

Prüfbericht-Nr.: Test report no.:	CN25OD4C 002	Auftrags-Nr.: Order no.:	168552592	Seite 1 von 22 Page 1 of 22
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2025-05-07	
Auftraggeber: Client:	Nimble Wireless 1423 Broadway #1131, Oakland, California, United States, 94612			
Prüfgegenstand: Test item:	M10			
Bezeichnung / Typ-Nr.: Identification / Type no.:	M10-506-W (Trademark: Waggle)			
Auftrags-Inhalt: Order content:	Test Report			
Prüfgrundlage: Test specification:	CFR Title 47 FCC Part 15: Subpart E Section 15.407 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 February 2021			
Wareneingangsdatum: Date of sample receipt:	2025-05-19	Please refer to Photo Document		
Prüfmuster-Nr.: Test sample no:	A003992354-002~019 A004017365-001			
Prüfzeitraum: Testing period:	2025-06-13 - 2025-06-19			
Ort der Prüfung: Place of testing:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:			genehmigt von: authorized by:	
Datum: Date:	2025-06-26	Ausstellungsdatum: Issue date:		2025-06-26
Stellung / Position:	Sachverständige(r)/Expert	Stellung / Position:		Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: 2AFSO-M10W IC: 33953-M10W, HVIN: M10-506-W This report is for 5GHz Wi-Fi.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

Prüfbericht-Nr.: CN25OD4C 002
Test report no.:

Seite 2 von 22
Page 2 of 22

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfbedingungen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature <i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature</i>
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

Test Summary

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY

RESULT: Pass

5.1.4 FREQUENCY STABILITY

RESULT: Pass

5.1.5 26dB BANDWIDTH AND 99% BANDWIDTH

RESULT: Pass

5.1.6 6dB BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 DYNAMIC FREQUENCY SELECTION (DFS)

RESULT: Pass

Contents

1	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS	5
2	TEST SITES	6
2.1	TEST FACILITIES	6
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	6
2.3	TRACEABILITY	7
2.4	CALIBRATION	7
2.5	MEASUREMENT UNCERTAINTY.....	7
2.6	LOCATION OF ORIGINAL DATA.....	7
2.7	STATUS OF FACILITY USED FOR TESTING.....	7
3	GENERAL PRODUCT INFORMATION	8
3.1	PRODUCT FUNCTION AND INTENDED USE.....	8
3.2	RATINGS AND SYSTEM DETAILS	8
3.3	INDEPENDENT OPERATION MODES	10
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	10
3.5	SUBMITTED DOCUMENTS.....	10
4	TEST SET-UP AND OPERATION MODES	11
4.1	PRINCIPLE OF CONFIGURATION SELECTION	11
4.2	TEST OPERATION AND TEST SOFTWARE.....	11
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	11
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	11
4.5	TEST SETUP DIAGRAM	12
5	TEST RESULTS	14
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	14
5.1.1	<i>Antenna Requirement</i>	<i>14</i>
5.1.2	<i>Maximum Peak Conducted Output Power</i>	<i>15</i>
5.1.3	<i>Conducted Power Spectral Density</i>	<i>16</i>
5.1.4	<i>Frequency Stability.....</i>	<i>17</i>
5.1.5	<i>26dB Bandwidth and 99% Bandwidth</i>	<i>18</i>
5.1.6	<i>6dB Bandwidth</i>	<i>19</i>
5.1.7	<i>Radiated Spurious Emission</i>	<i>20</i>
5.1.8	<i>Dynamic Frequency Selection (DFS).....</i>	<i>21</i>
6	PHOTOGRAPHS OF THE TEST SET-UP	22
7	LIST OF TABLES.....	22

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of 5GHz Wi-Fi

Appendix B: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, China

FCC Accreditation Designation No.: CN1260

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2024-09-26	2025-09-25
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2024-09-26	2025-09-25
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2024-09-26	2025-09-25
DC power supply	Keysight	E3642A	MY61276100	2024-09-26	2025-09-25
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2024-09-26	2025-09-25
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2024-09-26	2025-09-25
Test Software	Tonscend	JS1120-3	N/A	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A	N/A
Shielding Room	Albatross	SR1	APC17151-SR1	2024-09-14	2027-09-13
Unwanted Emission Testing (TS9975)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	2024-09-29	2025-09-28
Signal Analyzer	R&S	FSV 40	101439	2024-09-29	2025-09-28
System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
Filterbank	R&S	Wlan	100759	2024-09-29	2025-09-28
OSP	R&S	OSP 120	102040	N/A	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2024-09-29	2025-09-28
Amplifier	R&S	SCU-18F	180070	2024-09-29	2025-09-28
Amplifier	R&S	SCU40A	100475	2024-09-29	2025-09-28
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2024-09-28	2025-09-27
Double-Ridged Antenna (1-18 GHz)	ETS-LINDGREN	3117	00218717	2024-09-28	2025-09-27

Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2024-09-28	2025-09-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2024-09-28	2025-09-27
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-09-14	2027-09-13

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty (k=2)
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	± 4.17 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. File for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The Product is a Sensor which supports 2.4GHz Wi-Fi and 5GHz Wi-Fi functions.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	M10
Type Designation:	M10-506-W
Trademark:	Waggle
FCC ID:	2AFSO-M10W
IC:	33953-M10W
HVIN:	M10-506-W
Operating Voltage:	Li-Polymer Battery operated (DC 3.7V)
Operating Temperature Range:	-40 °C ~ +60 °C
Technical Specification of 2.4GHz Wi-Fi	
Operating Frequency:	2412 - 2462 MHz for 802.11b/g/n(HT20)/ax(HE20)
Type of Modulation:	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 Mbps for 802.11n(HT20) MCS0 ~ MCS11 for 802.11ax (Full RU, Partial RU mode supported for 802.11ax.)
Channel Number:	11 channels for 802.11b/g/n(HT20)/ax(HE)20
Channel Separation:	5 MHz
Antenna Type:	Chip Antenna
Antenna Number:	1x1 TRX
Antenna Gain:	4.1 dBi (Provided by the Client)
Technical Specification of 5GHz Wi-Fi	
Operating Frequency:	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz
Channel Number:	5180-5240MHz, 4CHs, 802.11 a/n20/ac20/ax20 5260-5320MHz, 4CHs, 802.11 a/n20/ac20/ax20 5500-5700MHz, 11CHs, 802.11 a/n20/ac20/ax20 5745-5825MHz, 5CHs, 802.11 a/n20/ac20/ax20 Note: 5600-5650MHz band is not used in Canada.
Type of Modulation:	OFDM(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate:	6/9/12/18/24/36/48/54 Mbps for 802.11a MCS0~MCS7 for 802.11n MCS0~MCS9 for 802.11ac MCS0-MCS11 for 802.11ax

	(Full RU, Partial RU mode supported for 802.11ax.)
Channel Separation:	20MHz
Antenna Type:	Chip Antenna
Antenna Number:	1x1 TRX
Antenna Gain:	3.8 dBi (Provided by the Client)

Note: The correctness of all data provided by customer in the test report is ensured and responsible of the customer. Any misjudgment of the test results caused by the use of incorrect data provided by customer shall be borne by the customer.

Table 4: RF Channel and Frequency of 5GHz Wi-Fi

U-NII-1	
20MHz Bandwidth	
Channel	Frequency (MHz)
36	5180
40	5200
44	5220
48	5240

U-NII-2A	
20MHz Bandwidth	
Channel	Frequency (MHz)
52	5260
56	5280
60	5300
64	5320

U-NII-2C	
20MHz Bandwidth	
Channel	Channel
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700

U-NII-3	
20MHz Bandwidth	
Channel	Frequency (MHz)
149	5745
153	5765
157	5785
161	5805
165	5825

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, 5G Wi-Fi wireless transmitting mode
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|-------------------------|----------------------------------|
| - Application Form | - User Manual |
| - Operation Description | - FCC/IC Label and Location Info |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model *M10-506-W* in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

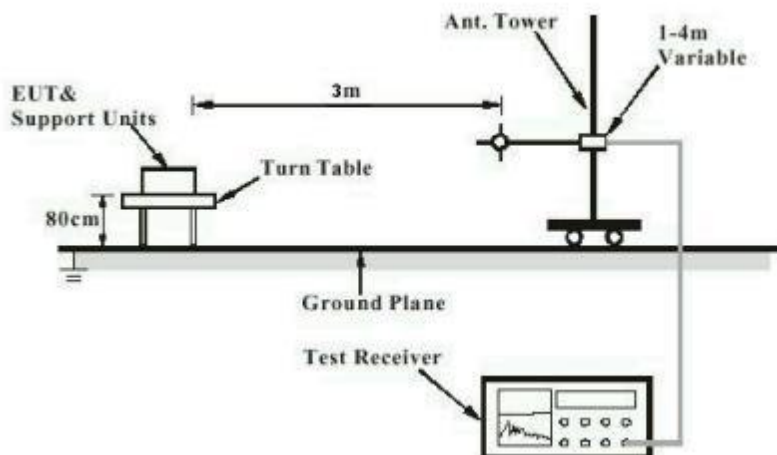


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

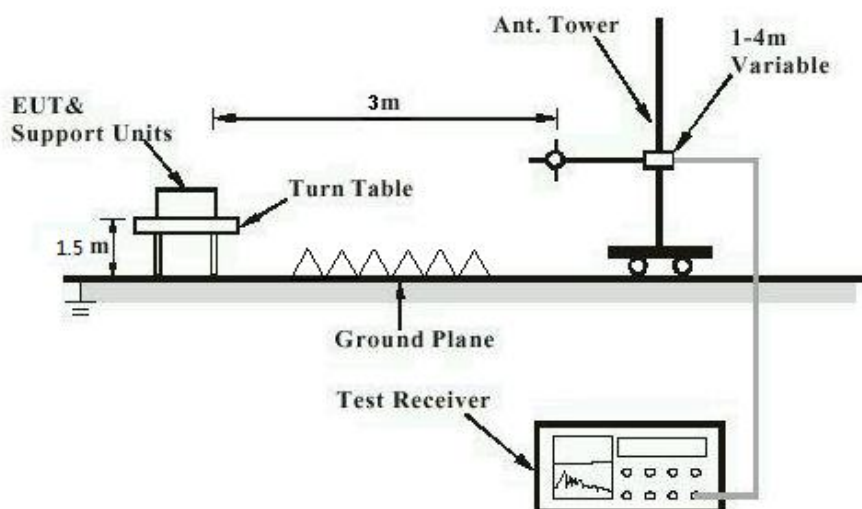


Diagram of Measurement Configuration for Conducted Transmitter Measurement

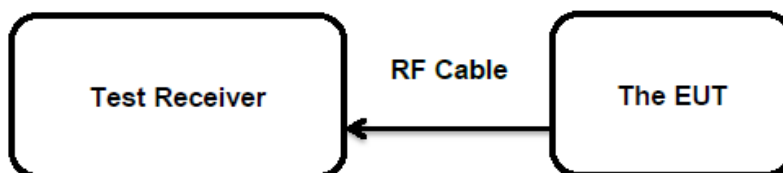
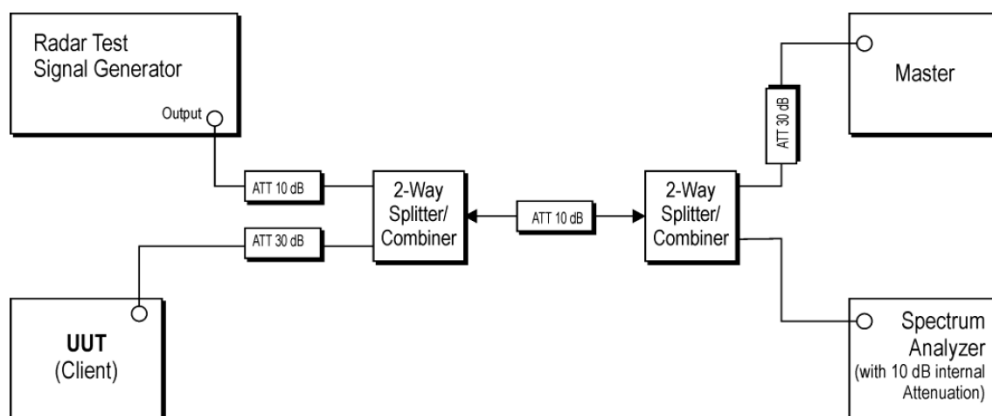


Diagram of Measurement Configuration for Dynamic Frequency Selection (DFS)



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.203
RSS-247 clause 6.8

According to the manufacturer declared, the EUT has Chip Antenna, permanent attachment and no consideration of replacement, refer to section 3.2 for details.

Therefore, the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.407(a)(1)&(2)&(4) RSS-247 clause 6.2
Basic standard	: ANSI C63.10: 2013
Limits	: FCC: <250mW (24dBm) (5150-5250MHz) *<250mW (24dBm) (5250-5350MHz, 5470-5725MHz) *250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz, where is lesser. <1W (30dBm) (5725-5850MHz) IC: * Max e.i.r.p.<200mW (23dBm) (5150-5250MHz) *200 mW (23dBm) or 10 dBm + 10 logB, where B is the 99% emission bandwidth in MHz, where is lesser. *Max conducted output power < 250mW (24dBm) (5250-5350MHz) *250 mW (24dBm) or 11 dBm + 10 logB, where B is the 99% emission bandwidth in MHz, where is lesser. *Max e.i.r.p.<1W (30dBm) (5250-5350MHz, 5470-5600MHz, 5650-5725MHz) *1 W (30dBm) or 17 dBm + 10 log B, where B is the 99% emission bandwidth in MHz, where is lesser. Max conducted output power <1W (30dBm) (5725-5850MHz)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2025-06-13 to 2025-06-14
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 45 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

Note: Per RSS-247 section 6.2.3, transmission on channels which overlap 5600-5650MHz is prohibited. This device is not support 5600-5650MHz radio-frequency operating band.

Prüfbericht - Nr.: **CN25OD4C 002**
Test Report No.:Seite 16 von 22
Page 16 of 22

5.1.3 Conducted Power Spectral Density

RESULT:**Pass****Test Specification**

Test standard	: FCC part 15.407(a) RSS-247 clause 6.2
Basic standard	: ANSI C63.10: 2013 KDB 789033 D02 v01r03
Limits	: FCC: <11dBm/MHz (5150-5250MHz, 5250-5350MHz and 5470-5725MHz) <30dBm/500kHz (5725-5850MHz) IC: e.i.r.p. spectral density <10dBm/MHz (5150-5250MHz) <11dBm/1MHz (5250-5350MHz, 5470-5600MHz and 5650-5725MHz) <30dBm/500kHz (5725-5850MHz)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2025-06-13 to 2025-06-14
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 45 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

Prüfbericht - Nr.: CN25OD4C 002
Test Report No.:

Seite 17 von 22
Page 17 of 22

5.1.4 Frequency Stability

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407(g)
RSS-Gen Clause 6.11
Basic standard : ANSI C63.10: 2013
Limits : Within assigned bands
Kind of test site : Shielded Room

Test Setup

Date of testing : 2025-06-13 to 2025-06-14
Input voltage : Fully charged battery
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 45 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

5.1.5 26dB Bandwidth and 99% Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.407(e)
RSS-Gen Clause 6.7
Basic standard : ANSI C63.10: 2013
Limits : N/A
Kind of test site : Shielded Room

Test Setup

Date of testing : 2025-06-13 to 2025-06-14
Input voltage : Fully charged battery
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 45 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

5.1.6 6dB Bandwidth

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.407(e) RSS-247 clause 6.2.4.1
Basic standard	: ANSI C63.10: 2013
Limits	: At least 500kHz (5725-5850MHz)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2025-06-13 to 2025-06-14
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 45 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.407(b) & FCC Part 15.205 & FCC Part 15.209 RSS-247 clause 6.2 & RSS-GEN clause 8.9 and 8.10
Basic standard	: ANSI C63.10: 2013 KDB 789033 D02 v01r03
Limits	: • For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. • For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. • For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. Emissions outside the band 5470-5600 MHz and 5650-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. • For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. • Restricted Bands meet the requirement of 15.209 limit and RSS-GEN
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 2025-06-15 to 2025-06-16
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: Refer to test result
Relative humidity	: Refer to test result
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix A.

5.1.8 Dynamic Frequency Selection (DFS)

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.407(h) RSS-247 clause 6.3
Basic standard	: ANSI C63.10: 2013
Limits	: 5250-5350MHz, 5470-5725MHz Channel Move Time: Within 10 seconds. Channel Closing Transmission Time: 200ms+aggregate of 60ms over remaining 10s period; Non-Occupancy Period: at least 30 minutes.
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2025-06-13 to 2025-06-19
Input voltage	: Fully charged battery
Operation mode	: A
Ambient temperature	: 25 °C
Relative humidity	: 45 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix B.

7 List of Tables

Table 1: List of Test and Measurement Equipment.....	6
Table 2: Measurement Uncertainty	7
Table 3: Technical Specification of EUT	8
Table 4: RF Channel and Frequency of 5GHz Wi-Fi.....	9
Table 5: List of Accessories and Auxiliary Equipment.....	11

Appendix A: Test Results of 5GHz Wi-Fi

APPENDIX A: TEST RESULTS OF 5GHZ WI-FI.....	1
APPENDIX A.1: TEST RESULTS OF MAXIMUM OUTPUT POWER.....	2
Test Result.....	2
Test Result, RU.....	4
APPENDIX A.2: TEST RESULTS OF 26DB BANDWIDTH	5
Test Result.....	5
Test Graphs.....	6
APPENDIX A.3: TEST RESULTS OF 99% BANDWIDTH.....	19
Test Result.....	19
Test Graphs.....	20
APPENDIX A.4: TEST RESULTS OF 6DB BANDWIDTH	37
Test Result.....	37
Test Graphs.....	38
APPENDIX A.5: TEST RESULTS OF CONDUCTED POWER SPECTRAL DENSITY	43
Test Result.....	43
Test Graphs.....	44
Test Result, RU.....	61
Test Graphs, RU	62
APPENDIX A.6: TEST RESULTS OF FREQUENCY STABILITY	74
Test Result.....	74
APPENDIX A.7: TEST RESULTS OF RADIATED SPURIOUS EMISSIONS	76
30MHz - 1GHz	76
1GHz - 18GHz.....	78
APPENDIX A.8: TEST RESULTS OF RADIATED EMISSIONS IN RESTRICTED BANDS	110
Wi-Fi 802.11 a mode.....	110
Wi-Fi 802.11 n(HT20) mode.....	122
APPENDIX A.9: TEST RESULTS OF DYNAMIC FREQUENCY SELECTION (DFS)	134
DFS Detection Thresholds	134
Channel Move Time and Channel Closing Transmission Time	135
Non-Occupancy Period	136

Appendix A.1: Test Results of Maximum output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	5180	15.08	≤23.98	PASS
		5200	15.46	≤23.98	PASS
		5240	15.36	≤23.98	PASS
		5260	15.25	≤23.98	PASS
		5280	14.83	≤23.98	PASS
		5320	14.46	≤23.98	PASS
		5500	15.09	≤23.98	PASS
		5580	15.39	≤23.98	PASS
		5700	15.49	≤23.98	PASS
		5745	15.40	≤30.00	PASS
		5785	15.38	≤30.00	PASS
11N20SISO	Ant1	5825	15.55	≤30.00	PASS
		5180	14.64	≤23.98	PASS
		5200	14.96	≤23.98	PASS
		5240	14.71	≤23.98	PASS
		5260	14.78	≤23.98	PASS
		5280	14.17	≤23.98	PASS
		5320	14.25	≤23.98	PASS
		5500	14.54	≤23.98	PASS
		5580	15.26	≤23.98	PASS
		5700	14.92	≤23.98	PASS
		5745	15.14	≤30.00	PASS
11AC20SISO	Ant1	5785	15.01	≤30.00	PASS
		5825	15.34	≤30.00	PASS
		5180	14.46	≤23.98	PASS
		5200	14.56	≤23.98	PASS
		5240	14.51	≤23.98	PASS
		5260	14.86	≤23.98	PASS
		5280	14.04	≤23.98	PASS
		5320	14.15	≤23.98	PASS
		5500	14.63	≤23.98	PASS
		5580	14.99	≤23.98	PASS
		5700	14.91	≤23.98	PASS
11AX20SISO	Ant1	5745	15.03	≤30.00	PASS
		5785	15.08	≤30.00	PASS
		5825	15.15	≤30.00	PASS
		5180	14.46	≤23.98	PASS
		5200	14.55	≤23.98	PASS
		5240	14.49	≤23.98	PASS
		5260	14.38	≤23.98	PASS
		5280	14.08	≤23.98	PASS
		5320	13.94	≤23.98	PASS
		5500	14.61	≤23.98	PASS
		5580	14.85	≤23.98	PASS
		5700	14.98	≤23.98	PASS
		5745	14.98	≤30.00	PASS
		5785	14.95	≤30.00	PASS
		5825	15.19	≤30.00	PASS

Max e.i.r.p for 5150-5250MHz band for RSS 247 requirement

TestMode	Antenna	Channel	Result[dBm]	Max e.i.r.p Limit[dBm]	Verdict
11A	Ant1	5180	18.88	≤23	PASS
		5200	19.26	≤23	PASS
		5240	19.16	≤23	PASS
11N20SISO	Ant1	5180	18.44	≤23	PASS
		5200	18.76	≤23	PASS
		5240	18.51	≤23	PASS
11AC20SISO	Ant1	5180	18.26	≤23	PASS
		5200	18.36	≤23	PASS
		5240	18.31	≤23	PASS
11AX20SISO	Ant1	5180	18.26	≤23	PASS
		5200	18.35	≤23	PASS
		5240	18.29	≤23	PASS

Max. e.i.r.p.=Max Conducted power(dBm) +antenna Gain(dBi)

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G): 3.8 dBi

Test Result, RU

TestMode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
11AX20SISO	Ant1	5180	26Tone	RU0	4.67	91.47	0.39	5.06	≤23.98	PASS
11AX20SISO	Ant1	5180	106Tone	RU54	9.53	91.31	0.39	9.92	≤23.98	PASS
11AX20SISO	Ant1	5200	26Tone	RU0	4.71	91.00	0.41	5.12	≤23.98	PASS
11AX20SISO	Ant1	5200	106Tone	RU54	9.55	90.69	0.42	9.97	≤23.98	PASS
11AX20SISO	Ant1	5240	26Tone	RU0	4.21	92.41	0.34	4.55	≤23.98	PASS
11AX20SISO	Ant1	5240	106Tone	RU54	9.24	91.78	0.37	9.61	≤23.98	PASS
11AX20SISO	Ant1	5260	26Tone	RU0	4.24	91.16	0.40	4.64	≤23.98	PASS
11AX20SISO	Ant1	5260	106Tone	RU54	9.42	91.94	0.36	9.78	≤23.98	PASS
11AX20SISO	Ant1	5280	26Tone	RU0	4.11	91.16	0.40	4.51	≤23.98	PASS
11AX20SISO	Ant1	5280	106Tone	RU54	9.19	90.85	0.42	9.61	≤23.98	PASS
11AX20SISO	Ant1	5320	26Tone	RU0	4.12	92.10	0.36	4.48	≤23.98	PASS
11AX20SISO	Ant1	5320	106Tone	RU54	9.39	91.00	0.41	9.80	≤23.98	PASS
11AX20SISO	Ant1	5500	26Tone	RU0	4.20	91.31	0.39	4.59	≤23.98	PASS
11AX20SISO	Ant1	5500	106Tone	RU54	8.90	92.25	0.35	9.25	≤23.98	PASS
11AX20SISO	Ant1	5580	26Tone	RU0	4.06	91.16	0.40	4.46	≤23.98	PASS
11AX20SISO	Ant1	5580	106Tone	RU54	9.30	90.85	0.42	9.72	≤23.98	PASS
11AX20SISO	Ant1	5700	26Tone	RU0	4.54	92.41	0.34	4.88	≤23.98	PASS
11AX20SISO	Ant1	5700	106Tone	RU54	9.58	91.47	0.39	9.97	≤23.98	PASS
11AX20SISO	Ant1	5745	26Tone	RU0	4.41	90.69	0.42	4.83	≤30.00	PASS
11AX20SISO	Ant1	5745	106Tone	RU54	9.32	90.85	0.42	9.74	≤30.00	PASS
11AX20SISO	Ant1	5785	26Tone	RU0	4.53	91.00	0.41	4.94	≤30.00	PASS
11AX20SISO	Ant1	5785	106Tone	RU54	9.50	92.25	0.35	9.85	≤30.00	PASS
11AX20SISO	Ant1	5825	26Tone	RU0	4.72	91.78	0.37	5.09	≤30.00	PASS
11AX20SISO	Ant1	5825	106Tone	RU54	9.64	91.78	0.37	10.01	≤30.00	PASS

Max e.i.r.p for 5150-5250MHz band for RSS 247 requirement

TestMode	Antenna	Frequency [MHz]	Ru Size	Ru Index	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Max e.i.r.p Limit [dBm]	Verdict
11AX20SISO	Ant1	5180	26Tone	RU0	4.67	91.47	0.39	8.86	≤23	PASS
11AX20SISO	Ant1	5180	106Tone	RU54	9.53	91.31	0.39	13.72	≤23	PASS
11AX20SISO	Ant1	5200	26Tone	RU0	4.71	91.00	0.41	8.92	≤23	PASS
11AX20SISO	Ant1	5200	106Tone	RU54	9.55	90.69	0.42	13.77	≤23	PASS
11AX20SISO	Ant1	5240	26Tone	RU0	4.21	92.41	0.34	8.35	≤23	PASS
11AX20SISO	Ant1	5240	106Tone	RU54	9.24	91.78	0.37	13.41	≤23	PASS

Max. e.i.r.p.=Max Conducted power(dBm) +antenna Gain(dBi)

Note:

1)The cable loss is taken into account in results.

2) Antenna gain(G): 3.8 dBi

Appendix A.2: Test Results of 26dB Bandwidth*Test Result*

TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.360	5169.880	5190.240	---	PASS
		5200	21.160	5189.960	5211.120	---	PASS
		5240	20.080	5229.880	5249.960	---	PASS
		5260	19.600	5250.080	5269.680	---	PASS
		5280	19.400	5270.320	5289.720	---	PASS
		5320	19.160	5310.240	5329.400	---	PASS
		5500	19.760	5489.840	5509.600	---	PASS
		5580	19.600	5570.080	5589.680	---	PASS
11N20SISO	Ant1	5700	18.960	5690.120	5709.080	---	PASS
		5180	20.880	5170.000	5190.880	---	PASS
		5200	22.960	5188.760	5211.720	---	PASS
		5240	19.600	5230.040	5249.640	---	PASS
		5260	19.560	5249.960	5269.520	---	PASS
		5280	20.240	5269.960	5290.200	---	PASS
		5320	19.640	5310.000	5329.640	---	PASS
		5500	19.560	5489.840	5509.400	---	PASS
11AC20SISO	Ant1	5580	19.920	5569.960	5589.880	---	PASS
		5700	19.440	5690.120	5709.560	---	PASS
		5180	19.760	5170.080	5189.840	---	PASS
		5200	19.840	5190.000	5209.840	---	PASS
		5240	20.160	5229.840	5250.000	---	PASS
		5260	20.080	5249.800	5269.880	---	PASS
		5280	21.400	5269.720	5291.120	---	PASS
		5320	19.800	5309.960	5329.760	---	PASS
11AX20SISO	Ant1	5500	19.840	5489.920	5509.760	---	PASS
		5580	20.080	5569.720	5589.800	---	PASS
		5700	19.360	5690.080	5709.440	---	PASS
		5180	21.120	5169.200	5190.320	---	PASS
		5200	19.760	5189.800	5209.560	---	PASS
		5240	20.040	5229.640	5249.680	---	PASS
		5260	21.920	5249.160	5271.080	---	PASS
		5280	20.600	5269.240	5289.840	---	PASS
	Ant1	5320	21.040	5309.280	5330.320	---	PASS
		5500	21.680	5489.400	5511.080	---	PASS
		5580	21.160	5569.200	5590.360	---	PASS
		5700	22.080	5689.240	5711.320	---	PASS

Test Graphs





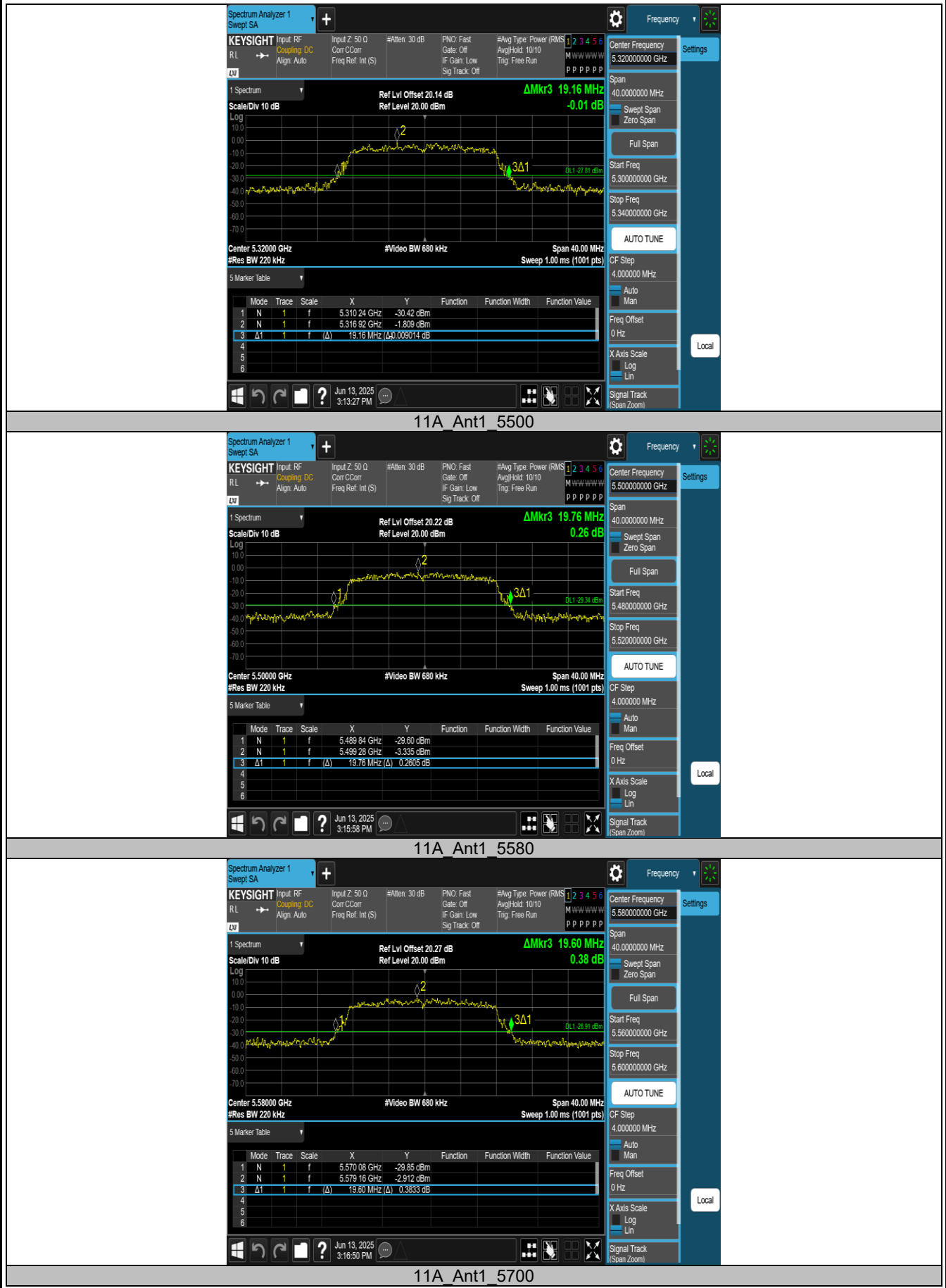
11A_Ant1_5260

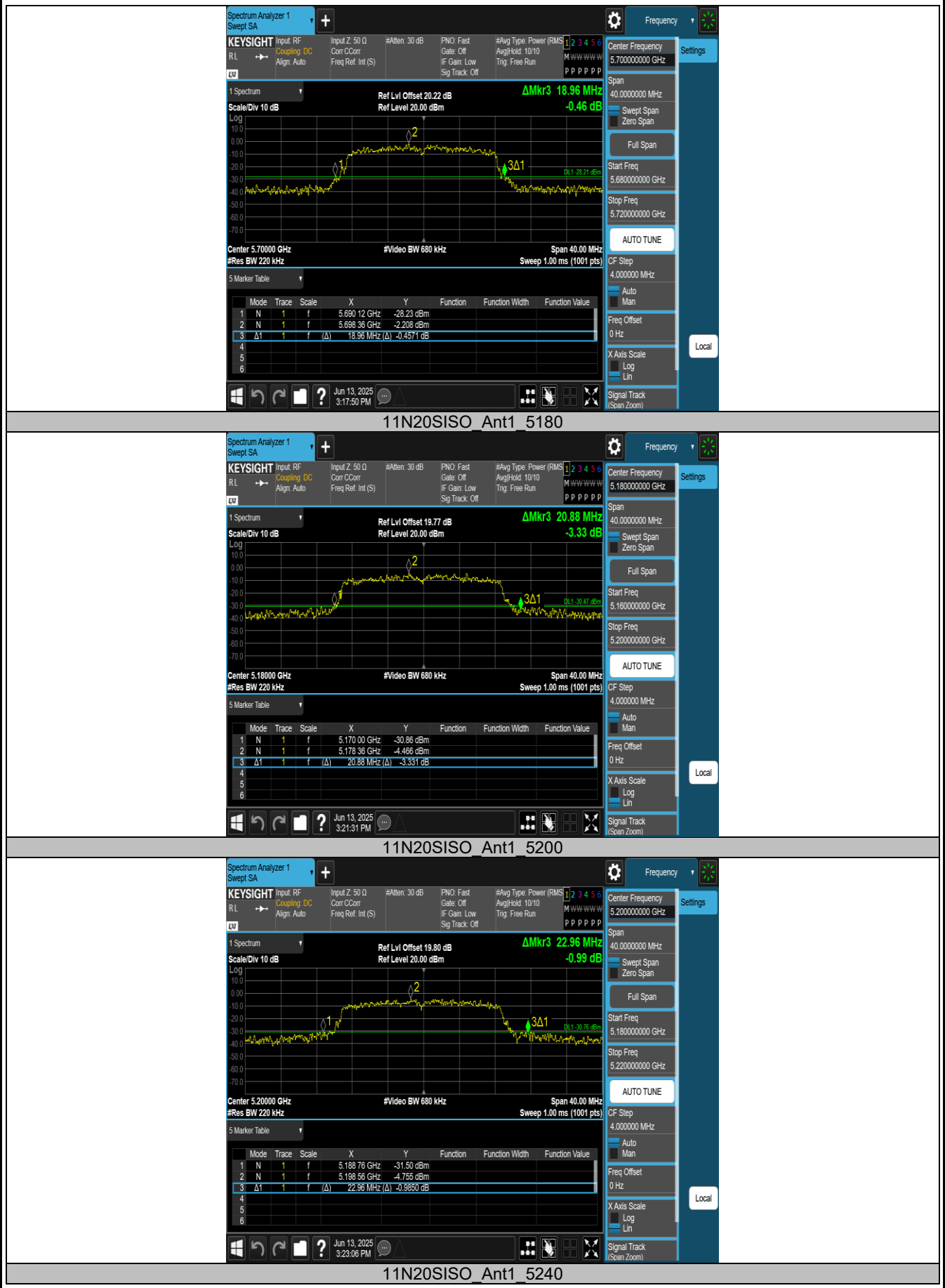


11A_Ant1_5280



11A_Ant1_5320







11N20SISO Ant1 5260



11N20SISO Ant1 5280



11N20SISO Ant1 5320



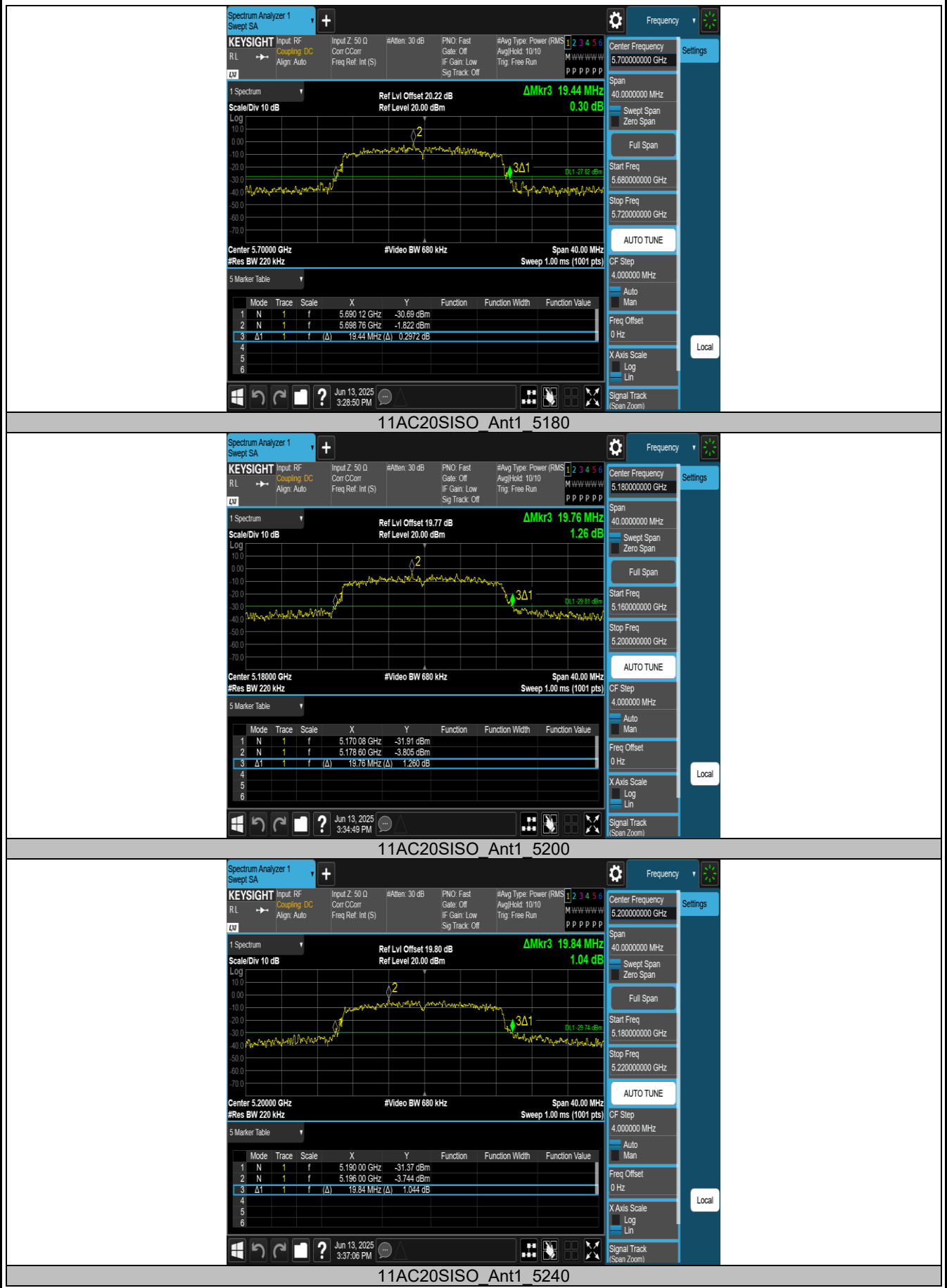
11N20SISO Ant1 5500

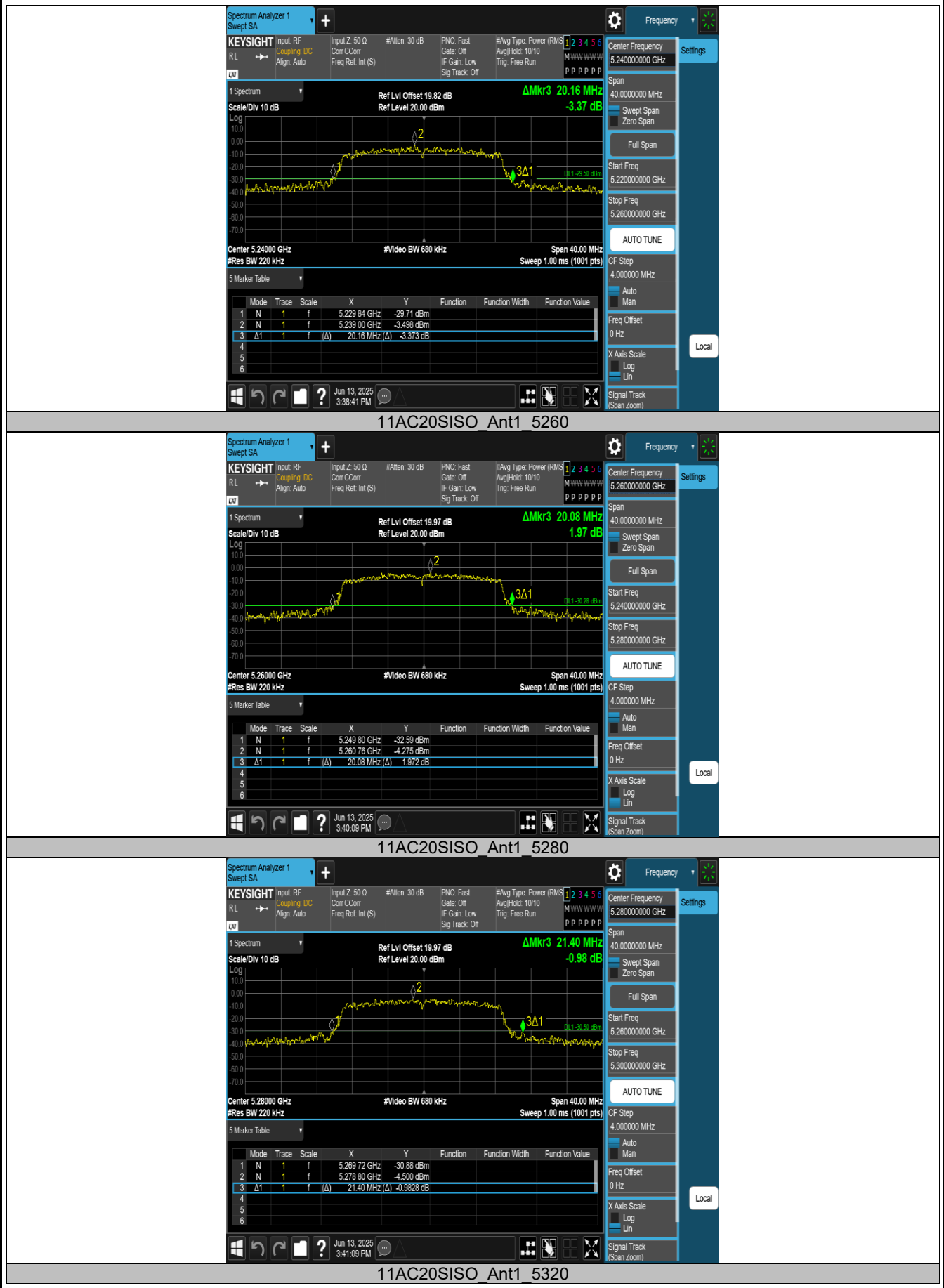


11N20SISO Ant1 5580



11N20SISO Ant1 5700







11AC20SISO_Ant1_5500



11AC20SISO_Ant1_5580



11AC20SISO_Ant1_5700



11AX20SISO_Ant1_5180



11AX20SISO_Ant1_5200



11AX20SISO_Ant1_5240

