

**Industrial Internet Innovation Center (Shanghai) Co.,Ltd.**

**SRD TEST REPORT**

<b>PRODUCT</b>	Bluetooth & WiFi 2.4G/5G Module
<b>BRAND</b>	WNC
<b>MODEL</b>	UWM-XP9098V2
<b>APPLICANT</b>	Wistron NeWeb Corporation
<b>FCC ID</b>	NKRUWM-XP9098V2
<b>ISSUE DATE</b>	March 5, 2024
<b>STANDARD(S)</b>	FCC Part15E

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## 1. Summary of Test Report

### 1.1 Test Standard(s)

No.	Test Standard	Title	Version
1	FCC Part15E	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	--

### 1.2 Reference Documents

No.	Test Standard	Title	Version
1	ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
2	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)	--
3	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band	--

Note: KDB 789033 D02 General UNII Test Procedures New Rules v02r01 is not A2LA certified.

### 1.3 Summary of Test Results

No.	Measurement Items	FCC Rules	Verdict
1	Maximum Output Power	15.407(a)	Pass
2	Power Spectral Density	15.407(a)	Pass
3	6dB Occupied Bandwidth	15.407(e)	Pass
4	99% Occupied Bandwidth	N/A	Pass
5	Band edge compliance	15.407(b)	Pass
6	Transmitter Spurious Emission -Conducted	15.407	Pass
7	Transmitter Spurious Emission - Radiated	15.407,15.205,15.209	Pass
8	AC Powerline Conducted Emission	15.207	Pass
9	Antenna requirement	15.203	Pass

**Note1:**

The UWM-XP9098V2 manufactured by WNC (Kunshan) Corporation Company Limited is a new products for testing.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.

**Note2:**

5.8G RLAN used a FPC antenna with max Gain 2.47dBi that complied with 15.203 Requirements. EUT

does not support CDD technology and the antennas are not correlated.

#### 1.4 Data Provided by Applicant

No.	Item(s)	Data
1	Antenna gain of EUT	2.47 dBi

Note: The data of antenna gain is provided by the Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.

## 2. General Information of The Laboratory

### 2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4, No. 766, Jingang Road, Pudong, Shanghai, China
Telephone	021-68866880
FCC Registration No.	708870
FCC Designation No.	CN1364

### 2.2 Laboratory Environmental Requirements

Temperature	15°C~35°C
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	86kPa~106kPa

### 2.3 Project Information

Project Manager	Xu Yuting
Test Date	December 06, 2023 to February 06, 2024

### 3. General Information of The Customer

#### 3.1 Applicant

Company	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C
Telephone	+886 3-666-7799

#### 3.2 Manufacturer

Company	WNC (Kunshan) Corporation Company Limited
Address	NO.88, Central Avenue, Comprehensive Free Trade Zone, Kunshan, Jiangsu, China
Telephone	+86-25-84821688 Ext: 6190

## 4. General Information of The Product

### 4.1 Product Description for Equipment under Test (EUT)

Product Name	Bluetooth & WiFi 2.4G/5G Module
Model name	UWM-XP9098V2
Date of Receipt	S07aa/S09aa: December 06, 2023
EUT ID*	S07aa/S09aa
SN/IMEI	S07aa: N7M5N3700B2J01 S09aa: N7M5N3700C4J01
Supported Radio Technology and Bands	BT 5.3 BR/EDR/BLE WLAN 802.11b/g/n/ac/ax WLAN 802.11a/n/ac/ax
Hardware Version	G02
Software Version	NA
FCC ID	NKRUWM-XP9098V2
NOTE1: EUT ID is the internal identification code of the laboratory.	
NOTE2: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

### 4.2 Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
AE1	RF Cable	N/A	N/A
EA01	Connecting Cable	N/A	N/A
EB02	PCB Board	N/A	N/A
CA01	Adapter	ADS0271-B120200	N/A
UC01	Serial cable	N/A	For EUT debugging
UD01	Lan Cable	N/A	For EUT debugging
AE1	Notebook PC	N/A	For EUT debugging
NOTE1: AE ID is the internal identification code of the laboratory.			

### 4.3 Additional Information

WLAN Frequency	UNII 3: 5725MHz-5850MHz
Occupied Channel Bandwidth	20 MHz for Wi-Fi (802.11 a/n/ac/ax) 40 MHz for Wi-Fi (802.11 n/ac/ax) 80 MHz for Wi-Fi(802.11 ac/ax)
WLAN type of modulation	OFDM

Test frequency list:

UNII-3:

BW_20M	Channel	149	153	157	161	165
	Freq. (MHz)	5745	5765	5785	5805	5825
BW_40M	Channel	151		159		/
	Freq. (MHz)	5755		5795		
BW_80M	Channel	155				
	Freq. (MHz)	5775				

Note: "/" Represents empty

Note: This report is for WLAN UNII-3 only.



## 5. Test Configuration Information

### 5.1 Laboratory Environmental Conditions

#### 5.1.1 Permanent Facilities

Relative Humidity	Min. = 45 %, Max. = 55 %		
Atmospheric Pressure	101kPa		
Temperature	Normal	Minimum	Maximum
	25°C	-40°C	85°C
Working Voltage of EUT	Normal	Minimum	Maximum
	3.3, 1.8V	3.14, 1.71V	3.46, 1.89V

### 5.2 Test Equipments Utilized

#### 5.2.1 Conducted Test System

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Test Software	TS1120	10727	V3.2.22	N/A	Tonscend	N/A	N/A
2	Automatic control unit	JS0806-2	2218060623	N/A	N/A	Tonscend	2023-05-06	1 Year
3	Wireless communication comprehensive tester	CMW500	164865	V3.8.12	N/A	R&S	2023-07-26	1 Year
4	Spectrum Analyzer	FSQ40	200063	V4.75	N/A	R&S	2023-10-16	1 Year
5	Analog Signal Generator	SMF	104770	V3.0.13.0-2.20.530.15.4	N/A	R&S	2023-10-16	1 year
6	Vector Signal Generator	SMCV100B	103691	V5.00.122.24	N/A	R&S	2023-07-27	1 Year
7	Programmable Power Supply	Keithley 2303	4039070	N/A	N/A	Keithley	2023-06-23	1 Year
8	Temperature box	B-TF-107C	BTF107C-201804107	N/A	N/A	Boyi	2023-06-28	1 Year
9	Network test unit AP	GT-AXE11000	N2IG0X401637KWF	V3.0.0.4.386_45940	N/A	ASUS	N/A	N/A
10	Vector Signal Generator	SMBV100A	257904	V4.15.125.49	N/A	R&S	2023-10-16	1 Year

**5.2.2 Radiated Emission Test System**

No	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123126	V5.2.1	B12	R&S	2023-10-16	1 Year
2	Universal Radio Communication Tester	CMW500	104178	V3.7.20	1206.0600.00	R&S	2023-10-16	1 Year
3	EMI Test Receiver	ESU40	100307	V5.1-24-3	01	R&S	2022-12-19 2023-12-19	1 Year
4	TRILOG Broadband Antenna	VULB9163	01345	N/A	N/A	Schwarzbeck	2023-03-23	1 Year
5	Double-ridged Waveguide Antenna	ETS-3117	00135890	N/A	N/A	ETS	2022-03-09	2 Years
6	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
7	Horn Antenna	3160-09	LM6321	N/A	N/A	R&S	2023-07-16	1 Year
8	Horn Antenna	3160-10	LM5942	N/A	N/A	R&S	2023-07-16	1 Year
9	Loop Antenna	AL-130R	121083	N/A	N/A	COM-POWER	2023-9-13	1 Year
10	Preamplifier	SCU08F1	8320024	N/A	N/A	R&S	2023-10-16	1 Year
11	Preamplifier	SCU18	10155	N/A	N/A	R&S	2023-10-16	1 Year
12	Preamplifier	SCU26	10025	N/A	N/A	R&S	2023-10-16	1 Year
13	Preamplifier	SCU40	10020	N/A	N/A	R&S	2023-10-16	1 Year
14	2-Line V-Network	ENV216	101380	N/A	N/A	R&S	2023-12-19	1 Year
15	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
16	Test Receiver	ESCI	101235	V5.1-24-3	0	R&S	2023-12-19	1 Year

### 5.2.3 Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω
Temperature	Min. = 15 °C, Max. = 35 °C

**Control room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber1** (9.8 meters×6.7 meters×6.7 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz

### 5.3 Measurement Uncertainty

Measurement Uncertainty of Conduction test

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Emission Bandwidth	5150-5850MHz	95%	±1.9%
Maximum Conduct Output Power	5150-5850MHz	95%	± 1.18 dB
Power Spectral Density	5150-5850MHz	95%	±0.98 dB
Band Edge Measurements	5150-5850MHz	95%	±1.21dB

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Unwanted Emissions Measurement	9kHz-40GHz	95%	9kHz-7GHz:±1.21dB 7GHz-40GHz: ±3.31dB
Frequency Stability	5150-5850MHz	95%	±1.9%

Measurement Uncertainty of Radiation test

Measurement Items	Uncertainty(dB)
Radiated Emission 30MHz-1000MHz	±5.10
Radiated Emission 1000MHz-18000MHz	±5.66
Radiated Emission 18000MHz-40000MHz	±5.22
AC Powerline Conducted Emission	±4.38

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 6. Measurement Results

### 6.1 Duty cycle

#### 6.1.1 Measurement Limit and Method

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	N/A

#### 6.1.2 Test Procedure

The measurement method is made according to KDB 789033 B

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.
- b) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission, Set  $RBW > EBW$  if possible; otherwise, set  $RBW$  to the largest available value. Set  $VBW > RBW$ . Set detector = peak or average. The zero-span measurement method shall not be used unless both  $RBW$  and  $VBW$  are  $> 50/T$ , where  $T$  is defined in II.B.1.a), and the number of sweep points across duration  $T$  exceeds 100. (For example, if  $VBW$  and/or  $RBW$  are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T < 16.7$  microseconds.)

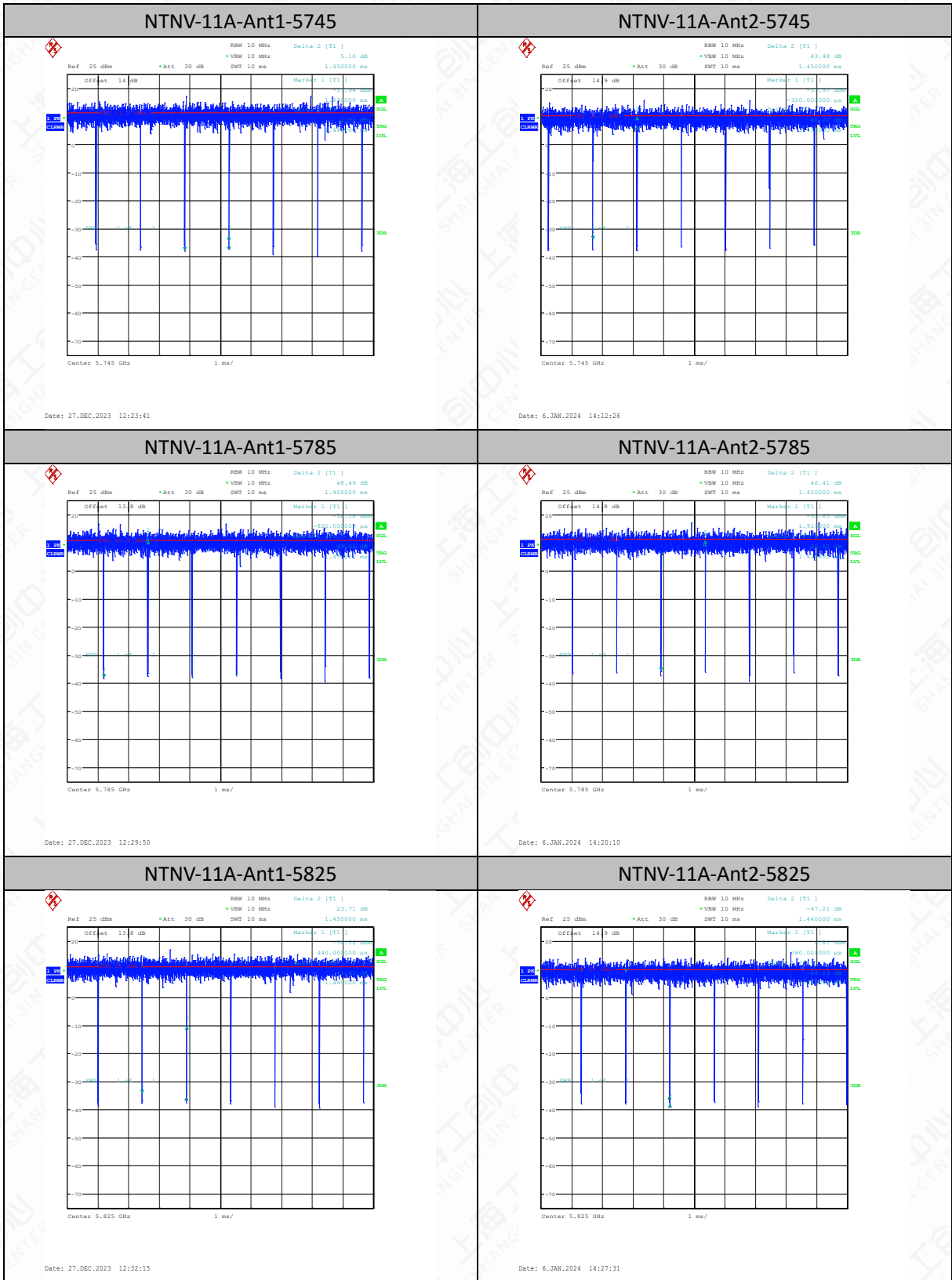
#### 6.1.3 Measurement Results

Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5745	1.44	1.45	99.31
11A	Ant2	5745	1.43	1.45	98.62
11A	Ant1	5785	1.43	1.45	98.62
11A	Ant2	5785	1.43	1.45	98.62
11A	Ant1	5825	1.44	1.45	99.31
11A	Ant2	5825	1.43	1.44	99.31
11A-CDD	Ant1	5745	1.43	1.45	98.62
11A-CDD	Ant2	5745	1.43	1.45	98.62
11A-CDD	Ant1	5785	1.43	1.45	98.62
11A-CDD	Ant2	5785	1.44	1.50	96.00
11A-CDD	Ant1	5825	1.43	1.44	99.31
11A-CDD	Ant2	5825	1.43	1.49	95.97
11N20SISO	Ant1	5745	1.34	1.35	99.26
11N20SISO	Ant2	5745	1.34	1.36	98.53
11N20SISO	Ant1	5785	1.34	1.35	99.26
11N20SISO	Ant2	5785	1.34	1.36	98.53
11N20SISO	Ant1	5825	1.34	1.36	98.53

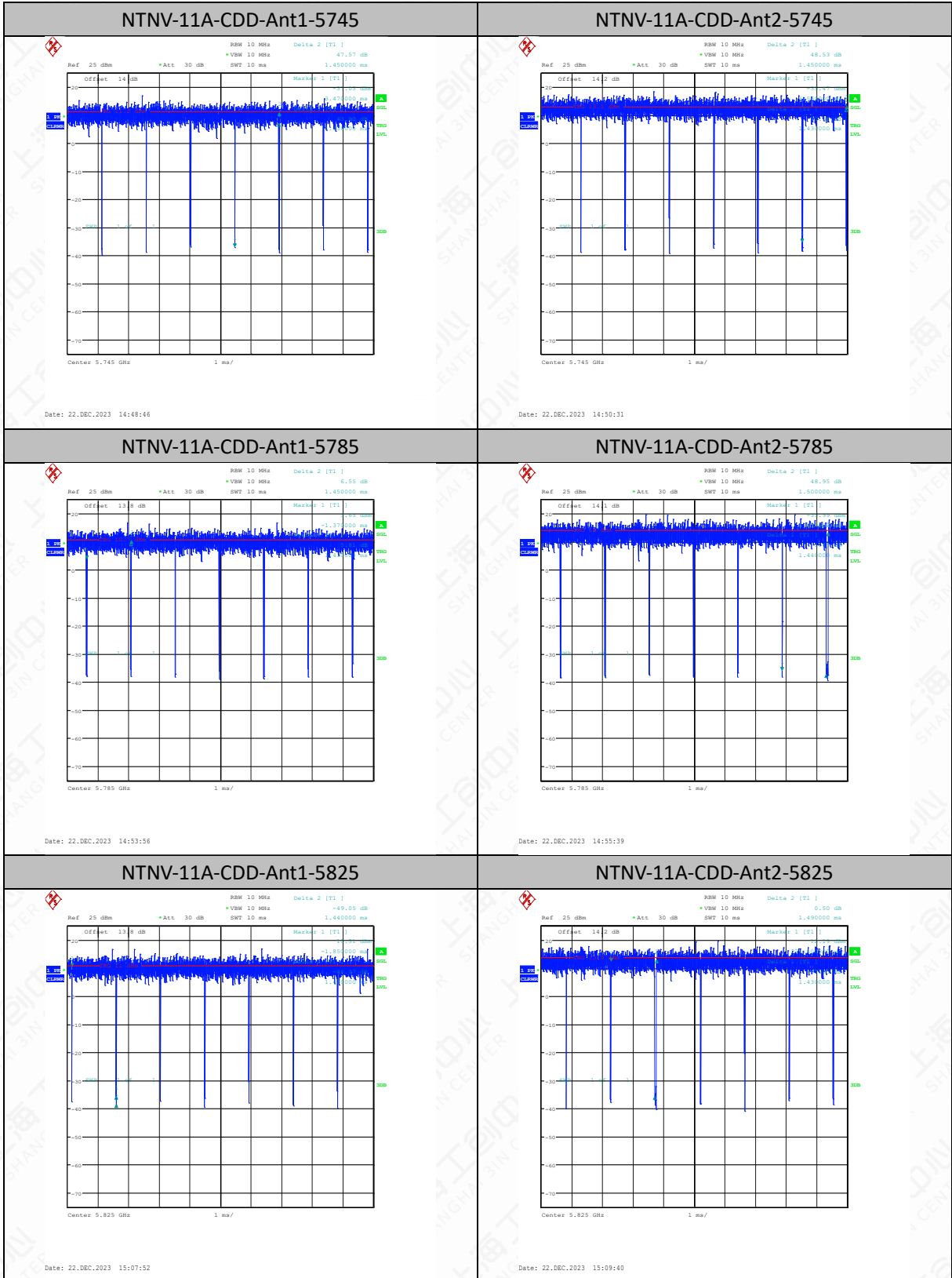
11N20SISO	Ant2	5825	1.34	1.35	99.26
11N20MIMO	Ant1	5745	0.69	0.70	98.57
11N20MIMO	Ant2	5745	0.69	0.70	98.57
11N20MIMO	Ant1	5785	0.69	0.71	97.18
11N20MIMO	Ant2	5785	0.69	0.71	97.18
11N20MIMO	Ant1	5825	0.69	0.71	97.18
11N20MIMO	Ant2	5825	0.69	0.70	98.57
11N40SISO	Ant1	5755	0.66	0.68	97.06
11N40SISO	Ant2	5755	0.67	0.68	98.53
11N40SISO	Ant1	5795	0.66	0.68	97.06
11N40SISO	Ant2	5795	0.66	0.68	97.06
11N40MIMO	Ant1	5755	0.36	0.37	97.30
11N40MIMO	Ant2	5755	0.35	0.37	94.59
11N40MIMO	Ant1	5795	0.36	0.38	94.74
11N40MIMO	Ant2	5795	0.35	0.42	83.33
11AC20SISO	Ant1	5745	1.35	1.37	98.54
11AC20SISO	Ant2	5745	1.35	1.36	99.26
11AC20SISO	Ant1	5785	1.35	1.37	98.54
11AC20SISO	Ant2	5785	1.35	1.36	99.26
11AC20SISO	Ant1	5825	1.34	1.41	95.04
11AC20SISO	Ant2	5825	1.34	1.36	98.53
11AC20MIMO	Ant1	5745	0.70	0.72	97.22
11AC20MIMO	Ant2	5745	0.70	0.76	92.11
11AC20MIMO	Ant1	5785	0.70	0.72	97.22
11AC20MIMO	Ant2	5785	0.70	0.72	97.22
11AC20MIMO	Ant1	5825	0.70	0.71	98.59
11AC20MIMO	Ant2	5825	0.70	0.71	98.59
11AC40SISO	Ant1	5755	0.67	0.69	97.10
11AC40SISO	Ant2	5755	0.68	0.74	91.89
11AC40SISO	Ant1	5795	0.68	0.69	98.55
11AC40SISO	Ant2	5795	0.67	0.73	91.78
11AC40MIMO	Ant1	5755	0.36	0.37	97.30
11AC40MIMO	Ant2	5755	0.35	0.37	94.59
11AC40MIMO	Ant1	5795	0.36	0.38	94.74
11AC40MIMO	Ant2	5795	0.36	0.38	94.74
11AC80SISO	Ant1	5775	0.33	0.34	97.06
11AC80SISO	Ant2	5775	0.33	0.35	94.29
11AC80MIMO	Ant1	5775	0.19	0.21	90.48
11AC80MIMO	Ant2	5775	0.19	0.21	90.48
11AX20SISO	Ant1	5745	1.04	1.06	98.11
11AX20SISO	Ant2	5745	1.04	1.06	98.11
11AX20SISO	Ant1	5785	1.05	1.06	99.06

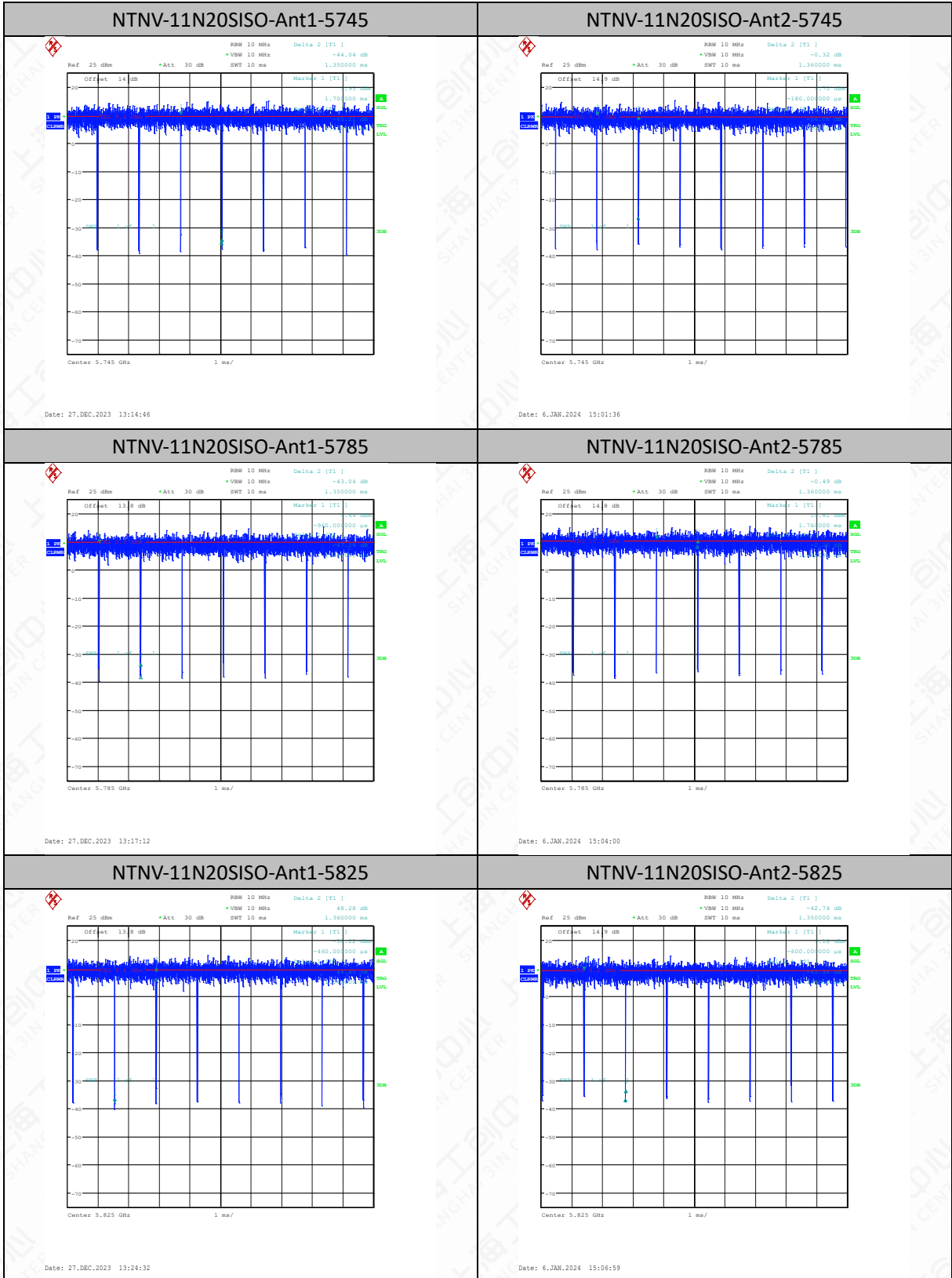
11AX20SISO	Ant2	5785	1.04	1.06	98.11
11AX20SISO	Ant1	5825	1.04	1.06	98.11
11AX20SISO	Ant2	5825	1.04	1.06	98.11
11AX20MIMO	Ant1	5745	0.55	0.61	90.16
11AX20MIMO	Ant2	5745	0.55	0.57	96.49
11AX20MIMO	Ant1	5785	0.56	0.57	98.25
11AX20MIMO	Ant2	5785	0.55	0.57	96.49
11AX20MIMO	Ant1	5825	0.56	0.57	98.25
11AX20MIMO	Ant2	5825	0.56	0.62	90.32
11AX40SISO	Ant1	5755	0.55	0.57	96.49
11AX40SISO	Ant2	5755	0.55	0.62	88.71
11AX40SISO	Ant1	5795	0.55	0.57	96.49
11AX40SISO	Ant2	5795	0.55	0.57	96.49
11AX40MIMO	Ant1	5755	0.31	0.32	96.88
11AX40MIMO	Ant2	5755	0.31	0.32	96.88
11AX40MIMO	Ant1	5795	0.31	0.33	93.94
11AX40MIMO	Ant2	5795	0.30	0.32	93.75
11AX80SISO	Ant1	5775	0.29	0.31	93.55
11AX80SISO	Ant2	5775	0.30	0.31	96.77
11AX80MIMO	Ant1	5775	0.18	0.20	90.00
11AX80MIMO	Ant2	5775	0.18	0.20	90.00

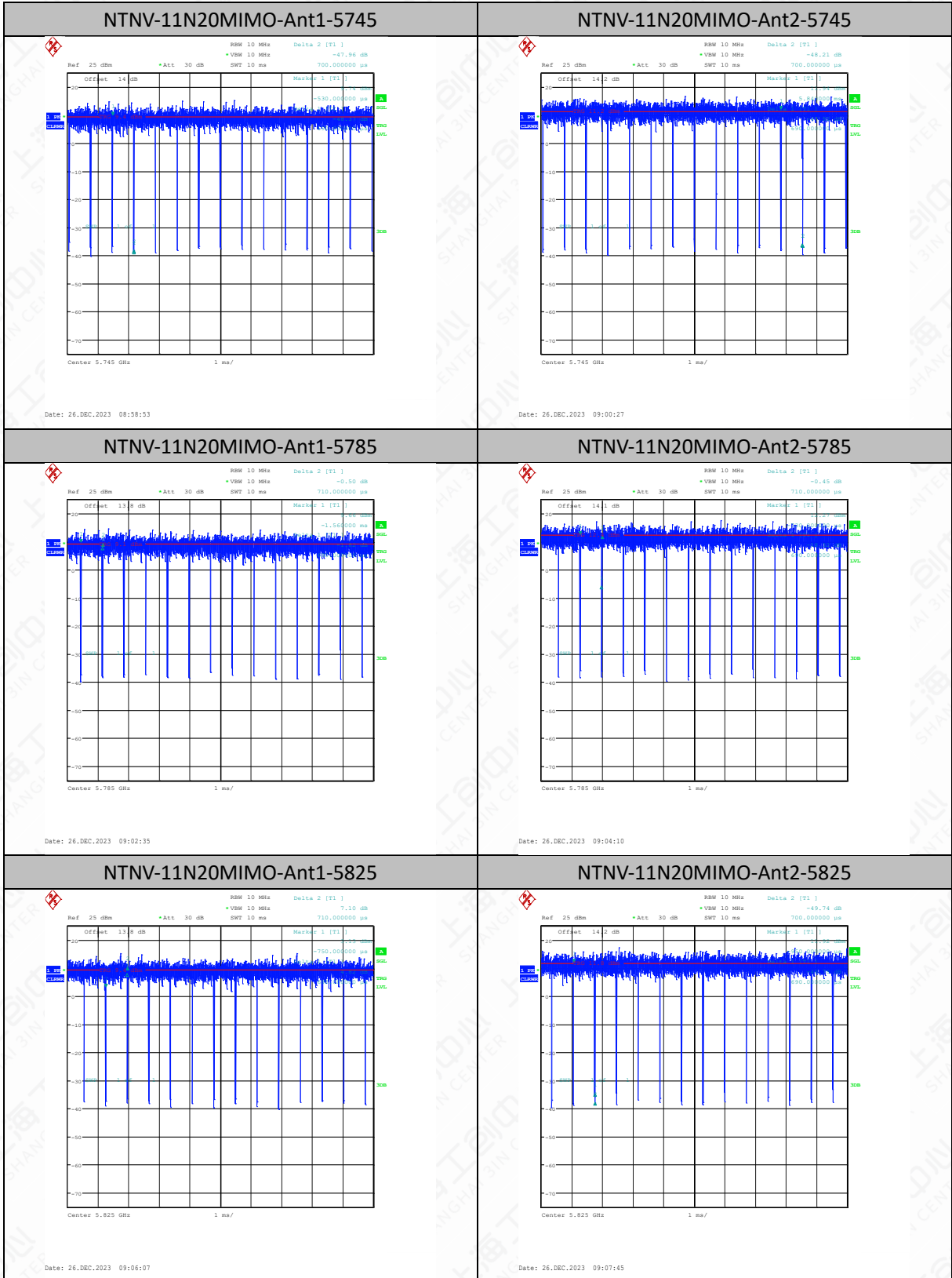
## Test Graphs

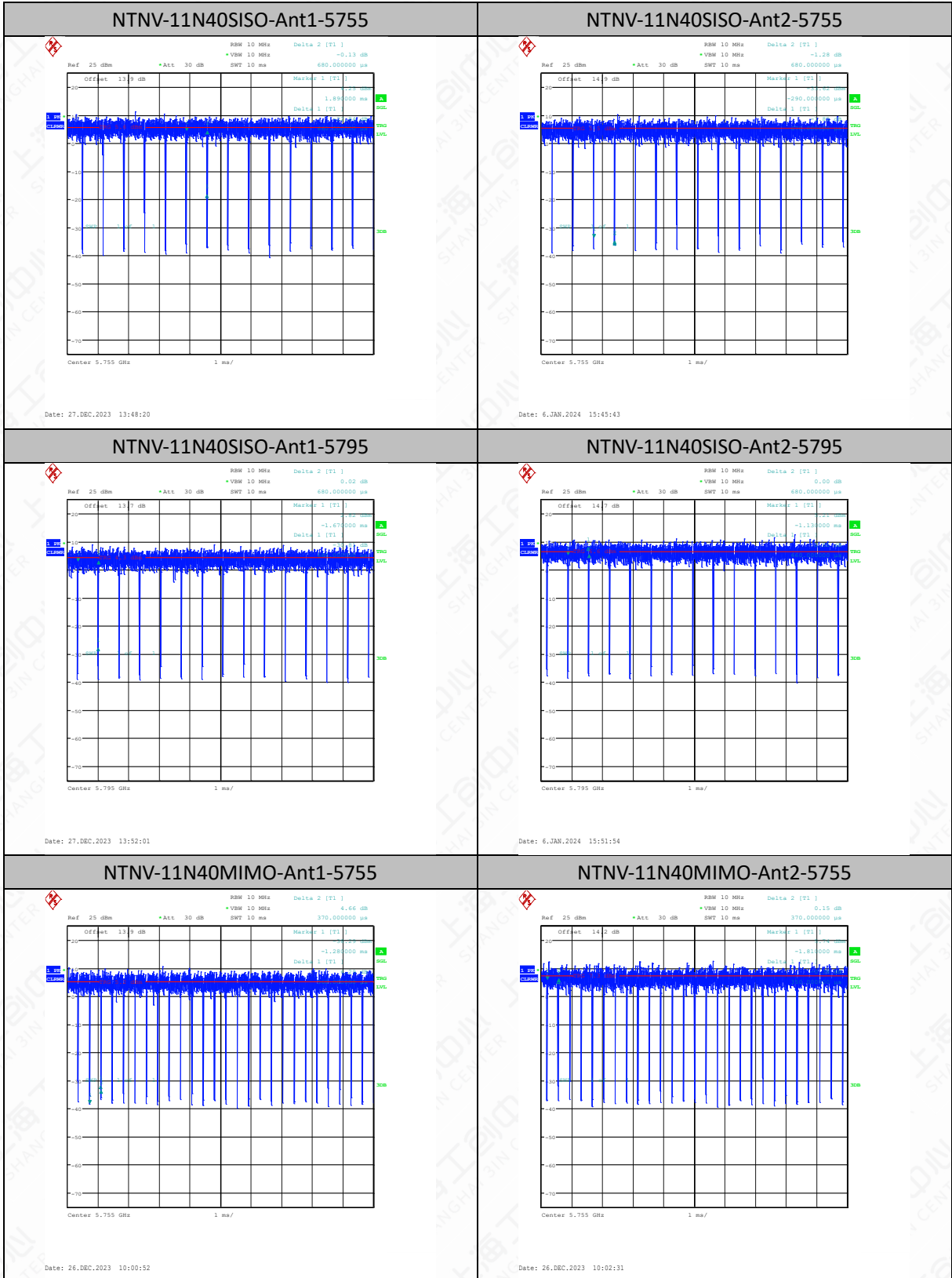


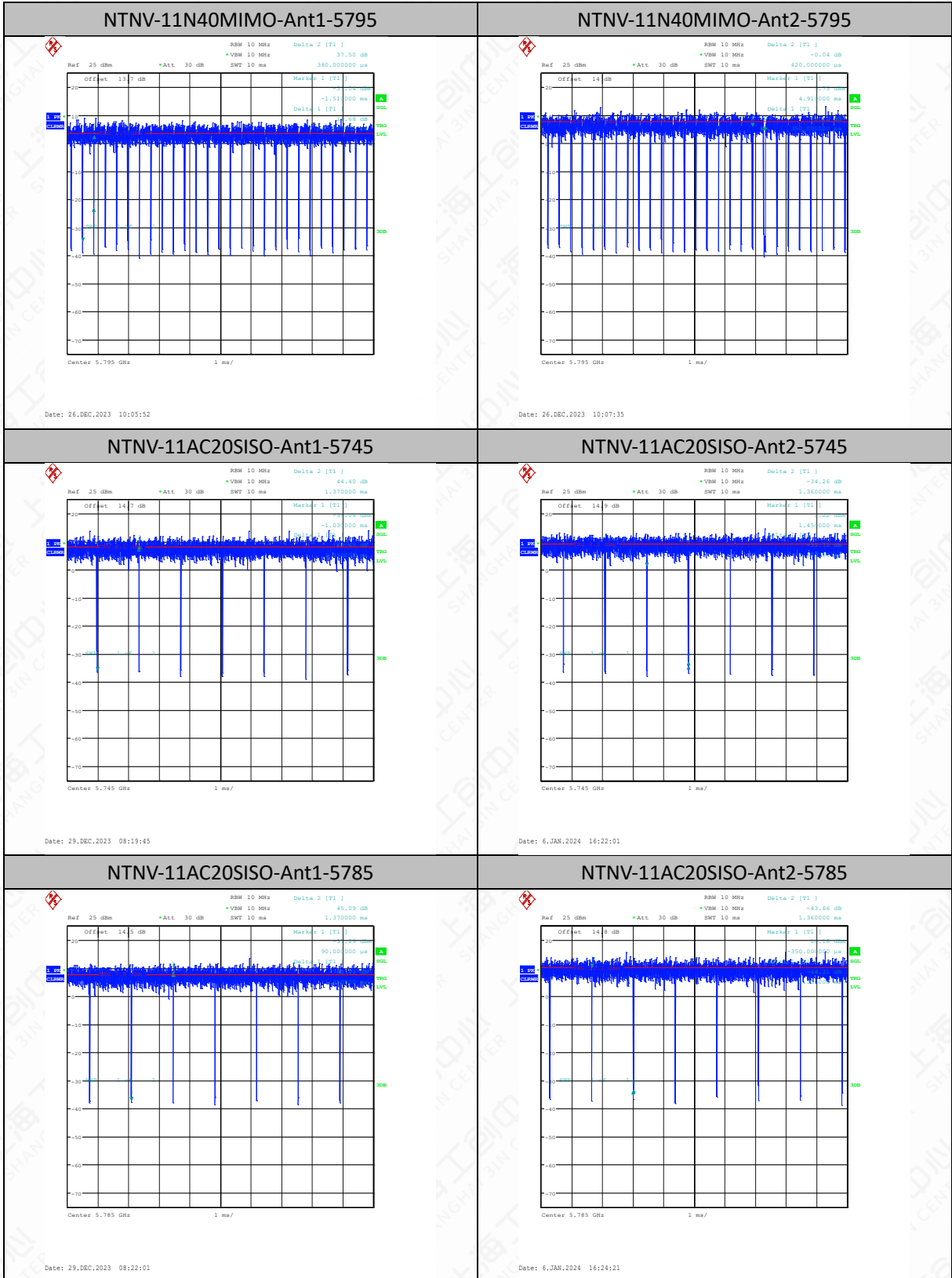


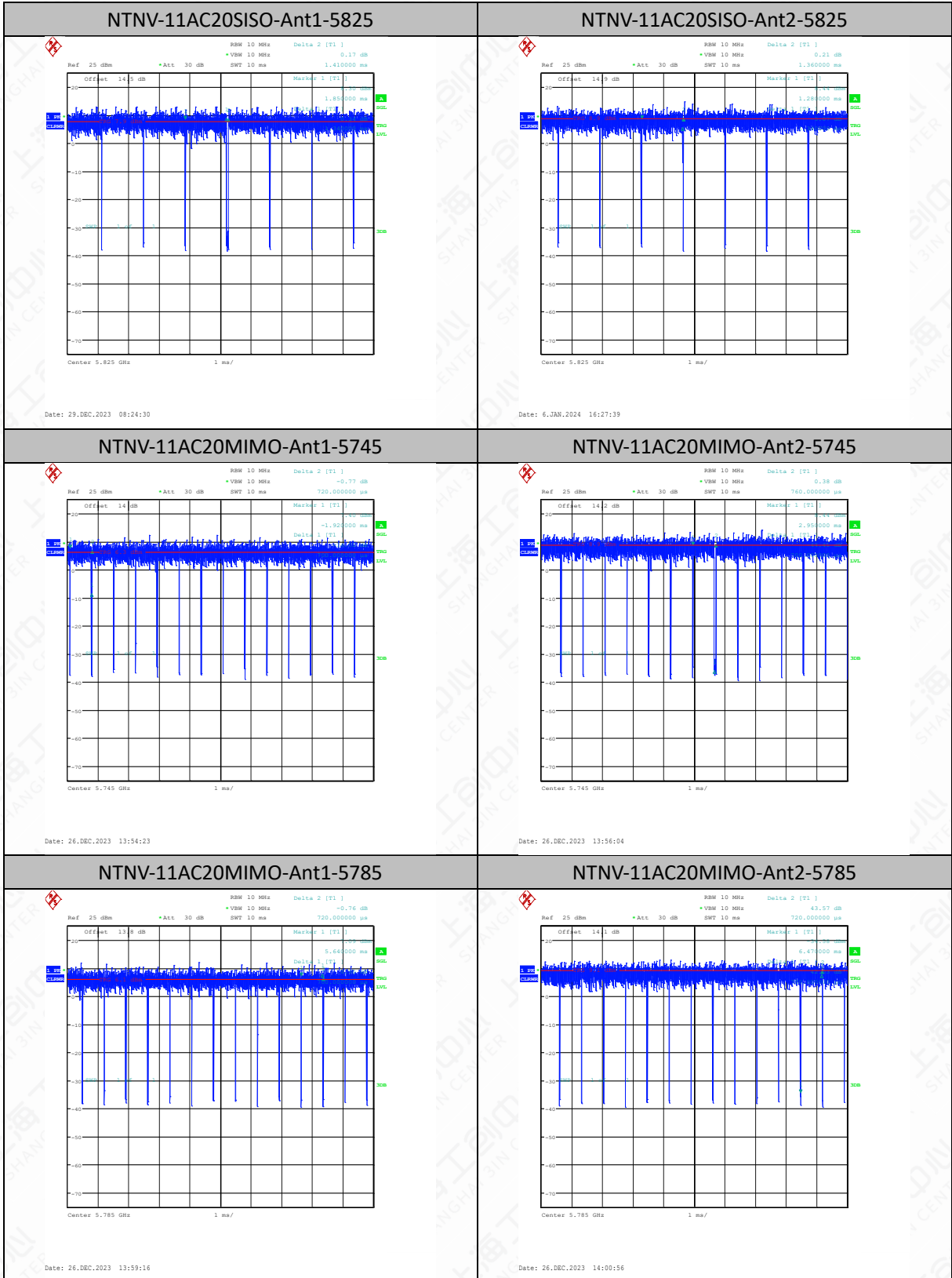


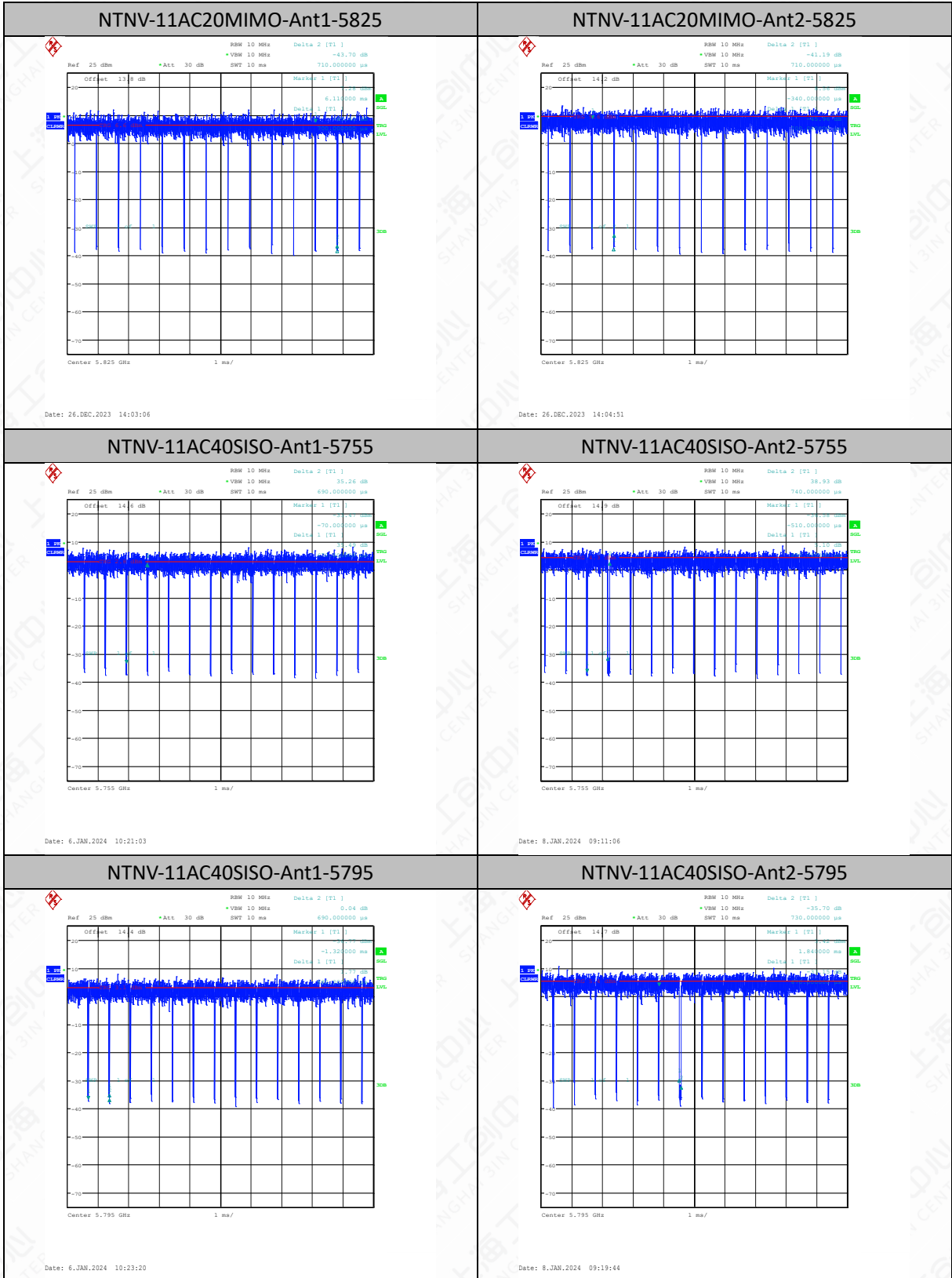


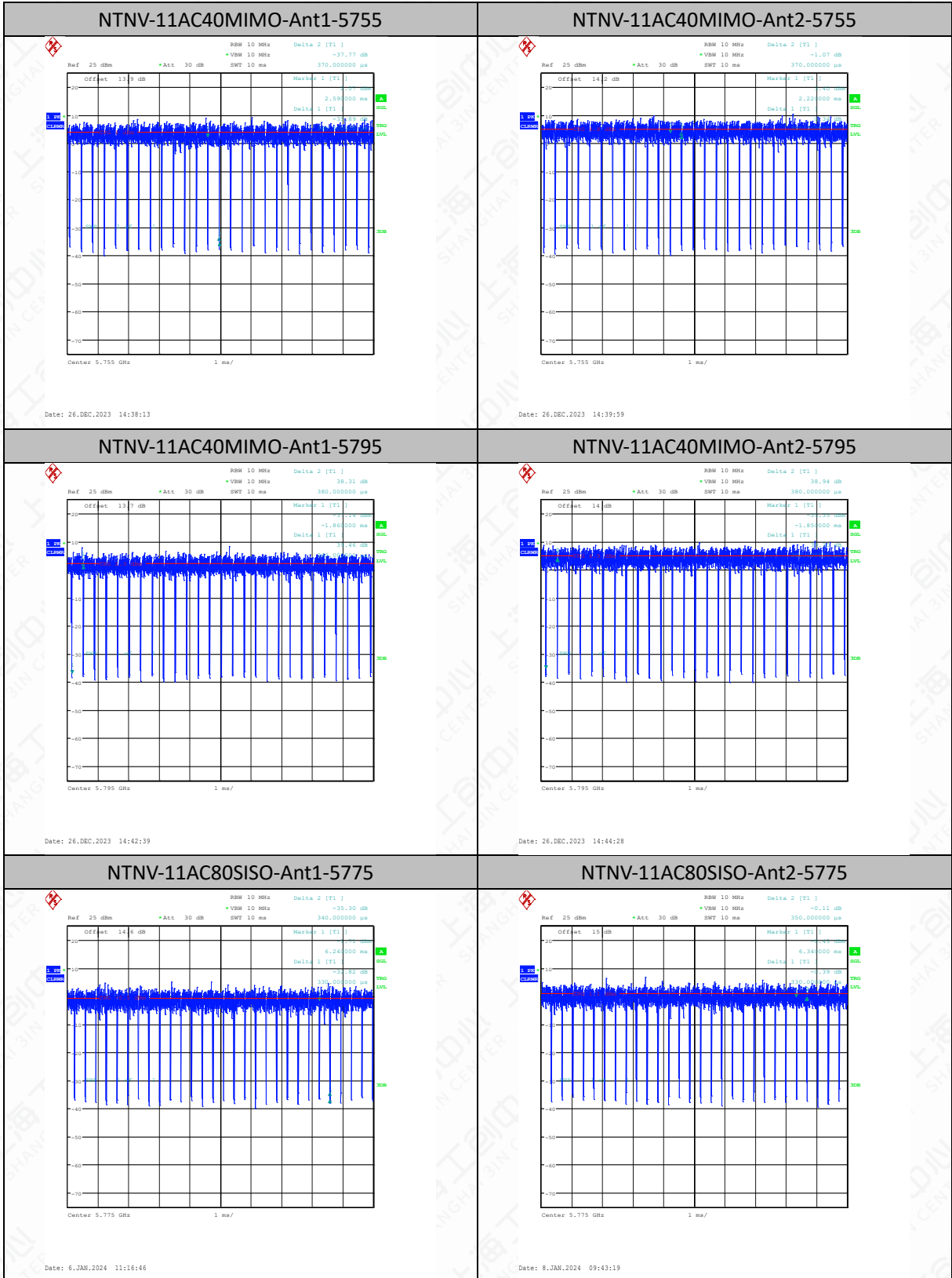




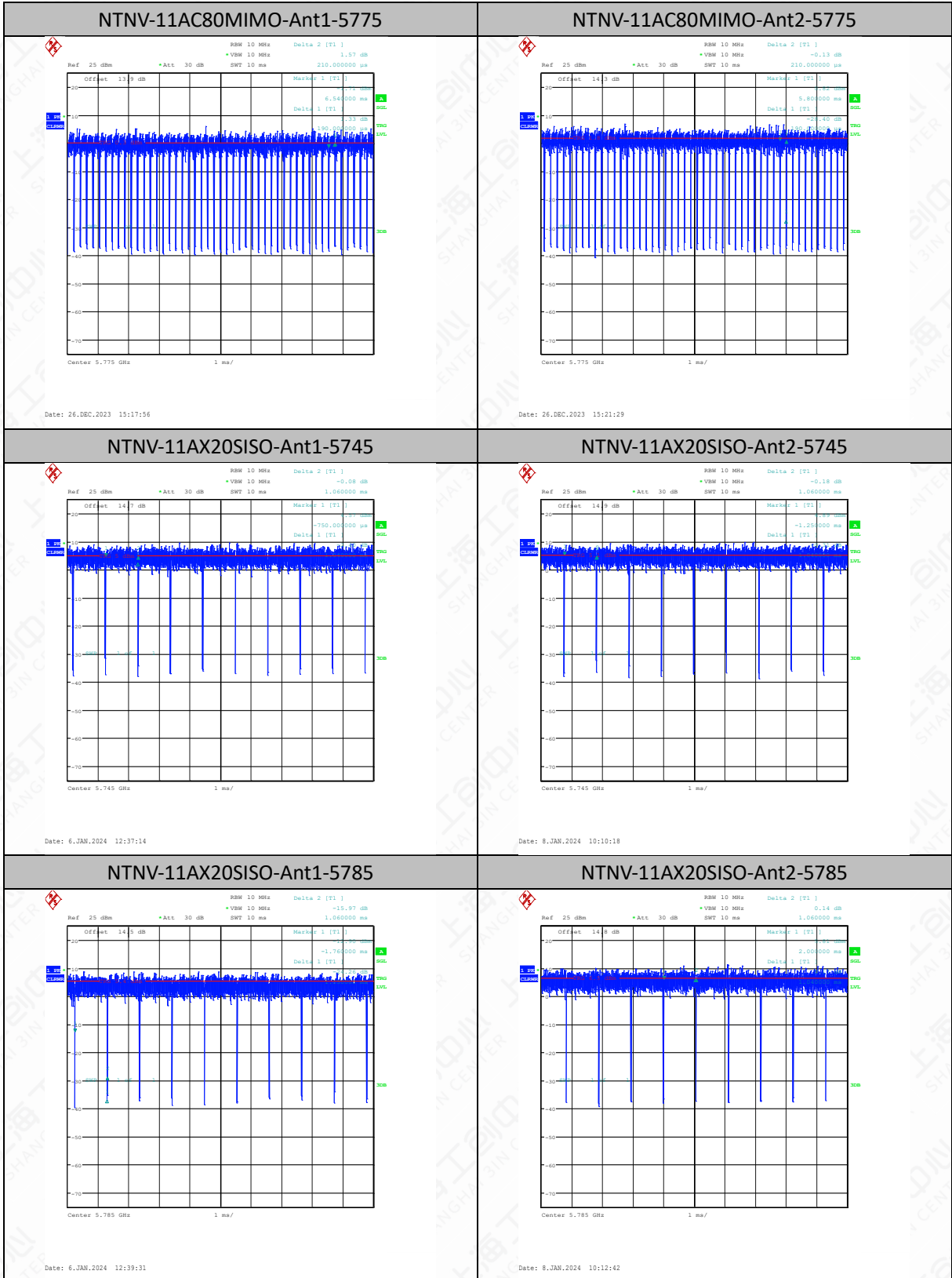


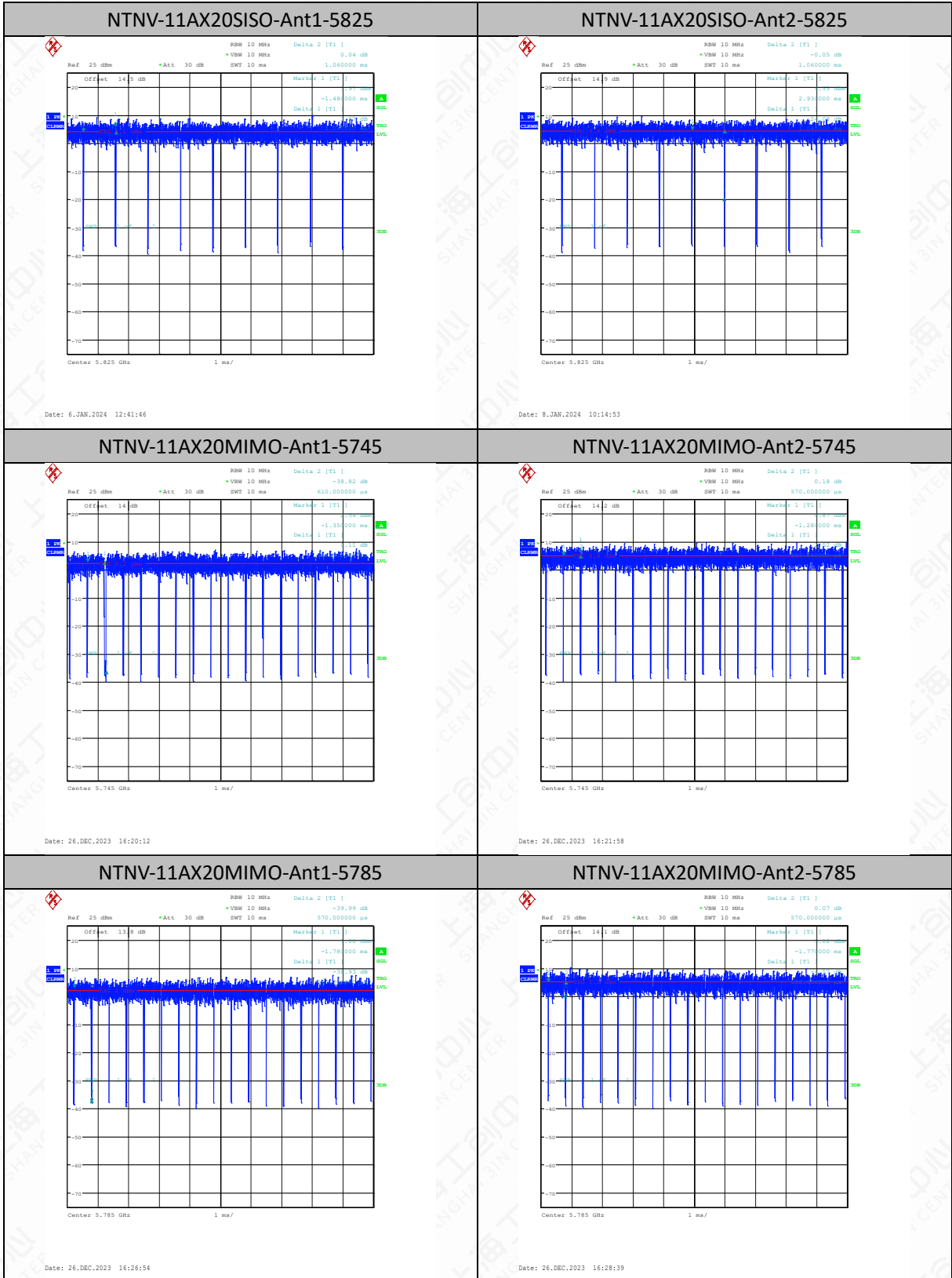


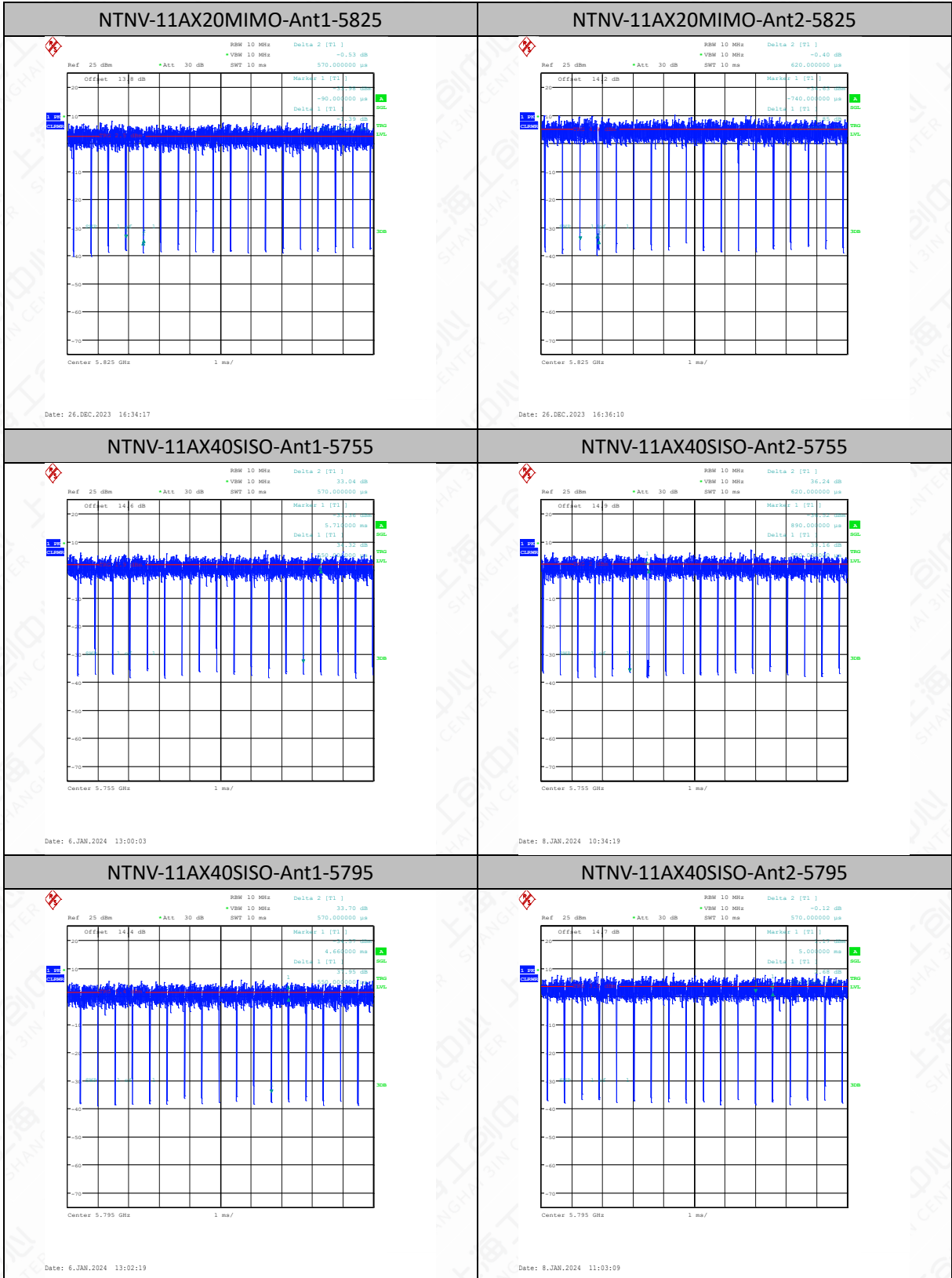


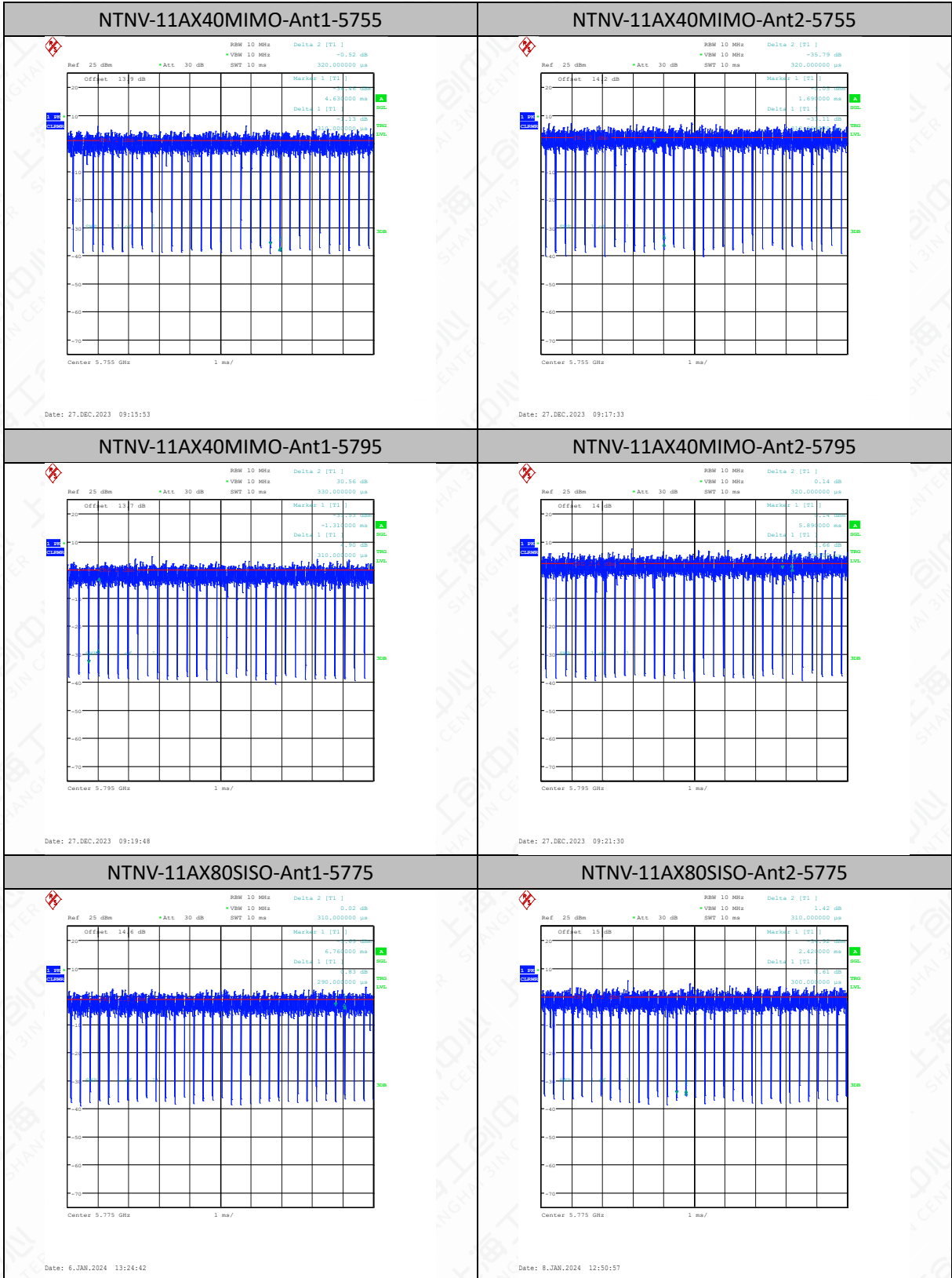


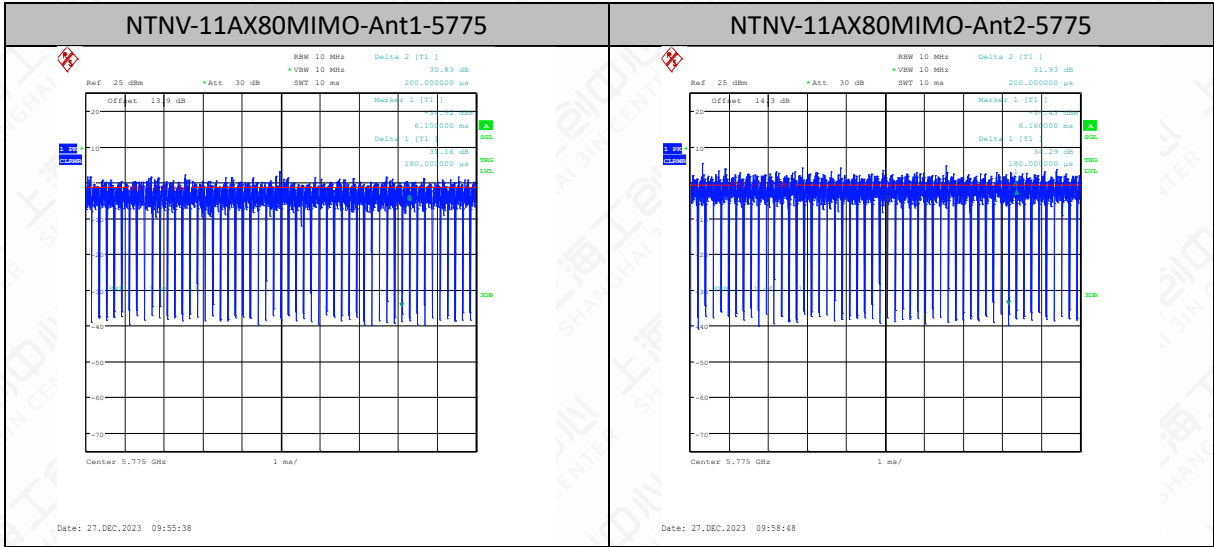












## 6.2 Maximum Average Output Power

### 6.2.1 Measurement Limit and Method

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

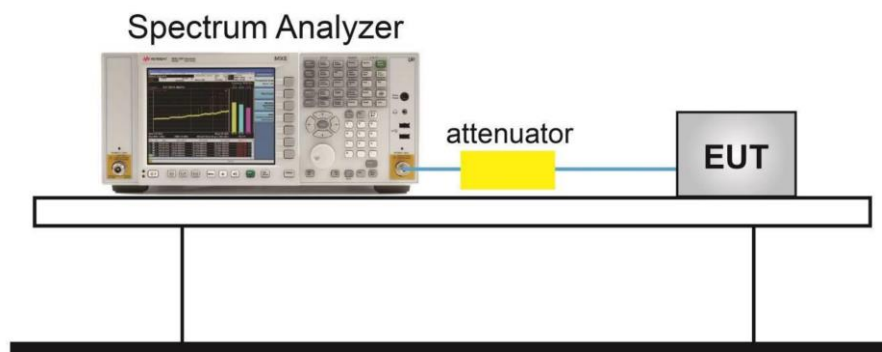
### 6.2.2 Test Procedure

The measurement method SA-2 is made according to KDB 789033 E

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. Measure the duty cycle,  $x$ , of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Set RBW = 1 MHz. (iv) Set VBW  $\geq$  3 MHz.
4. Number of points in sweep  $\geq 2 \times$  span / RBW. (This ensures that bin-to-bin spacing is  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to "free run."
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
9. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
10. Add  $10 \log (1/x)$ , where  $x$  is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add  $10 \log (1/0.25) = 6$  dB if the duty cycle is 25%

### 6.2.3 Test setup



## 6.2.4 Measurement Results

Test Mode	Antenna	Frequency [MHz]	Set Power	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]
11A	Ant1	5745	12	7.80	99.31	0.03	7.83	≤30.00	2.47	10.30
11A	Ant2	5745	12	7.70	98.62	0.06	7.76	≤30.00	2.47	10.23
11A	Ant1	5785	12	7.24	98.62	0.06	7.30	≤30.00	2.47	9.77
11A	Ant2	5785	12	8.52	98.62	0.06	8.58	≤30.00	2.47	11.05
11A	Ant1	5825	12	6.98	99.31	0.03	7.01	≤30.00	2.47	9.48
11A	Ant2	5825	12	7.25	99.31	0.03	7.28	≤30.00	2.47	9.75
11A-CDD	Ant1	5745	12	7.69	98.62	0.06	7.75	≤30.00	2.47	10.22
11A-CDD	Ant2	5745	12	7.72	98.62	0.06	7.78	≤30.00	2.47	10.25
11A-CDD	total	5745	12	---	---	---	10.78	≤30.00	---	13.25
11A-CDD	Ant1	5785	12	7.20	98.62	0.06	7.26	≤30.00	2.47	9.73
11A-CDD	Ant2	5785	12	8.64	96.00	0.18	8.82	≤30.00	2.47	11.29
11A-CDD	total	5785	12	---	---	---	11.12	≤30.00	---	13.59
11A-CDD	Ant1	5825	12	7.05	99.31	0.03	7.08	≤30.00	2.47	9.55
11A-CDD	Ant2	5825	12	7.86	95.97	0.18	8.04	≤30.00	2.47	10.51
11A-CDD	total	5825	12	---	---	---	10.60	≤30.00	---	13.07
11N20SISO	Ant1	5745	12	7.83	99.26	0.03	7.86	≤30.00	2.47	10.33
11N20SISO	Ant2	5745	12	7.68	98.53	0.06	7.74	≤30.00	2.47	10.21
11N20SISO	Ant1	5785	12	7.28	99.26	0.03	7.31	≤30.00	2.47	9.78
11N20SISO	Ant2	5785	12	8.52	98.53	0.06	8.58	≤30.00	2.47	11.05
11N20SISO	Ant1	5825	12	6.95	98.53	0.06	7.01	≤30.00	2.47	9.48
11N20SISO	Ant2	5825	12	7.29	99.26	0.03	7.32	≤30.00	2.47	9.79
11N20MIMO	Ant1	5745	12	7.38	98.57	0.06	7.44	≤30.00	2.47	9.91
11N20MIMO	Ant2	5745	12	7.56	98.57	0.06	7.62	≤30.00	2.47	10.09
11N20MIMO	total	5745	12	---	---	---	10.54	≤30.00	---	13.01
11N20MIMO	Ant1	5785	12	6.93	97.18	0.12	7.05	≤30.00	2.47	9.52
11N20MIMO	Ant2	5785	12	8.48	97.18	0.12	8.60	≤30.00	2.47	11.07
11N20MIMO	total	5785	12	---	---	---	10.90	≤30.00	---	13.37
11N20MIMO	Ant1	5825	12	6.79	97.18	0.12	6.91	≤30.00	2.47	9.38
11N20MIMO	Ant2	5825	12	7.77	98.57	0.06	7.83	≤30.00	2.47	10.30
11N20MIMO	total	5825	12	---	---	---	10.40	≤30.00	---	12.87
11N40SISO	Ant1	5755	11	6.60	97.06	0.13	6.73	≤30.00	2.47	9.20
11N40SISO	Ant2	5755	11	7.02	98.53	0.06	7.08	≤30.00	2.47	9.55
11N40SISO	Ant1	5795	11	6.22	97.06	0.13	6.35	≤30.00	2.47	8.82
11N40SISO	Ant2	5795	11	8.02	97.06	0.13	8.15	≤30.00	2.47	10.62
11N40MIMO	Ant1	5755	11	6.11	97.30	0.12	6.23	≤30.00	2.47	8.70
11N40MIMO	Ant2	5755	11	6.70	94.59	0.24	6.94	≤30.00	2.47	9.41
11N40MIMO	total	5755	11	---	---	---	9.61	≤30.00	---	12.08
11N40MIMO	Ant1	5795	11	5.93	94.74	0.23	6.16	≤30.00	2.47	8.63

11N40MIMO	Ant2	5795	11	7.79	83.33	0.79	8.58	≤30.00	2.47	11.05
11N40MIMO	total	5795	11	---	---	---	10.55	≤30.00	---	13.02
11AC20SISO	Ant1	5745	11	6.79	98.54	0.06	6.85	≤30.00	2.47	9.32
11AC20SISO	Ant2	5745	11	7.27	99.26	0.03	7.30	≤30.00	2.47	9.77
11AC20SISO	Ant1	5785	11	6.35	98.54	0.06	6.41	≤30.00	2.47	8.88
11AC20SISO	Ant2	5785	11	8.14	99.26	0.03	8.17	≤30.00	2.47	10.64
11AC20SISO	Ant1	5825	11	6.11	95.04	0.22	6.33	≤30.00	2.47	8.80
11AC20SISO	Ant2	5825	11	6.73	98.53	0.06	6.79	≤30.00	2.47	9.26
11AC20MIMO	Ant1	5745	11	6.47	97.22	0.12	6.59	≤30.00	2.47	9.06
11AC20MIMO	Ant2	5745	11	7.19	92.11	0.36	7.55	≤30.00	2.47	10.02
11AC20MIMO	total	5745	11	---	---	---	10.11	≤30.00	---	12.58
11AC20MIMO	Ant1	5785	11	5.98	97.22	0.12	6.10	≤30.00	2.47	8.57
11AC20MIMO	Ant2	5785	11	8.06	97.22	0.12	8.18	≤30.00	2.47	10.65
11AC20MIMO	total	5785	11	---	---	---	10.27	≤30.00	---	12.74
11AC20MIMO	Ant1	5825	11	5.76	98.59	0.06	5.82	≤30.00	2.47	8.29
11AC20MIMO	Ant2	5825	11	6.65	98.59	0.06	6.71	≤30.00	2.47	9.18
11AC20MIMO	total	5825	11	---	---	---	9.30	≤30.00	---	11.77
11AC40SISO	Ant1	5755	9	4.58	97.10	0.13	4.71	≤30.00	2.47	7.18
11AC40SISO	Ant2	5755	9	5.36	91.89	0.37	5.73	≤30.00	2.47	8.20
11AC40SISO	Ant1	5795	9	4.29	98.55	0.06	4.35	≤30.00	2.47	6.82
11AC40SISO	Ant2	5795	9	6.19	91.78	0.37	6.56	≤30.00	2.47	9.03
11AC40MIMO	Ant1	5755	9	4.13	97.30	0.12	4.25	≤30.00	2.47	6.72
11AC40MIMO	Ant2	5755	9	4.77	94.59	0.24	5.01	≤30.00	2.47	7.48
11AC40MIMO	total	5755	9	---	---	---	7.66	≤30.00	---	10.13
11AC40MIMO	Ant1	5795	9	3.89	94.74	0.23	4.12	≤30.00	2.47	6.59
11AC40MIMO	Ant2	5795	9	5.85	94.74	0.23	6.08	≤30.00	2.47	8.55
11AC40MIMO	total	5795	9	---	---	---	8.22	≤30.00	---	10.69
11AC80SISO	Ant1	5775	9	4.61	97.06	0.13	4.74	≤30.00	2.47	7.21
11AC80SISO	Ant2	5775	9	5.79	94.29	0.26	6.05	≤30.00	2.47	8.52
11AC80MIMO	Ant1	5775	9	4.09	90.48	0.43	4.52	≤30.00	2.47	6.99
11AC80MIMO	Ant2	5775	9	5.48	90.48	0.43	5.91	≤30.00	2.47	8.38
11AC80MIMO	total	5775	9	---	---	---	8.28	≤30.00	---	10.75
11AX20SISO	Ant1	5745	7	3.10	98.11	0.08	3.18	≤30.00	2.47	5.65
11AX20SISO	Ant2	5745	7	3.50	98.11	0.08	3.58	≤30.00	2.47	6.05
11AX20SISO	Ant1	5785	7	2.56	99.06	0.04	2.60	≤30.00	2.47	5.07
11AX20SISO	Ant2	5785	7	4.34	98.11	0.08	4.42	≤30.00	2.47	6.89
11AX20SISO	Ant1	5825	7	2.64	98.11	0.08	2.72	≤30.00	2.47	5.19
11AX20SISO	Ant2	5825	7	3.00	98.11	0.08	3.08	≤30.00	2.47	5.55
11AX20MIMO	Ant1	5745	7	2.64	90.16	0.45	3.09	≤30.00	2.47	5.56
11AX20MIMO	Ant2	5745	7	3.31	96.49	0.16	3.47	≤30.00	2.47	5.94
11AX20MIMO	total	5745	7	---	---	---	6.29	≤30.00	---	8.76
11AX20MIMO	Ant1	5785	7	2.12	98.25	0.08	2.20	≤30.00	2.47	4.67

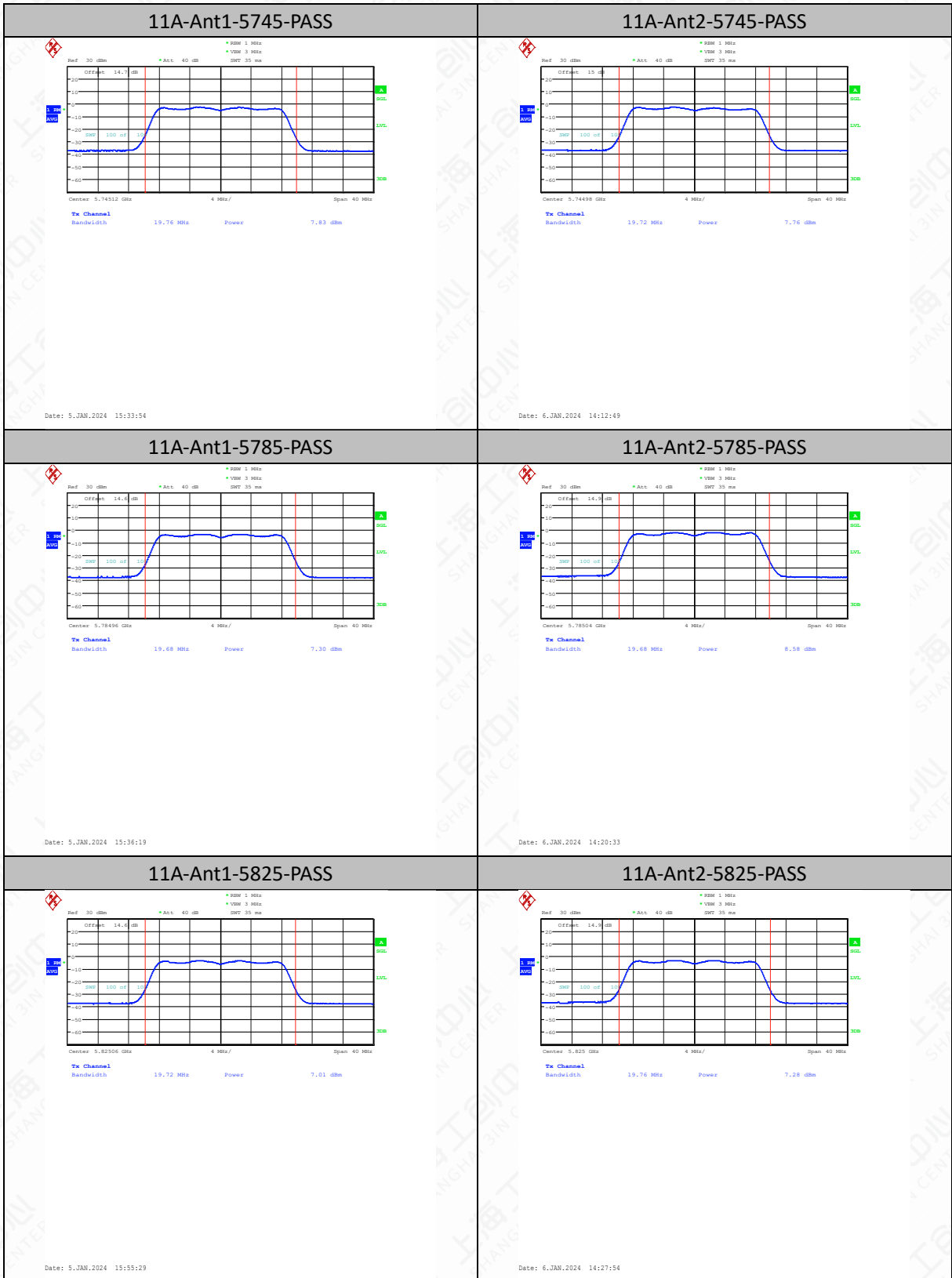


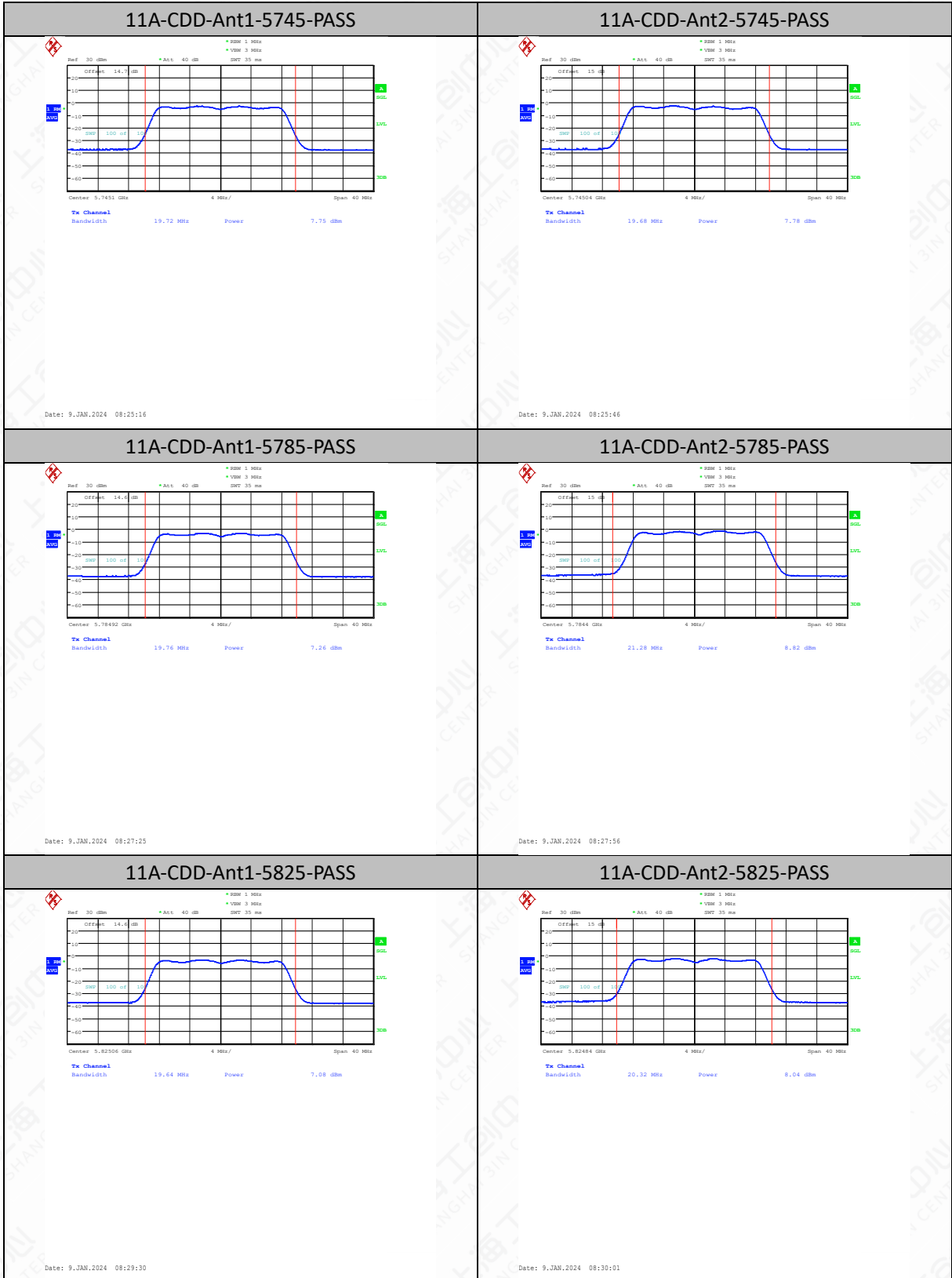
11AX20MIMO	Ant2	5785	7	4.14	96.49	0.16	4.30	≤30.00	2.47	6.77
11AX20MIMO	total	5785	7	---	---	---	6.39	≤30.00	---	8.86
11AX20MIMO	Ant1	5825	7	2.35	98.25	0.08	2.43	≤30.00	2.47	4.90
11AX20MIMO	Ant2	5825	7	2.91	90.32	0.44	3.35	≤30.00	2.47	5.82
11AX20MIMO	total	5825	7	---	---	---	5.92	≤30.00	---	8.39
11AX40SISO	Ant1	5755	7	2.84	96.49	0.16	3.00	≤30.00	2.47	5.47
11AX40SISO	Ant2	5755	7	3.25	88.71	0.52	3.77	≤30.00	2.47	6.24
11AX40SISO	Ant1	5795	7	2.59	96.49	0.16	2.75	≤30.00	2.47	5.22
11AX40SISO	Ant2	5795	7	4.26	96.49	0.16	4.42	≤30.00	2.47	6.89
11AX40MIMO	Ant1	5755	7	2.37	96.88	0.14	2.51	≤30.00	2.47	4.98
11AX40MIMO	Ant2	5755	7	2.99	96.88	0.14	3.13	≤30.00	2.47	5.60
11AX40MIMO	total	5755	7	---	---	---	5.84	≤30.00	---	8.31
11AX40MIMO	Ant1	5795	7	2.19	93.94	0.27	2.46	≤30.00	2.47	4.93
11AX40MIMO	Ant2	5795	7	4.05	93.75	0.28	4.33	≤30.00	2.47	6.80
11AX40MIMO	total	5795	7	---	---	---	6.51	≤30.00	---	8.98
11AX80SISO	Ant1	5775	7	2.86	93.55	0.29	3.15	≤30.00	2.47	5.62
11AX80SISO	Ant2	5775	7	3.95	96.77	0.14	4.09	≤30.00	2.47	6.56
11AX80MIMO	Ant1	5775	7	2.35	90.00	0.46	2.81	≤30.00	2.47	5.28
11AX80MIMO	Ant2	5775	7	3.64	90.00	0.46	4.10	≤30.00	2.47	6.57
11AX80MIMO	total	5775	7	---	---	---	6.51	≤30.00	---	8.98

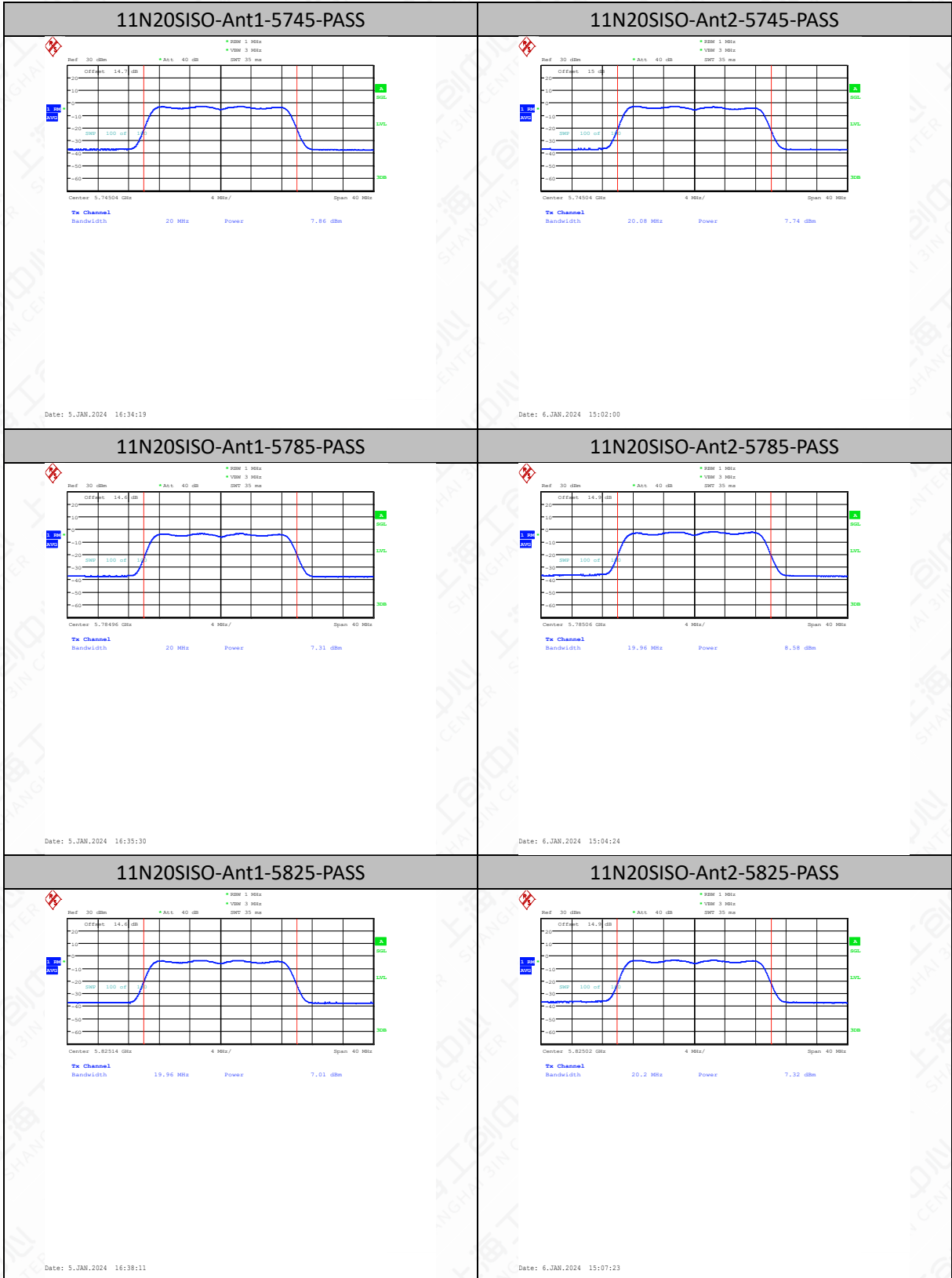
Note:

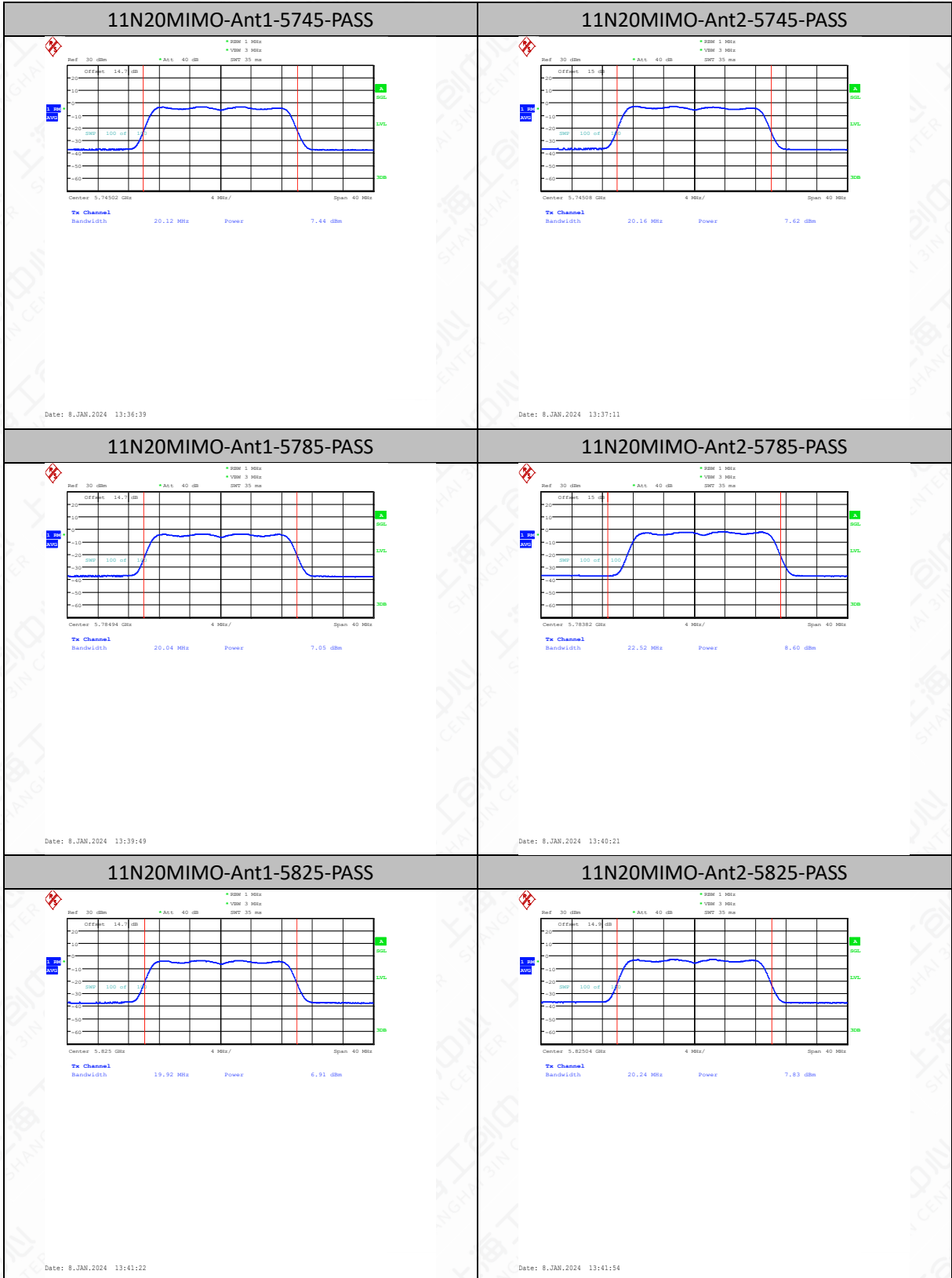
- 1.The Duty Cycle Factor is compensated in the graph.
2. In the graph, the Center frequency = (Low frequency of 26dB OBW + High frequency of 26dB OBW) /2.
- 3.The 11a data rate 6Mbps is selected as worse condition, 11n/11ac data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

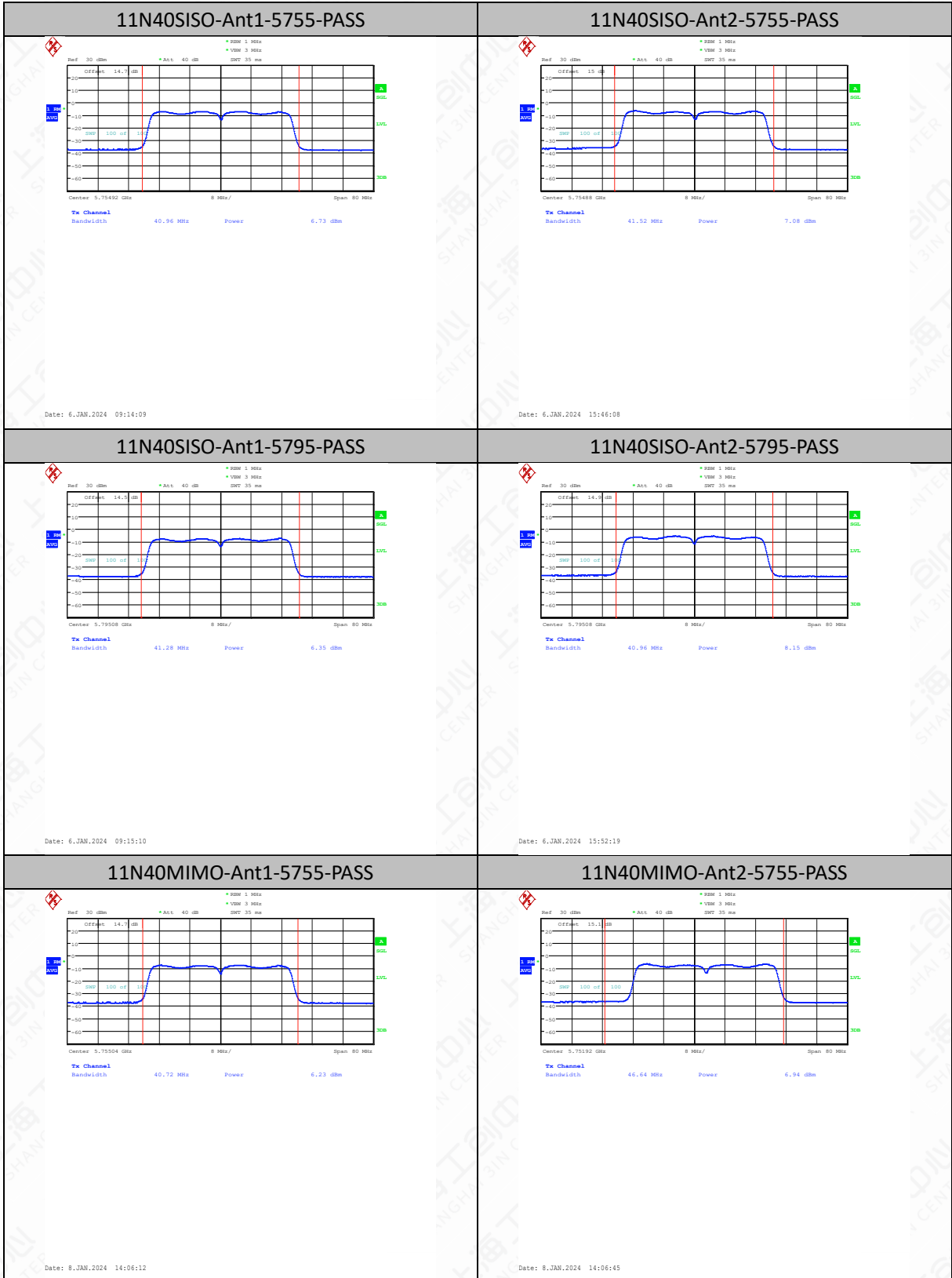
## Test Graphs channel power

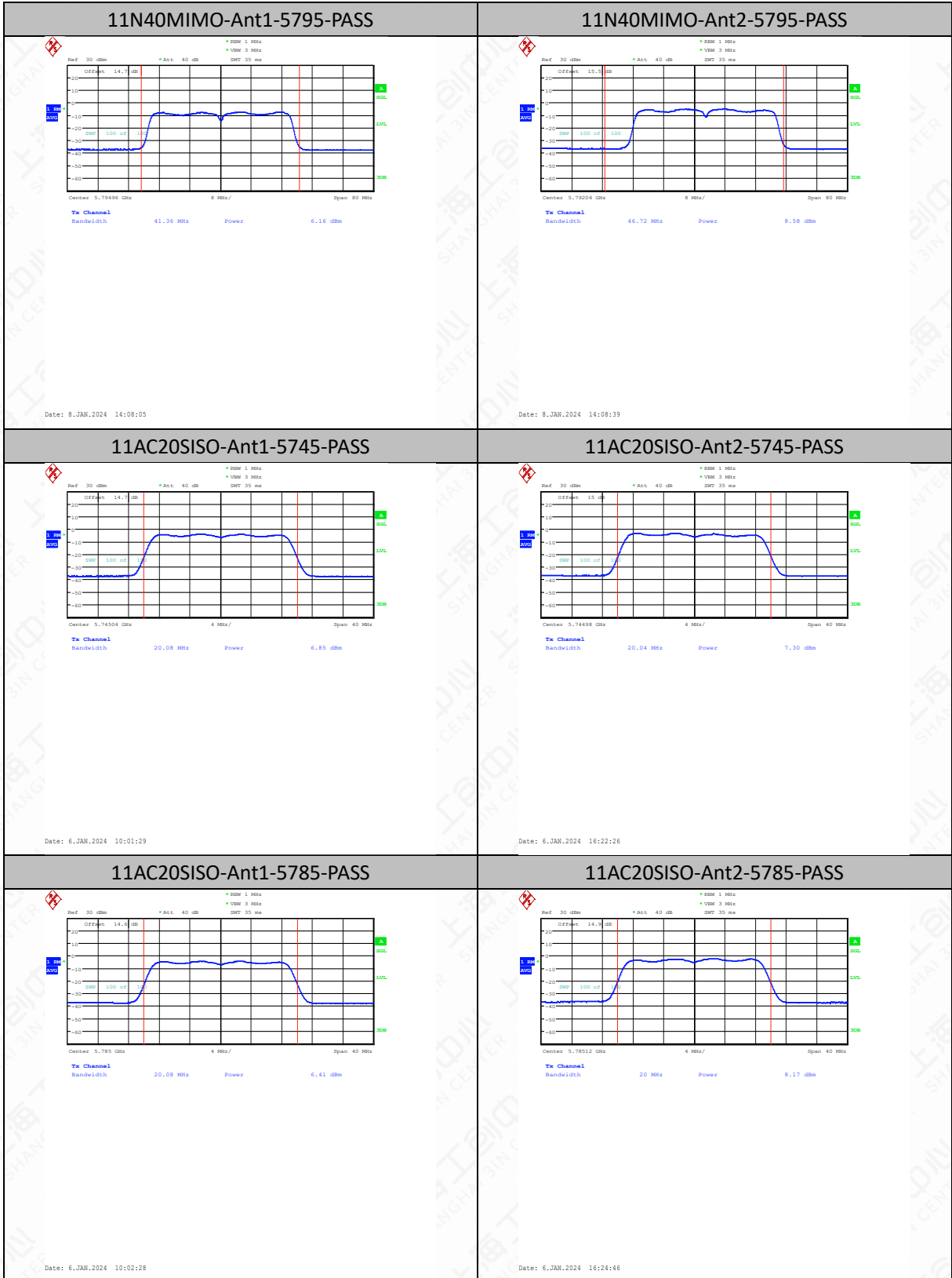


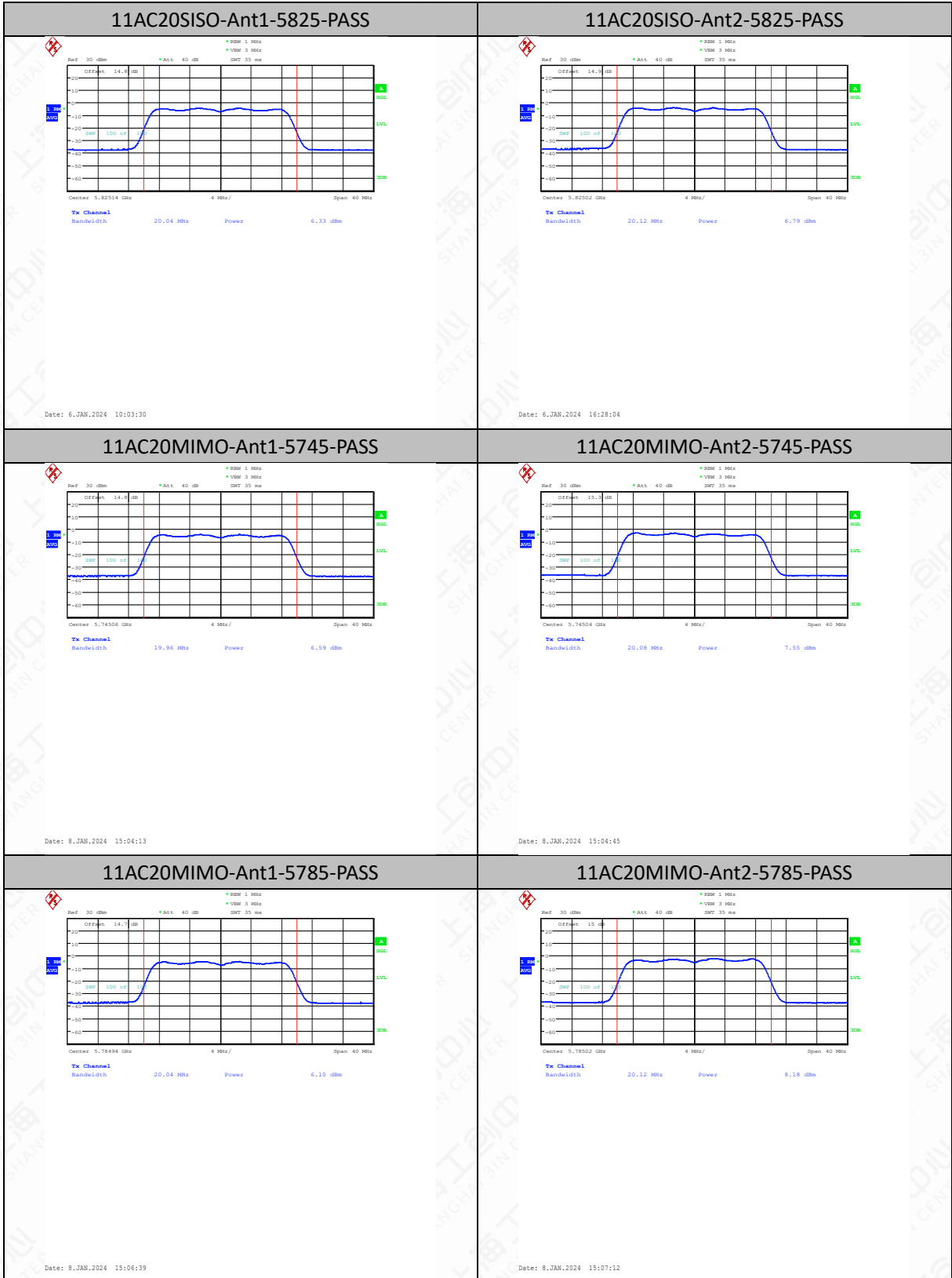




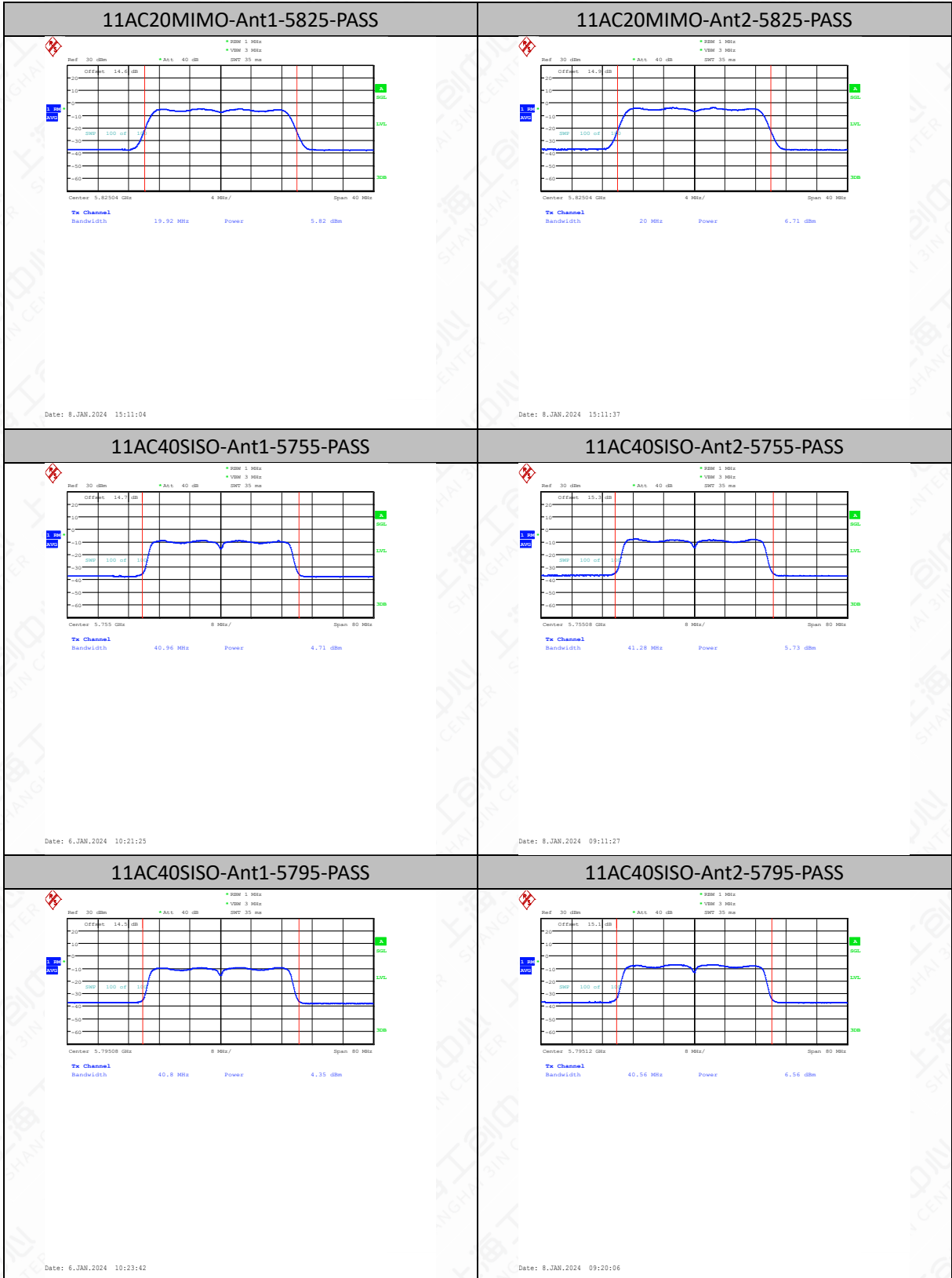


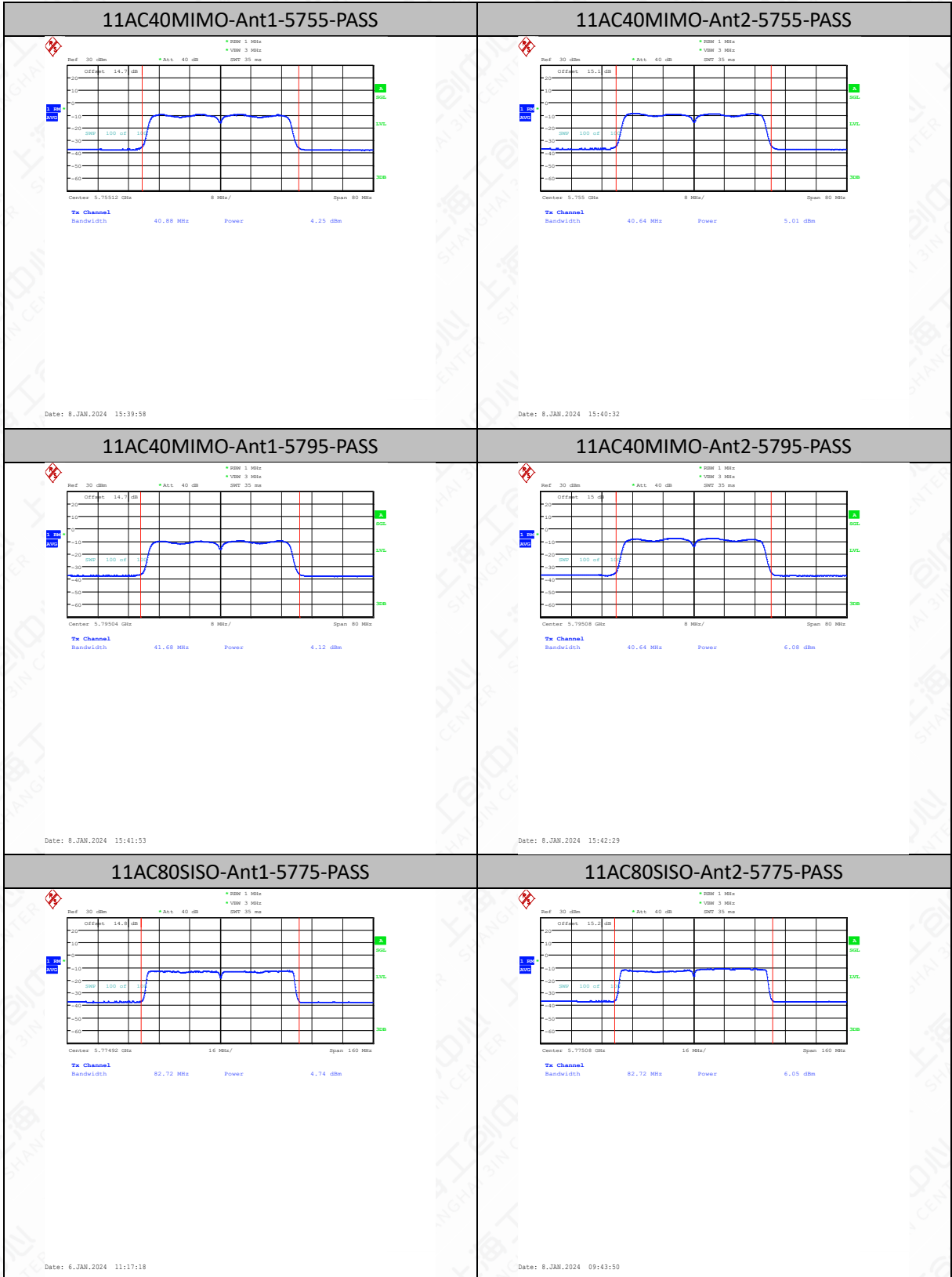


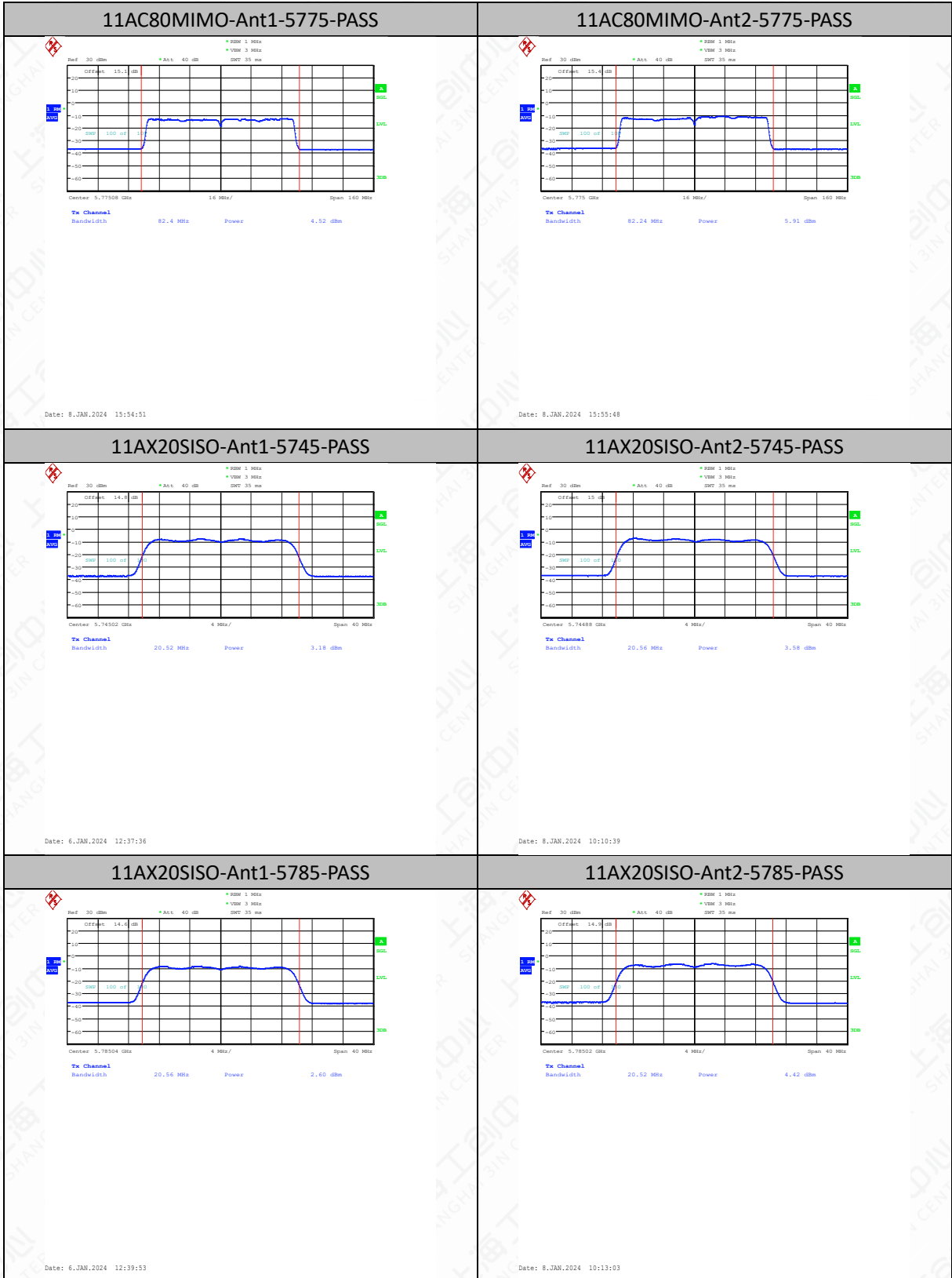


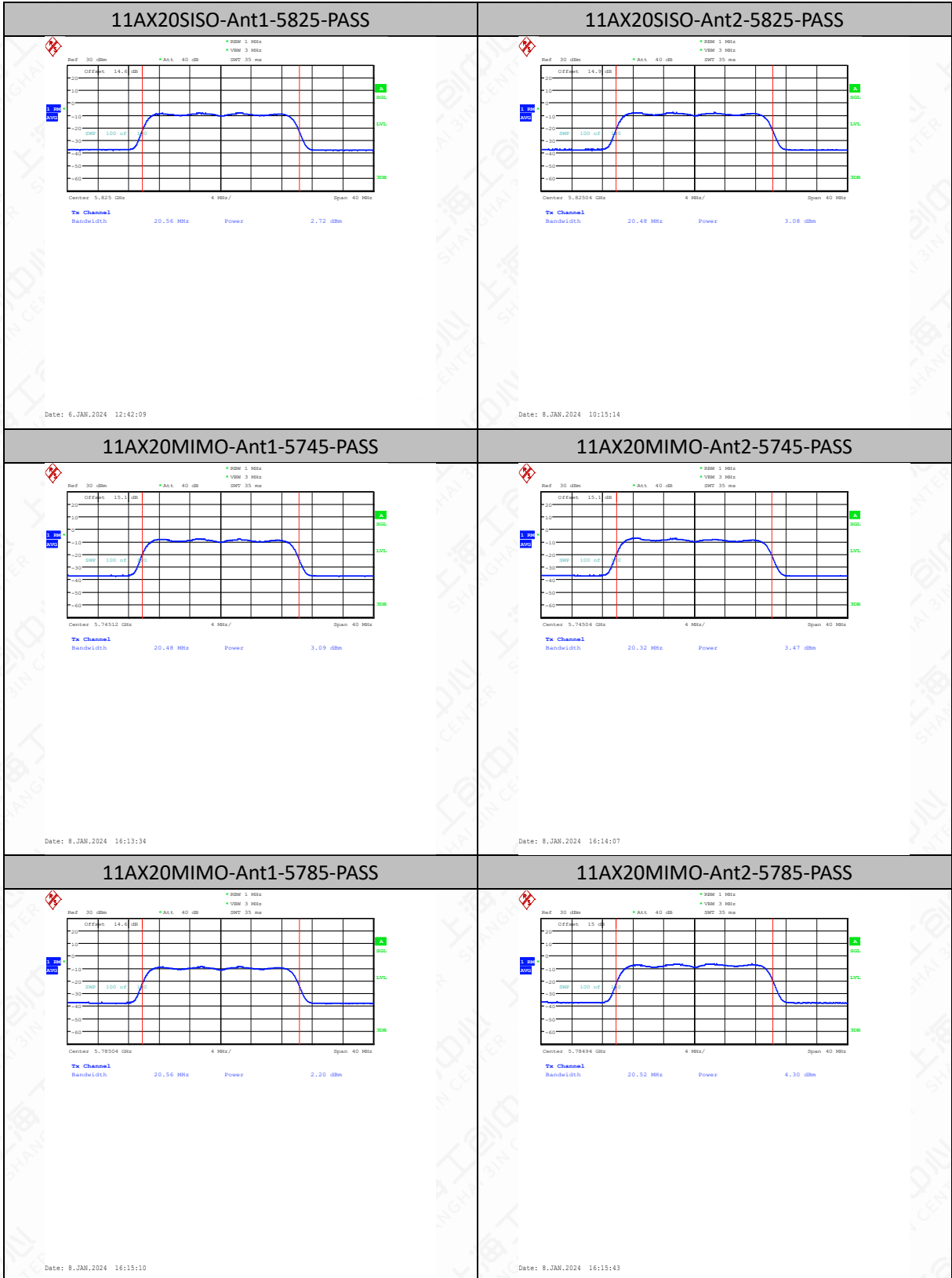


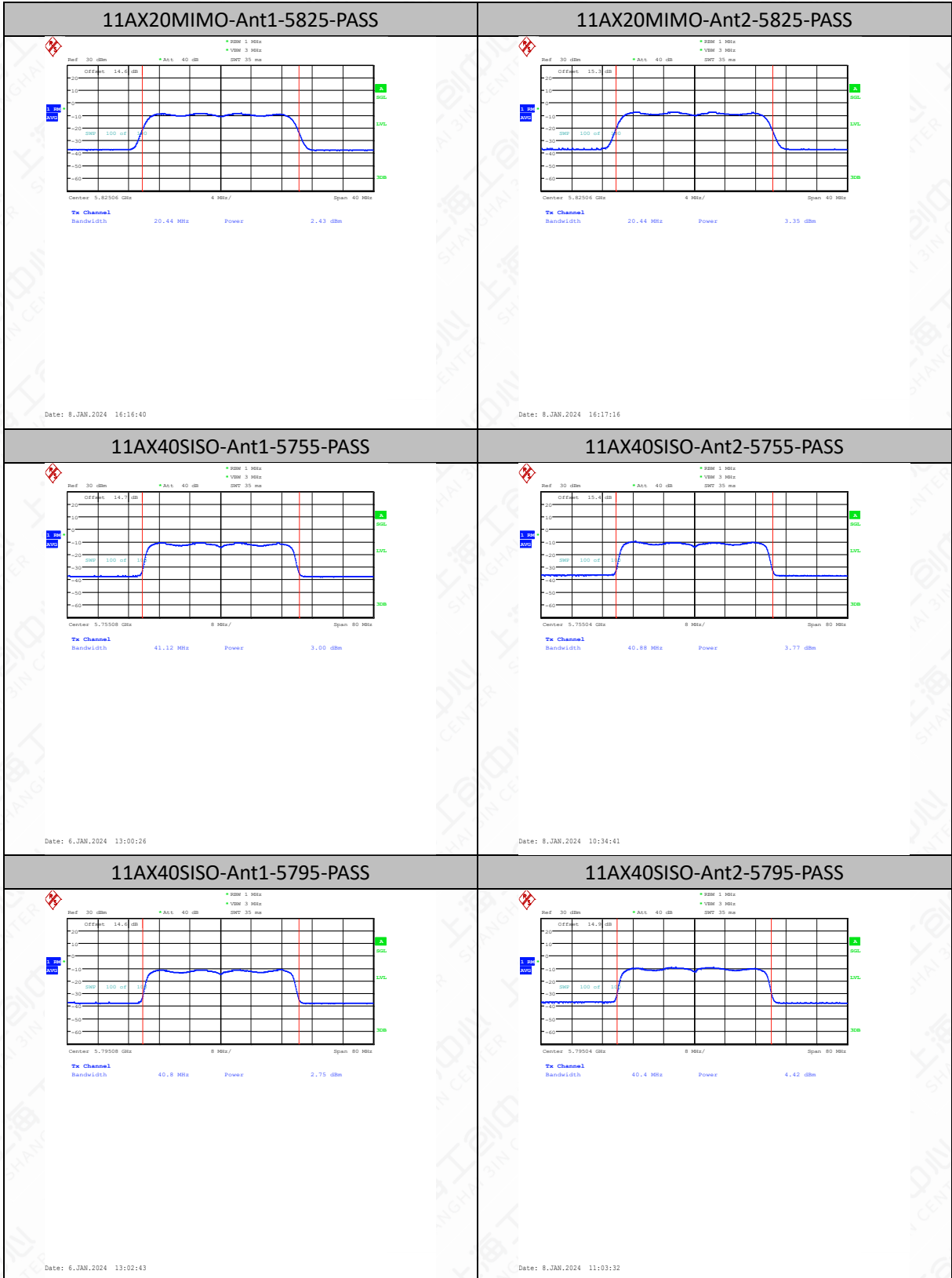


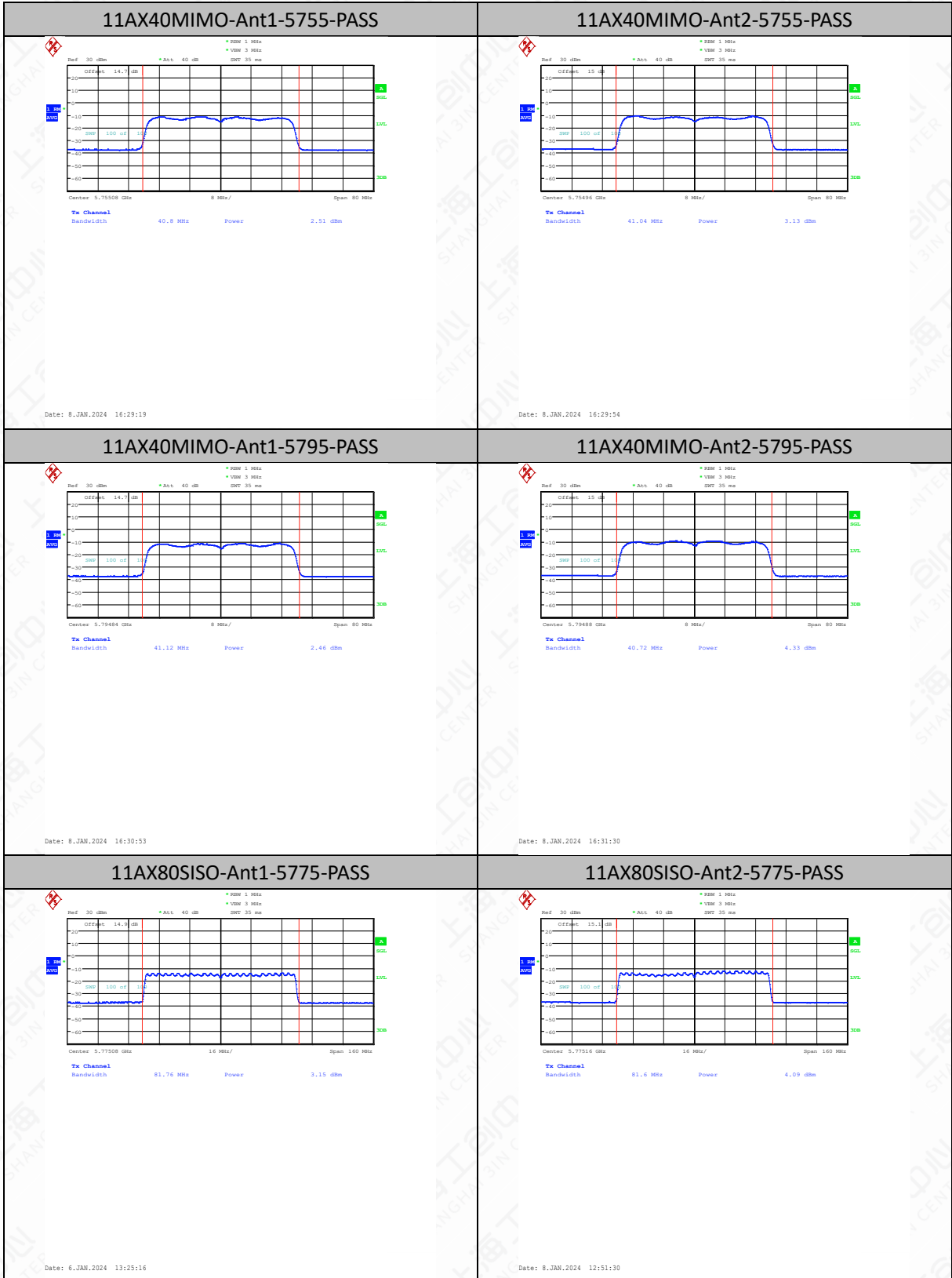


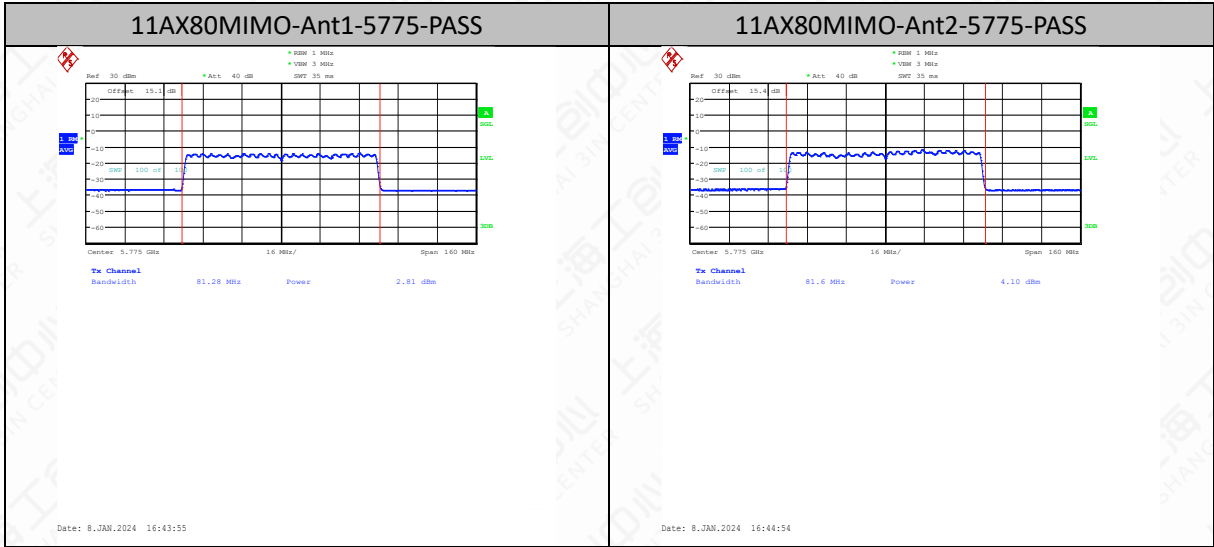












### 6.3 Peak Power Spectral Density

#### 6.2.1 Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz

#### 6.2.2 Test Procedure

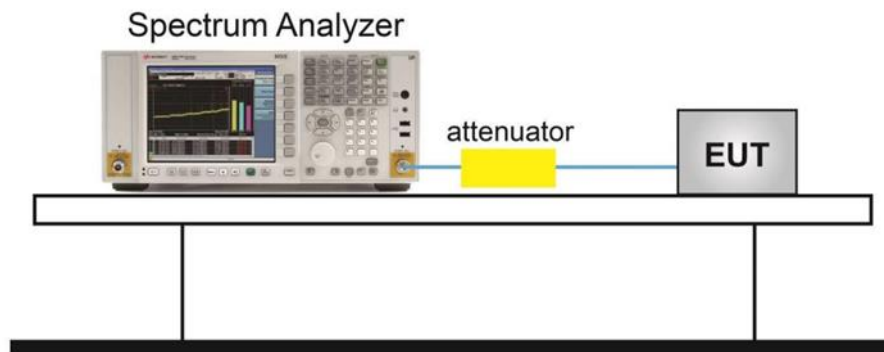
The measurement method is made according to KDB 789033 F

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power..." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
  - a) If Method SA-2 or SA-2 Alternative was used, add  $10 \log(1/x)$ , where  $x$  is the duty cycle, to the peak of the spectrum.
  - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
  - a) Set  $RBW \geq 1/T$ , where  $T$  is defined in II.B.1.a).
  - b) Set  $VBW \geq 3 RBW$ .
  - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log(500 \text{ kHz}/RBW)$  to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
  - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log(1\text{MHz}/RBW)$  to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
  - e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for steps 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.



## 6.2.3 Test setup



## 6.2.4 Measurement Results

TestMode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5745	-5.88	≤30.00	PASS
11A	Ant2	5745	-5.96	≤30.00	PASS
11A	Ant1	5785	-6.58	≤30.00	PASS
11A	Ant2	5785	-5.13	≤30.00	PASS
11A	Ant1	5825	-6.71	≤30.00	PASS
11A	Ant2	5825	-6.45	≤30.00	PASS
11A-CDD	Ant1	5745	-6.04	≤30.00	PASS
11A-CDD	Ant2	5745	-5.78	≤30.00	PASS
11A-CDD	total	5745	-2.90	≤30.00	PASS
11A-CDD	Ant1	5785	-6.66	≤30.00	PASS
11A-CDD	Ant2	5785	-4.81	≤30.00	PASS
11A-CDD	total	5785	-2.63	≤30.00	PASS
11A-CDD	Ant1	5825	-6.46	≤30.00	PASS
11A-CDD	Ant2	5825	-5.44	≤30.00	PASS
11A-CDD	total	5825	-2.91	≤30.00	PASS
11N20SISO	Ant1	5745	-6.24	≤30.00	PASS
11N20SISO	Ant2	5745	-6.19	≤30.00	PASS
11N20SISO	Ant1	5785	-6.80	≤30.00	PASS
11N20SISO	Ant2	5785	-5.39	≤30.00	PASS
11N20SISO	Ant1	5825	-6.96	≤30.00	PASS
11N20SISO	Ant2	5825	-6.64	≤30.00	PASS
11N20MIMO	Ant1	5745	-6.52	≤30.00	PASS
11N20MIMO	Ant2	5745	-6.18	≤30.00	PASS
11N20MIMO	total	5745	-3.34	≤30.00	PASS
11N20MIMO	Ant1	5785	-6.95	≤30.00	PASS
11N20MIMO	Ant2	5785	-5.23	≤30.00	PASS
11N20MIMO	total	5785	-3.00	≤30.00	PASS

11N20MIMO	Ant1	5825	-6.93	≤30.00	PASS
11N20MIMO	Ant2	5825	-6.13	≤30.00	PASS
11N20MIMO	total	5825	-3.50	≤30.00	PASS
11N40SISO	Ant1	5755	-10.17	≤30.00	PASS
11N40SISO	Ant2	5755	-9.74	≤30.00	PASS
11N40SISO	Ant1	5795	-10.49	≤30.00	PASS
11N40SISO	Ant2	5795	-8.68	≤30.00	PASS
11N40MIMO	Ant1	5755	-10.69	≤30.00	PASS
11N40MIMO	Ant2	5755	-9.68	≤30.00	PASS
11N40MIMO	total	5755	-7.15	≤30.00	PASS
11N40MIMO	Ant1	5795	-10.63	≤30.00	PASS
11N40MIMO	Ant2	5795	-8.13	≤30.00	PASS
11N40MIMO	total	5795	-6.19	≤30.00	PASS
11AC20SISO	Ant1	5745	-7.18	≤30.00	PASS
11AC20SISO	Ant2	5745	-6.65	≤30.00	PASS
11AC20SISO	Ant1	5785	-7.72	≤30.00	PASS
11AC20SISO	Ant2	5785	-5.70	≤30.00	PASS
11AC20SISO	Ant1	5825	-7.64	≤30.00	PASS
11AC20SISO	Ant2	5825	-7.15	≤30.00	PASS
11AC20MIMO	Ant1	5745	-7.41	≤30.00	PASS
11AC20MIMO	Ant2	5745	-6.34	≤30.00	PASS
11AC20MIMO	total	5745	-3.83	≤30.00	PASS
11AC20MIMO	Ant1	5785	-7.82	≤30.00	PASS
11AC20MIMO	Ant2	5785	-5.63	≤30.00	PASS
11AC20MIMO	total	5785	-3.58	≤30.00	PASS
11AC20MIMO	Ant1	5825	-8.02	≤30.00	PASS
11AC20MIMO	Ant2	5825	-7.18	≤30.00	PASS
11AC20MIMO	total	5825	-4.57	≤30.00	PASS
11AC40SISO	Ant1	5755	-12.34	≤30.00	PASS
11AC40SISO	Ant2	5755	-11.05	≤30.00	PASS
11AC40SISO	Ant1	5795	-12.64	≤30.00	PASS
11AC40SISO	Ant2	5795	-10.27	≤30.00	PASS
11AC40MIMO	Ant1	5755	-12.74	≤30.00	PASS
11AC40MIMO	Ant2	5755	-11.79	≤30.00	PASS
11AC40MIMO	total	5755	-9.23	≤30.00	PASS
11AC40MIMO	Ant1	5795	-12.75	≤30.00	PASS
11AC40MIMO	Ant2	5795	-10.55	≤30.00	PASS
11AC40MIMO	total	5795	-8.50	≤30.00	PASS
11AC80SISO	Ant1	5775	-15.86	≤30.00	PASS
11AC80SISO	Ant2	5775	-13.96	≤30.00	PASS
11AC80MIMO	Ant1	5775	-15.78	≤30.00	PASS
11AC80MIMO	Ant2	5775	-13.63	≤30.00	PASS

11AC80MIMO	total	5775	-11.56	≤30.00	PASS
11AX20SISO	Ant1	5745	-11.06	≤30.00	PASS
11AX20SISO	Ant2	5745	-10.54	≤30.00	PASS
11AX20SISO	Ant1	5785	-11.67	≤30.00	PASS
11AX20SISO	Ant2	5785	-9.60	≤30.00	PASS
11AX20SISO	Ant1	5825	-11.41	≤30.00	PASS
11AX20SISO	Ant2	5825	-11.09	≤30.00	PASS
11AX20MIMO	Ant1	5745	-11.18	≤30.00	PASS
11AX20MIMO	Ant2	5745	-10.50	≤30.00	PASS
11AX20MIMO	total	5745	-7.82	≤30.00	PASS
11AX20MIMO	Ant1	5785	-12.02	≤30.00	PASS
11AX20MIMO	Ant2	5785	-9.74	≤30.00	PASS
11AX20MIMO	total	5785	-7.72	≤30.00	PASS
11AX20MIMO	Ant1	5825	-11.62	≤30.00	PASS
11AX20MIMO	Ant2	5825	-10.75	≤30.00	PASS
11AX20MIMO	total	5825	-8.15	≤30.00	PASS
11AX40SISO	Ant1	5755	-14.09	≤30.00	PASS
11AX40SISO	Ant2	5755	-13.15	≤30.00	PASS
11AX40SISO	Ant1	5795	-14.34	≤30.00	PASS
11AX40SISO	Ant2	5795	-12.56	≤30.00	PASS
11AX40MIMO	Ant1	5755	-14.51	≤30.00	PASS
11AX40MIMO	Ant2	5755	-13.83	≤30.00	PASS
11AX40MIMO	total	5755	-11.15	≤30.00	PASS
11AX40MIMO	Ant1	5795	-14.44	≤30.00	PASS
11AX40MIMO	Ant2	5795	-12.55	≤30.00	PASS
11AX40MIMO	total	5795	-10.38	≤30.00	PASS
11AX80SISO	Ant1	5775	-16.98	≤30.00	PASS
11AX80SISO	Ant2	5775	-15.28	≤30.00	PASS
11AX80MIMO	Ant1	5775	-17.03	≤30.00	PASS
11AX80MIMO	Ant2	5775	-14.70	≤30.00	PASS
11AX80MIMO	total	5775	-12.70	≤30.00	PASS

Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2.The Duty Cycle Factor is compensated in the graph.

Test graphs as below:

