

3.3.3 TEST PROCEDURES

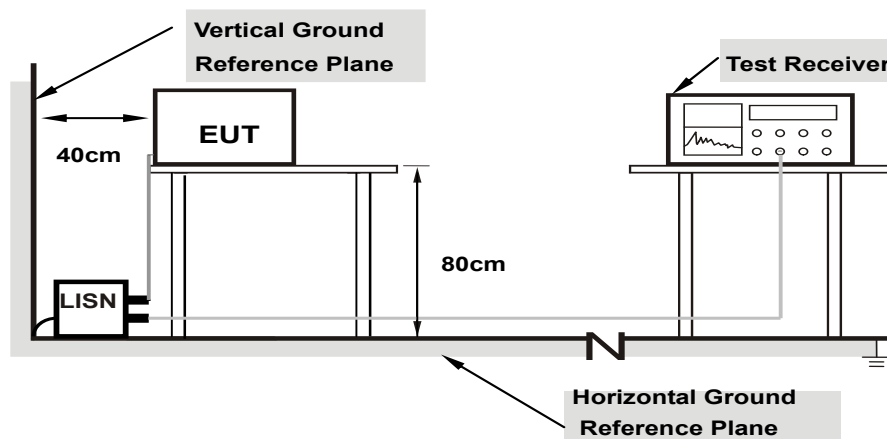
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.3.6 EUT OPERATING CONDITIONS

Same as 3.1.6.

3.3.7 TEST RESULTS

CONDUCTED WORST-CASE DATA										
Frequency Range	150KHz ~ 30MHz					Detector Function & Resolution Bandwidth		Quasi-Peak (QP) / Average (AV), 9 kHz		
Input Power	120Vac, 60Hz					Environmental Conditions		26deg. C, 51%RH		
Tested By	Carl Xie									

Rg	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.164	37.73	65.28	27.55	25.20	55.28	30.08	9.79	L1	9.000
1	0.492	28.09	56.13	28.04	27.19	46.13	18.94	9.75	L1	9.000
1	1.734	13.55	56.00	42.45	8.31	46.00	37.69	9.80	L1	9.000
1	4.178	12.32	56.00	43.68	5.64	46.00	40.36	10.06	L1	9.000
1	10.262	27.32	60.00	32.68	20.59	50.00	29.41	11.05	L1	9.000
1	21.327	35.48	60.00	24.52	27.03	50.00	22.97	13.59	L1	9.000

REMARKS:

- Q.P. and AV. are abbreviations of quasi-peak and average individually.
- "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
- The emission levels of other frequencies were very low against the limit.
- Margin value = Limit value -Emission level
- Correction factor = Insertion loss + Cable loss
- Emission Level = Correction Factor + Reading Value.

Legend:

- AVG Level @Spectrum Overview
- QPK Level @Spectrum Overview
- AVG Limit @FCC Part 15 Voltage Mains Class B
- QPK Limit @FCC Part 15 Voltage Mains Class B
- CAV Level @Final Results
- QPK Level @Final Results



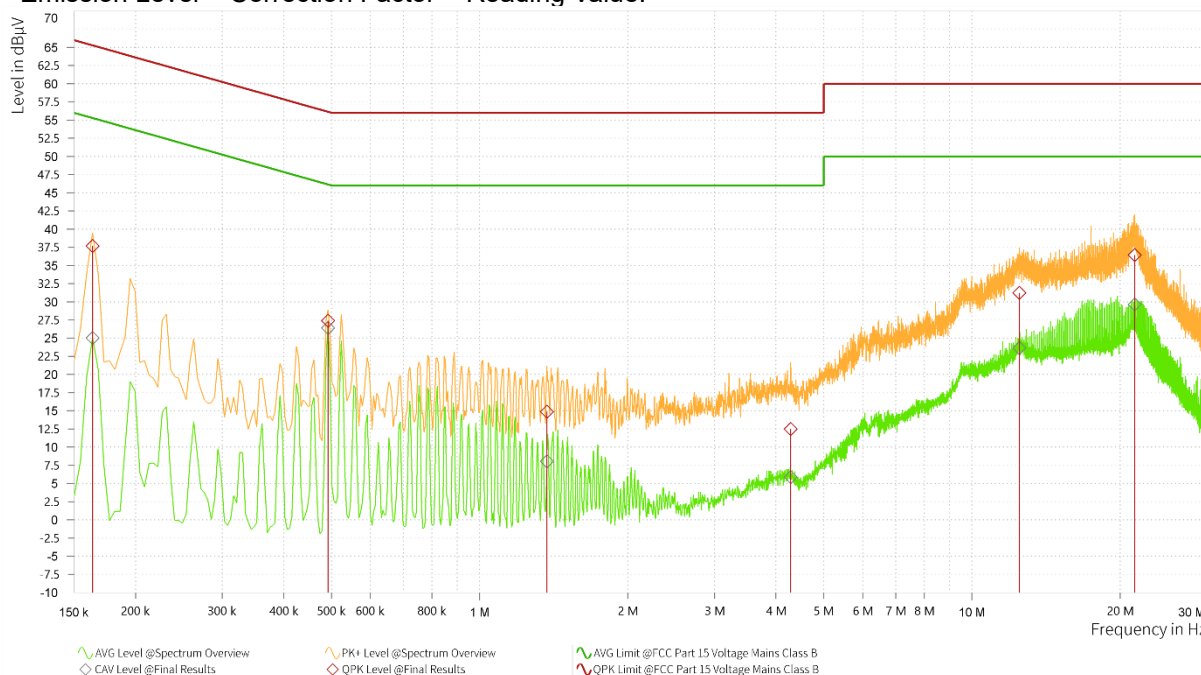
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Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	26deg. C, 51%RH
Tested By	Carl Xie		

Rg	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.164	37.69	65.28	27.59	25.01	55.28	30.27	9.79	N	9.000
1	0.492	27.39	56.13	28.74	26.38	46.13	19.75	9.75	N	9.000
1	1.370	14.87	56.00	41.13	8.06	46.00	37.94	9.79	N	9.000
1	4.286	12.50	56.00	43.50	5.86	46.00	40.14	10.07	N	9.000
1	12.480	31.22	60.00	28.78	23.65	50.00	26.35	11.61	N	9.000
1	21.426	36.43	60.00	23.57	29.62	50.00	20.38	13.60	N	9.000

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value -Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

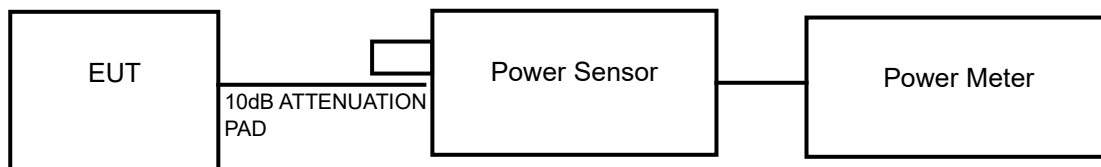


3.4 TRANSMIT POWER MEASUREMENT

3.4.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	EUT Category	Limit
		Max Average Power
U-NII-5 U-NII-6 U-NII-7 U-NII-8	Client Devices (controlled of an indoor AP)	EIRP 24 dBm
U-NII-5 U-NII-7	Client Devices (controlled of a Standard Power AP)	EIRP 30 dBm

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).

3.4.4 TEST PROCEDURE

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.4.7 TEST RESULT

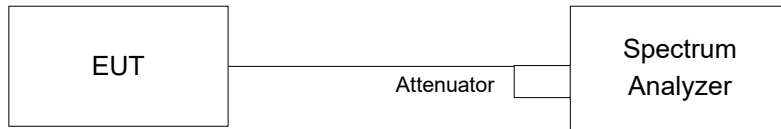
Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).



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3.5 EMISSION BANDWIDTH MEASUREMENT

3.5.1 TEST SETUP



3.5.2 TEST INSTRUMENTS

Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).

3.5.3 TEST PROCEDURE

For 99% Occupied Bandwidth

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

For 26dB Bandwidth

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

3.5.4 TEST RESULT

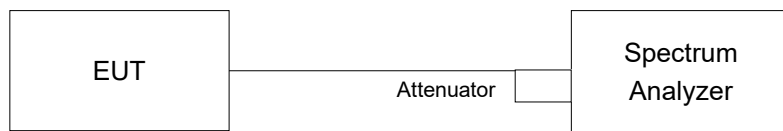
Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).

3.6 MAXIMUM POWER SPECTRAL DENSITY MEASUREMENT

3.6.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category	Limit
		Peak Power Density (EIRP)
U-NII-5 U-NII-6 U-NII-7 U-NII-8	Client Devices (controlled of an indoor AP)	-1 dBm/MHz
U-NII-5 U-NII-7	Client Devices (controlled of a Standard Power AP)	17 dBm/MHz

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).



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3.6.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP level.
- e. Follow ANSI 63.10 and KDB 412172 D01 v01r01, EIRP Value (dBm) = Field Strength Value (dBμV/m) + Correction Factor @ 3m.
- f. Correction Factor (dB) @ 3m = $20\log(D) - 104.7$; where D is the measurement distance @3m=-95.23dB

Note: Spectrum analyzer setting as below:

Method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to "free run" .
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add $10\log(1/\text{duty cycle})$

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITIONS

Same as 3.3.6.

3.6.7 TEST RESULTS

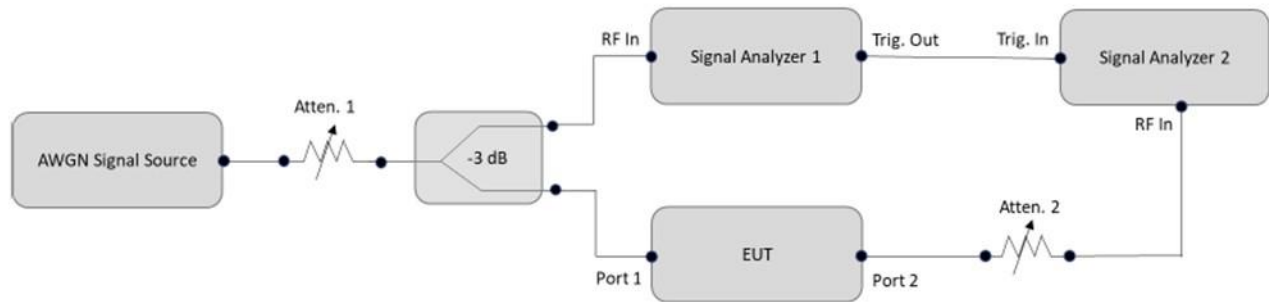
Please Refer to WIFI module(model name: RTL8852CE) test report(NO.: FR1N0223-01, FCC ID:TX2-RTL8852CE).

3.7 CONTENTION BASED PROTOCOL MEASUREMENT

3.7.1 LIMITS OF CONTENTION BASED PROTOCOL MEASUREMENT

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm (The threshold is referenced to a 0 dBi antenna gain.) or lower. Additionally, indoor low-power devices must detect co-channel energy with 90% or greater certainty.

3.7.2 TEST SETUP



3.7.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless communication integrated tester	Rohde&Schwarz	CMW500	166205	2025/6/30	2026/6/29
MXA Signal Analyzer	KEYSIGHT	N9020B	MY60112669	2025/8/27	2026/8/26
WiFi 7GHz Band Extender	Tonscend	TS-WF7U2	806WF7U003305251003	2025/1/17	2026/1/16
WiFi 7GHz Band Extender	Tonscend	TS-WF7U2	806WF7U003305251003	2026/1/16	2027/1/15
RF Control Unit	Tonscend	JS0806-2	806JS2X020201251002	2025/1/17	2026/1/16
RF Control Unit	Tonscend	JS0806-2	806JS2X020201251002	2026/1/16	2027/1/15
PSG Analog Signal Generator	Agilent	E8257D	MY51111397	2025/7/01	2026/6/30
MXG Vector Signal Generator	KEYSIGHT	N5182B	MY61250150	2025/1/15	2026/1/14
MXG Vector Signal Generator	KEYSIGHT	N5182B	MY61250150	2026/1/14	2027/1/13
DC Power Supply	AGILENT	HMP2020	100598	2025/7/01	2026/6/30
10dB attenuator	JFW INDUSTRIES INC	50HF-010-SMA	50HF-010-SMA-1	2025/6/30	2026/6/29
10dB attenuator	JFW INDUSTRIES INC	50HF-010-SMA	50HF-010-SMA-2	2025/6/30	2026/6/29
hygrothermograph	Anymetrers	----	TH101B	2025/7/22	2026/7/21
Temperature Box	zhongkemeiqi	MA22040172	MQ-DTH50F-2	2025/7/01	2026/6/30
power divider	WOKEN	71688	204-003180-01	2025/6/30	2026/6/29

NOTE:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
- The test was performed in RF Oven room.

3.7.4 TEST PROCEDURE

- Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters (set as following section 4.7.5 EUT operating condition).
- Determine number of times detection threshold test as following table,

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Same as EUT transmission
$BW_{Inc} < BW_{EUT} \leq 2x BW_{Inc}$	Once	Contained within BW_{EUT}
$2x BW_{Inc} < BW_{EUT} \leq 4x BW_{Inc}$	Twice. (Incumbent transmission is contained within BW_{EUT})	Closely to the lower edge and upper edge of the EUT Channel
$BW_{EUT} > 4x BW_{Inc}$	Three times	Closely to the lower edge ,in the middle and upper edge of the EUT Channel

- Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use step c table to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT.
- Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- Refer to step c table to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step d, choose a different center frequency for the AWGN signal and repeat the process.

3.7.5 EUT OPERATING CONDITION

Set the EUT to transmit with a constant duty cycle and relative operating parameters which including power level, operating frequency, modulation and bandwidth.

3.7.6 TEST RESULTS

Please Refer to Appendix Of this test report.

3.8 ANTENNA REQUIREMENTS

3.8.1 STANDARD APPLICABLE

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 ANTENNA CONNECTED CONSTRUCTION

An embedded-in antenna design is used.

3.8.3 ANTENNA GAIN

According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain=GANT +Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain= 10 log(NANT/ Nss) dB;

For power measurements on IEEE 802.11 devices,Array Gain = 0 dB for NANT≤ 4;

The EUT supports Cyclic Delay Diversity (CDD) mode,

For power measurements, the directional GANT is set equal to the antenna having the highest gain as following formulas.

Directional Gain = Max.Gain + Array Gain.

For PSD measurements, the directional GANT is calculation is following F)2)f)ii of KDB 662911 D01 v02r01.

The directional gain is calculated as following table.

	Band	Ant 0 (dBi)	Ant 1 (dBi)	DG For Power (dBi)	DG For PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
6GHz	U-NII 5	4.3	4.3	4.3	7.31	0	0
	U-NII 6	4.3	4.3	4.3	7.31	0	0
	U-NII 7	4.3	4.3	4.3	7.31	0	0
	U-NII 8	4.3	4.3	4.3	7.31	0	0

NOTE :DG= directional gain, Power Limit Reduction = DG For Power Gain -6dbi<0

PSD Limit Reduction = DG For PSD – 6dBi<0. Therefore, it is not necessary to reduce maximum peak output power and PSD limit.



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4 PICTURES OF TEST ARRANGEMENTS

Please refer to the attached file (Test Setup Photo).



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5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.



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6 APPENDIX

CONTENTION BASED PROTOCOL TEST RESULT

Test Mode	Antenna	Channel	Interference Frequency [MHz]		Status	Awgn Power [dBm]	Gain [dB]	Path Loss [dB]	Adjusted Power [dBm]	Limit [dBm]	Detection Rate		Verdict
											Result [%]	Limit [%]	
11AX20MIMO	Ant1	5955	Center	5955	OFF	-74	-3.20	0	-70.80	-62	90	90	PASS
11AX20MIMO	Ant1	5955	Center	5955	Minimal	-74.96	-3.20	0	-71.76	-62	30	---	---
11AX20MIMO	Ant1	5955	Center	5955	ON	-90.2	-3.20	0	-87.00	-62	---	---	---
11AX20MIMO	Ant1	6435	Center	6435	OFF	-74.74	-3.20	0	-71.54	-62	100	90	PASS
11AX20MIMO	Ant1	6435	Center	6435	Minimal	-75.76	-3.20	0	-72.56	-62	30	---	---
11AX20MIMO	Ant1	6435	Center	6435	ON	-90.2	-3.20	0	-87.00	-62	---	---	---
11AX20MIMO	Ant1	6535	Center	6535	OFF	-76.77	-3.20	0	-73.57	-62	100	90	PASS
11AX20MIMO	Ant1	6535	Center	6535	Minimal	-77.58	-3.20	0	-74.38	-62	50	---	---
11AX20MIMO	Ant1	6535	Center	6535	ON	-90.2	-3.20	0	-87.00	-62	---	---	---
11AX20MIMO	Ant1	6895	Center	6895	OFF	-75.38	-3.20	0	-72.18	-62	100	90	PASS
11AX20MIMO	Ant1	6895	Center	6895	Minimal	-76.34	-3.20	0	-73.14	-62	10	---	---
11AX20MIMO	Ant1	6895	Center	6895	ON	-90.2	-3.20	0	-87.00	-62	---	---	---

Note: Adjusted Power= Injected AWGN Power - Antenna Gain + Path Loss

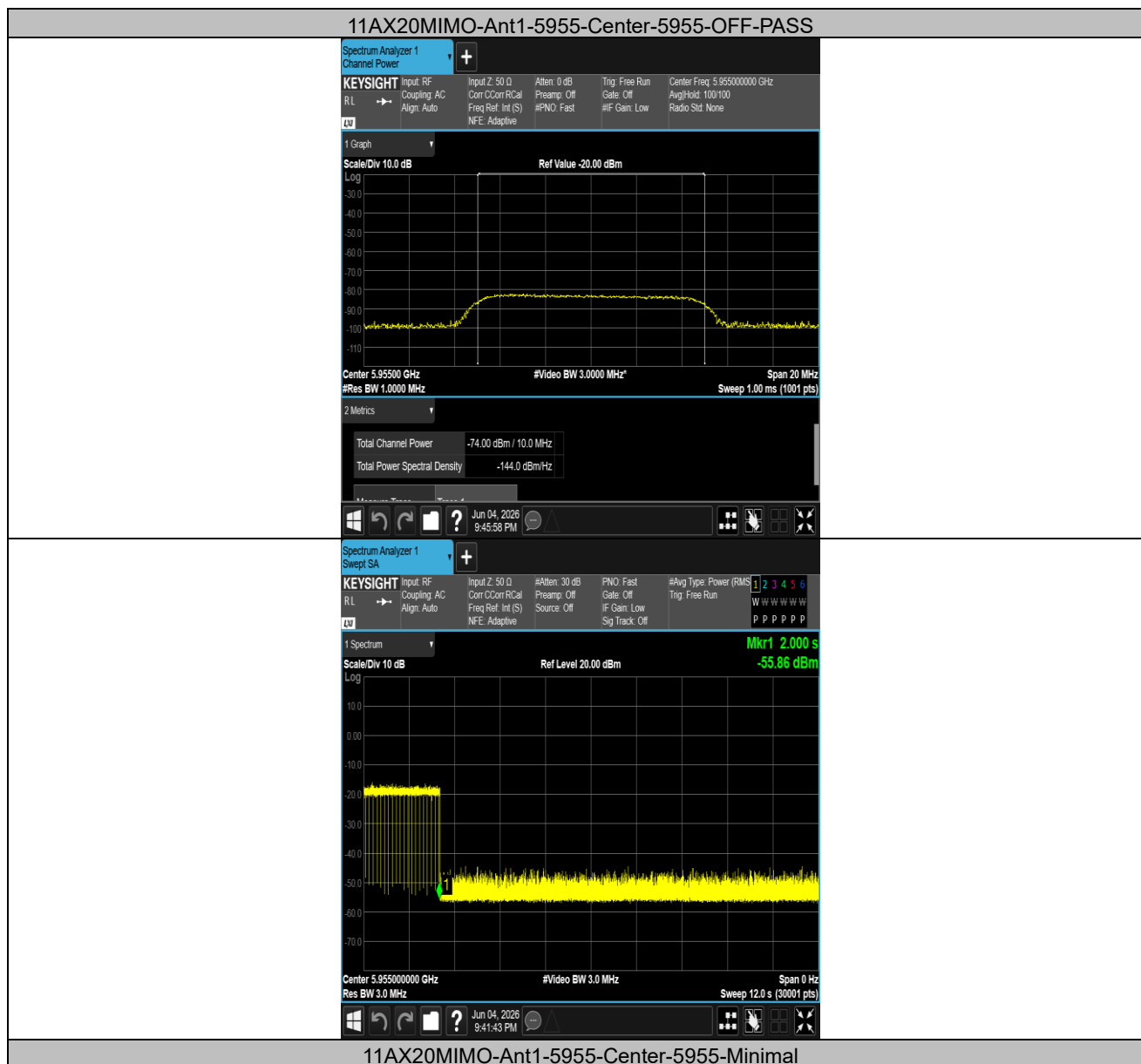
Test Mode	Antenna	Channel	Interference Frequency [MHz]		Status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Rate [%]	Limit [%]	Verdict
11AX20MIMO	Ant1	5955	Center	5955	OFF	0	1	1	1	1	1	1	1	1	1	90	90	PASS
11AX20MIMO	Ant1	5955	Center	5955	Minimal	-	-	-	-	-	-	-	-	-	-	30	---	---
11AX20MIMO	Ant1	5955	Center	5955	ON	-	-	-	-	-	-	-	-	-	-	---	---	---
11AX20MIMO	Ant1	6435	Center	6435	OFF	1	1	1	1	1	1	1	1	1	1	100	90	PASS
11AX20MIMO	Ant1	6435	Center	6435	Minimal	-	-	-	-	-	-	-	-	-	-	30	---	---
11AX20MIMO	Ant1	6435	Center	6435	ON	-	-	-	-	-	-	-	-	-	-	---	---	---
11AX20MIMO	Ant1	6535	Center	6535	OFF	1	1	1	1	1	1	1	1	1	1	100	90	PASS
11AX20MIMO	Ant1	6535	Center	6535	Minimal	-	-	-	-	-	-	-	-	-	-	50	---	---
11AX20MIMO	Ant1	6535	Center	6535	ON	-	-	-	-	-	-	-	-	-	-	---	---	---
11AX20MIMO	Ant1	6895	Center	6895	OFF	1	1	1	1	1	1	1	1	1	1	100	90	PASS
11AX20MIMO	Ant1	6895	Center	6895	Minimal	-	-	-	-	-	-	-	-	-	-	10	---	---
11AX20MIMO	Ant1	6895	Center	6895	ON	-	-	-	-	-	-	-	-	-	-	---	---	---

Note: CBP Detection Trials (1=Detection, 0=No Detection).



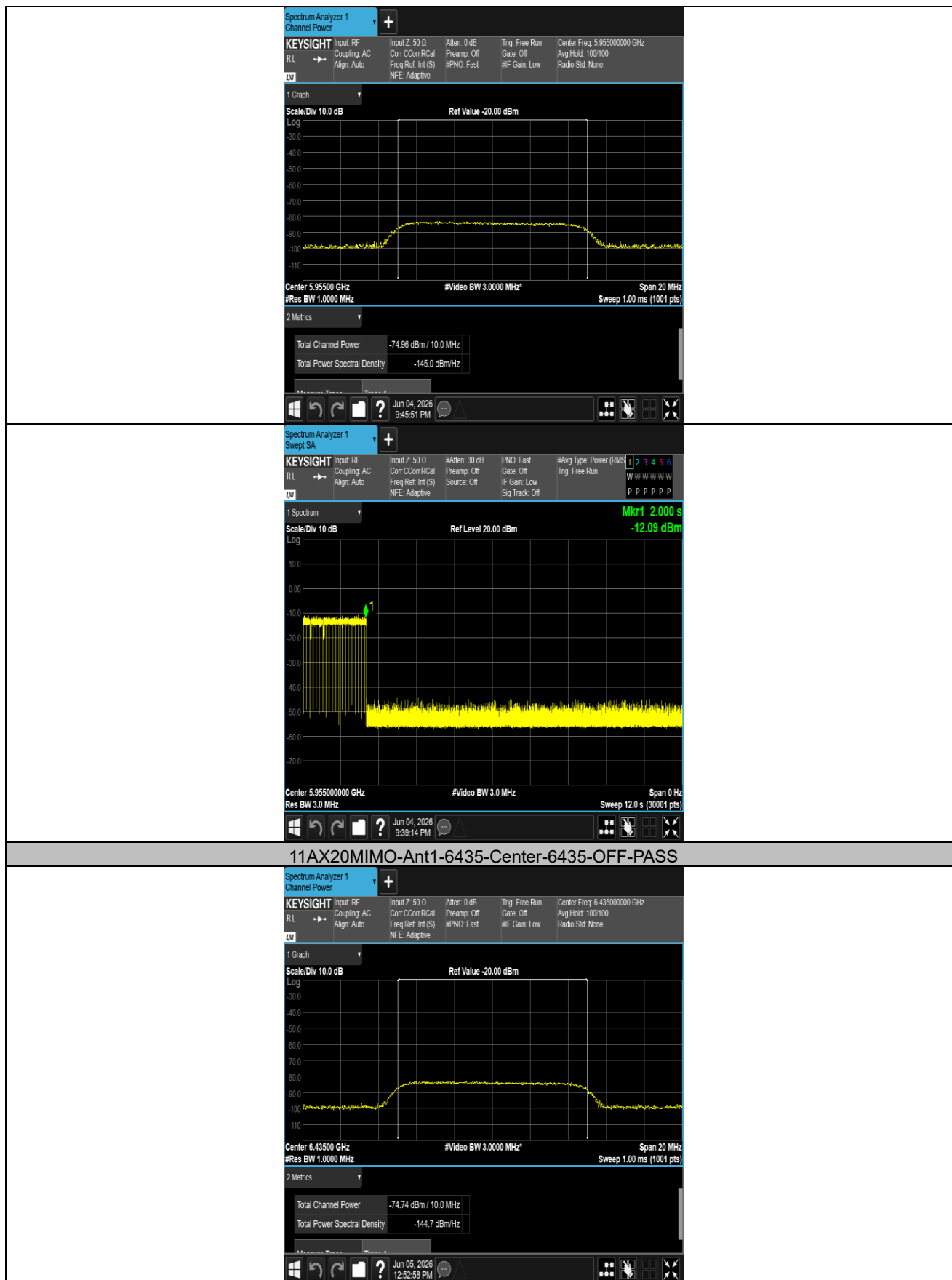
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TEST GRAPHS





Test Report No.: RF260413B007



Boomwave Test (Shenzhen)
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