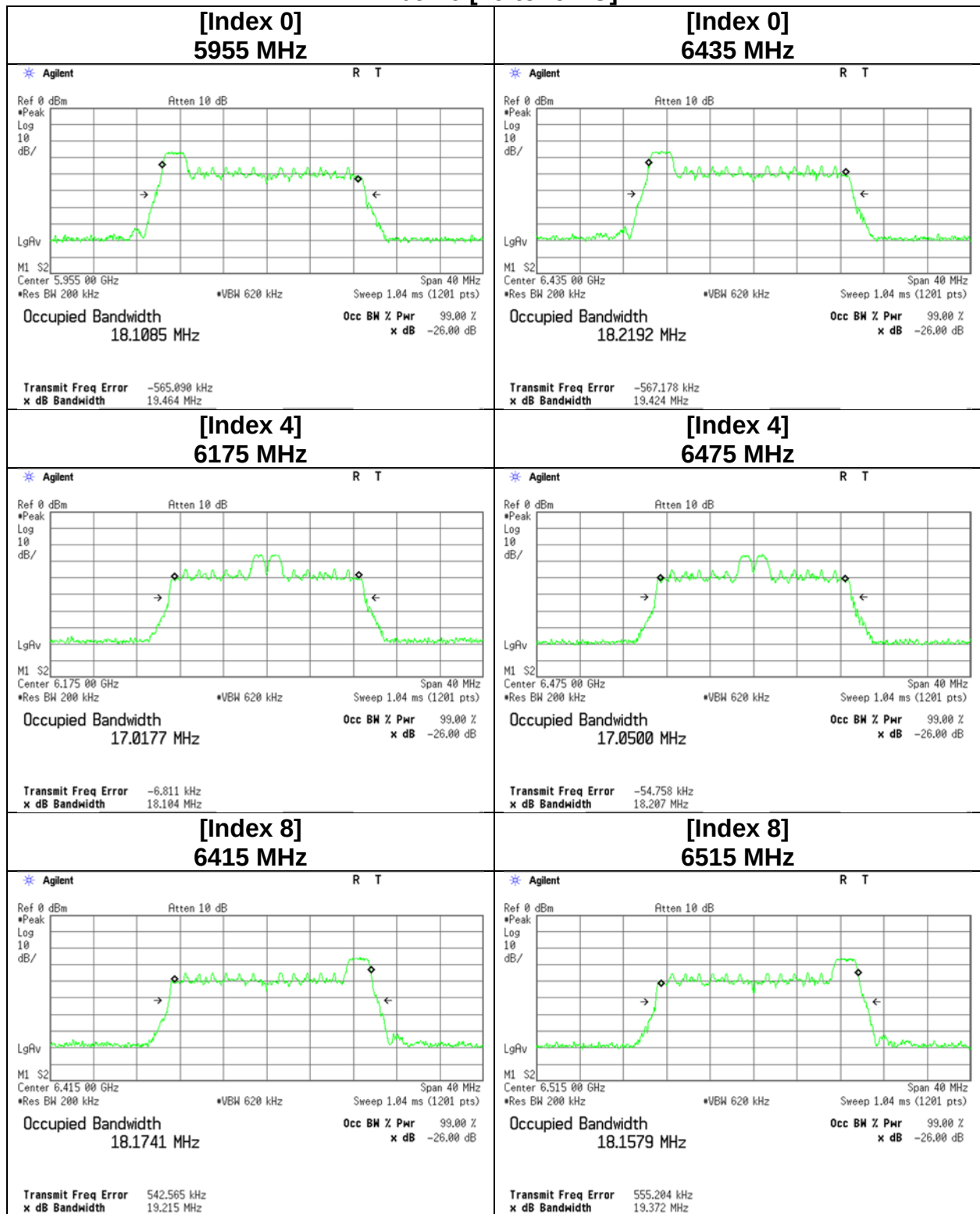


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



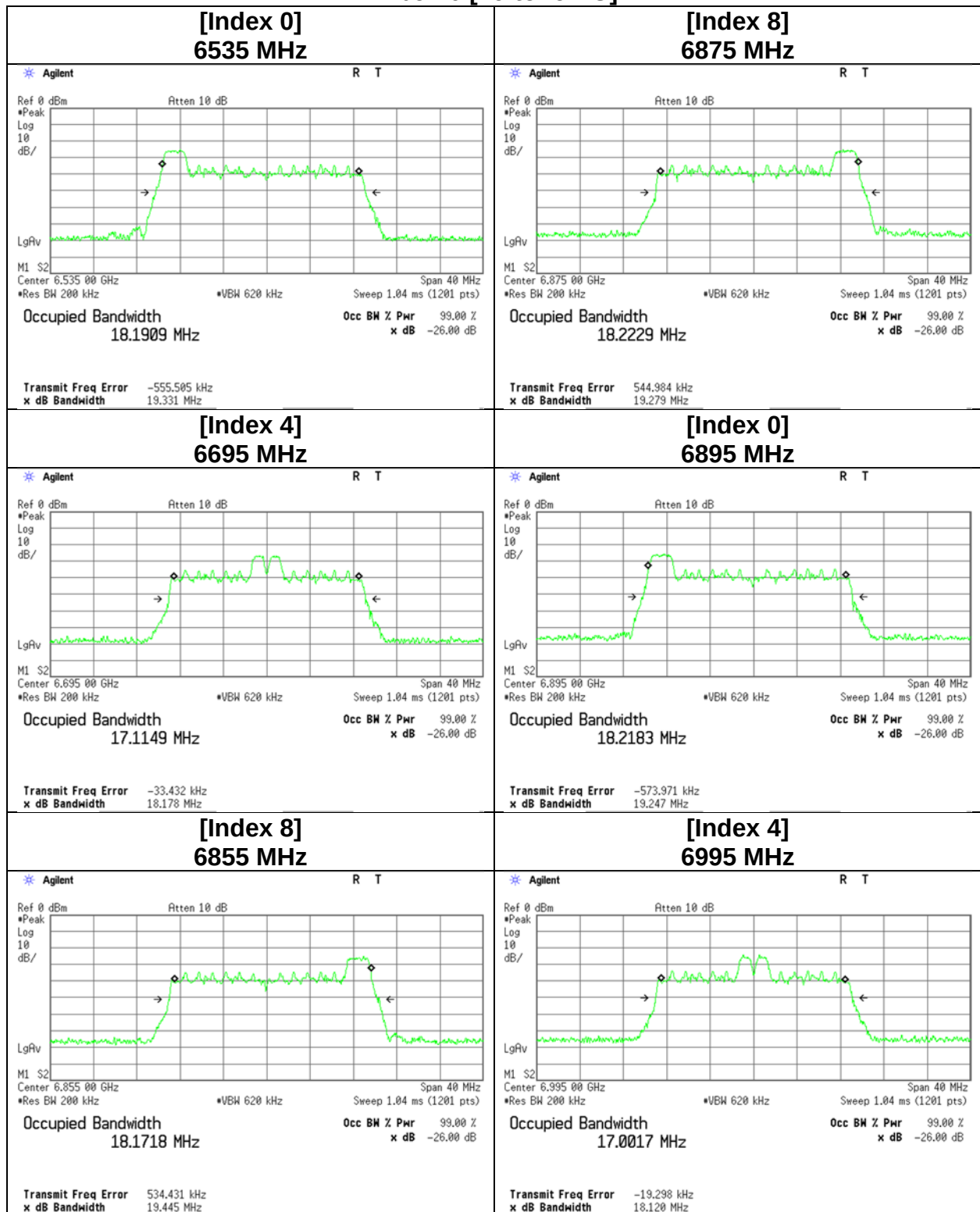
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [26-tone RU]

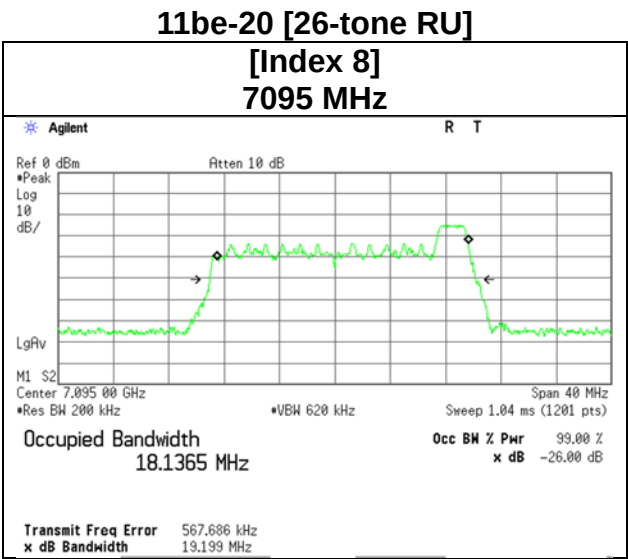


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [26-tone RU]

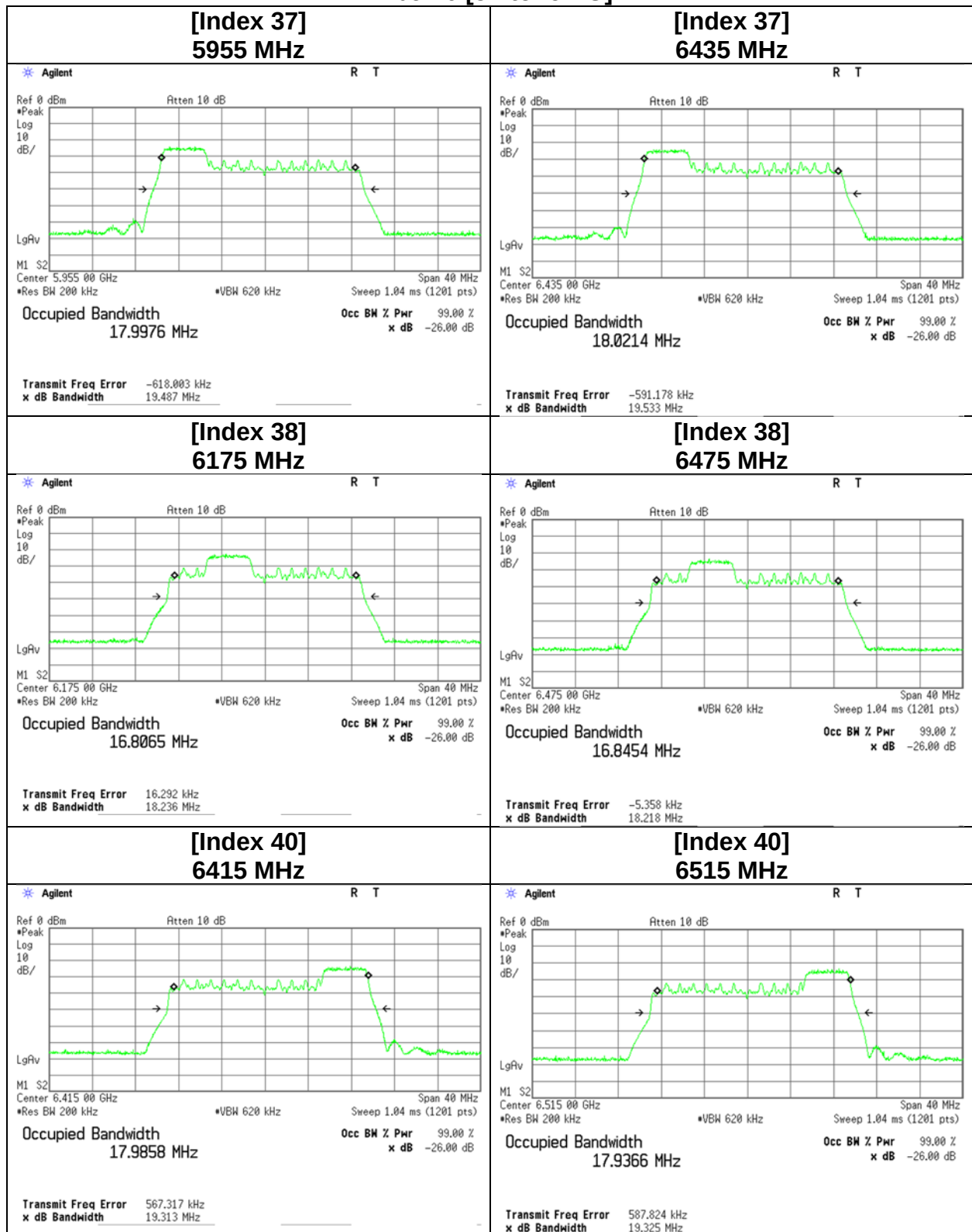


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



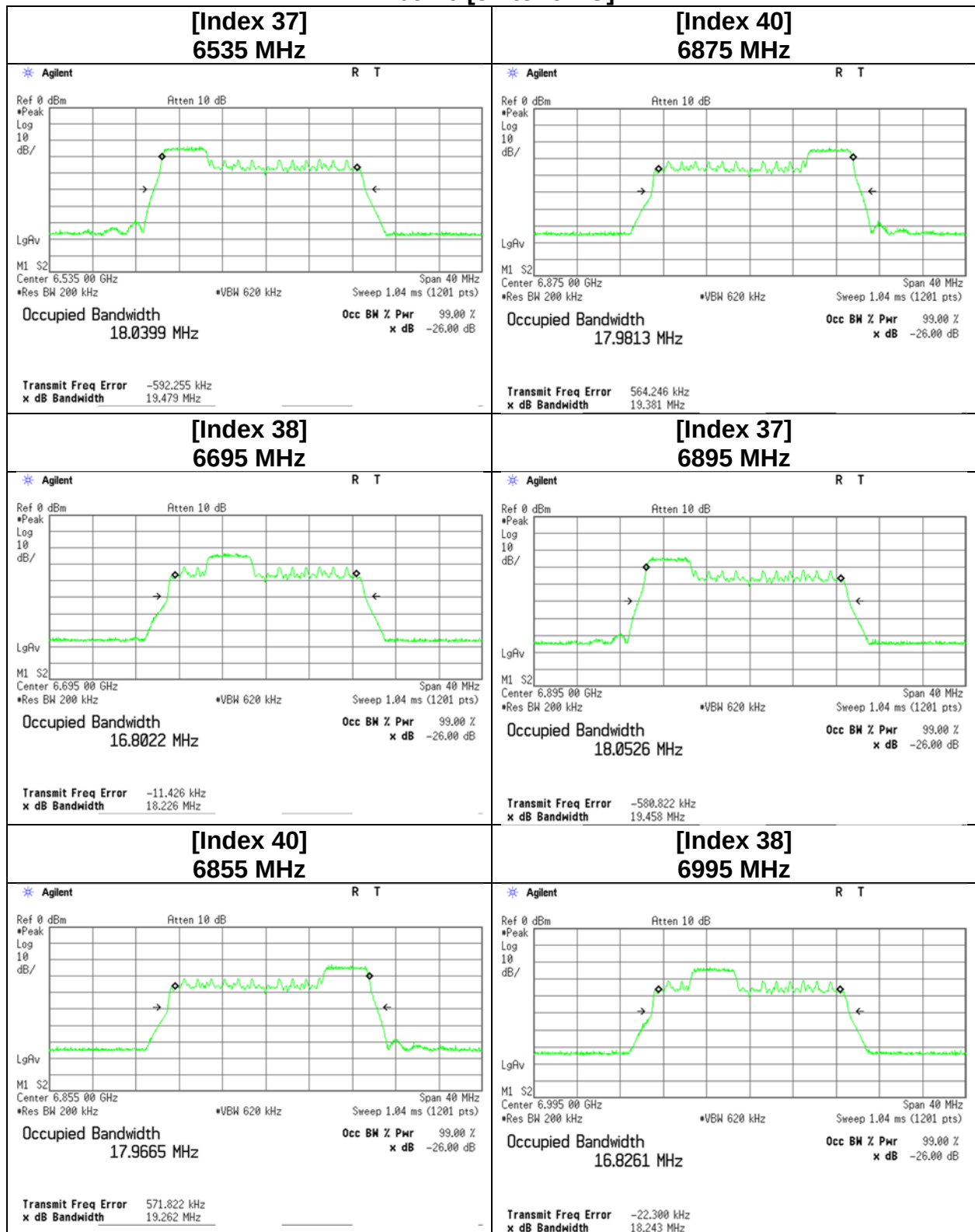
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [52-tone RU]

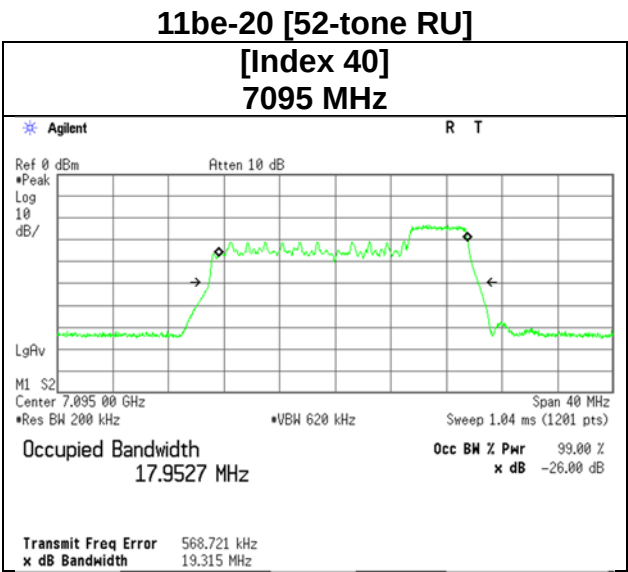


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [52-tone RU]

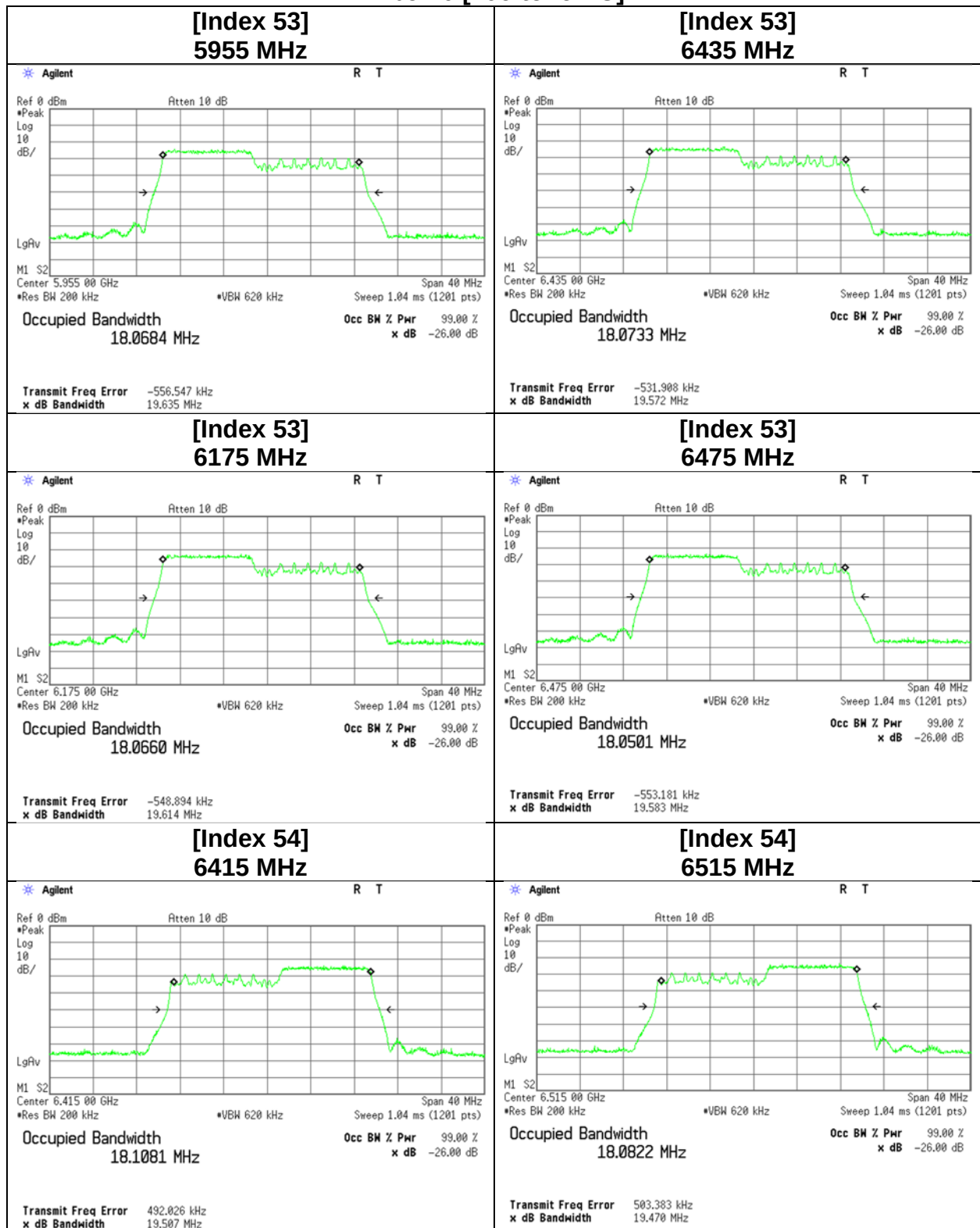


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



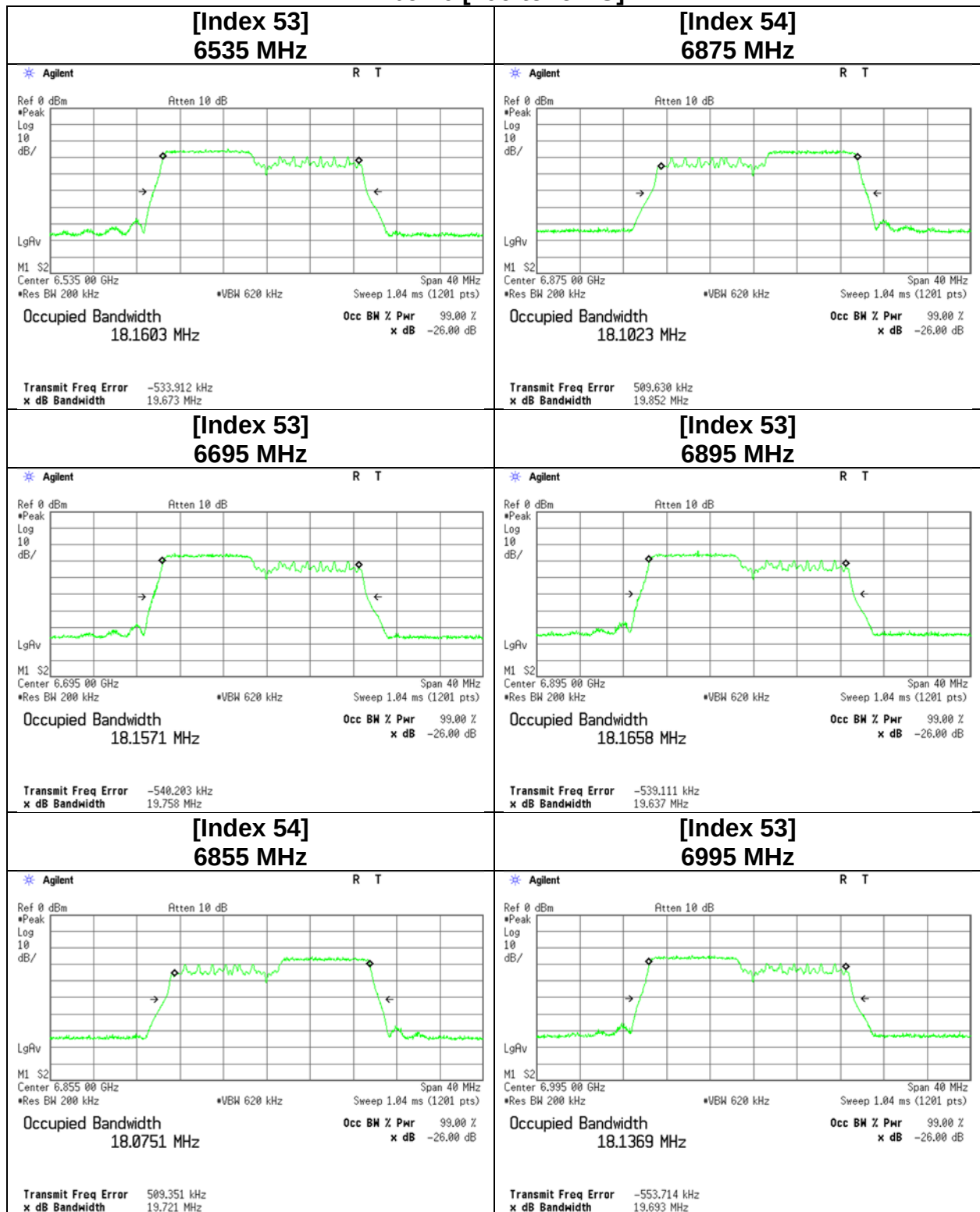
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [106-tone RU]

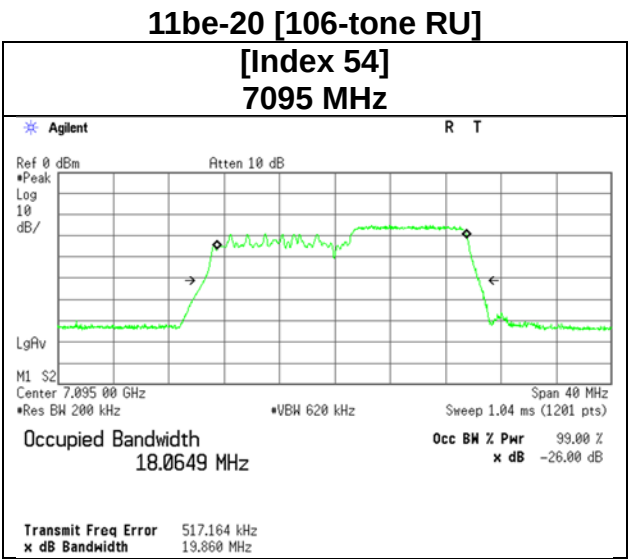


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [106-tone RU]

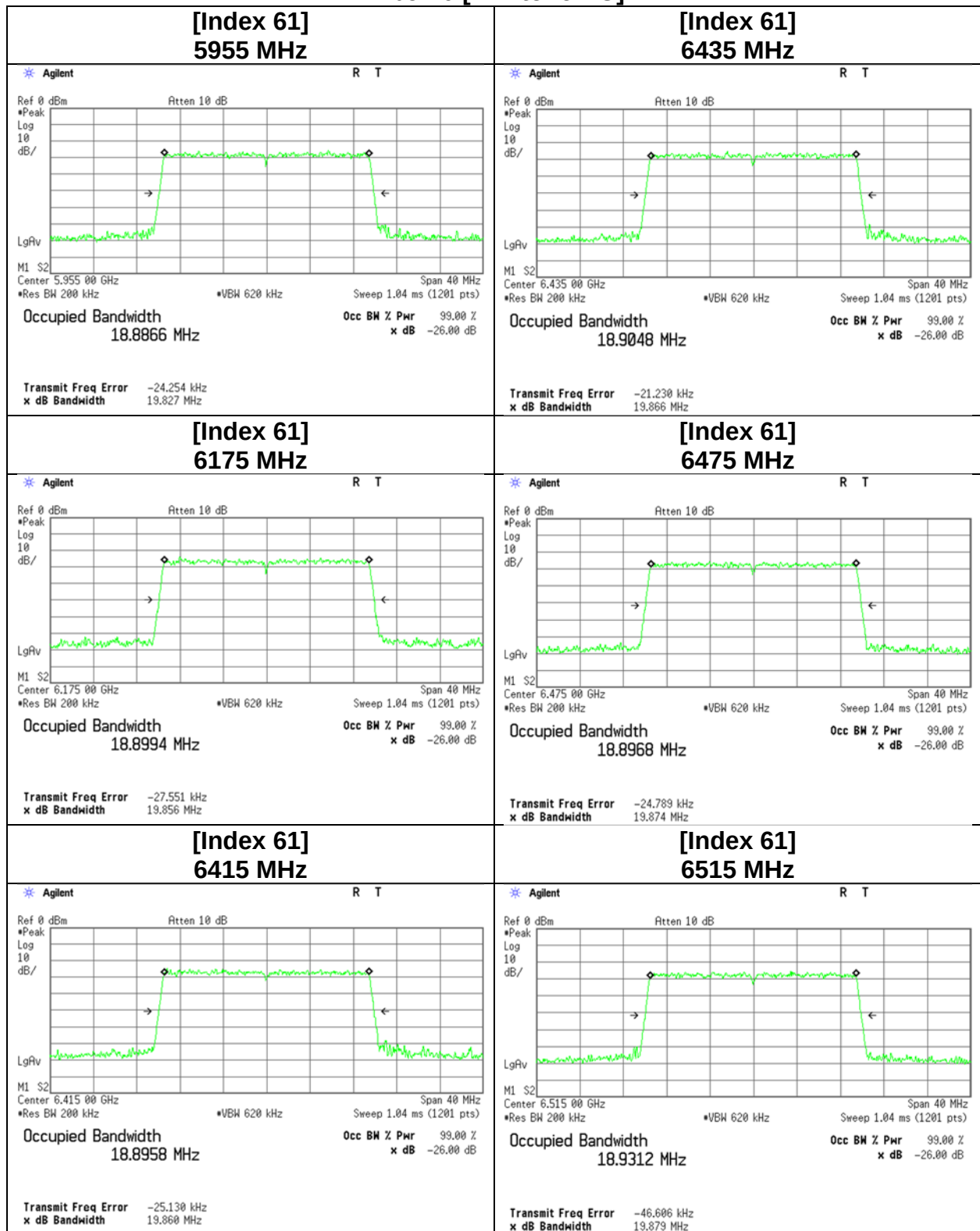


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



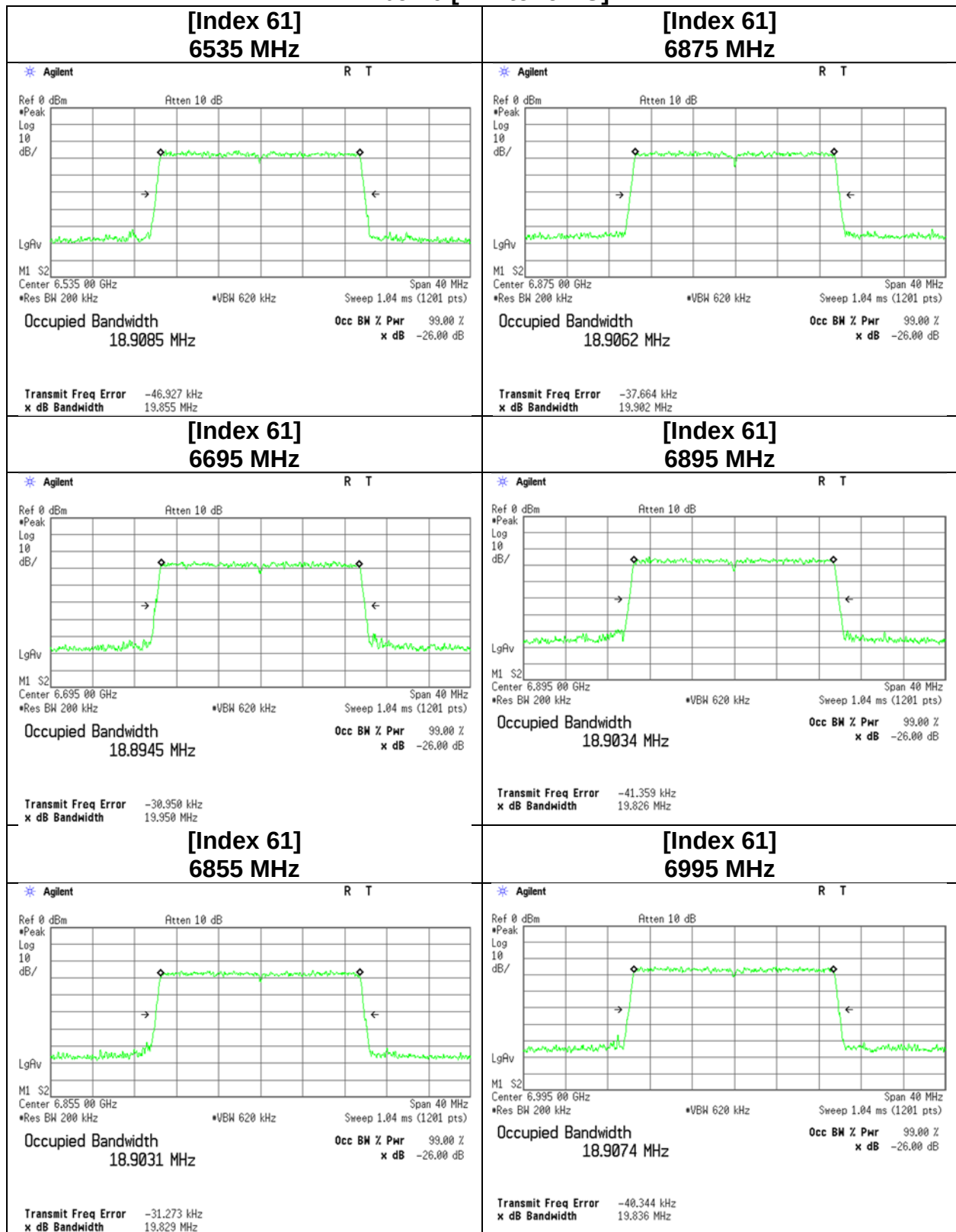
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [242-tone RU]

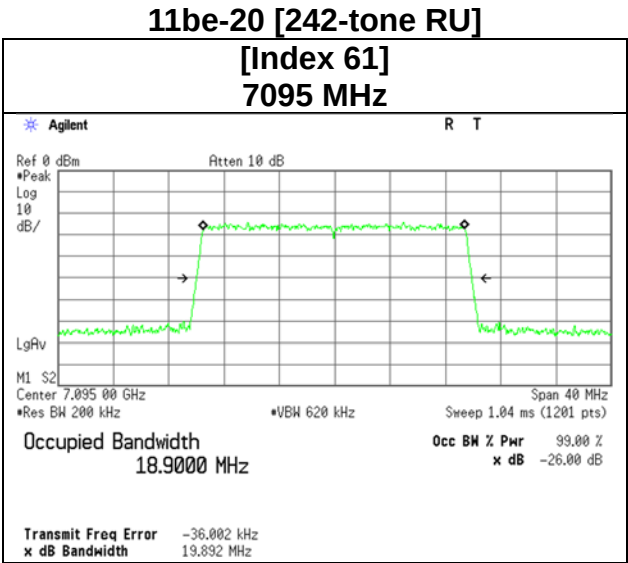


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-20 [242-tone RU]

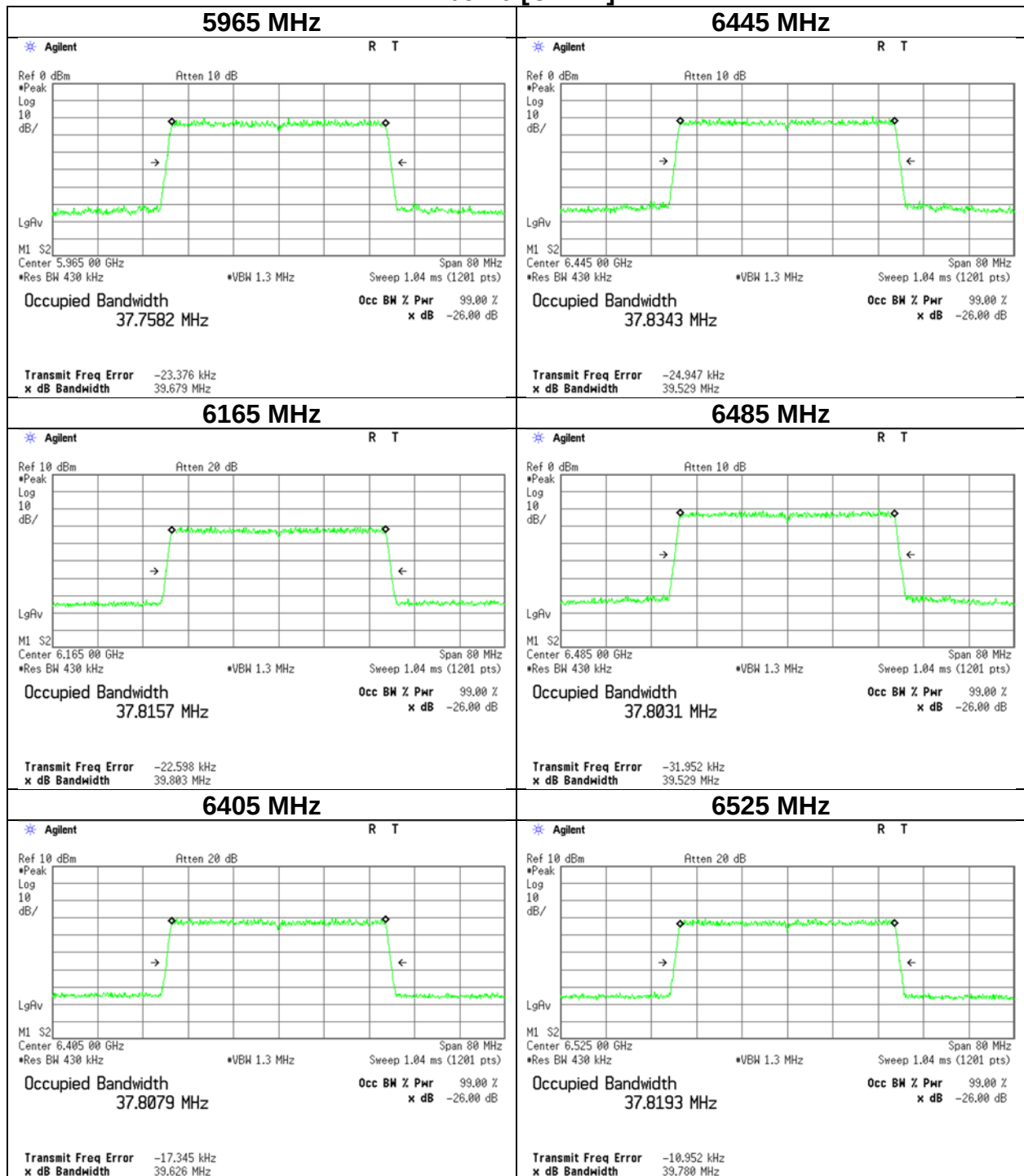


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



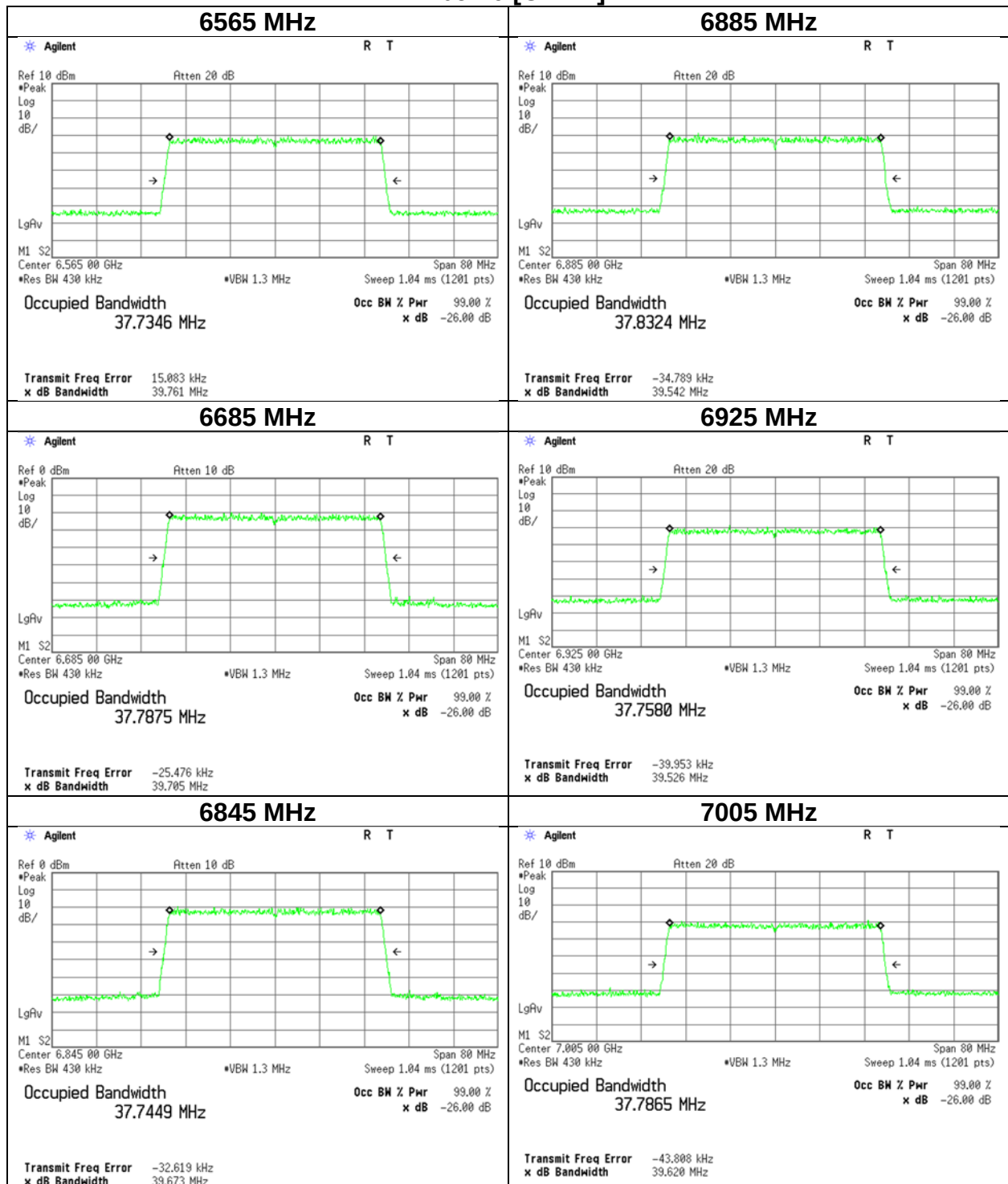
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [OFDM]

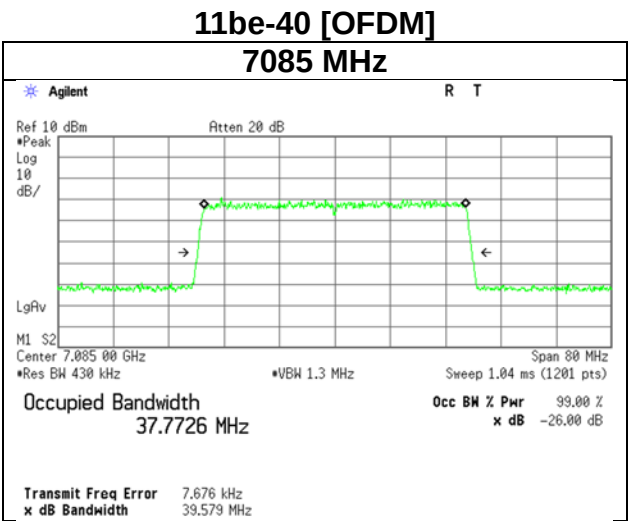


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [OFDM]

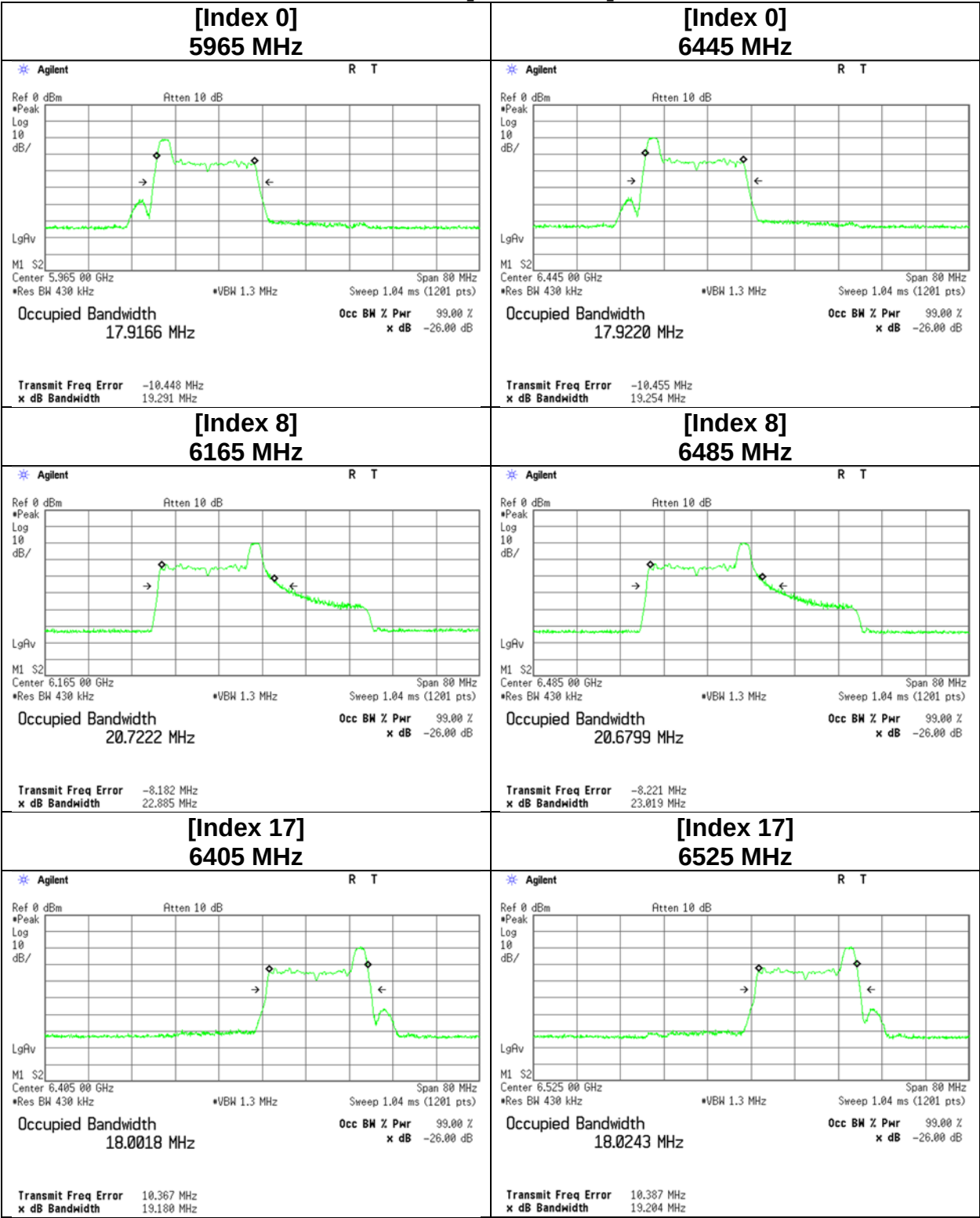


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



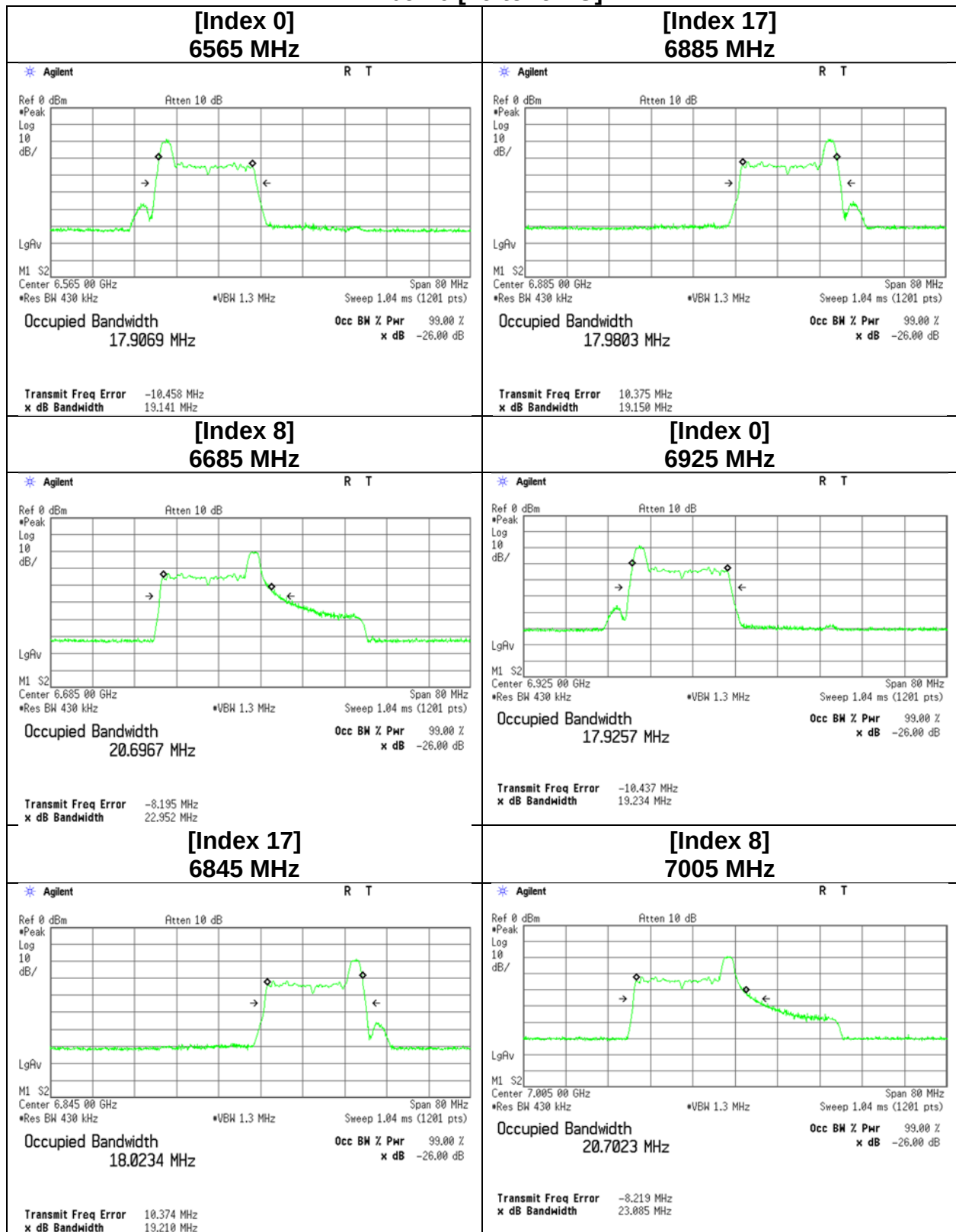
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [26-tone RU]

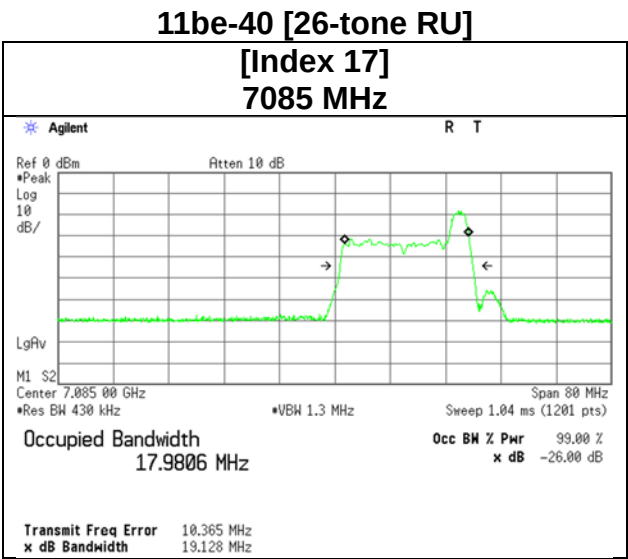


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [26-tone RU]

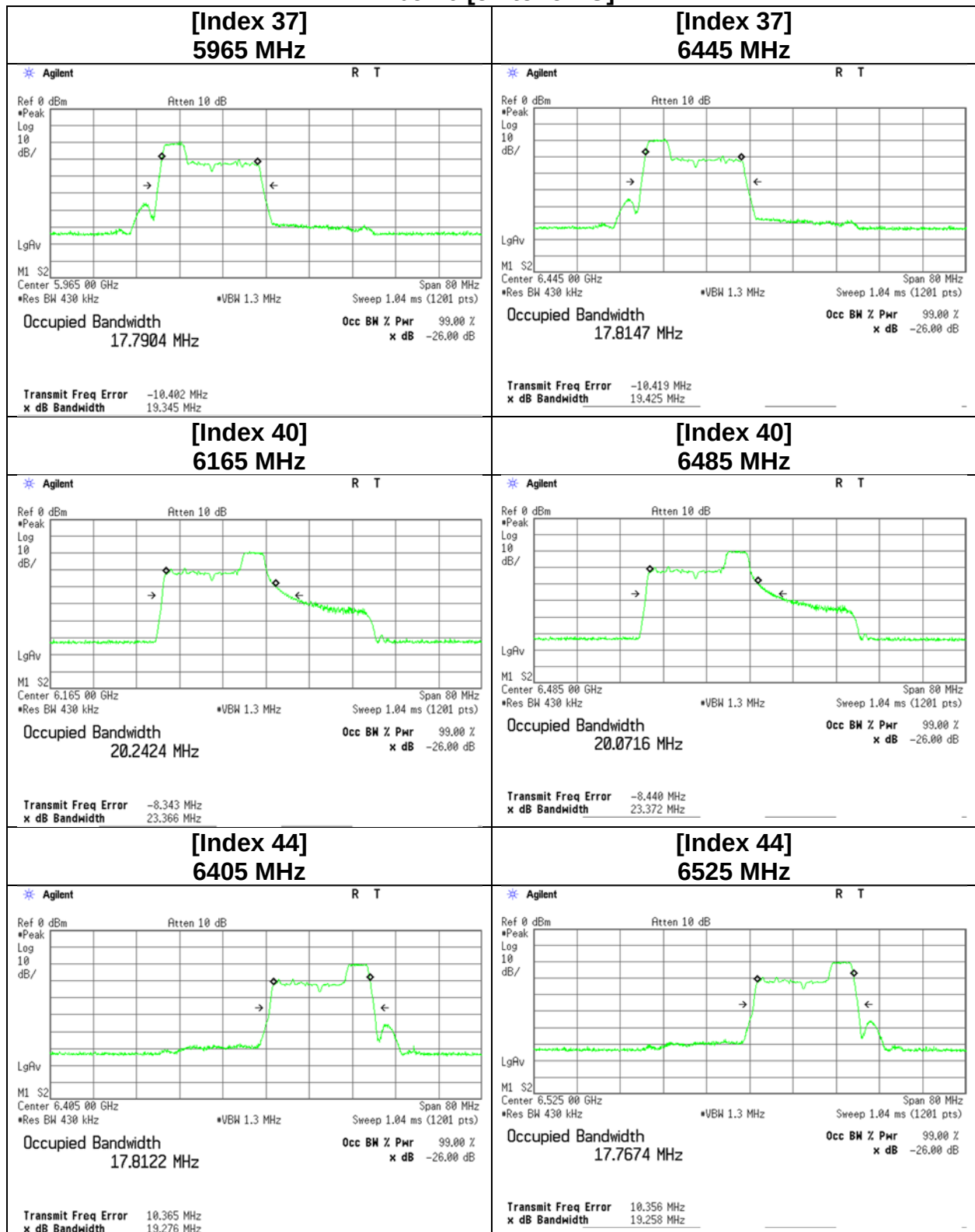


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



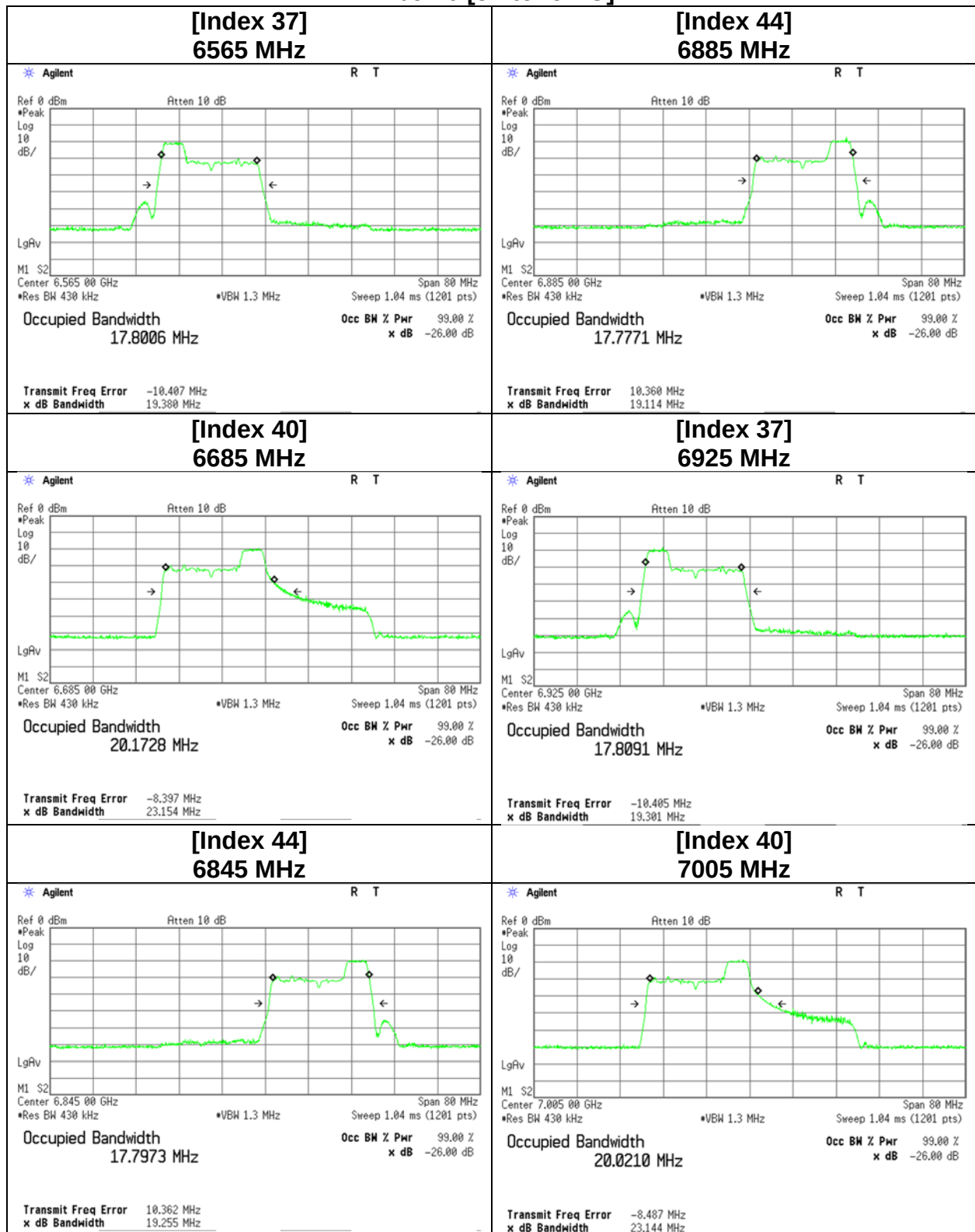
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [52-tone RU]

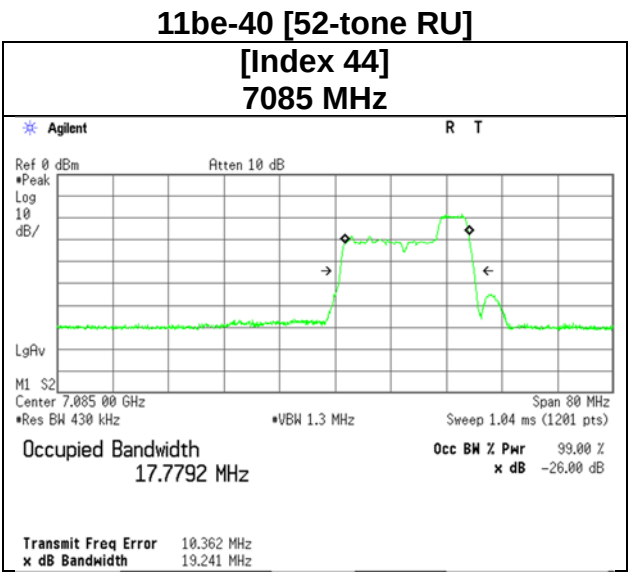


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [52-tone RU]

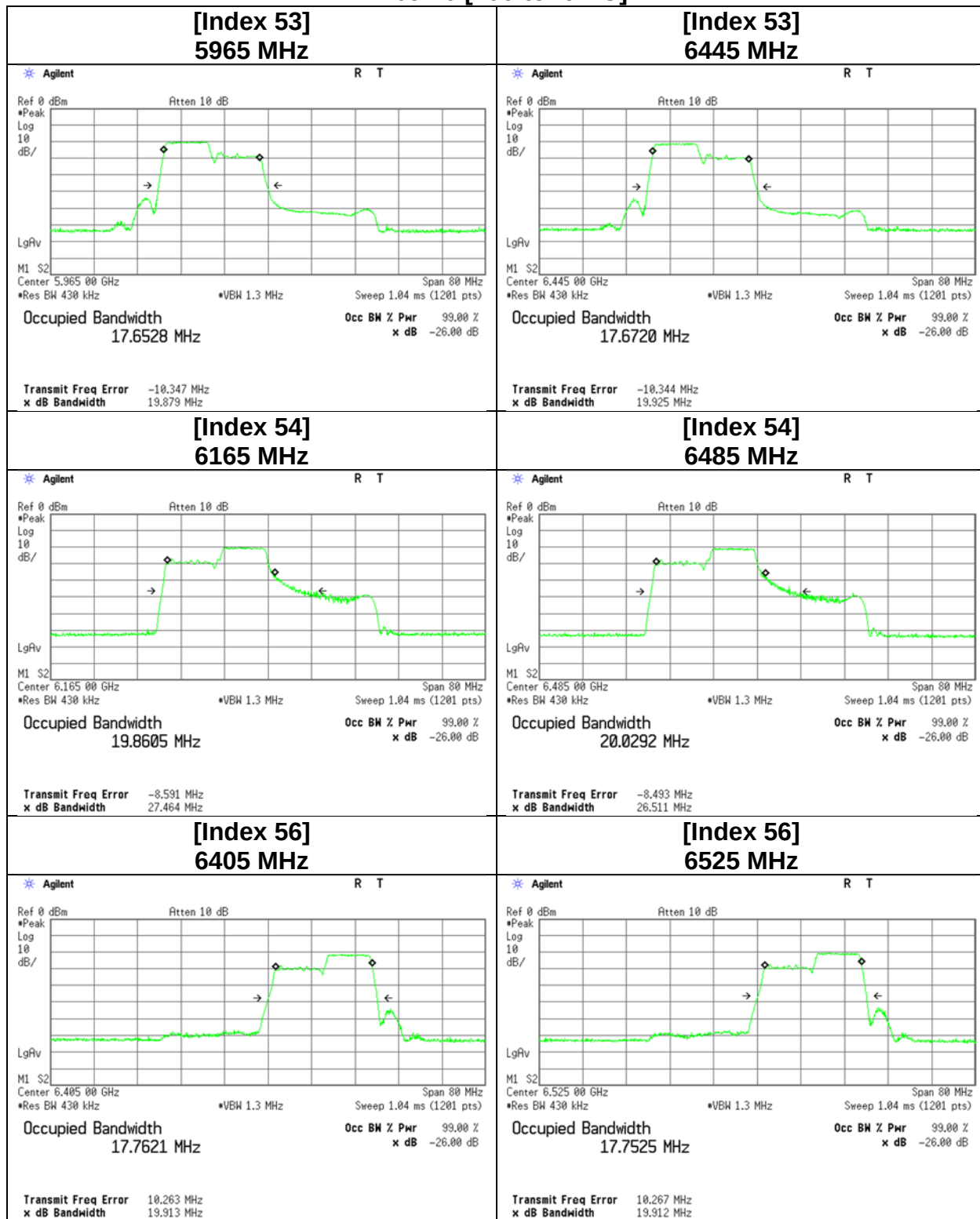


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



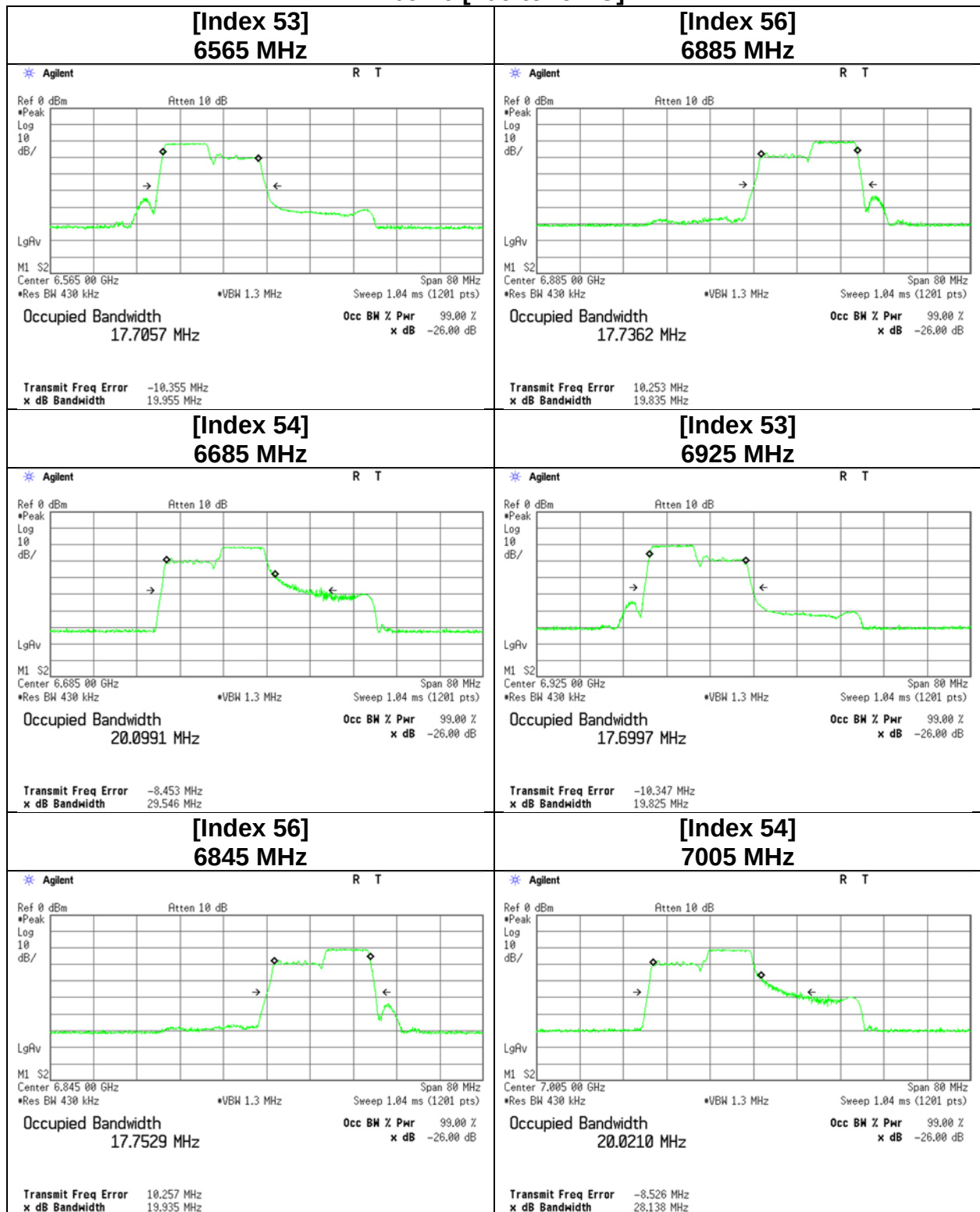
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [106-tone RU]

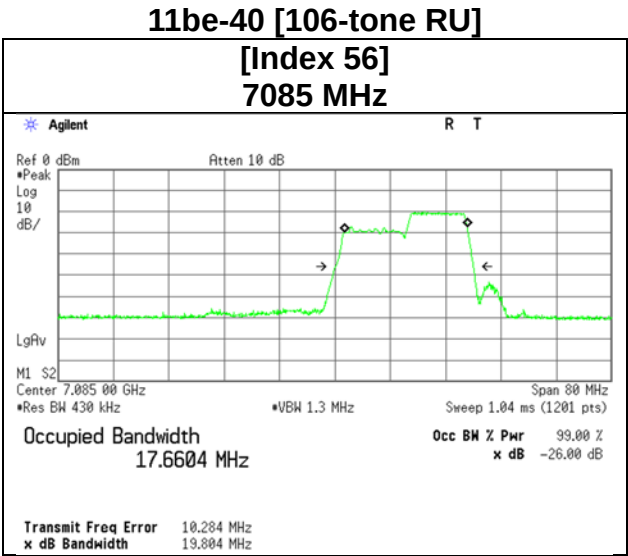


26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [106-tone RU]

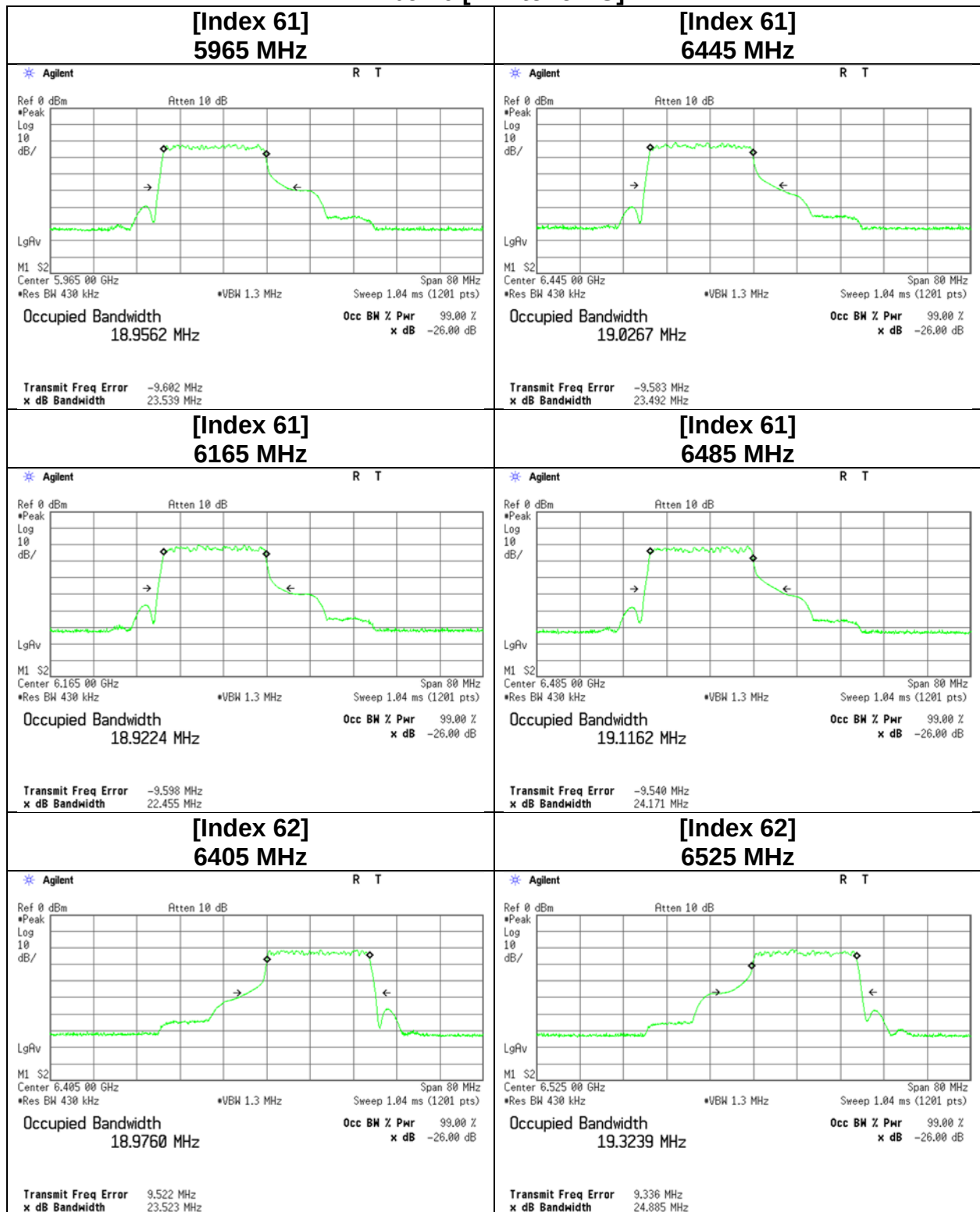


26 dB Emission Bandwidth and 99 % Occupied Bandwidth



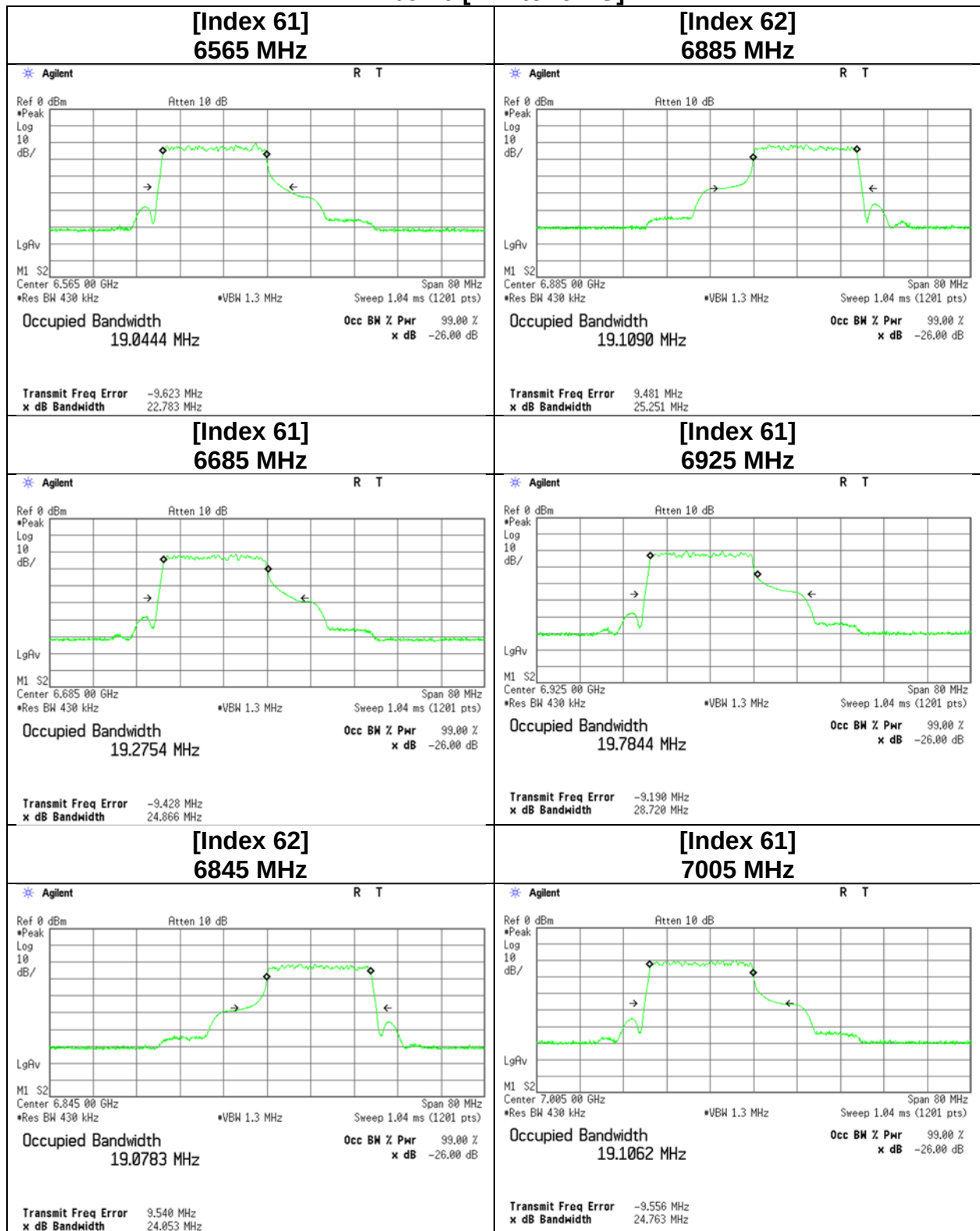
26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [242-tone RU]



26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [242-tone RU]



26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11be-40 [484-tone RU]

