



RADIO TEST REPORT

Test Report No. : 13568152S-L

Applicant : KONICA MINOLTA, INC.
Type of EUT : Wireless LAN SDIO module
Model Number of EUT : SX-SDMAN2
*: The EUT was installed in the typical host device for testing.
Test regulation : FCC Part 15 Subpart E: 2021
Test item : Antenna terminal conducted test
(Except for DFS test)
Test Result : Complied (Refer to SECTION 3.2)

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3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.

Date of test: January 13 and 14, 2021

Representative test engineer:

Shiro Kobayashi

Engineer

Consumer Technology Division

Approved by:

Toyokazu Imamura

Leader

Consumer Technology Division



CERTIFICATE 1266.03

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
- ☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 13568152S-L

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13568152S-L	March 1, 2021	-	-

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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SECTION 1: Customer information

Company Name : KONICA MINOLTA, INC.
Address : 1, Sakura-machi, Hino-shi, Tokyo, Japan 191-8511
Telephone Number : +81-42-589-8429
Facsimile Number : +81-42-589-8053
Contact Person : Yukihiro Niekawa

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 LAN SDIO module
Model Number : SX-SDMAN2
Serial Number : Refer to SECTION 4.2
Rating : DC 3.3 V, DC 1.8 V
Receipt Date : June 17, 2016 and September 29, 2020
Country of Mass-production : Japan
Condition : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification : No Modification by the test lab.

2.2 Product Description

Model: SX-SDMAN2 (referred to as the EUT in this report) is a Wireless LAN SDIO module.

Clock frequency(ies) in the system : 26 MHz

Radio Specification

Type of radio	IEEE802.11b	IEEE802.11g	IEEE802.11a	IEEE802.11n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2412 MHz-2462 MHz	2412 MHz-2462 MHz	5180 MHz-5240 MHz 5260 MHz-5320 MHz 5500 MHz-5700 MHz 5745 MHz-5825 MHz	2412 MHz-2462 MHz 5180 MHz-5240 MHz 5260 MHz-5320 MHz 5500 MHz-5700 MHz 5745 MHz-5825 MHz	5190 MHz-5230 MHz 5270 MHz-5310 MHz 5510 MHz-5670 MHz 5755 MHz-5795 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel spacing	5 MHz		20 MHz	2.4 GHz band: 5 MHz 5 GHz band: 20 MHz	40 MHz
Antenna type	[Main Antenna (chain 0) /Sub Antenna (chain 1)] PIFA (Planar Inverted F Antenna)				
Antenna Gain	Main Antenna (chain 0) -1.95 dBi (2.4 GHz Band), -0.98 dBi (5 GHz Band) Sub Antenna (chain 1) -2.21 dBi (2.4 GHz Band), -1.54 dBi (5 GHz Band)				
Antenna Connector type	[Main Antenna (chain 0) /Sub Antenna (chain 1)] Connector; PCB side: U.FL, Antenna side: soldered				

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart E
FCC Part 15 final revised on January 12, 2021 and effective February 11, 2021

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

* The revisions do not affect the test result conducted before its effective date.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
26 dB Emission Bandwidth	FCC: KDB Publication Number 789033 ISED: -	FCC: 15.407 (a) (1) (2) (3) ISED: -	See data	N/A a)	Conducted
Maximum Conducted Output Power	FCC: KDB Publication Number 789033 ISED: -	FCC: 15.407 (a) (1) (2) (3) ISED: RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1		Complied b)	Conducted
Maximum Power Spectral Density	FCC: KDB Publication Number 789033 ISED: -	FCC : 15.407 (a) (1) (2) (3) ISED: RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1		Complied c)	Conducted
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 789033 ISED: -	FCC: 15.407 (b), 15.205 and 15.209 ISED: RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.2		Complied d)	Conducted (< 30 MHz) *1)
6 dB Emission Bandwidth	FCC: ANSI C63.10-2013 ISED: -	FCC: 15.407 (e) ISED: RSS-247 6.2.4.1		Complied e)	Conducted
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) Radiated test result is not included in this test report.					
a) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth) b) Refer to APPENDIX 1 (data of Maximum Conducted Output Power) c) Refer to APPENDIX 1 (data of Maximum Power Spectral Density) d) Refer to APPENDIX 1 (data of Conducted Spurious Emission) e) 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.

FCC Part 15.31 (e)

The RF Module has its own regulator.

The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector. Therefore the equipment complies with the requirement.

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3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 6 dB 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 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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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4,5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.6 dB	2.56dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	2.7 dB	2.7 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 dB	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-
	18 GHz-40 GHz	5.3 dB	5.3 dB	5.3 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	1.4 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.6 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.91 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.2 dB
Spurious emission (Conducted) below 1GHz	0.87 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.96 dB
Spurious emission (Conducted) 3 GHz-18 GHz	3.0 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.2 dB
Bandwidth Measurement	0.012 %
Duty cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.95 deg.C.
Humidity_SCH-01	0.83 %
Temperature_SCH-02	2.0 deg.C.
Humidity_SCH-02	6.6 %
Voltage	0.86 %

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3.5 Test Location

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A2LA Certificate Number: 1266.03

(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

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.

Mode	Remarks*
IEEE 802.11a (11a)	18 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 11 (Long GI), PN9
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 2 (Long GI), PN9
IEEE 802.11n MIMO 40 MHz BW (11n-40)	MCS 10 (Long GI), PN9
IEEE 802.11n SISO 40 MHz BW (11n-40)	MCS 2 (Long GI), PN9
*The worst antenna (Ant: x) 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 settings: 8 dBm Software: Wireless authentication test tool Version 1.3.0.3 (Maximum Peak output power), Date: 2016.7.6, Version 1.3.0 (other than Maximum Peak output power), Date: 2017.4.18, (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.	

*The details of Operation mode(s)

Test Item	Operating mode	Tested antenna *2)	Tested frequency			
			Lower Band	Middle Band	Additional Band	Upper Band
26 dB Emission Bandwidth	11a	Sub	-	5260 MHz	5500 MHz	-
	11n-20 (SISO)	Sub		5300 MHz	5580 MHz	
	11n-20 (MIMO)	Main		5320 MHz	5700 MHz	
	11n-40 (SISO)	Sub	-	5270 MHz	5510 MHz	-
	11n-40 (MIMO)	Main		5310 MHz	5550 MHz 5670 MHz	
99 % Occupied Bandwidth, Maximum Conducted Output Power, Maximum Power Spectral Density	11a	Sub	5180 MHz	5260 MHz	5500 MHz	5745 MHz
	11n-20 (SISO)	Sub	5220 MHz	5300 MHz	5580 MHz	5785 MHz
	11n-20 (MIMO)	Main	5240 MHz	5320 MHz	5700 MHz	5825 MHz
	11n-40 (SISO)	Sub	5190 MHz	5270 MHz	5510 MHz	5755 MHz
	11n-40 (MIMO)	Main	5230 MHz	5310 MHz	5550 MHz 5670 MHz	5795 MHz
6 dB Bandwidth	11a	Sub	-	-	-	5745 MHz
	11n-20 (SISO)	Main				5785 MHz
	11n-20 (MIMO)	Sub				5825 MHz
	11n-40 (SISO)	Sub	-	-	-	5755 MHz
	11n-40 (MIMO)	Main				5795 MHz
Conducted Spurious Emission	11n-20 (MIMO) *1)	Main	5180 MHz	-	-	-
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.						
*2) The test was performed with the antenna that had higher power as a representative.						

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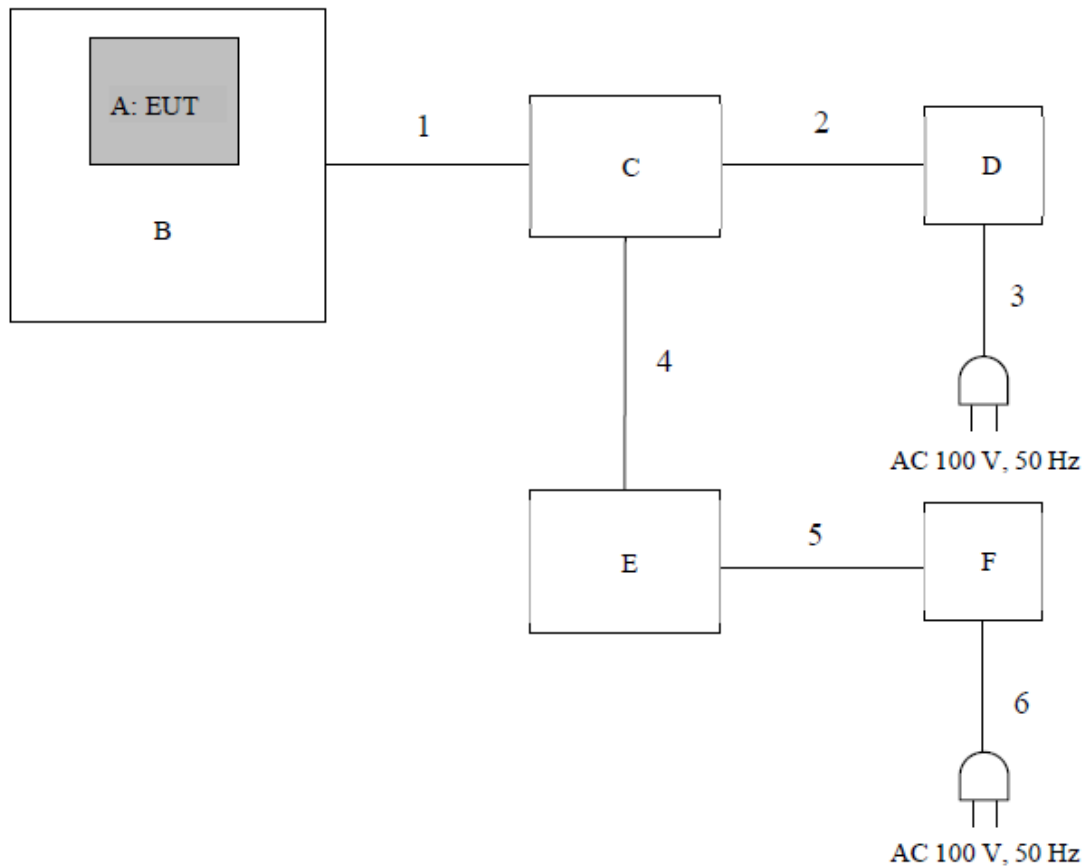
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4.2 Configuration and peripherals



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless LAN SDIO module	SX-SDMAN2	A9YH-S002	KONICA MINOLTA Inc.	EUT
B	SKR 3000	P-75	A9YH-S002	KONICA MINOLTA Inc.	-
C	Battery Charging Unit	AeroDR	A7R9-00077	KONICA MINOLTA Inc.	-
D	AC Adapter	TR60M48	60480-0000099	ELECTRONICS CO., LTD.	-
E	Laptop Computer	dynabook Satellite B453 M	ZE127581H	TOSHIBA	-
F	AC Adapter	PA3917U-1ACA	G71C000DP410	TOSHIBA	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	IO Cable	10.0	Shielded	Shielded	-
2	DC Cable	1.5	Unshielded	Unshielded	-
3	AC Cable	3.0	Unshielded	Unshielded	-
4	LAN Cable	1.0	Unshielded	Unshielded	Cat.6
5	DC Cable	0.8	Unshielded	Unshielded	-
6	AC Cable	1.7	Unshielded	Unshielded	-

SECTION 5: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used and Test method
26 dB Bandwidth	Enough to capture the emission	Close to 1 % of EBW	> RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Peak	Max Hold	Spectrum Analyzer
6 dB Bandwidth	Enough to capture the emission	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 160 MHz BW) (Method PM-G)
Maximum Power Spectral Density	Encompass the entire EBW	1 MHz or 100 kHz *2)	≥ 3 RBW	Auto	RMS Power Averaging (100 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission*3) *4)	9 kHz – 150 kHz 150 kHz – 30 MHz	200 Hz 10 kHz	620 Hz 30 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 ($10 \log(500 \text{ kHz} / 100 \text{ kHz})$) 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 not detected as shown in the chart. (9 kHz-150 kHz: RBW = 200 Hz, 150 kHz-30 MHz: RBW = 10 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

APPENDIX 1: Test data

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 13, 2021 January 14, 2021
Temperature / Humidity 22 deg. C / 36 % RH 21 deg. C / 51 % RH
Engineer Yosuke Murakami Shiro Kobayashi
Mode Tx

11a

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Sub	5180	-	16654.2
	5220	-	16646.2
	5240	-	16647.5
	5260	20.393	16675.5
	5300	20.876	16628.7
	5320	20.457	16632.3
	5500	20.384	16624.9
	5580	20.024	16655.9
	5700	20.367	16664.3
	5745	-	16654.0
	5785	-	16644.2
	5825	-	16670.5

11n-20 (SISO)

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Sub	5180	-	17799.4
	5220	-	17776.7
	5240	-	17800.5
	5260	20.982	17796.2
	5300	21.521	17775.4
	5320	21.081	17752.7
	5500	21.375	17801.0
	5580	21.157	17776.8
	5700	21.055	17784.8
	5745	-	17773.7
	5785	-	17768.6
	5825	-	17777.1

11n-20 (MIMO)

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Main	5180	-	17846.4
	5220	-	17892.1
	5240	-	17904.2
	5260	21.120	17897.3
	5300	21.135	17857.9
	5320	20.989	17867.9
	5500	21.185	17877.4
	5580	20.964	17839.1
	5700	21.138	17879.2
	5745	-	17838.9
	5785	-	17879.0
	5825	-	17852.8

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

11n-40 (SISO)

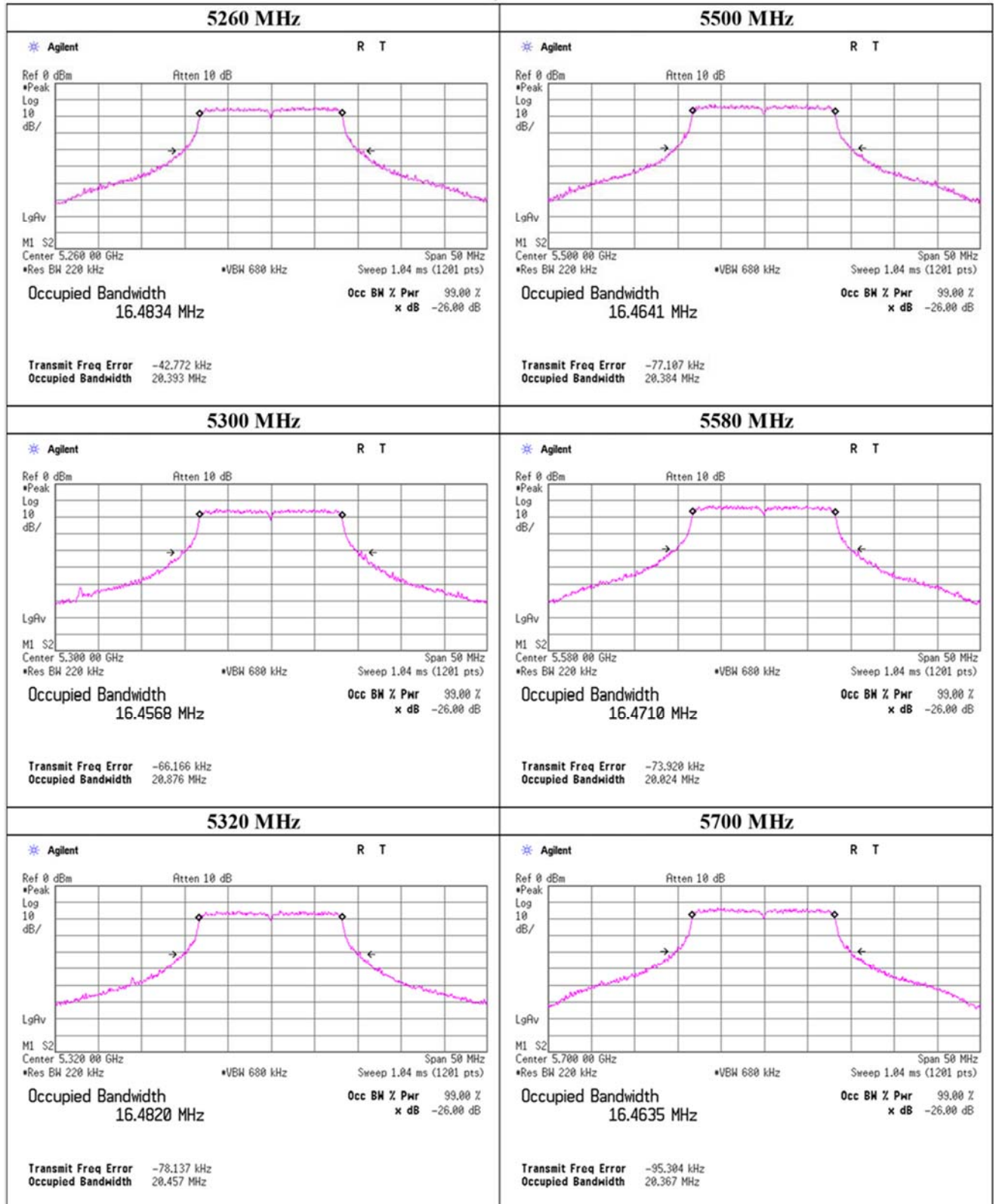
Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Sub	5190	-	36003.4
	5230	-	35930.5
	5270	41.897	35924.3
	5310	41.538	35903.6
	5510	42.368	35919.5
	5550	42.223	36014.6
	5670	42.740	35866.4
	5755	-	35900.3
	5795	-	35951.3

11n-40 (MIMO)

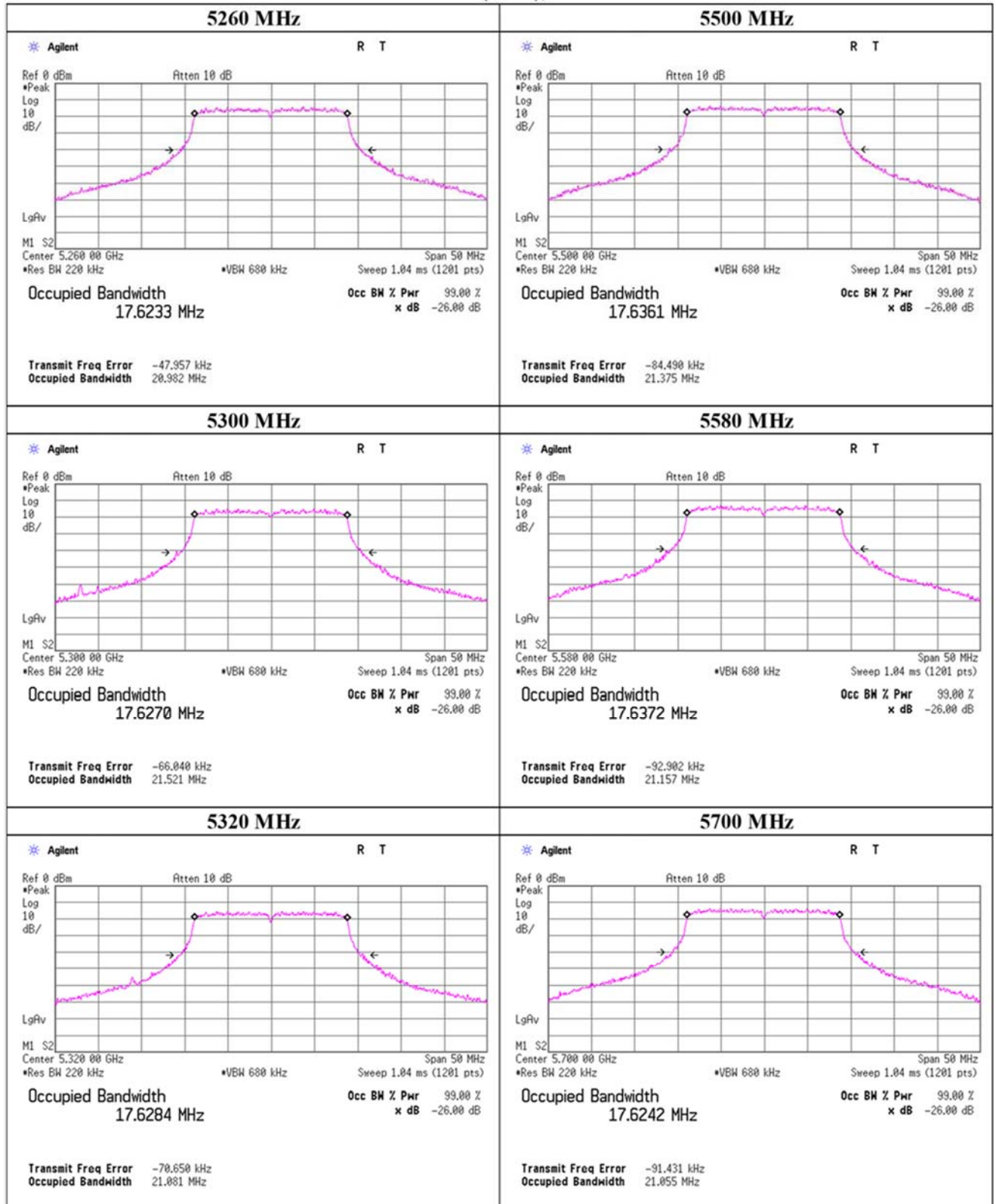
Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Main	5190	-	35872.7
	5230	-	35909.1
	5270	40.867	35883.2
	5310	40.941	35879.5
	5510	40.721	35858.3
	5550	40.858	35877.6
	5670	41.056	35840.6
	5755	-	35933.6
	5795	-	35856.2

26 dB Emission Bandwidth

11a, Sub



26 dB Emission Bandwidth 11n-20 (SISO), Sub



UL Japan, Inc.

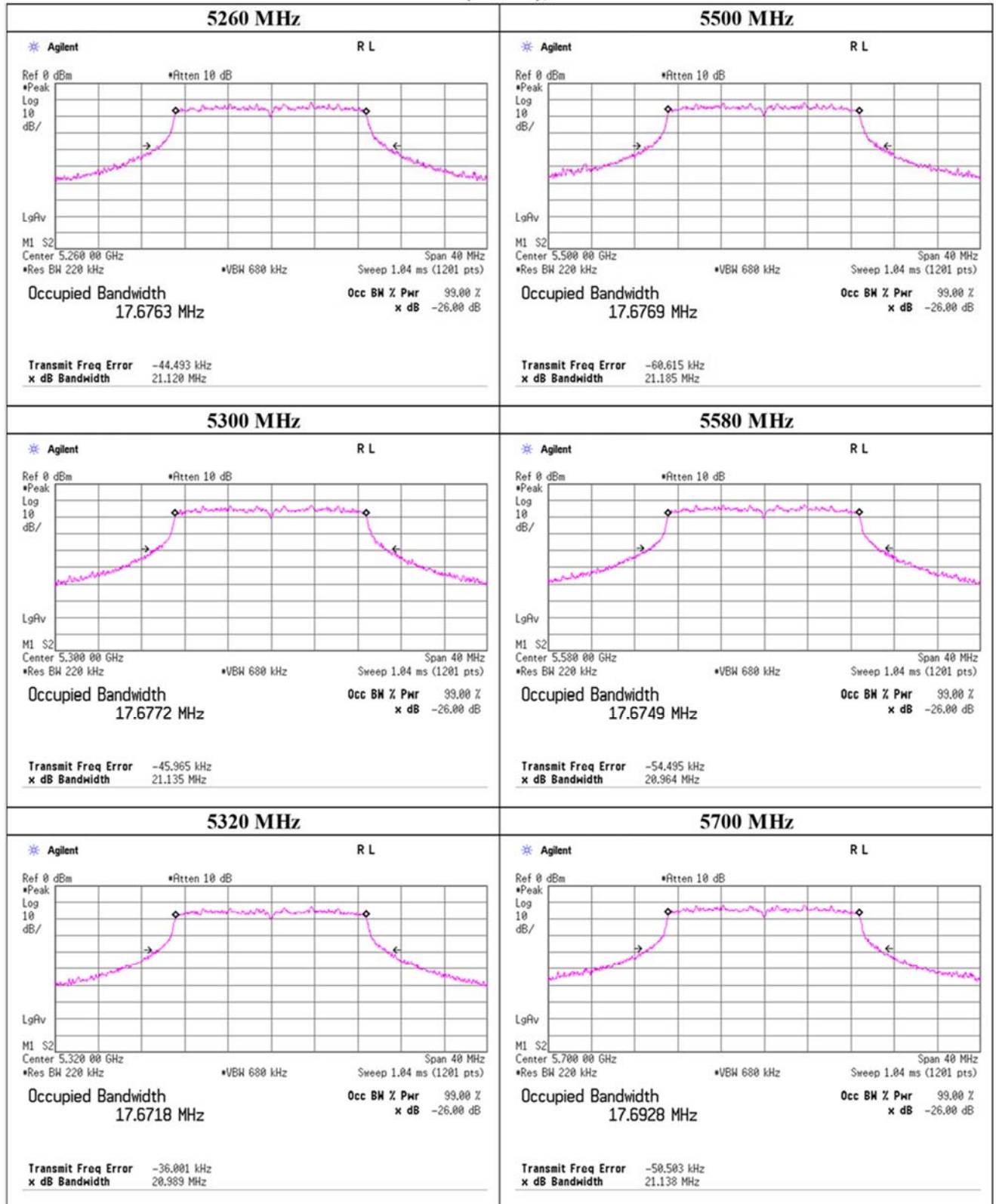
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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26 dB Emission Bandwidth 11n-20 (MIMO), Main



UL Japan, Inc.

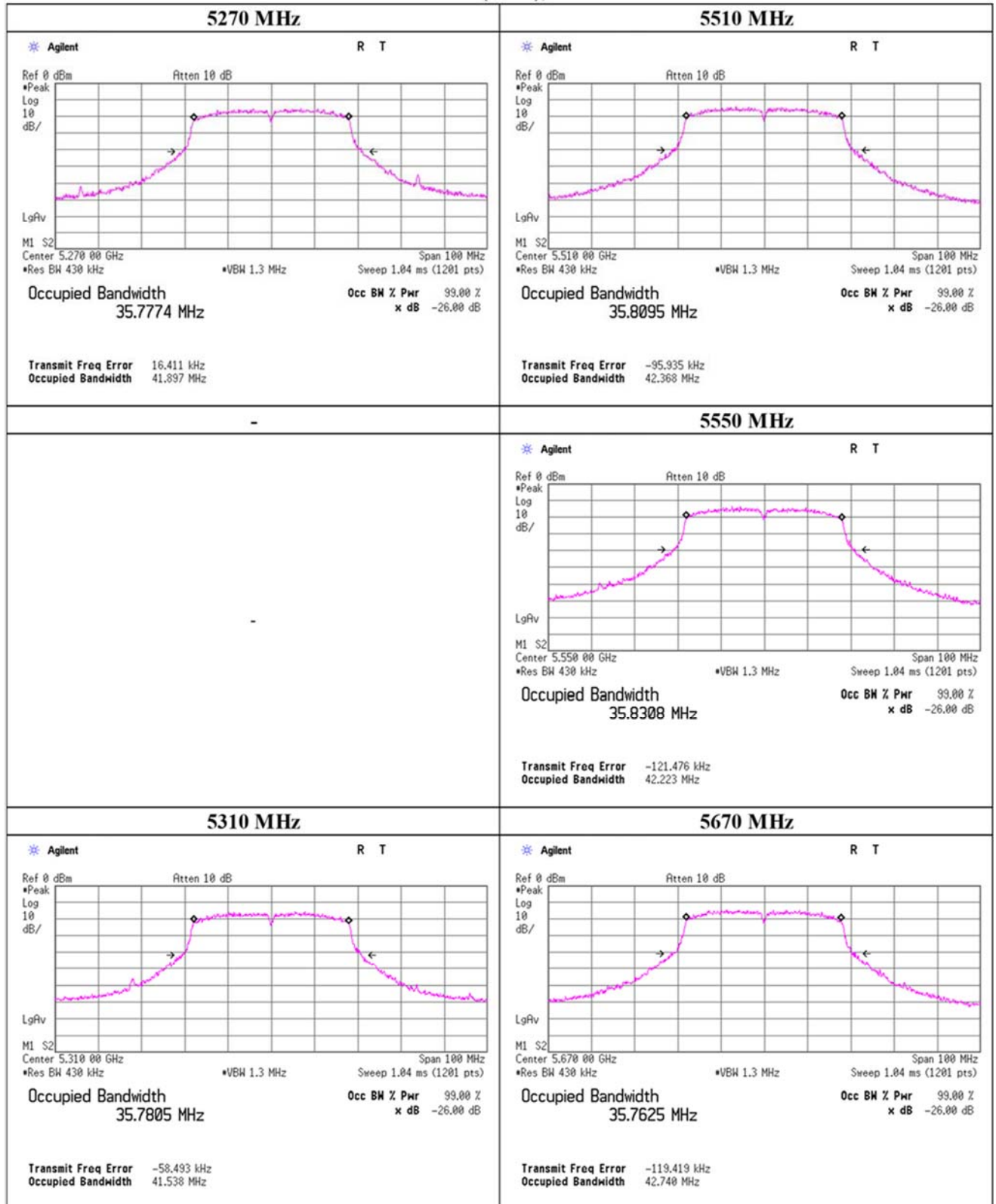
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

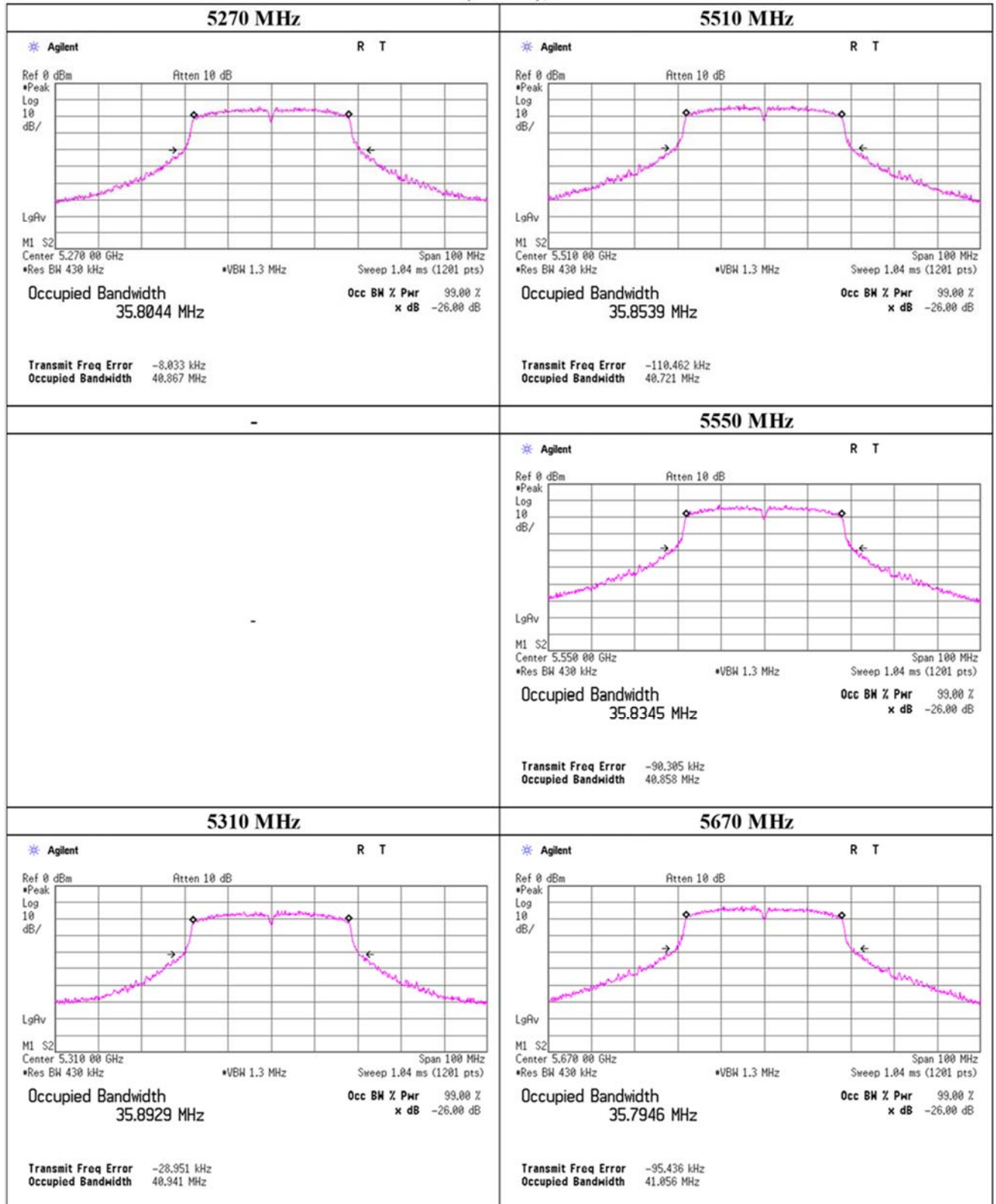
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

26 dB Emission Bandwidth 11n-40 (SISO), Sub

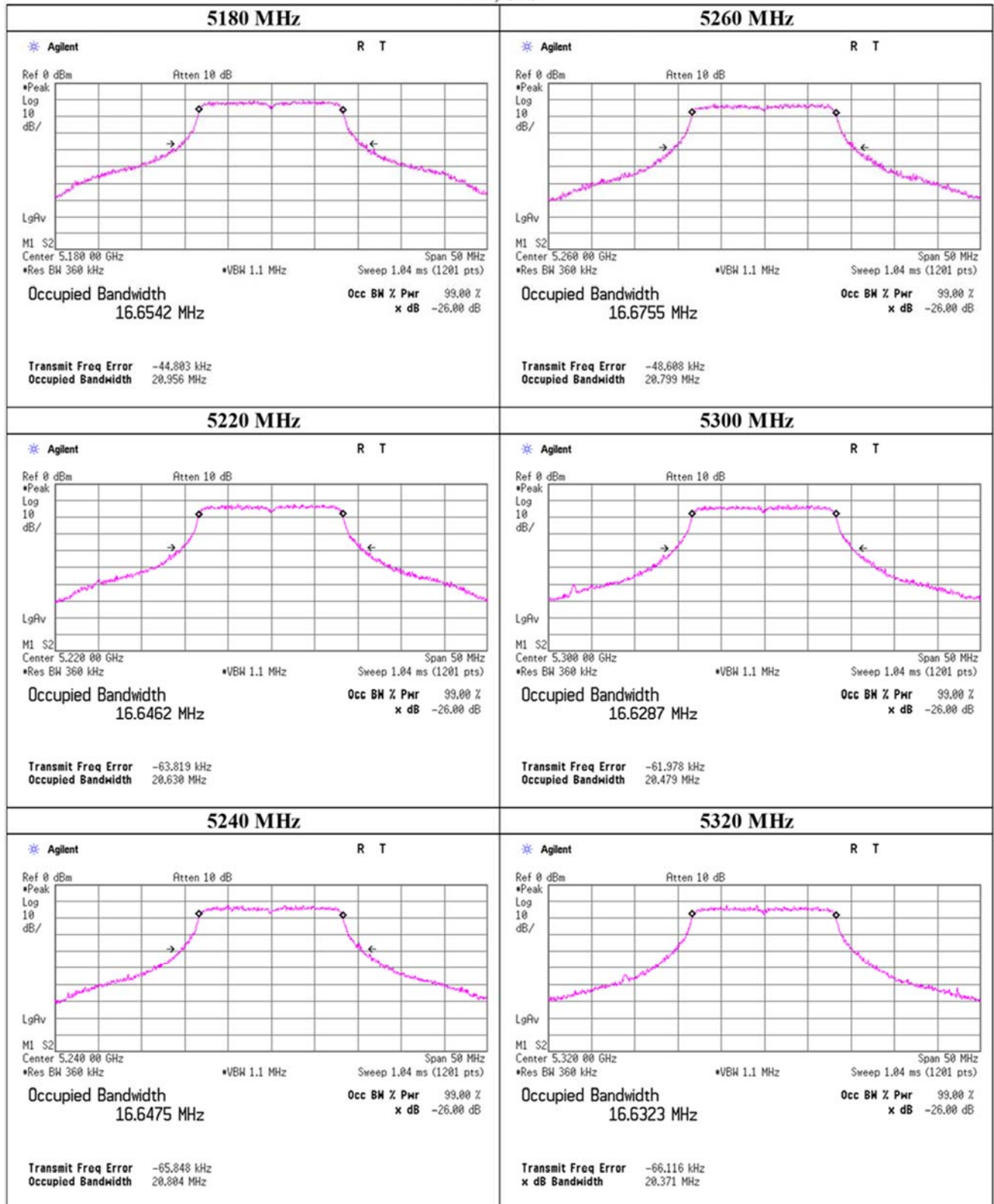


26 dB Emission Bandwidth 11n-40 (MIMO), Main



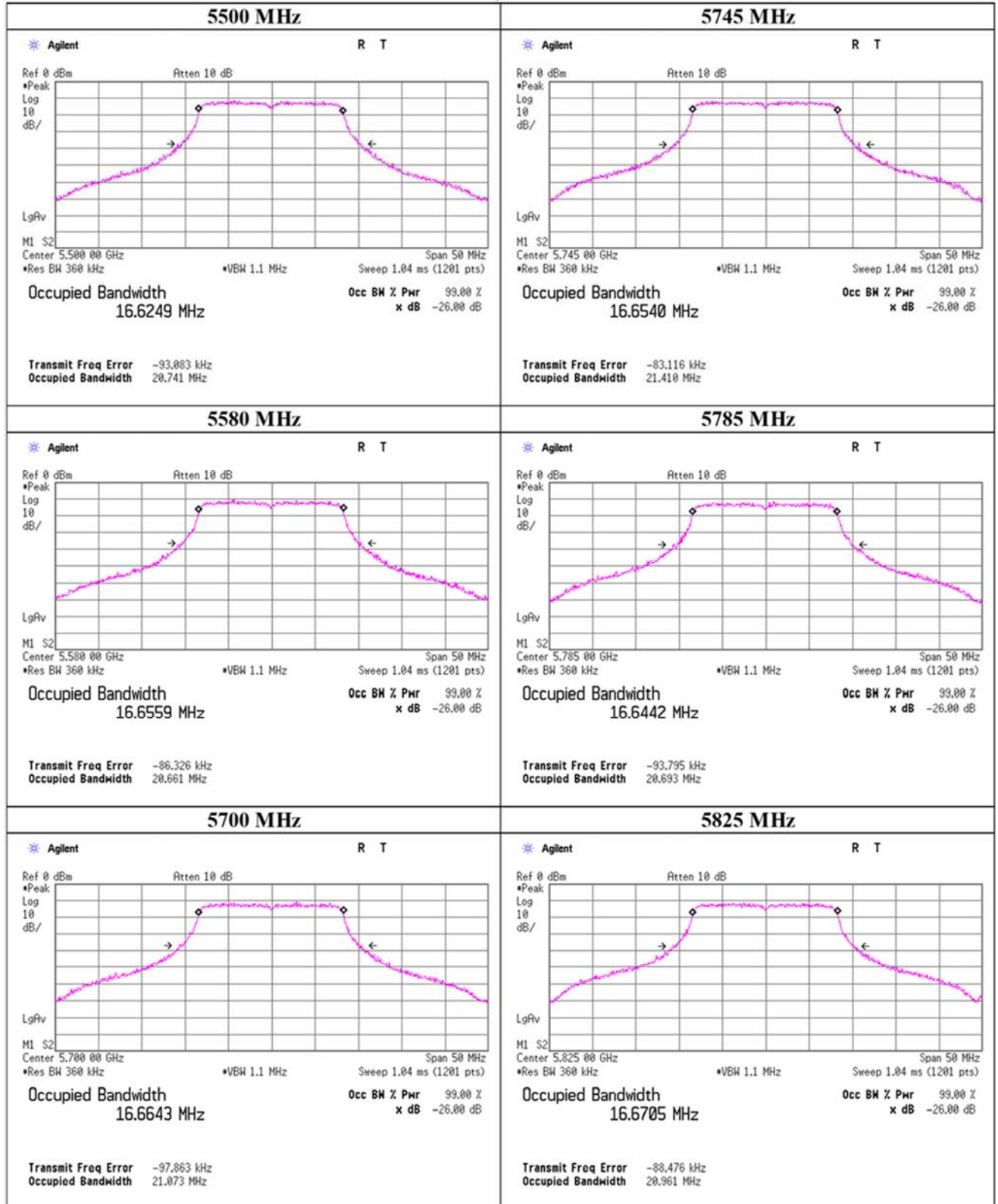
99% Occupied Bandwidth

11a, Sub



99% Occupied Bandwidth

11a, Sub



UL Japan, Inc.

Shonan EMC Lab.

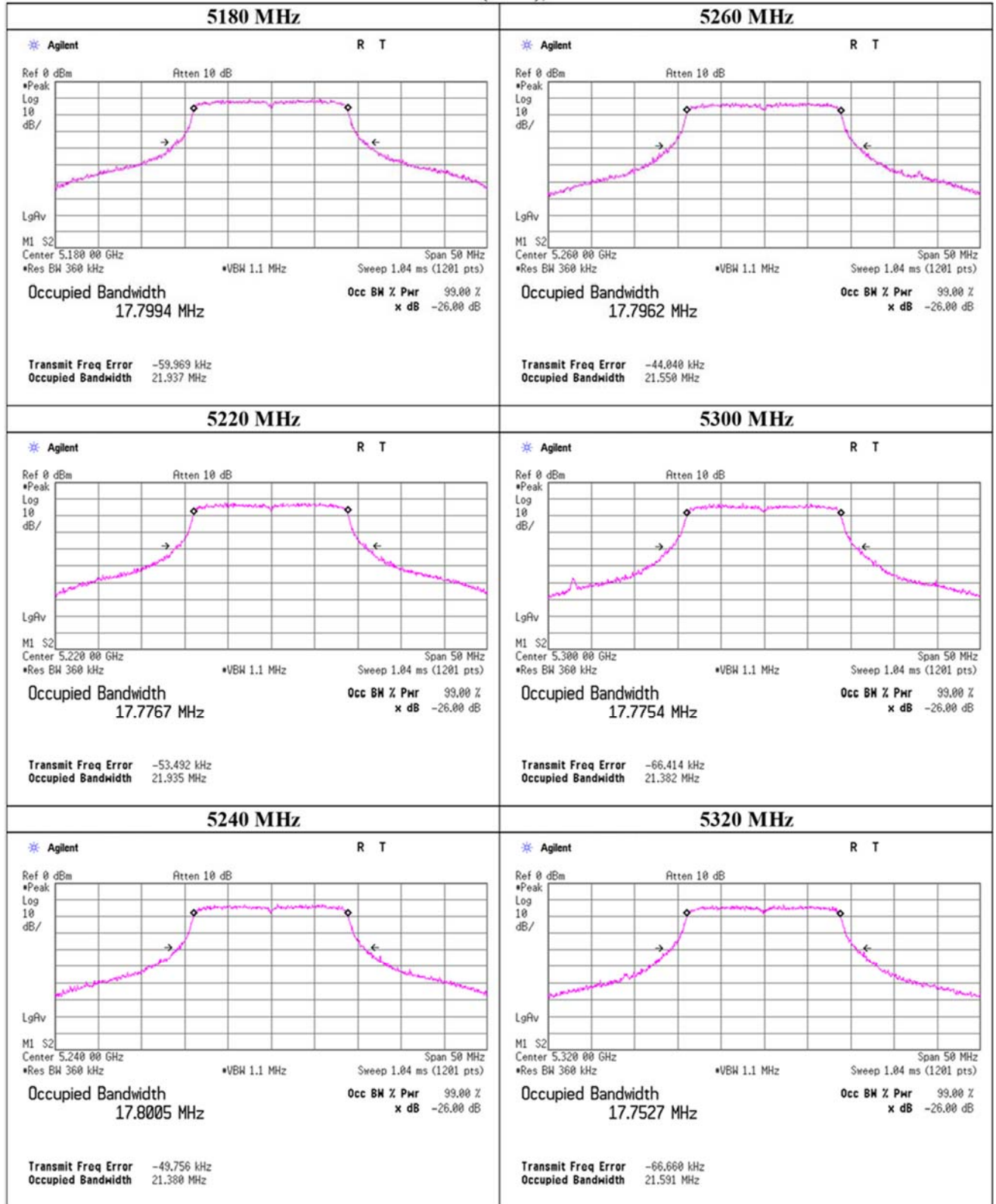
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

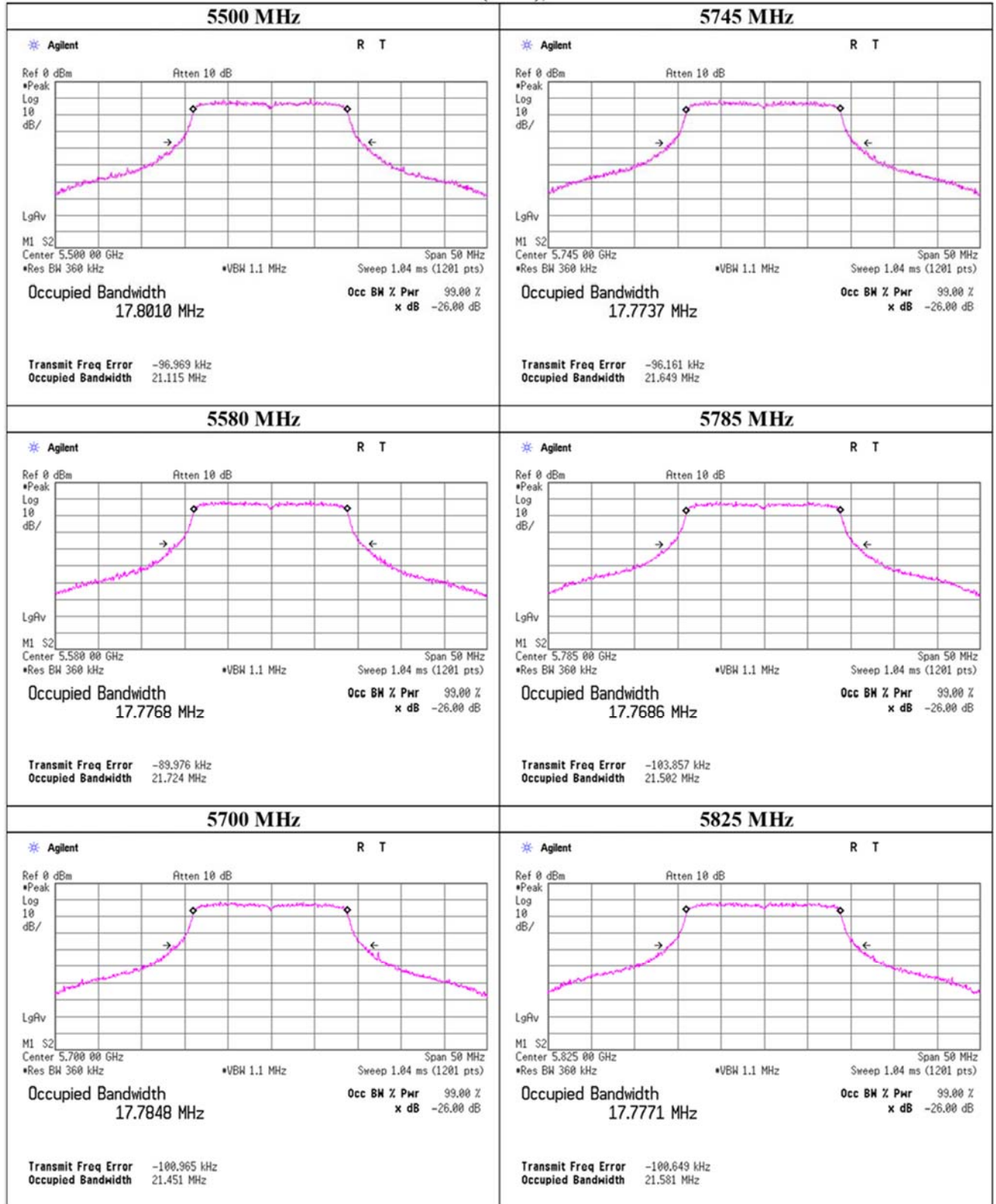
99% Occupied Bandwidth

11n-20 (SISO), Sub



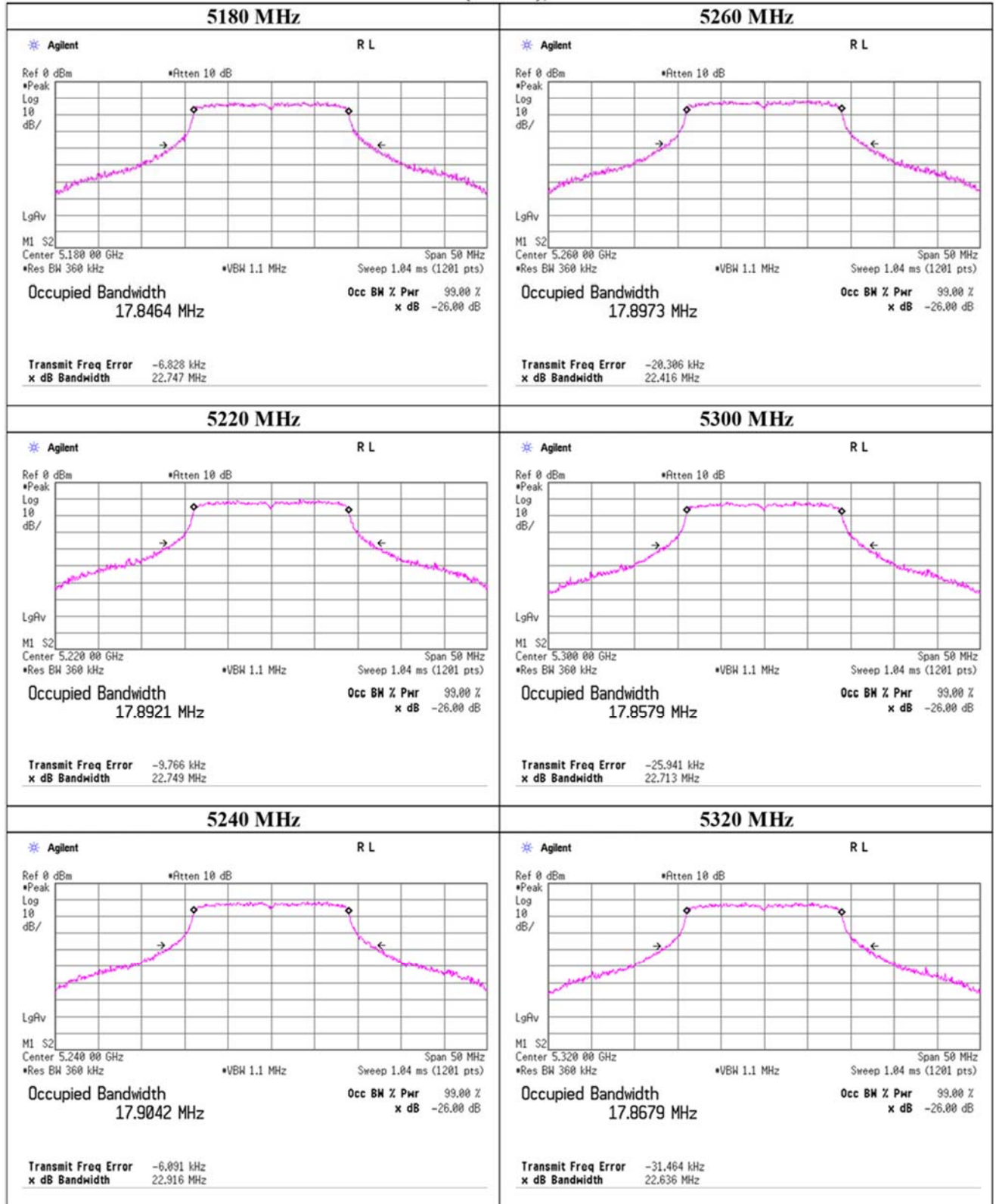
99% Occupied Bandwidth

11n-20 (SISO), Sub



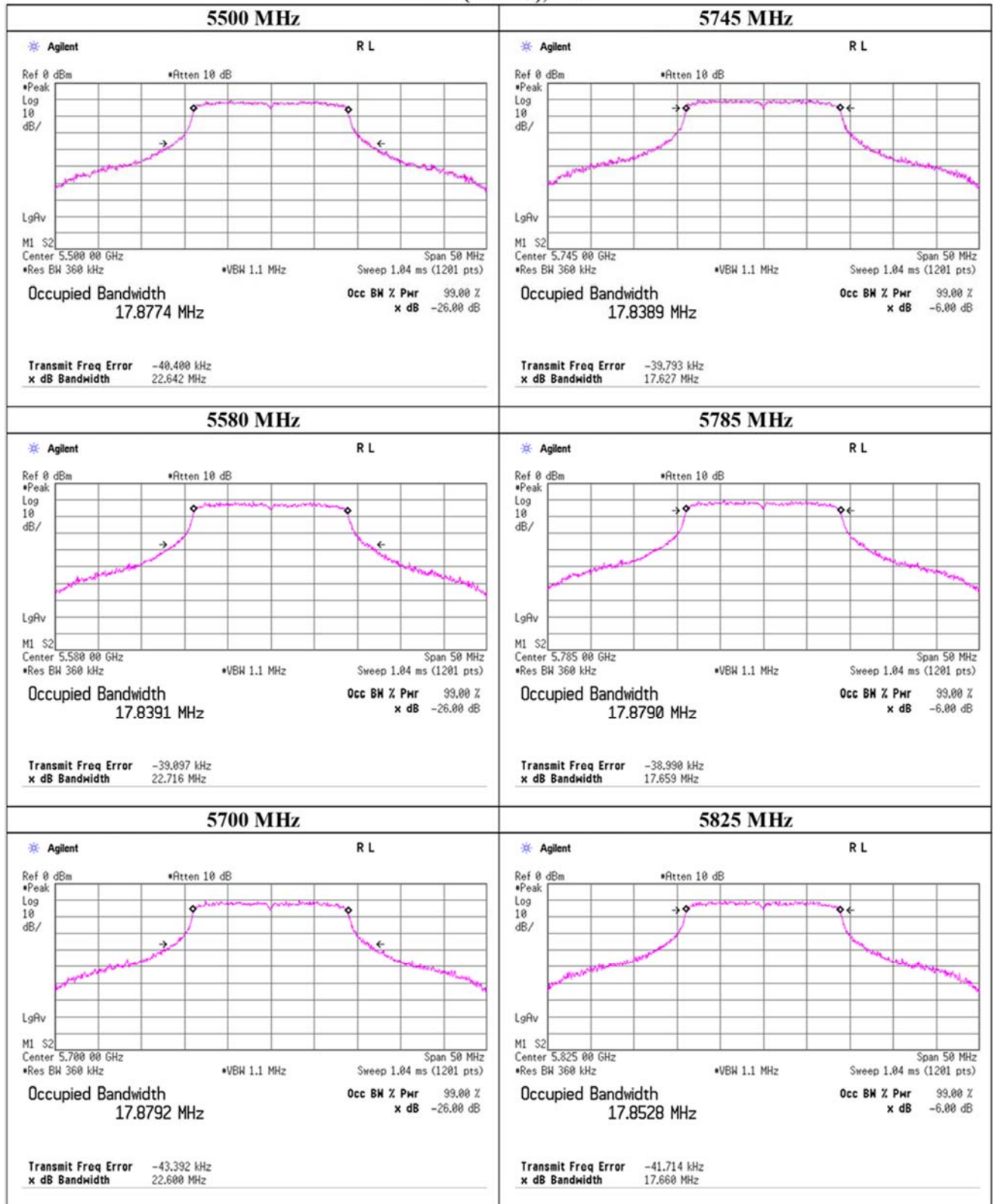
99% Occupied Bandwidth

11n-20 (MIMO), Main



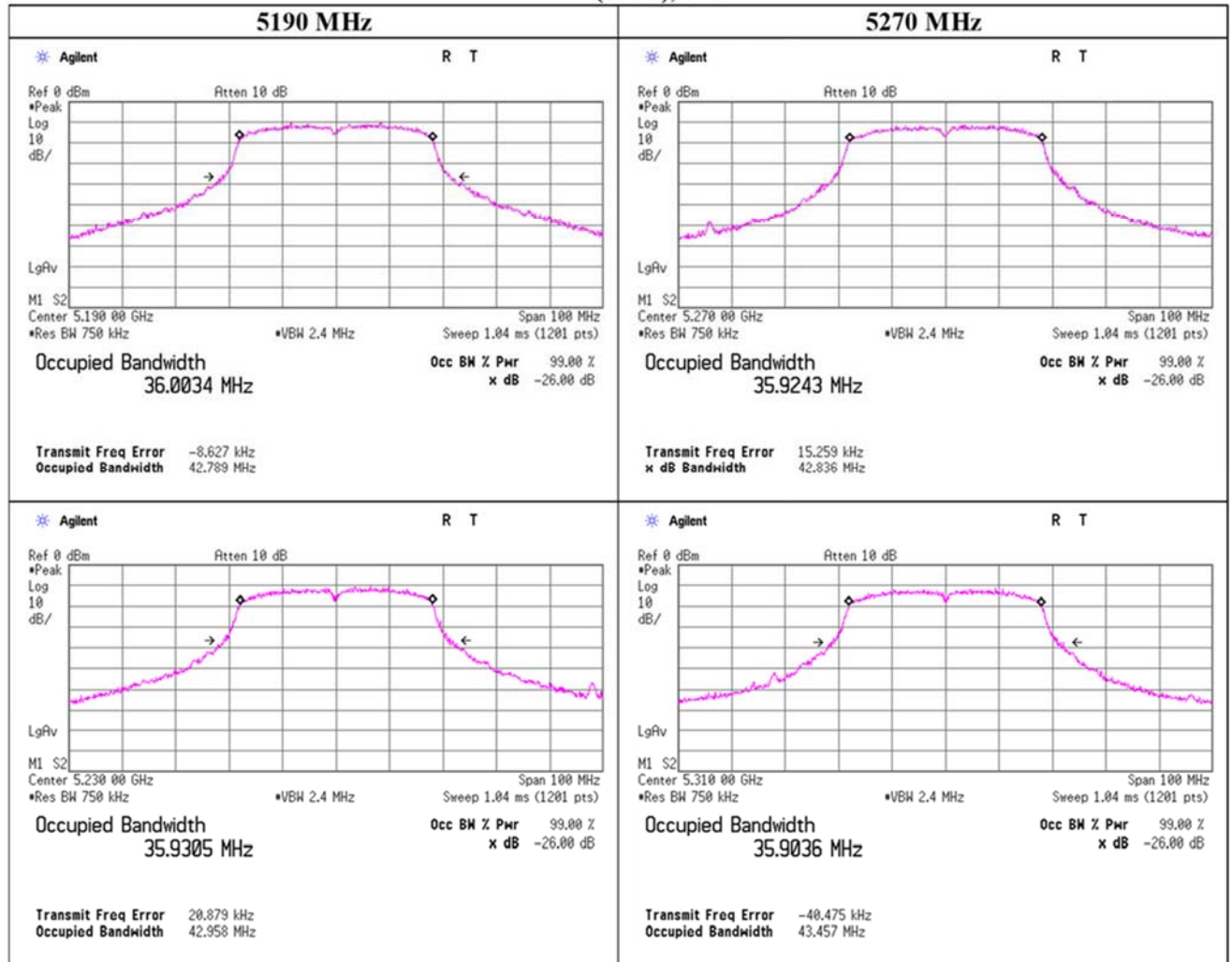
99% Occupied Bandwidth

11n-20 (MIMO), Main



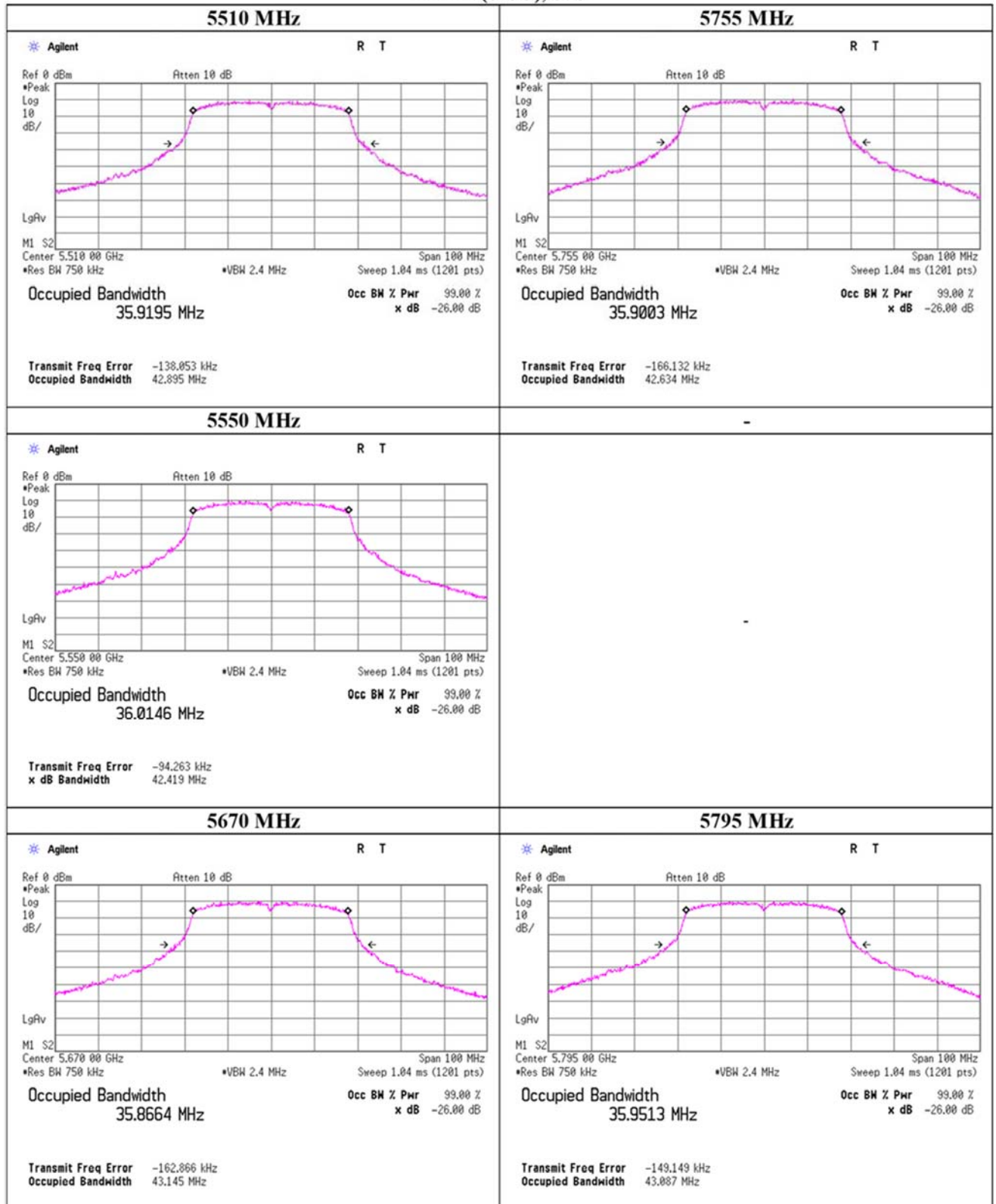
99% Occupied Bandwidth

11n-40 (SISO), Sub



99% Occupied Bandwidth

11n-40 (SISO), Sub



UL Japan, Inc.

Shonan EMC Lab.

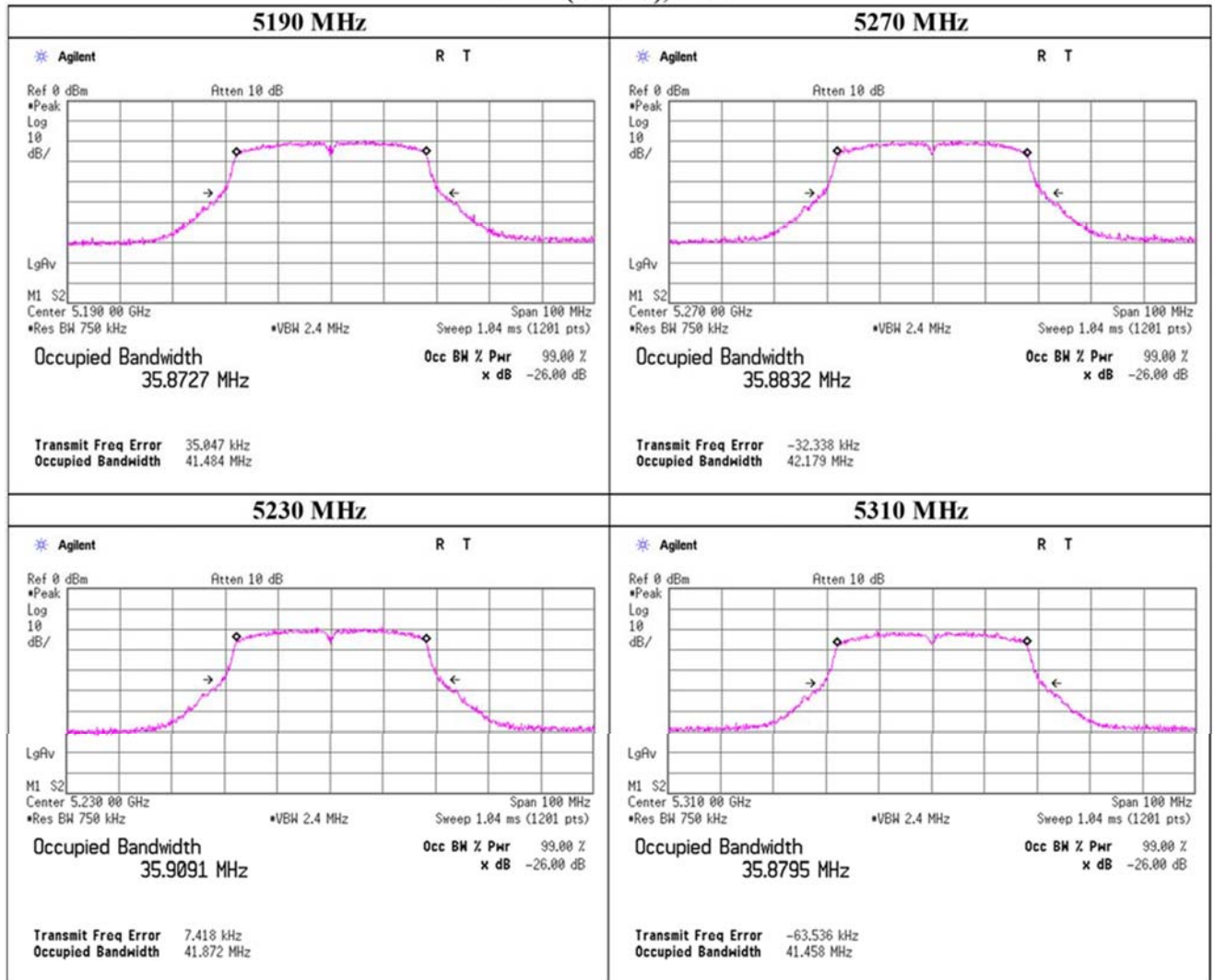
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

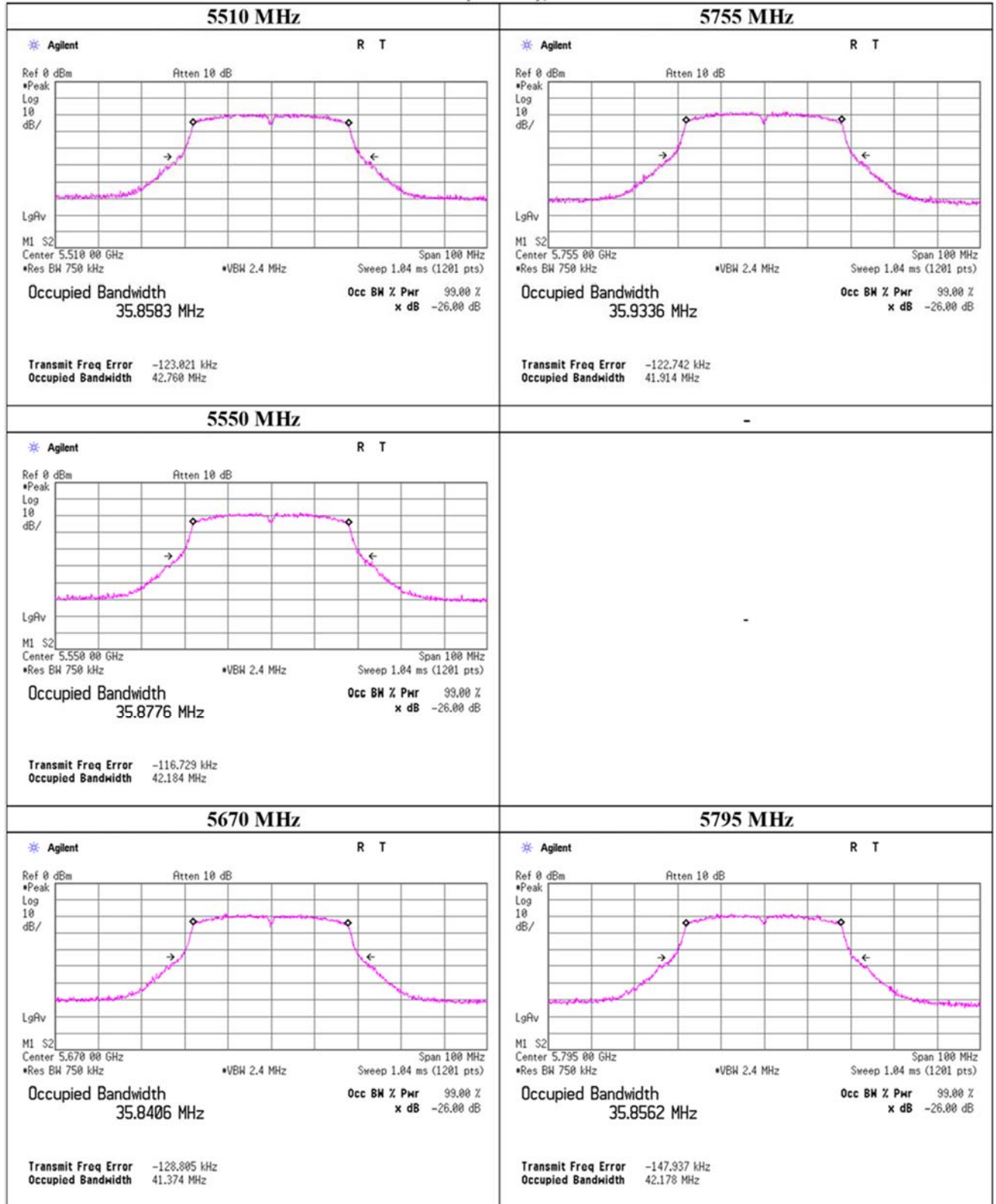
99% Occupied Bandwidth

11n-40 (MIMO), Main



99% Occupied Bandwidth

11n-40 (MIMO), Main



6dB Bandwidth

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 13, 2021 January 14, 2021
Temperature / Humidity 22 deg. C / 36 % RH 21 deg. C / 51 % RH
Engineer Yosuke Murakami Shiro Kobayashi
Mode Tx

11a

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Sub	5745	16.349	> 0.500
	5785	16.382	> 0.500
	5825	16.379	> 0.500

11n-20 (SISO)

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Sub	5745	17.251	> 0.500
	5785	17.326	> 0.500
	5825	17.256	> 0.500

11n-20 (SISO)

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Main	5745	17.681	> 0.500
	5785	17.719	> 0.500
	5825	17.715	> 0.500

11n-40 (SISO)

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Sub	5755	35.101	> 0.500
	5795	35.129	> 0.500

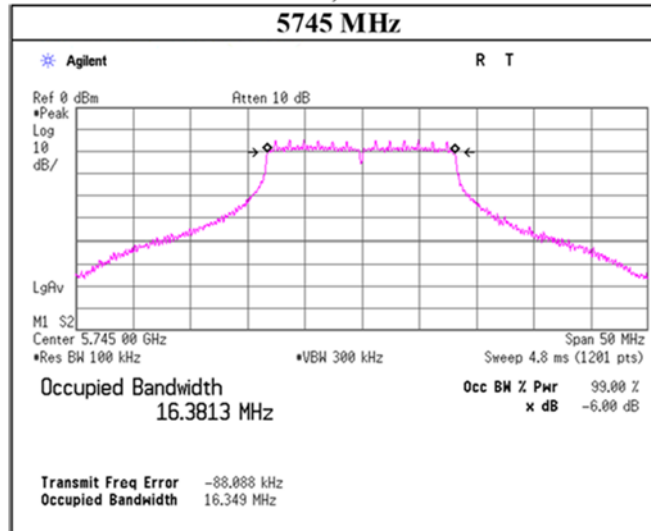
11n-40 (MIMO)

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Main	5755	35.103	> 0.500
	5795	35.132	> 0.500

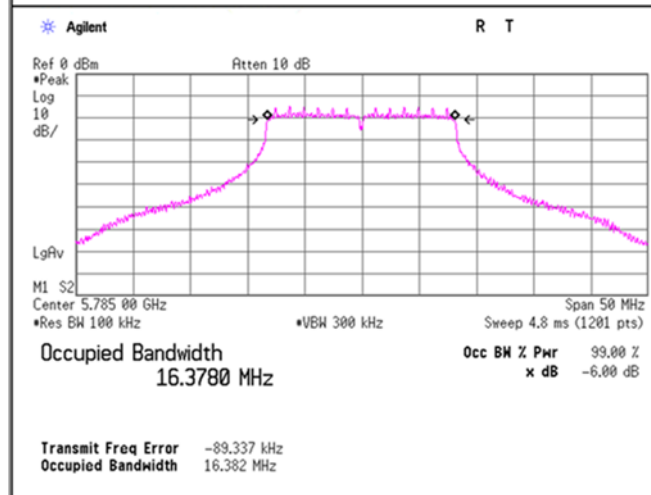
6dB Bandwidth

11a, Sub

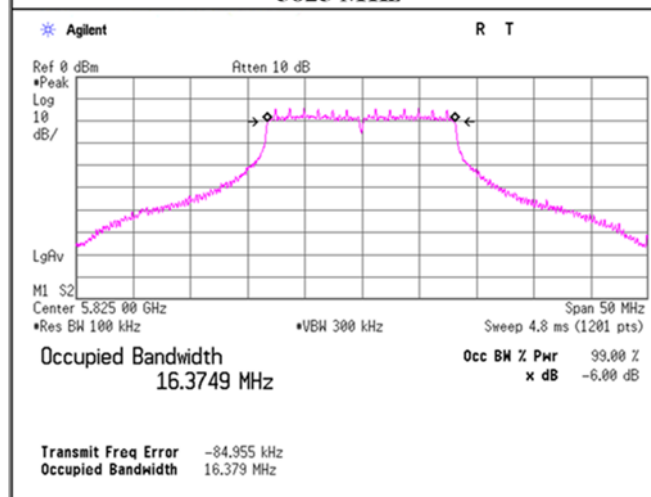
5745 MHz



5785 MHz



5825 MHz



UL Japan, Inc.

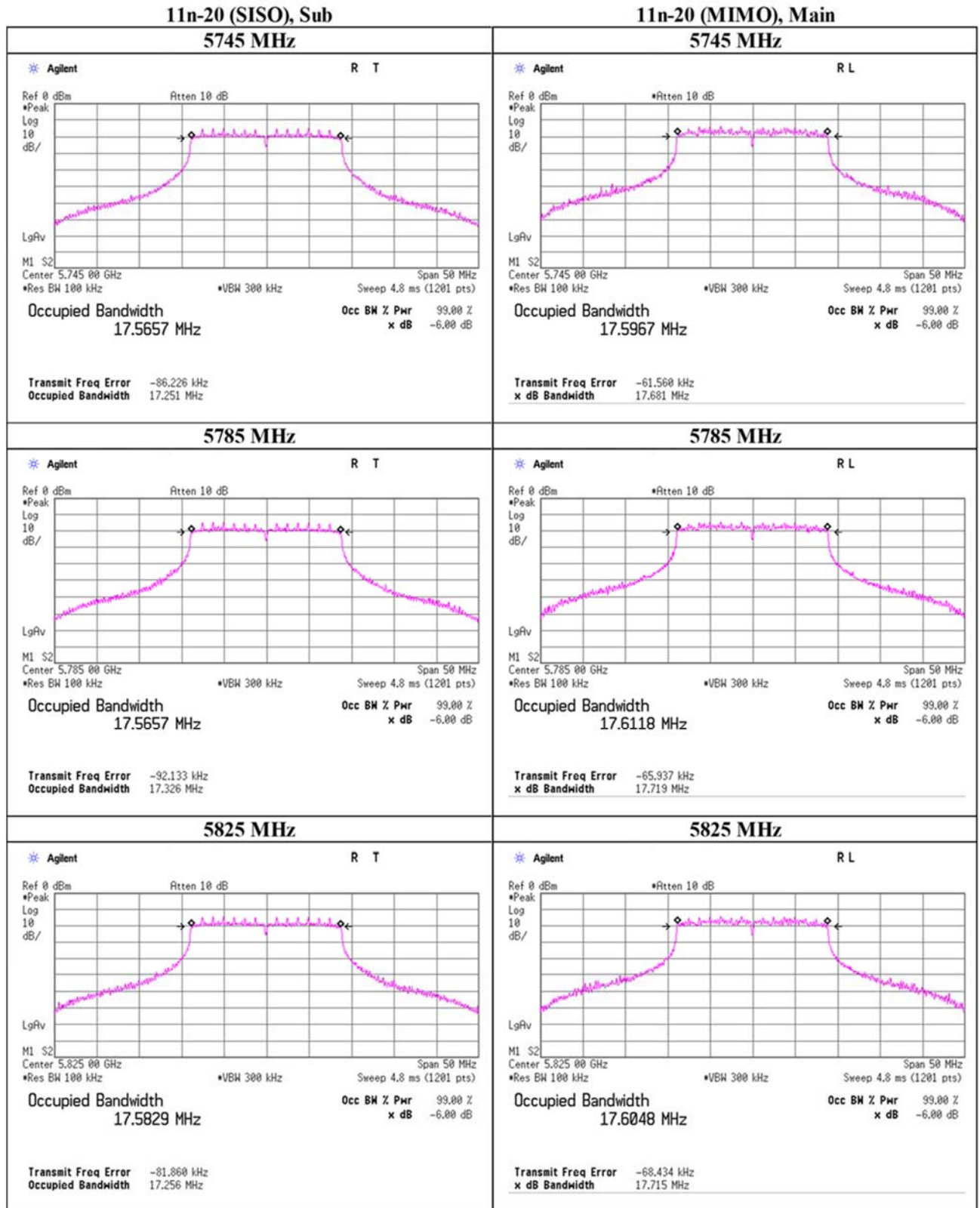
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

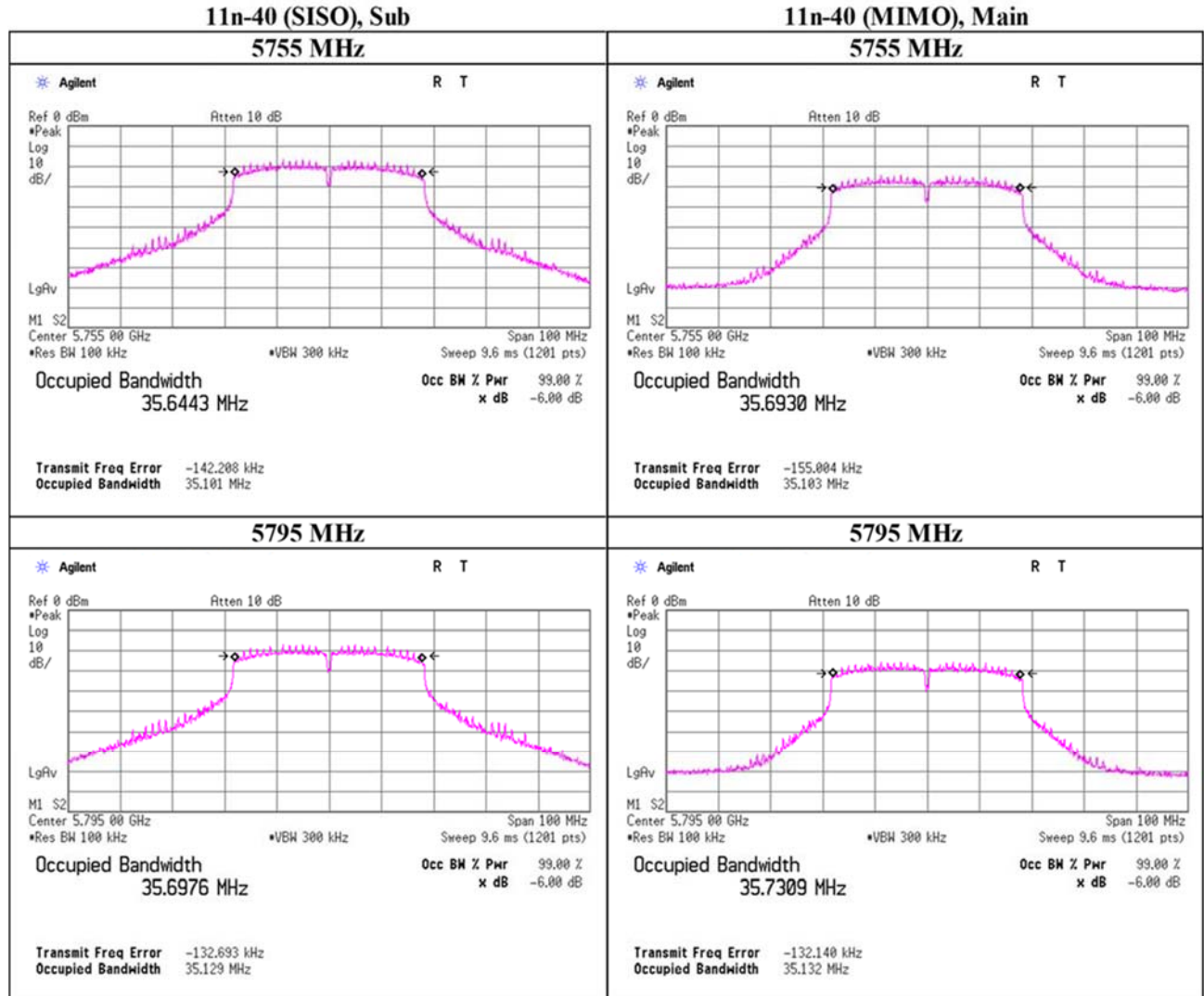
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

6dB Bandwidth



6dB Bandwidth



Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021 January 13, 2021
Temperature / Humidity 22 deg. C / 35 % RH 23 deg. C / 43 % RH
Engineer Shiro Kobayashi Shiro Kobayashi
Mode Tx 11a

11a, Main

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99 % OBW (B for ISSED) [MHz]	Conducted Power				e.i.r.p.			
							Result	Limit	Margin		Result	Limit	Margin	
							[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-3.80	2.39	10.22	-0.98	-	16.654	8.81	7.60	23.97	15.16	7.83	6.07	29.97	22.14
5220	-4.47	2.40	10.22	-0.98	-	16.646	8.15	6.53	23.97	15.82	7.17	5.21	29.97	22.80
5240	-4.75	2.40	10.22	-0.98	-	16.647	7.87	6.12	23.97	16.10	6.89	4.89	29.97	23.08
5260	-4.52	2.40	10.22	-0.98	20.393	16.676	8.10	6.46	23.97	15.87	7.12	5.15	29.97	22.85
5300	-5.27	2.40	10.22	-0.98	20.876	16.629	7.35	5.43	23.97	16.62	6.37	4.34	29.97	23.60
5320	-5.03	2.40	10.22	-0.98	20.457	16.632	7.59	5.74	23.97	16.38	6.61	4.58	29.97	23.36
5500	-3.86	2.41	10.22	-0.98	20.384	16.625	8.77	7.53	23.97	15.20	7.79	6.01	29.97	22.18
5580	-4.86	2.41	10.22	-0.98	20.024	16.656	7.77	5.98	23.97	16.20	6.79	4.78	29.97	23.18
5700	-3.15	2.42	10.22	-0.98	20.367	16.664	9.49	8.89	23.97	14.48	8.51	7.10	29.97	21.46
5745	-3.52	2.42	10.22	-0.98	-	16.654	9.12	8.17	30.00	20.88	8.14	6.52	36.00	27.86
5785	-3.77	2.42	10.22	-0.98	-	16.644	8.87	7.71	30.00	21.13	7.89	6.15	36.00	28.11
5825	-3.94	2.42	10.22	-0.98	-	16.670	8.70	7.41	30.00	21.30	7.72	5.92	36.00	28.28

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

11a, Sub

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99 % OBW (B for ISSED) [MHz]	Conducted Power				e.i.r.p.			
							Result	Limit	Margin		Result	Limit	Margin	
							[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-2.67	2.38	9.93	-1.54	-	16.654	9.64	9.20	23.97	14.33	8.10	6.46	29.97	21.87
5220	-4.53	2.38	9.93	-1.54	-	16.646	7.78	6.00	23.97	16.19	6.24	4.21	29.97	23.73
5240	-4.75	2.38	9.93	-1.54	-	16.647	7.56	5.70	23.97	16.41	6.02	4.00	29.97	23.95
5260	-4.70	2.38	9.93	-1.54	20.393	16.676	7.61	5.77	23.97	16.36	6.07	4.05	29.97	23.90
5300	-4.83	2.38	9.93	-1.54	20.876	16.629	7.48	5.60	23.97	16.49	5.94	3.93	29.97	24.03
5320	-5.08	2.38	9.93	-1.54	20.457	16.632	7.23	5.28	23.97	16.74	5.69	3.71	29.97	24.28
5500	-3.83	2.39	9.94	-1.54	20.384	16.625	8.50	7.08	23.97	15.47	6.96	4.97	29.97	23.01
5580	-3.35	2.39	9.94	-1.54	20.024	16.656	8.98	7.91	23.97	14.99	7.44	5.55	29.97	22.53
5700	-3.60	2.40	9.94	-1.54	20.367	16.664	8.74	7.48	23.97	15.23	7.20	5.25	29.97	22.77
5745	-4.15	2.40	9.94	-1.54	-	16.654	8.19	6.59	30.00	21.81	6.65	4.62	36.00	29.35
5785	-4.40	2.40	9.94	-1.54	-	16.644	7.94	6.22	30.00	22.06	6.40	4.37	36.00	29.60
5825	-4.10	2.40	9.94	-1.54	-	16.670	8.24	6.67	30.00	21.76	6.70	4.68	36.00	29.30

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021 January 13, 2021
Temperature / Humidity 22 deg. C / 35 % RH 23 deg. C / 43 % RH
Engineer Shiro Kobayashi Shiro Kobayashi
Mode Tx 11n-20 (SISO)

11n-20 (SISO), Main

Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	26 dB EBW (B for FCC)	99 % OBW (B for ISED)	Conducted Power				e.i.r.p.			
							Result		Limit	Margin	Result		Limit	Margin
							[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
[M Hz]	[dBm]	[dB]	[dB]	[dBi]	[MHz]	[M Hz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-3.78	2.39	10.22	-0.98	-	17.799	8.83	7.64	23.97	15.14	7.85	6.10	29.97	22.12
5220	-4.94	2.40	10.22	-0.98	-	17.777	7.68	5.86	23.97	16.29	6.70	4.68	29.97	23.27
5240	-4.95	2.40	10.22	-0.98	-	17.800	7.67	5.85	23.97	16.30	6.69	4.67	29.97	23.28
5260	-4.95	2.40	10.22	-0.98	20.982	17.796	7.67	5.85	23.97	16.30	6.69	4.67	29.97	23.28
5300	-5.71	2.40	10.22	-0.98	21.521	17.775	6.91	4.91	23.97	17.06	5.93	3.92	29.97	24.04
5320	-5.43	2.40	10.22	-0.98	21.081	17.753	7.19	5.24	23.97	16.78	6.21	4.18	29.97	23.76
5500	-3.84	2.41	10.22	-0.98	21.375	17.801	8.79	7.57	23.97	15.18	7.81	6.04	29.97	22.16
5580	-4.55	2.41	10.22	-0.98	21.157	17.777	8.08	6.43	23.97	15.89	7.10	5.13	29.97	22.87
5700	-3.56	2.42	10.22	-0.98	21.055	17.785	9.08	8.09	23.97	14.89	8.10	6.46	29.97	21.87
5745	-3.49	2.42	10.22	-0.98	-	17.774	9.15	8.22	30.00	20.85	8.17	6.56	36.00	27.83
5785	-3.68	2.42	10.22	-0.98	-	17.769	8.96	7.87	30.00	21.04	7.98	6.28	36.00	28.02
5825	-3.48	2.42	10.22	-0.98	-	17.777	9.16	8.24	30.00	20.84	8.18	6.58	36.00	27.82

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever

is lower Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

11n-20, Sub

Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	26 dB EBW (B for FCC)	99 % OBW (B for ISED)	Conducted Power				e.i.r.p.			
							Result		Limit	Margin	Result		Limit	Margin
							[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
[M Hz]	[dBm]	[dB]	[dB]	[dBi]	[MHz]	[M Hz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-2.80	2.38	9.93	-1.54	-	17.799	9.51	8.93	23.97	14.46	7.97	6.27	29.97	22.00
5220	-4.42	2.38	9.93	-1.54	-	17.777	7.89	6.15	23.97	16.08	6.35	4.32	29.97	23.62
5240	-5.17	2.38	9.93	-1.54	-	17.800	7.14	5.18	23.97	16.83	5.60	3.63	29.97	24.37
5260	-5.33	2.38	9.93	-1.54	20.982	17.796	6.98	4.99	23.97	16.99	5.44	3.50	29.97	24.53
5300	-5.22	2.38	9.93	-1.54	21.521	17.775	7.09	5.12	23.97	16.88	5.55	3.59	29.97	24.42
5320	-5.96	2.38	9.93	-1.54	21.081	17.753	6.35	4.32	23.97	17.62	4.81	3.03	29.97	25.16
5500	-4.49	2.39	9.94	-1.54	21.375	17.801	7.84	6.08	23.97	16.13	6.30	4.27	29.97	23.67
5580	-3.44	2.39	9.94	-1.54	21.157	17.777	8.89	7.74	23.97	15.08	7.35	5.43	29.97	22.62
5700	-3.67	2.40	9.94	-1.54	21.055	17.785	8.67	7.36	23.97	15.30	7.13	5.16	29.97	22.84
5745	-3.75	2.40	9.94	-1.54	-	17.774	8.59	7.23	30.00	21.41	7.05	5.07	36.00	28.95
5785	-4.38	2.40	9.94	-1.54	-	17.769	7.96	6.25	30.00	22.04	6.42	4.39	36.00	29.58
5825	-4.08	2.40	9.94	-1.54	-	17.777	8.26	6.70	30.00	21.74	6.72	4.70	36.00	29.28

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever

is lower Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C /
35 % RH Engineer Shiro
Kobayashi
Mode Tx 11n-20 (MIMO)

Main + Sub

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW [MHz]	99 % OBW [MHz]	Conducted power						e.i.r.p.					
	(B for FCC)	(B for ISSED)	Antenna			Result [dBm]	Limit [dBm]	Margin [dB]	Antenna			Result [dBm]	Limit [dBm]	Margin [dB]
			Main [mW]	Sub [mW]	Sum [mW]				Main [mW]	Sub [mW]	Sum [mW]			
5180	-	17.846	9.62	9.20	18.82	12.75	23.97	11.22	7.67	6.46	14.13	11.50	29.97	18.47
5220	-	17.892	8.02	7.35	15.36	11.86	23.97	12.11	6.40	5.15	11.55	10.63	29.97	19.34
5240	-	17.904	7.19	6.30	13.49	11.30	23.97	12.67	5.74	4.42	10.16	10.07	29.97	19.90
5260	21.1198	17.897	6.95	6.52	13.47	11.29	23.97	12.68	5.55	4.57	10.12	10.05	29.97	19.92
5300	21.1353	17.858	5.92	6.81	12.72	11.05	23.97	12.92	4.72	4.78	9.50	9.78	29.97	20.19
5320	20.9889	17.868	5.64	6.87	12.51	10.97	23.97	13.00	4.50	4.82	9.32	9.69	29.97	20.28
5500	21.1847	17.877	8.18	7.89	16.07	12.06	23.97	11.91	6.53	5.53	12.06	10.82	29.97	19.15
5580	20.9639	17.839	6.49	7.67	14.16	11.51	23.97	12.46	5.18	5.38	10.56	10.24	29.97	19.73
5700	21.1382	17.879	7.55	7.48	15.03	11.77	23.97	12.20	6.03	5.25	11.27	10.52	29.97	19.45
5745	-	17.839	7.71	6.89	14.60	11.64	30.00	18.36	6.15	4.83	10.98	10.41	36.00	25.59
5785	-	17.879	7.59	6.84	14.42	11.59	30.00	18.41	6.05	4.80	10.85	10.35	36.00	25.65
5825	-	17.853	7.66	8.26	15.92	12.02	30.00	17.98	6.11	5.79	11.90	10.76	36.00	25.24

	Main						Sub					
Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	Result		Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	Result	
[M Hz]	[dBm]	[dB]	[dB]	[dBi]	Cond. Power [dBm]	e.i.r.p. [dBm]	[dBm]	[dB]	[dB]	[dBi]	Cond. Power [dBm]	e.i.r.p. [dBm]
5180	-2.78	2.39	10.22	-0.98	9.83	8.85	-2.67	2.38	9.93	-1.54	9.64	8.10
5220	-3.58	2.40	10.22	-0.98	9.04	8.06	-3.65	2.38	9.93	-1.54	8.66	7.12
5240	-4.05	2.40	10.22	-0.98	8.57	7.59	-4.32	2.38	9.93	-1.54	7.99	6.45
5260	-4.20	2.40	10.22	-0.98	8.42	7.44	-4.17	2.38	9.93	-1.54	8.14	6.60
5300	-4.90	2.40	10.22	-0.98	7.72	6.74	-3.98	2.38	9.93	-1.54	8.33	6.79
5320	-5.11	2.40	10.22	-0.98	7.51	6.53	-3.94	2.38	9.93	-1.54	8.37	6.83
5500	-3.50	2.41	10.22	-0.98	9.13	8.15	-3.36	2.39	9.94	-1.54	8.97	7.43
5580	-4.51	2.41	10.22	-0.98	8.12	7.14	-3.48	2.39	9.94	-1.54	8.85	7.31
5700	-3.86	2.42	10.22	-0.98	8.78	7.80	-3.60	2.40	9.94	-1.54	8.74	7.20
5745	-3.77	2.42	10.22	-0.98	8.87	7.89	-3.96	2.40	9.94	-1.54	8.38	6.84
5785	-3.84	2.42	10.22	-0.98	8.80	7.82	-3.99	2.40	9.94	-1.54	8.35	6.81
5825	-3.80	2.42	10.22	-0.98	8.84	7.86	-3.17	2.40	9.94	-1.54	9.17	7.63

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is

lower Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021 January 13, 2021
Temperature / Humidity 22 deg. C / 35 % RH 23 deg. C / 43 % RH
Engineer Shiro Kobayashi Shiro Kobayashi
Mode Tx 11n-40 (SISO)

11n-40 (SISO), Main

Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	26 dB EBW (B for FCC)	99% OBW (B for ISSED)	Conducted Power				e.i.r.p.			
							Result		Limit	Margin	Result		Limit	Margin
[M Hz]	[dBm]	[dB]	[dB]	[dBi]	[MHz]	[MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5190	-4.80	2.39	10.22	-0.98	-	36.003	7.81	6.04	23.97	16.16	6.83	4.82	29.97	23.14
5230	-5.07	2.40	10.22	-0.98	-	35.930	7.55	5.69	23.97	16.42	6.57	4.54	29.97	23.40
5270	-5.64	2.40	10.22	-0.98	41.897	35.924	6.98	4.99	23.97	16.99	6.00	3.98	29.97	23.97
5310	-6.50	2.40	10.22	-0.98	41.538	35.904	6.12	4.09	23.97	17.85	5.14	3.27	29.97	24.83
5510	-4.88	2.41	10.22	-0.98	42.368	35.920	7.75	5.96	23.97	16.22	6.77	4.75	29.97	23.20
5550	-4.59	2.41	10.22	-0.98	42.223	36.015	8.04	6.37	23.97	15.93	7.06	5.08	29.97	22.91
5670	-5.15	2.41	10.22	-0.98	42.740	35.866	7.48	5.60	23.97	16.49	6.50	4.47	29.97	23.47
5755	-4.47	2.42	10.22	-0.98	-	35.900	8.17	6.56	30.00	21.83	7.19	5.24	36.00	28.81
5795	-4.42	2.42	10.22	-0.98	-	35.951	8.22	6.64	30.00	21.78	7.24	5.30	36.00	28.76

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever

is lower Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

11n-40 (SISO), Sub

Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	26 dB EBW (B for FCC)	99 % OBW (B for ISSED)	Conducted Power				e.i.r.p.			
							Result		Limit	Margin	Result		Limit	Margin
							[dBm]	[mW]	[dBm]		[dB]	[dBm]	[mW]	
5190	-4.12	2.38	9.93	-1.54	-	36.003	8.19	6.59	23.97	15.78	6.65	4.62	29.97	23.32
5230	-4.72	2.38	9.93	-1.54	-	35.930	7.59	5.74	23.97	16.38	6.05	4.03	29.97	23.92
5270	-5.58	2.38	9.93	-1.54	41.897	35.924	6.73	4.71	23.97	17.24	5.19	3.30	29.97	24.78
5310	-5.53	2.38	9.93	-1.54	41.538	35.904	6.78	4.76	23.97	17.19	5.24	3.34	29.97	24.73
5510	-4.13	2.39	9.94	-1.54	42.368	35.920	8.20	6.61	23.97	15.77	6.66	4.63	29.97	23.31
5550	-4.20	2.39	9.94	-1.54	42.223	36.015	8.13	6.50	23.97	15.84	6.59	4.56	29.97	23.38
5670	-4.27	2.39	9.94	-1.54	42.740	35.866	8.06	6.40	23.97	15.91	6.52	4.49	29.97	23.45
5755	-4.34	2.40	9.94	-1.54	-	35.900	8.00	6.31	30.00	22.00	6.46	4.43	36.00	29.54
5795	-4.05	2.40	9.94	-1.54	-	35.951	8.29	6.75	30.00	21.71	6.75	4.73	36.00	29.25

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever

is lower Conducted Power Limit (5725 MHz-5850 MHz) = 1 W

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C /
35 % RH Engineer Shiro
Kobayashi
Mode Tx 11n-40 (MIMO)

Main + Sub

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB	99 %	Conducted power						e.i.r.p.					
	EBW	OBW	Antenna			Result	Limit	Margin	Antenna			Result	Limit	Margin
	(B for FCC) [MHz]	(B for ISSED) [MHz]	Main [mW]	Sub [mW]	Sum [mW]	[dBm]	[dBm]	[dB]	Main [mW]	Sub [mW]	Sum [mW]	[dBm]	[dBm]	[dB]
5190	-	35.873	8.77	7.29	16.06	12.06	23.97	11.91	7.00	5.12	12.12	10.83	29.97	19.14
5230	-	35.909	7.26	5.09	12.35	10.92	23.97	13.05	5.79	3.57	9.37	9.72	29.97	20.25
5270	40.8673	35.883	5.24	4.24	9.47	9.76	23.97	14.21	4.18	2.97	7.15	8.54	29.97	21.43
5310	40.9409	35.880	3.92	4.63	8.55	9.32	23.97	14.65	3.13	3.25	6.38	8.05	29.97	21.92
5510	40.721	35.858	6.43	7.55	13.98	11.45	23.97	12.52	5.13	5.30	10.43	10.18	29.97	19.79
5550	40.8581	35.878	7.64	7.45	15.09	11.79	23.97	12.18	6.10	5.22	11.32	10.54	29.97	19.43
5670	41.0561	35.841	7.31	6.76	14.07	11.48	23.97	12.49	5.83	4.74	10.58	10.24	29.97	19.73
5755	-	35.934	7.31	6.70	14.01	11.46	30.00	18.54	5.83	4.70	10.53	10.23	36.00	25.77
5795	-	35.856	7.05	7.80	14.85	11.72	30.00	18.28	5.62	5.47	11.09	10.45	36.00	25.55

Main							Sub					
Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	Result		Power Meter Reading	Cable Loss	Atten. Loss	Antenna Gain	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBi]	Cond. Power [dBm]	e.i.r.p. [dBm]	[dBm]	[dB]	[dB]	[dBi]	Cond. Power [dBm]	e.i.r.p. [dBm]
5190	-3.18	2.39	10.22	-0.98	9.43	8.45	-3.68	2.38	9.93	-1.54	8.63	7.09
5230	-4.01	2.40	10.22	-0.98	8.61	7.63	-5.24	2.38	9.93	-1.54	7.07	5.53
5270	-5.43	2.40	10.22	-0.98	7.19	6.21	-6.04	2.38	9.93	-1.54	6.27	4.73
5310	-6.69	2.40	10.22	-0.98	5.93	4.95	-5.65	2.38	9.93	-1.54	6.66	5.12
5510	-4.55	2.41	10.22	-0.98	8.08	7.10	-3.55	2.39	9.94	-1.54	8.78	7.24
5550	-3.80	2.41	10.22	-0.98	8.83	7.85	-3.61	2.39	9.94	-1.54	8.72	7.18
5670	-3.99	2.41	10.22	-0.98	8.64	7.66	-4.03	2.39	9.94	-1.54	8.30	6.76
5755	-4.00	2.42	10.22	-0.98	8.64	7.66	-4.08	2.40	9.94	-1.54	8.26	6.72
5795	-4.16	2.42	10.22	-0.98	8.48	7.50	-3.42	2.40	9.94	-1.54	8.92	7.38

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C / 35 % RH
Engineer Shiro Kobayashi
Mode Tx 11a

5180 MHz

Antenna	Rate [M bps]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted power [dBm]	Remarks
Main	6	-3.58	2.39	10.22	9.03	-
	9	-3.65	2.39	10.22	8.96	-
	12	-3.79	2.39	10.22	8.82	-
	18	-3.80	2.39	10.22	8.81	-
	24	-3.87	2.39	10.22	8.74	-
	36	-4.12	2.39	10.22	8.49	-
	48	-3.96	2.39	10.22	8.65	-
	54	-3.97	2.39	10.22	8.64	-
Sub	6	-2.73	2.38	9.93	9.58	-
	9	-2.72	2.38	9.93	9.59	-
	12	-2.70	2.38	9.93	9.61	-
	18	-2.67	2.38	9.93	9.64	*
	24	-2.99	2.38	9.93	9.32	-
	36	-3.13	2.38	9.93	9.18	-
	48	-2.74	2.38	9.93	9.57	-
	54	-2.72	2.38	9.93	9.59	-

* Worst rate

Sample Calculation: Conducted power = Reading + Cable Loss + Atten. Loss

Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C /
35 % RH Engineer Shiro
Kobayashi
Mode Tx 11n-20 (SISO)

5180 MHz

Antenna	MCS Index	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Burst power [dBm]	Remarks
Main	0 (Long GI)	-3.81	2.39	10.22	8.80	-
	1 (Long GI)	-4.09	2.39	10.22	8.52	-
	2 (Long GI)	-3.78	2.39	10.22	8.83	-
	3 (Long GI)	-4.29	2.39	10.22	8.32	-
	4 (Long GI)	-4.28	2.39	10.22	8.33	-
	5 (Long GI)	-4.29	2.39	10.22	8.32	-
	6 (Long GI)	-4.71	2.39	10.22	7.90	-
	7 (Long GI)	-4.35	2.39	10.22	8.26	-
	0 (Short GI)	-3.68	2.39	10.22	8.93	-
	1 (Short GI)	-3.60	2.39	10.22	9.01	-
	2 (Short GI)	-3.51	2.39	10.22	9.10	-
	3 (Short GI)	-4.13	2.39	10.22	8.48	-
	4 (Short GI)	-4.34	2.39	10.22	8.27	-
	5 (Short GI)	-4.41	2.39	10.22	8.20	-
	6 (Short GI)	-4.64	2.39	10.22	7.97	-
	7 (Short GI)	-4.67	2.39	10.22	7.94	-
Sub	0 (Long GI)	-2.85	2.38	9.93	9.46	-
	1 (Long GI)	-2.88	2.38	9.93	9.43	-
	2 (Long GI)	-2.80	2.38	9.93	9.51	*
	3 (Long GI)	-3.06	2.38	9.93	9.25	-
	4 (Long GI)	-3.03	2.38	9.93	9.28	-
	5 (Long GI)	-2.92	2.38	9.93	9.39	-
	6 (Long GI)	-2.96	2.38	9.93	9.35	-
	7 (Long GI)	-4.02	2.38	9.93	8.29	-
	0 (Short GI)	-2.94	2.38	9.93	9.37	-
	1 (Short GI)	-2.96	2.38	9.93	9.35	-
	2 (Short GI)	-2.85	2.38	9.93	9.46	-
	3 (Short GI)	-3.02	2.38	9.93	9.29	-
	4 (Short GI)	-2.91	2.38	9.93	9.40	-
	5 (Short GI)	-2.89	2.38	9.93	9.42	-
	6 (Short GI)	-3.16	2.38	9.93	9.15	-
	7 (Short GI)	-3.97	2.38	9.93	8.34	-

* Worst rate

Sample Calculation:

$$\text{Burst power} = \text{Reading (timed average)} + \text{Cable Loss} + \text{Atten. Loss}$$

UL Japan, Inc.

Shonan EMC Lab.

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Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C / 35 % RH
Engineer Shiro Kobayashi
Mode Tx 11n-20 (MIMO)

5180 MHz

MCS Index	Conducted power			Result [dBm]	Remarks
	Antenna Main [mW]	Sub [mW]	Sum [mW]		
8 (Long GI)	8.57	8.47	17.04	12.32	-
9 (Long GI)	8.87	8.67	17.54	12.44	-
10 (Long GI)	9.35	8.97	18.33	12.63	-
11 (Long GI)	9.62	9.20	18.82	12.75	*
12 (Long GI)	9.66	9.08	18.74	12.73	-
13 (Long GI)	7.98	7.76	15.74	11.97	-
14 (Long GI)	8.38	8.09	16.47	12.17	-
15 (Long GI)	6.44	6.22	12.66	11.03	-
8 (Short GI)	8.85	8.34	17.19	12.35	-
9 (Short GI)	8.65	8.22	16.87	12.27	-
10 (Short GI)	9.02	8.47	17.49	12.43	-
11 (Short GI)	9.40	8.89	18.29	12.62	-
12 (Short GI)	9.42	8.85	18.27	12.62	-
13 (Short GI)	8.05	7.26	15.31	11.85	-
14 (Short GI)	7.96	7.06	15.02	11.77	-
15 (Short GI)	6.32	5.94	12.27	10.89	-

MCS Index	Main				Sub			
	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Cond. Power [dBm]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Cond. Power [dBm]
8 (Long GI)	-3.28	2.39	10.22	9.33	-3.03	2.38	9.93	9.28
9 (Long GI)	-3.13	2.39	10.22	9.48	-2.93	2.38	9.93	9.38
10 (Long GI)	-2.90	2.39	10.22	9.71	-2.78	2.38	9.93	9.53
11 (Long GI)	-2.78	2.39	10.22	9.83	-2.67	2.38	9.93	9.64
12 (Long GI)	-2.76	2.39	10.22	9.85	-2.73	2.38	9.93	9.58
13 (Long GI)	-3.59	2.39	10.22	9.02	-3.41	2.38	9.93	8.90
14 (Long GI)	-3.38	2.39	10.22	9.23	-3.23	2.38	9.93	9.08
15 (Long GI)	-4.52	2.39	10.22	8.09	-4.37	2.38	9.93	7.94
8 (Short GI)	-3.14	2.39	10.22	9.47	-3.10	2.38	9.93	9.21
9 (Short GI)	-3.24	2.39	10.22	9.37	-3.16	2.38	9.93	9.15
10 (Short GI)	-3.06	2.39	10.22	9.55	-3.03	2.38	9.93	9.28
11 (Short GI)	-2.88	2.39	10.22	9.73	-2.82	2.38	9.93	9.49
12 (Short GI)	-2.87	2.39	10.22	9.74	-2.84	2.38	9.93	9.47
13 (Short GI)	-3.55	2.39	10.22	9.06	-3.70	2.38	9.93	8.61
14 (Short GI)	-3.60	2.39	10.22	9.01	-3.82	2.38	9.93	8.49
15 (Short GI)	-4.60	2.39	10.22	8.01	-4.57	2.38	9.93	7.74

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

UL Japan, Inc.

Shonan EMC Lab.

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Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C /
35 % RH Engineer Shiro
Kobayashi
Mode Tx 11n-40 (SISO)

5190 MHz

Antenna	MCS Index	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Burst power [dBm]	Remarks
Main	0 (Long GI)	-4.66	2.39	10.22	7.95	-
	1 (Long GI)	-4.57	2.39	10.22	8.04	-
	2 (Long GI)	-4.80	2.39	10.22	7.81	-
	3 (Long GI)	-4.96	2.39	10.22	7.65	-
	4 (Long GI)	-4.85	2.39	10.22	7.76	-
	5 (Long GI)	-4.74	2.39	10.22	7.87	-
	6 (Long GI)	-4.81	2.39	10.22	7.80	-
	7 (Long GI)	-4.91	2.39	10.22	7.70	-
	0 (Short GI)	-4.59	2.39	10.22	8.02	-
	1 (Short GI)	-4.56	2.39	10.22	8.05	-
	2 (Short GI)	-4.48	2.39	10.22	8.13	-
	3 (Short GI)	-4.86	2.39	10.22	7.75	-
	4 (Short GI)	-5.02	2.39	10.22	7.59	-
	5 (Short GI)	-4.88	2.39	10.22	7.73	-
	6 (Short GI)	-4.64	2.39	10.22	7.97	-
	7 (Short GI)	-4.88	2.39	10.22	7.73	-
Sub	0 (Long GI)	-4.32	2.38	9.93	7.99	-
	1 (Long GI)	-4.25	2.38	9.93	8.06	-
	2 (Long GI)	-4.12	2.38	9.93	8.19	*
	3 (Long GI)	-4.44	2.38	9.93	7.87	-
	4 (Long GI)	-4.33	2.38	9.93	7.98	-
	5 (Long GI)	-4.28	2.38	9.93	8.03	-
	6 (Long GI)	-4.25	2.38	9.93	8.06	-
	7 (Long GI)	-4.46	2.38	9.93	7.85	-
	0 (Short GI)	-4.32	2.38	9.93	7.99	-
	1 (Short GI)	-4.28	2.38	9.93	8.03	-
	2 (Short GI)	-4.16	2.38	9.93	8.15	-
	3 (Short GI)	-4.40	2.38	9.93	7.91	-
	4 (Short GI)	-4.58	2.38	9.93	7.73	-
	5 (Short GI)	-4.22	2.38	9.93	8.09	-
	6 (Short GI)	-4.42	2.38	9.93	7.89	-
	7 (Short GI)	-4.47	2.38	9.93	7.84	-

* Worst rate

Sample Calculation: Burst power = Reading (timed average) + Cable Loss + Atten. Loss

UL Japan, Inc.

Shonan EMC Lab.

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Maximum Conducted Output Power

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 12, 2021
Temperature / Humidity 22 deg. C / 35 % RH
Engineer Shiro Kobayashi
Mode Tx 11n-40 (MIMO)

5190 MHz

MCS Index	Conducted power			Result [dBm]	Remarks
	Antenna Main [mW]	Sub [mW]	Sum [mW]		
8 (Long GI)	8.38	7.13	15.50	11.90	-
9 (Long GI)	8.57	7.03	15.60	11.93	-
10 (Long GI)	8.77	7.29	16.06	12.06	*
11 (Long GI)	8.11	7.66	15.77	11.98	-
12 (Long GI)	8.53	7.29	15.83	11.99	-
13 (Long GI)	8.53	7.24	15.78	11.98	-
14 (Long GI)	8.39	7.13	15.52	11.91	-
15 (Long GI)	6.35	6.24	12.59	11.00	-
8 (Short GI)	8.11	7.01	15.12	11.80	-
9 (Short GI)	8.32	7.14	15.46	11.89	-
10 (Short GI)	8.71	7.23	15.94	12.02	-
11 (Short GI)	7.85	7.35	15.20	11.82	-
12 (Short GI)	8.13	7.62	15.75	11.97	-
13 (Short GI)	8.39	7.26	15.66	11.95	-
14 (Short GI)	8.49	7.36	15.85	12.00	-
15 (Short GI)	6.22	6.47	12.69	11.04	-

MCS Index	Main				Sub			
	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Cond. Power [dBm]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Cond. Power [dBm]
8 (Long GI)	-3.38	2.39	10.22	9.23	-3.78	2.38	9.93	8.53
9 (Long GI)	-3.28	2.39	10.22	9.33	-3.84	2.38	9.93	8.47
10 (Long GI)	-3.18	2.39	10.22	9.43	-3.68	2.38	9.93	8.63
11 (Long GI)	-3.52	2.39	10.22	9.09	-3.47	2.38	9.93	8.84
12 (Long GI)	-3.30	2.39	10.22	9.31	-3.68	2.38	9.93	8.63
13 (Long GI)	-3.30	2.39	10.22	9.31	-3.71	2.38	9.93	8.60
14 (Long GI)	-3.37	2.39	10.22	9.24	-3.78	2.38	9.93	8.53
15 (Long GI)	-4.58	2.39	10.22	8.03	-4.36	2.38	9.93	7.95
8 (Short GI)	-3.52	2.39	10.22	9.09	-3.85	2.38	9.93	8.46
9 (Short GI)	-3.41	2.39	10.22	9.20	-3.77	2.38	9.93	8.54
10 (Short GI)	-3.21	2.39	10.22	9.40	-3.72	2.38	9.93	8.59
11 (Short GI)	-3.66	2.39	10.22	8.95	-3.65	2.38	9.93	8.66
12 (Short GI)	-3.51	2.39	10.22	9.10	-3.49	2.38	9.93	8.82
13 (Short GI)	-3.37	2.39	10.22	9.24	-3.70	2.38	9.93	8.61
14 (Short GI)	-3.32	2.39	10.22	9.29	-3.64	2.38	9.93	8.67
15 (Short GI)	-4.67	2.39	10.22	7.94	-4.20	2.38	9.93	8.11

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

UL Japan, Inc.

Shonan EMC Lab.

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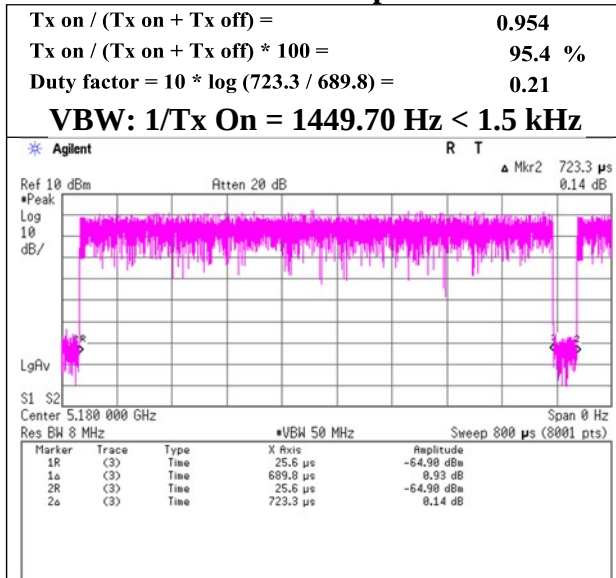
Telephone : +81 463 50 6400

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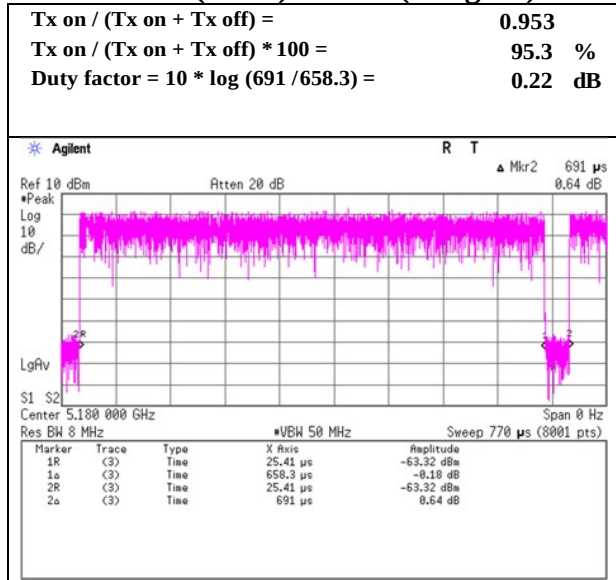
Burst rate confirmation

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 14, 2021
Temperature / Humidity 21 deg. C / 51 % RH
Engineer Shiro Kobayashi
Mode Tx

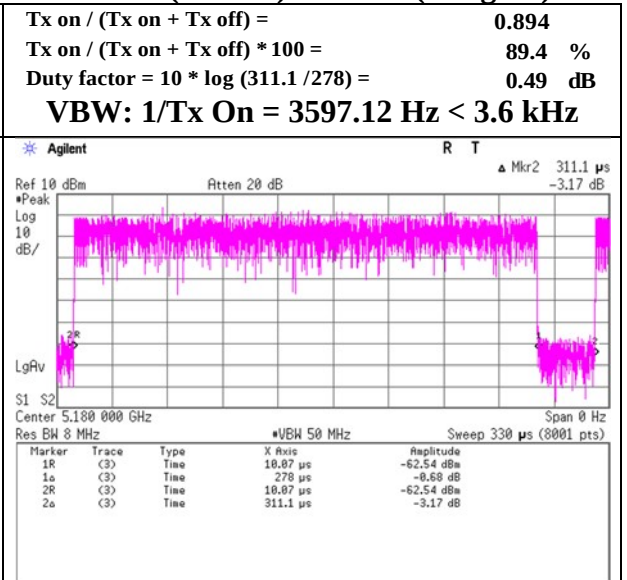
11a 18 Mbps



11n-20 (SISO) MCS 2 (Long GI)



11n-20 (MIMO) MCS 11 (Long GI)

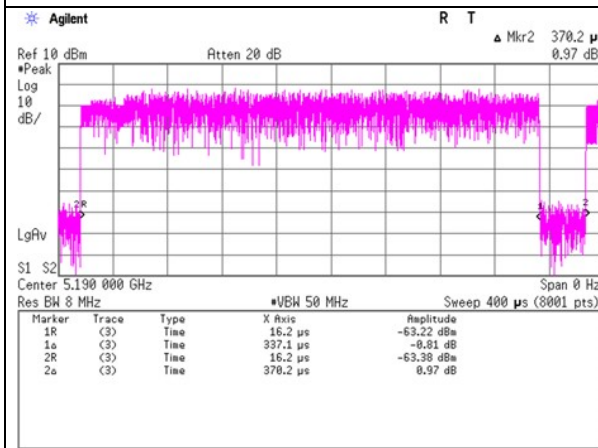


Burst rate confirmation

Report No. 13568152S-L
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 14, 2021
Temperature / Humidity 21 deg. C / 51 % RH
Engineer Shiro Kobayashi
Mode Tx

11n-40 (MIMO) MCS 2 (Long GI)

Tx on / (Tx on + Tx off) = **0.911**
Tx on / (Tx on + Tx off) * 100 = **91.1 %**
Duty factor = 10 * log (370.2 / 337.1) = **0.41 dB**



11n-40 (MIMO) MCS 10 (Long GI)

Tx on / (Tx on + Tx off) = **0.852**
Tx on / (Tx on + Tx off) * 100 = **85.2 %**
Duty factor = 10 * log (226.4 / 193) = **0.70 dB**
VBW: 1/Tx On = 5181.347 Hz < 5.6 kHz

