FCC RADIO TEST REPORT

FCC ID	:	**RI7FN990B40**
Equipment	:	**5G NR Module**
Brand Name	:	**Telit Cinterion**
Model Name	:	**FN990B40**
Marketing Name	:	**FN990B40**
Applicant	:	**Telit Communications S.p.A. Via Stazione Di Prosecco 5/B, Trieste 34010, Italy**
Manufacturer	:	**Telit Communications S.p.A. Via Stazione Di Prosecco 5/B, Trieste 34010, Italy**
Standard	:	**FCC 47 CFR Part 2, 25**

The product was received on Oct. 15, 2024 and testing was performed from Oct. 18, 2024 to Jul. 10, 2025. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issue Date
FG4O1530H	01	Initial issue of report	Jul. 15, 2025
FG4O1530H	02	Revise section 1.1 This report is an updated version, replacing the report issued on Jul. 15, 2025.	Aug. 18, 2025

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046 §25.149 (c)(4)(iii)	Conducted Output Power	Pass	-
	§25.149 (c)(4)(iii)	Equivalent Isotropic Radiated Power (n53)	Pass	
3.3	§25.149 (c)(4)(ii)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049 §25.149 (c)(4)(ii)	Occupied Bandwidth	Pass	-
3.5	25.149(c)(4)(iv)	Power spectral density	Pass	
3.6	§2.1051 §25.149 (c)(4)(v.vi)	Conducted Band Edge Measurement	Pass	-
3.7	§2.1051 §25.149 (c)(4)(v.vi)	Conducted Spurious Emission	Pass	-
3.8	§2.1055	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §25.149 (c)(4)(v.vi)	Radiated Spurious Emission	Pass	17.41 dB under the limit at 9942.00 MHz

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng

Report Producer: Clio Lo

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs WCDMA/LTE/5G NR and GNSS. **Antenna Type** WWAN: Monopole Antenna
HW Version: 1.00 **SW Version:** M0W.003001

Remark: The EUT's information above is declared by manufacturer.

Support band and evaluated information	
Supported band	n53
Evaluated and Tested band	n53

FDD/TDD band Power Class					
	SISO PC3	**SISO PC2**	**MIMO PC3**	**MIMO PC2**	**MIMO PC1.5**
N53	V				

RF Exposure Max Antenna Gain(dBi)							
Band	**Ant0**	**Ant1**	**Ant2**	**Ant3**	**Main Ant. #**	**MIMO Main Ant. #**	**SRS Ant. #**
N53	**5.5**				**0**	**-**	**-**

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY
Test Engineer	Ekko You
Temperature (℃)	20.4~24.7
Relative Humidity (%)	50.3~57.4

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH12-HY (TAF Code: 3786)
Test Engineer	Jack Cheng, Tim Lee and Wilson Wu
Temperature (℃)	20~25
Relative Humidity (%)	50~60
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- FCC 47 CFR Part 2, 25
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

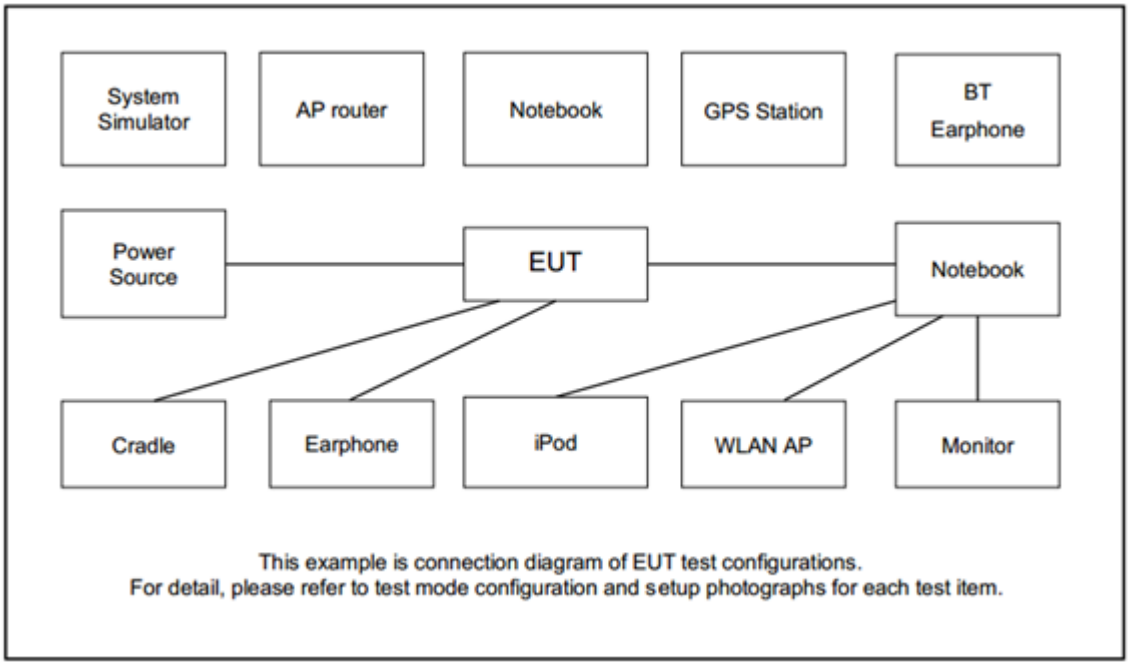
For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in two config (Degree 0 and Degree 90), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and only the worst case emissions were reported in this report.

Modulation Type	Modulation	Modulation Type	Modulation
A	DFT-s-OFDM pi/2 BPSK	N/A	N/A
B	DFT-s-OFDM QPSK	F	CP-OFDM QPSK
C	DFT-s-OFDM 16QAM	G	CP-OFDM 16QAM
D	DFT-s-OFDM 64QAM	H	CP-OFDM 64QAM
E	DFT-s-OFDM 256QAM	I	CP-OFDM 256QAM

Test Item	Modulation Type	Bandwidth	RB Size	Channel
Conducted Power	A, B, C, D, E	10 MHz	1, Half, Full	L, M, H
EIRP	A, B, C, D, E	10 MHz	1, Half, Full	L, M, H
PAR	A, B, C, D, E	10 MHz	Outer_Full	M
Bandwidth	A,F,G,H,I	10 MHz	Outer_Full	M
CSE	B	10 MHz	Inner_1RB	L, M, H
Frequency Stability	A	10 MHz	Outer_Full	M
RSE	A	10 MHz	Inner_1RB	L, M, H

Remark:
1. Evaluated all the transmitter signal and reporting worst-case configuration among all modulation types.
2. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst-case emissions are reported.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
2.	Power Supply	Topward	3303D	N/A	N/A	N/A
3.	Notebook	DELL	Latitude 3400	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n53 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	497700	497860	498000
	Frequency	2488.5	2489.3	2490

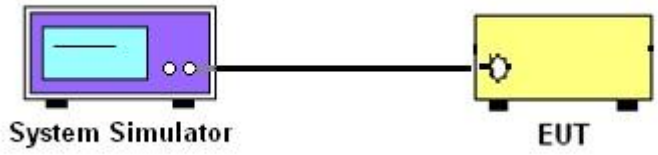
3 Conducted Test Items

3.1 Measuring Instruments

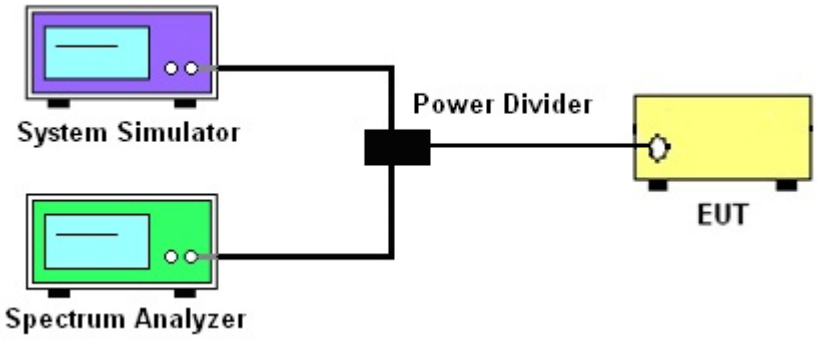
See list of measuring instruments of this test report.

3.1.1 Test Setup

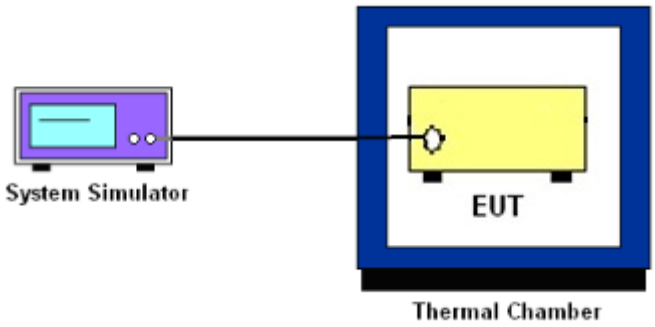
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission, Power spectral density



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and

3.2.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The maximum transmit power is no more than 1 W with a peak EIRP of no more than 6 dBW;

According to KDB 412172 D01 Power Approach,

EIRP = P_T + G_T – L_C, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is 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 transmitted power.

The 6dB and 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 6dB and 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
6. Determine the “6dB and -26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Power spectral density

3.5.1 Description of Power Spectral Density

The maximum power spectral density conducted to the antenna is not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

3.5.2 Test Procedures

1. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz
4. Detector = RMS, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
5. Measure and record the results in the test report.

3.6 Conducted Band Edge

3.6.1 Description of Conducted Band Edge Measurement

Emissions below 2483.5 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least 40 + 10 log (P) dB at the channel edge at 2483.5 MHz, 43 + 10 log (P) dB at 5 MHz from the channel edge, and 55 + 10 log (P) dB at X MHz from the channel edge where X is the greater of 6 MHz or the actual emission bandwidth.

Emissions above 2495 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least 43 + 10 log (P) dB on all frequencies between the channel edge at 2495 MHz and X MHz from this channel edge and 55 + 10 log (P) dB on all frequencies more than X MHz from this channel edge, where X is the greater of 6 MHz or the actual emission bandwidth;

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately above and adjacent to the 2495 MHz a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. If 1 percent of the emission bandwidth of the fundamental emission is less than 1 MHz, the power measured must be integrated over the required measurement bandwidth of 1 MHz. A resolution bandwidth narrower than 1 MHz is permitted to improve measurement accuracy, provided the measured power is integrated over the full required measurement bandwidth (*i.e.,* 1 MHz). The emission bandwidth of the fundamental emission of a transmitter is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.

3.7 Conducted Spurious Emission

3.7.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.7.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The conducted spurious emission for the whole frequency range was taken.
4. Make the measurement with the spectrum analyzer's RBW = 100 kHz if the authorized frequency band/block is at or below 1 GHz and 1 MHz if the authorized frequency band/block is above 1 GH, VBW = 3 * RBW.
5. Set spectrum analyzer with RMS detector.
6. Taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

3.8 Frequency Stability

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.8.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

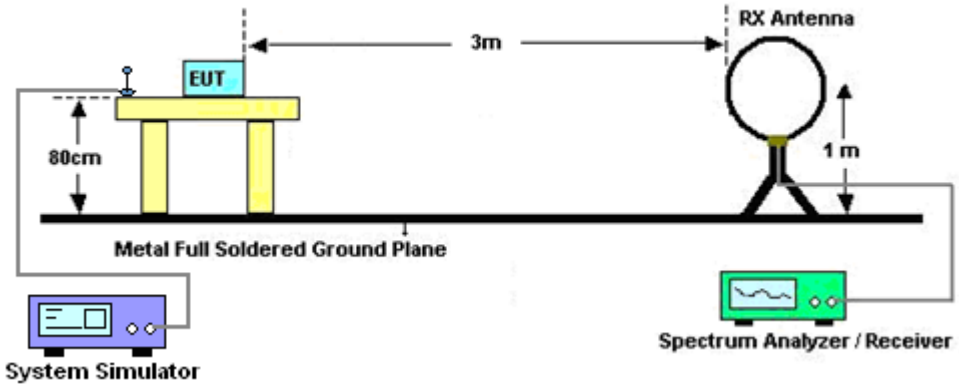
4 Radiated Test Items

4.1 Measuring Instruments

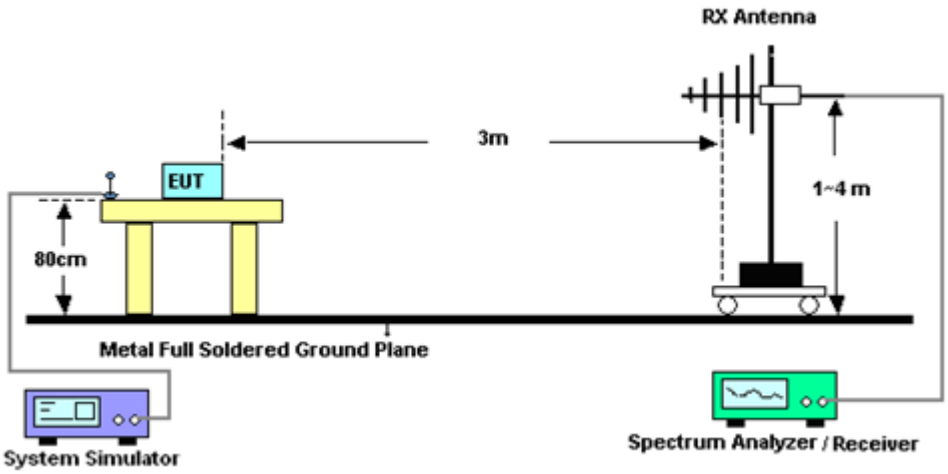
See list of measuring instruments of this test report.

4.1.1 Test Setup

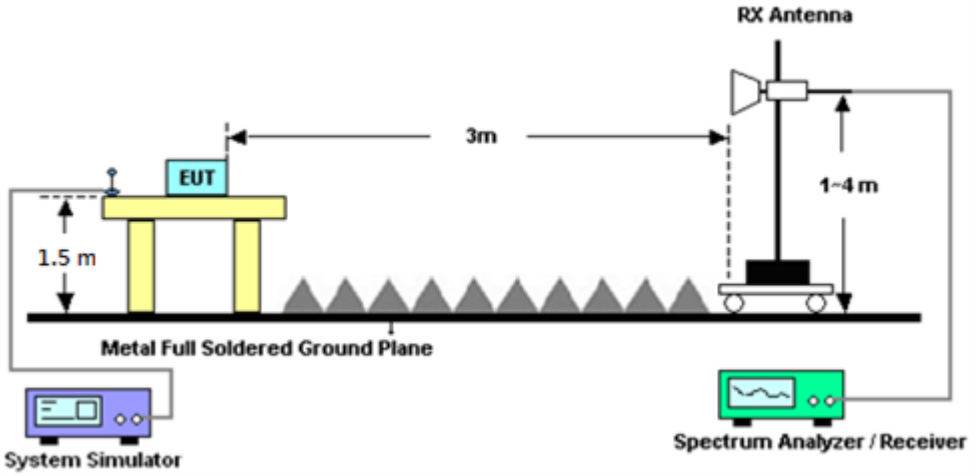
For radiated test below 30MHz



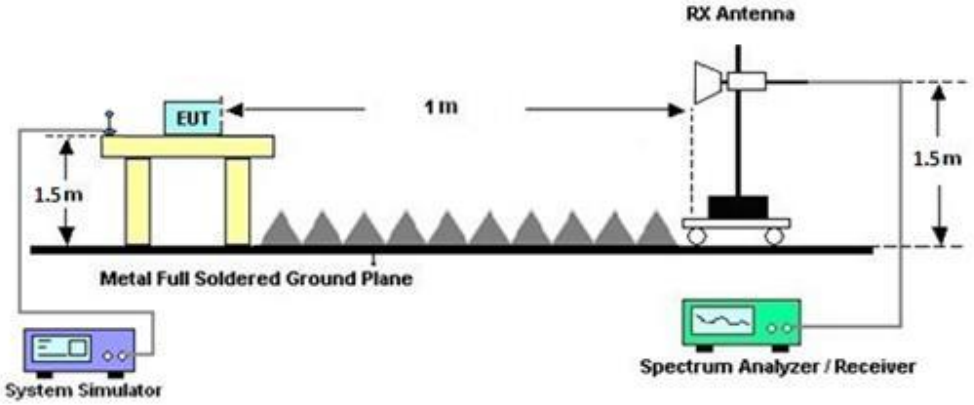
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26-2015.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI C63.26-2015 section 5.5.4 Radiated measurement using the field strength method.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. To convert spectrum reading E(dBuV/m) to EIRP(dBm)

   EIRP(dBm) = Level (dBuV/m) + 20log(d) -104.77,

   where d is the distance at which filed strength limit is specified in the rules
7. Field Strength Level (dBm) = Spectrum Reading (dBm) + Antenna Factor + Cable Loss + Read Level - Preamp Factor.
8. ERP (dBm) = EIRP (dBm) - 2.15
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2E	101108	9 kHz~30 MHz	Dec. 18, 2024	Jun. 17, 2025~ Jul. 10, 2025	Dec. 17, 2025	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	37059 & 01	30MHz~1GHz	Nov. 27, 2024	Jun. 17, 2025~ Jul. 10, 2025	Nov. 26, 2025	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02038	1GHz~18GHz	Jul. 29, 2024	Jun. 17, 2025~ Jul. 10, 2025	Jul. 28, 2025	Radiation (03CH12-HY)
Preamplifier	E-INSTRUMENT TECH LTD.	ERA-100M-18G-56-01-A70	EC1900269	1GHz-18GHz	Dec. 19, 2024	Jun. 17, 2025~ Jul. 10, 2025	Dec. 18, 2025	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Aug. 09, 2024	Jun. 17, 2025~ Jul. 10, 2025	Aug. 08, 2025	Radiation (03CH12-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz~26.5GHz	Sep. 09, 2024	Jun. 17, 2025~ Jul. 10, 2025	Sep. 08, 2025	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00993	18GHz-40GHz	Nov. 18, 2024	Jun. 17, 2025~ Jul. 10, 2025	Nov. 17, 2025	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 02, 2024	Jun. 17, 2025~ Jul. 10, 2025	Dec. 01, 2025	Radiation (03CH12-HY)
Notch Filter	Wainwright	WLKS1200-12SS	SN2	1.2GHz Low Pass Filter	Mar. 12, 2025	Jun. 17, 2025~ Jul. 10, 2025	Mar. 11, 2026	Radiation (03CH12-HY)
Notch Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN2	3GHz High Pass Filter	Mar. 12, 2025	Jun. 17, 2025~ Jul. 10, 2025	Mar. 11, 2026	Radiation (03CH12-HY)
Notch Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN2	6.75GHz High Pass Filter	Mar. 12, 2025	Jun. 17, 2025~ Jul. 10, 2025	Mar. 11, 2026	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Dec. 19, 2024	Jun. 17, 2025~ Jul. 10, 2025	Dec. 18, 2025	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803955/2	30MHz~40GHz	Nov. 01, 2024	Jun. 17, 2025~ Jul. 10, 2025	Oct. 31, 2025	Radiation (03CH12-HY)
RF Cable	EMCI	EMC101Y-KM-KM-100	240907	30MHz~40GHz	Nov. 14, 2024	Jun. 17, 2025~ Jul. 10, 2025	Nov. 13, 2025	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP210090	N/A	Aug. 29, 2024	Jun. 17, 2025~ Jul. 10, 2025	Aug. 28, 2025	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 17, 2025~ Jul. 10, 2025	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jun. 17, 2025~ Jul. 10, 2025	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 17, 2025~ Jul. 10, 2025	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Jun. 17, 2025~ Jul. 10, 2025	N/A	Radiation (03CH12-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
DC Power Supply	GW Instek	GPE2323	GEU871221	0V~64V ;0A~6A	Apr. 09, 2024	Oct. 18, 2024~ Apr. 07, 2025	Apr. 08, 2025	Conducted (TH03-HY)
DC Power Supply	GW Instek	GPE2323	GET910884	0V~64V ;0A~6A	Nov. 20, 2024	Apr. 08, 2025~ Jul. 01, 2025	Nov. 19, 2025	Conducted (TH03-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101691	10Hz~44GHz	Oct. 02, 2024	Oct. 18, 2024~ Jul. 01, 2025	Oct. 01, 2025	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 06, 2024	Oct. 18, 2024~ Jul. 01, 2025	Sep. 05, 2025	Conducted (TH03-HY)
Hygrometer	TECPEL	DTM-303B	TP200886	NA	Mar. 14, 2024	Oct. 18, 2024~ Mar. 12, 2025	Mar. 13, 2025	Conducted (TH03-HY)
Hygrometer	Testo	608-H1	34893241	NA	Mar. 03, 2024	Mar. 13, 2025~ Jul. 01, 2025	Mar. 02, 2026	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8821C	6262116730	LTE	Jun. 28, 2024	Oct. 18, 2024~ Jun. 25, 2025	Jun. 27, 2025	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8821C	6261849015	LTE	Nov. 26, 2024	Jun. 26, 2025~ Jul. 01, 2025	Nov. 25, 2025	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8000A	6262134933	FR1	Jun. 27, 2024	Oct. 18, 2024~ Jun. 25, 2025	Jun. 26, 2025	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8000A	6261940327	FR1	Nov. 28, 2024	Jun. 26, 2025~ Jul. 01, 2025	Nov. 27, 2025	Conducted (TH03-HY)
Power divider	Anritsu	K241C	2143398	9KHz~40GHz	Jun. 13, 2024	Oct. 18, 2024~ Jun. 11, 2025	Jun. 12, 2025	Conducted (TH03-HY)
Power divider	MVE	MVE8283	E800028	9KHz~18GHz	Aug. 23, 2024	Jun. 12, 2025~ Jul. 01, 2025	Aug. 22, 2025	Conducted (TH03-HY)
RF Cable	MVE	MCBL-LL403P.50	E80002C	9KHz~40GHz	Aug. 23, 2024	Oct. 18, 2024~ Jul. 01, 2025	Aug. 22, 2025	Conducted (TH03-HY)
Software 1	Sporton	FCC 5GNR_FSV3044_20231106	N/A	Conducted Test Item	N/A	Oct. 18, 2024~ Jul. 01, 2025	N/A	Conducted (TH03-HY)

6 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.3 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 6 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7 dB**

Uncertainty of Radiated Emission Measurement (6 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power and EIRP)

NR n53 Maximum Average Power [dBm] (GT - LC = 5.5 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	23.25	23.28	23.27	28.80	0.7586
10	1	22		23.25	23.24	23.24		
10	12	6		23.22	23.21	23.30		
10	1	0		22.64	22.64	22.67		
10	1	23		22.58	22.45	22.55		
10	24	0		22.81	22.72	22.71		
10	1	1	QPSK	23.24	23.20	23.24		
10	1	22		23.21	23.13	23.16		
10	12	6		23.24	23.11	23.12		
10	1	0		22.16	22.14	22.16		
10	1	23		22.11	22.06	22.09		
10	24	0		22.31	22.21	22.34		
10	1	1	16-QAM	22.13	22.18	22.16	27.68	0.5861
10	1	1	64-QAM	20.76	20.72	20.86		
10	1	1	256-QAM	18.70	18.58	18.61		
Limit	EIRP < 37.78dBm			Result			Pass	

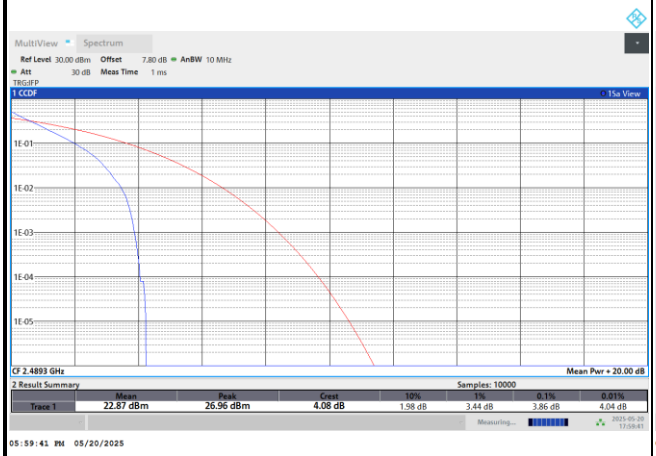
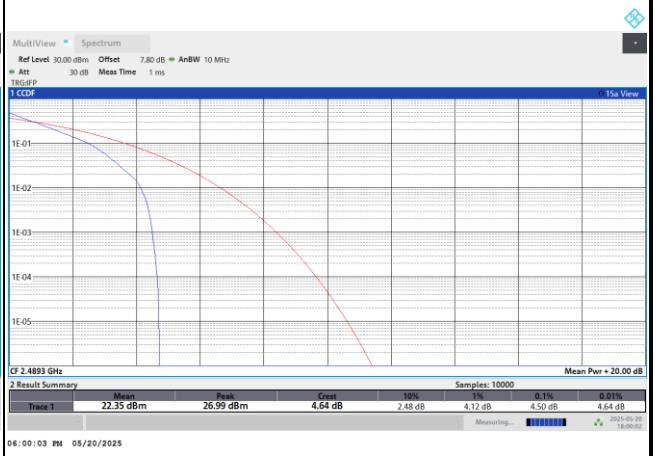
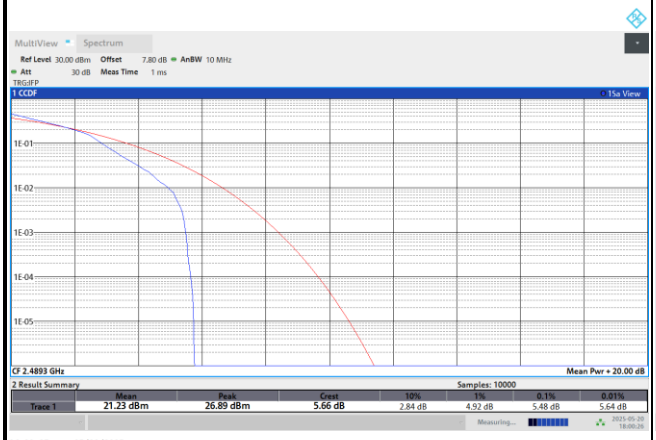
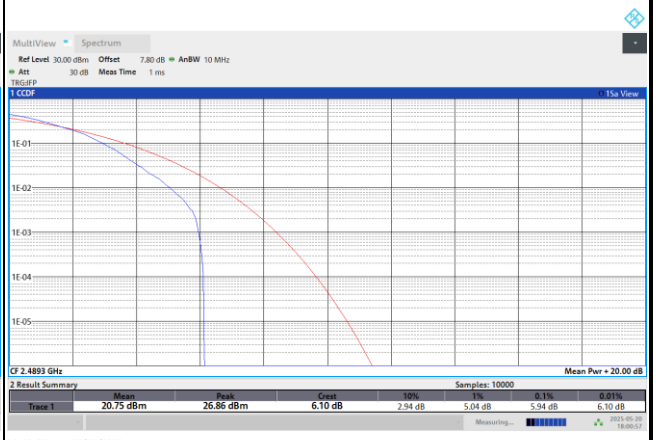
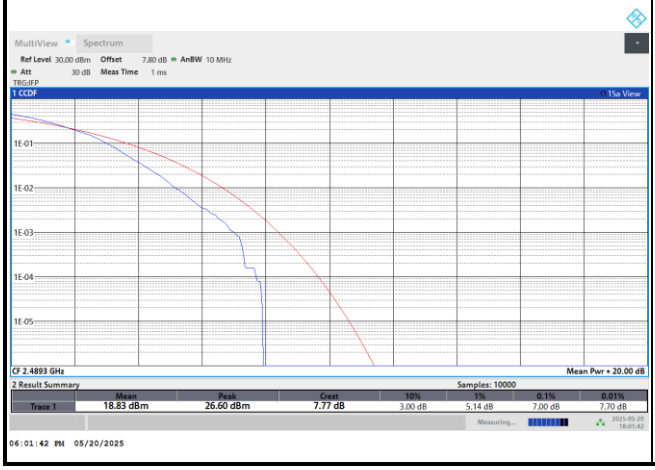
Total power is less than limit 1W

FR1 n53

<SISO Mode>

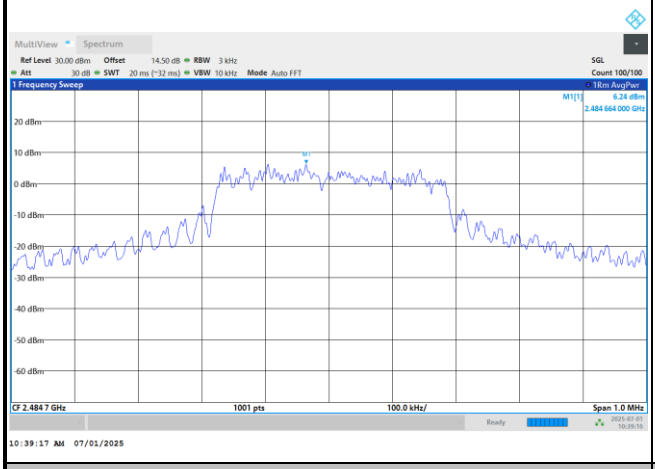
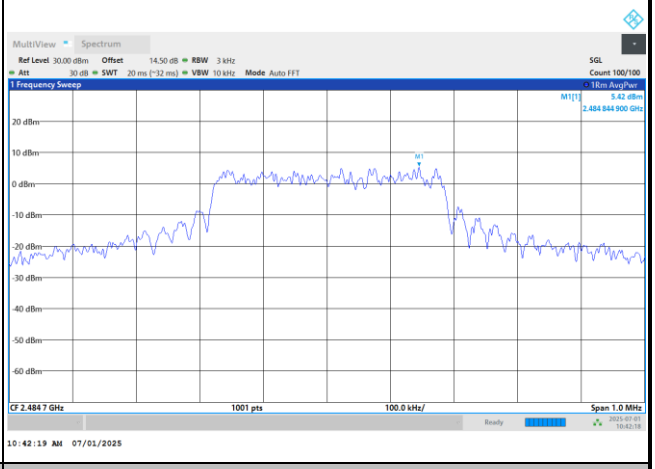
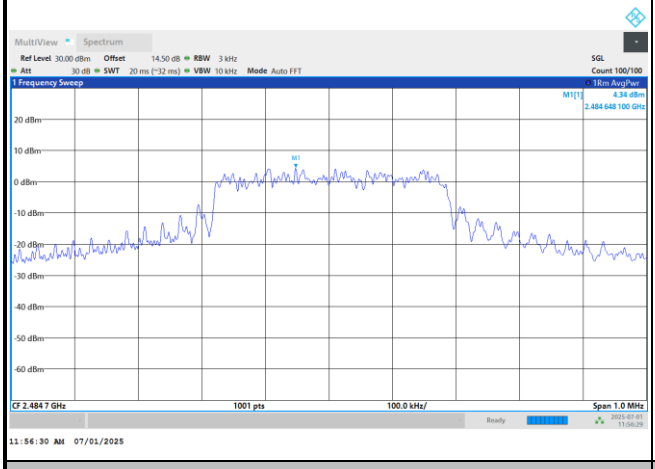
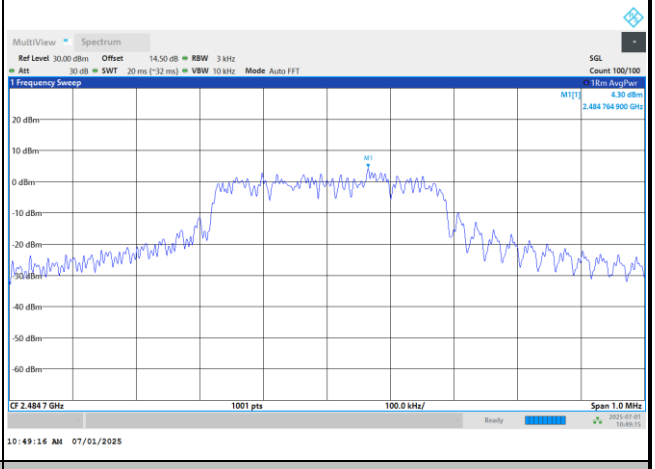
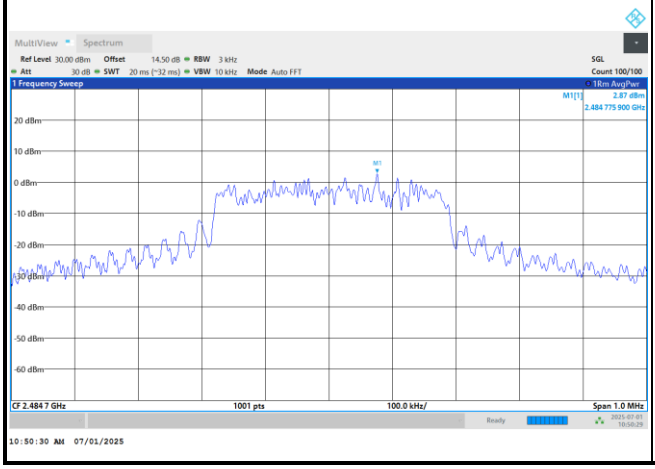
Peak-to-Average Ratio

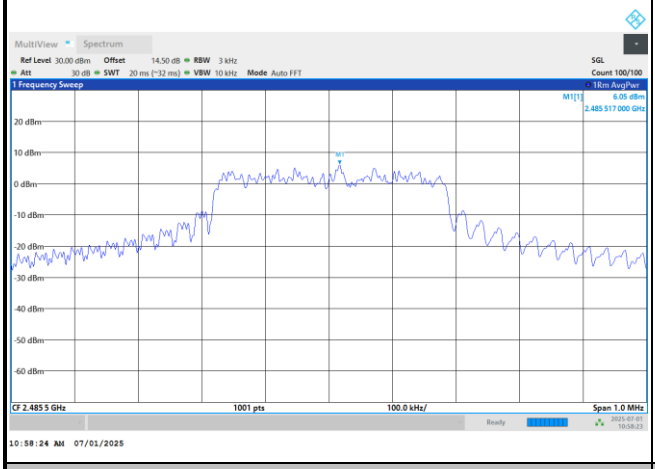
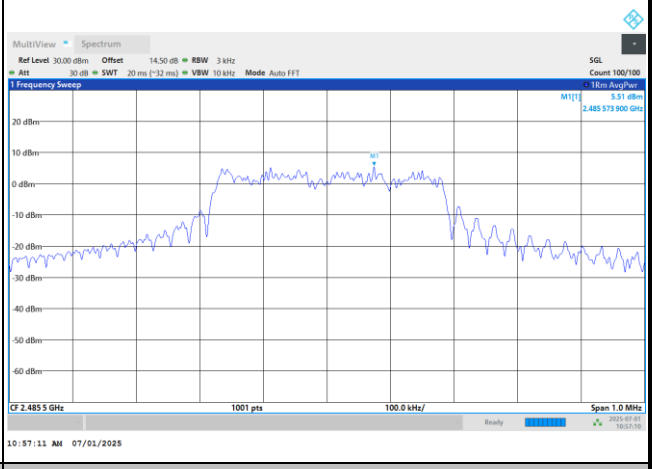
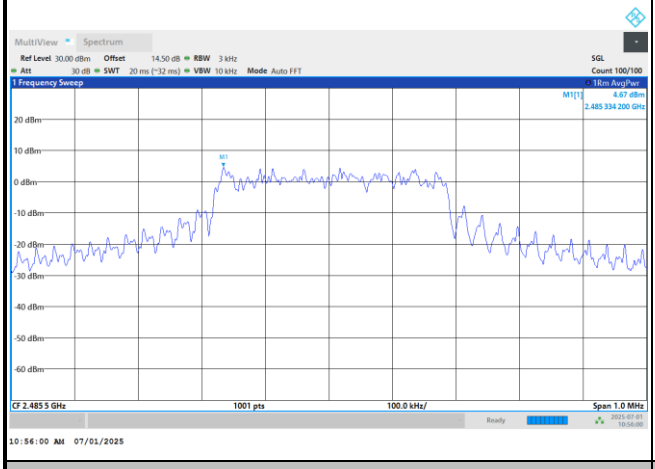
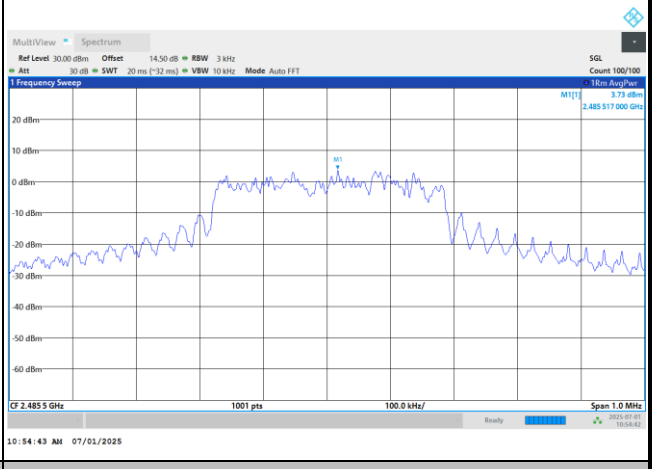
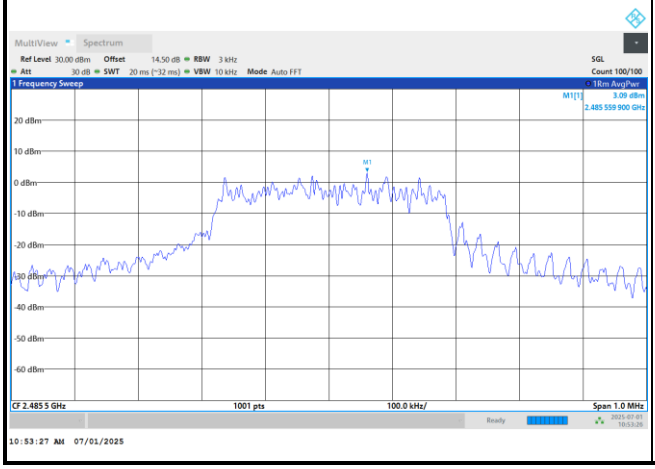
Mode	FR1 n53 / 10MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
Middle CH	3.86	4.50	5.48	5.94	PASS
Mode	FR1 n53 / 10MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
Middle CH	7.00				PASS

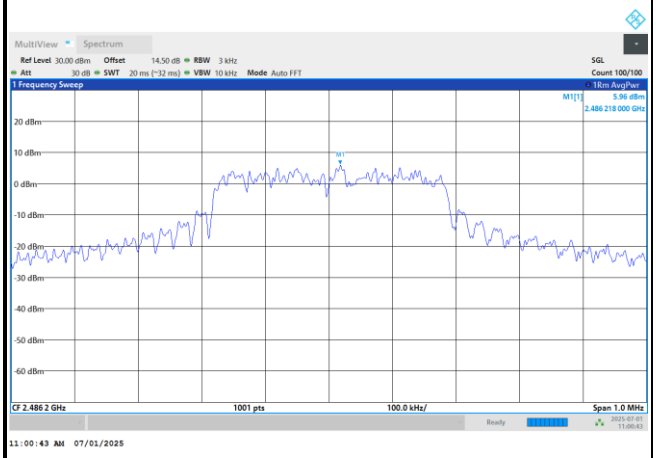
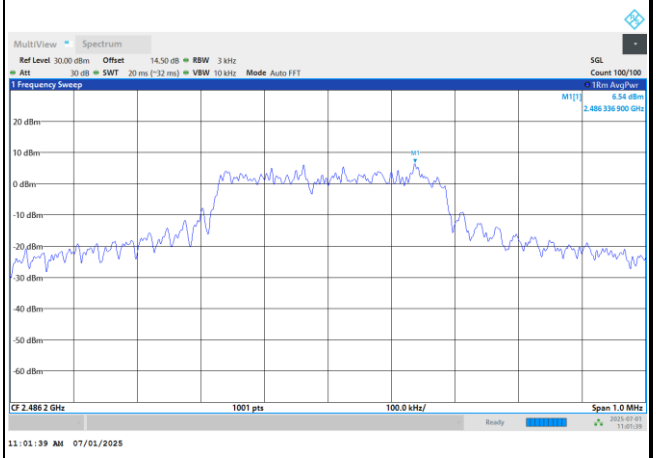
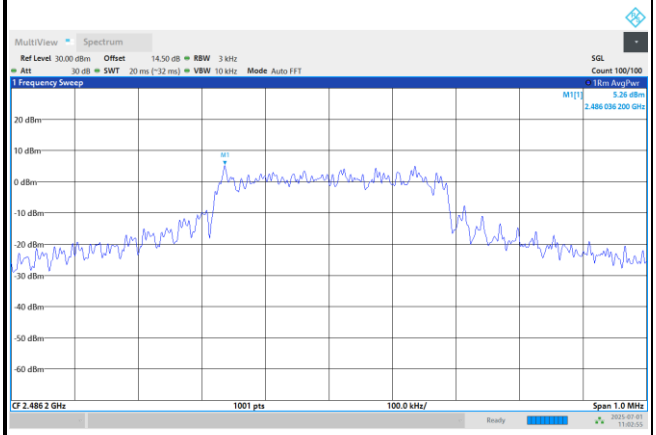
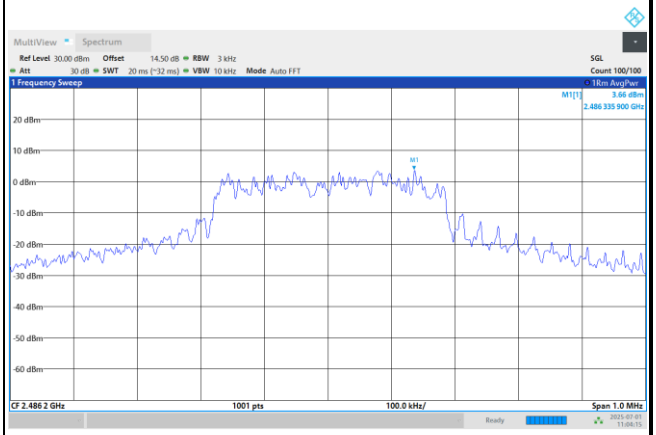
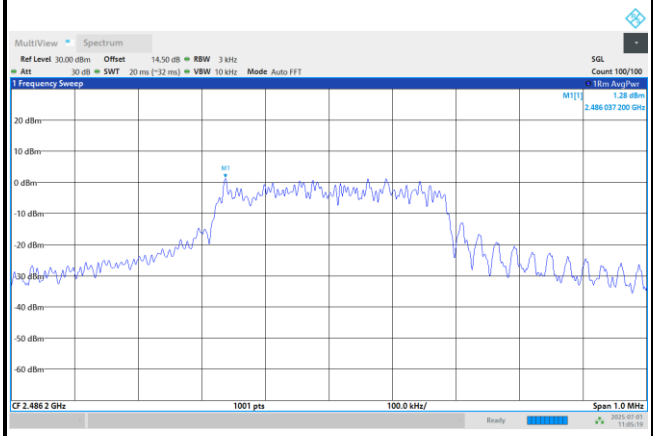
FR1 n53 / 10MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

Power Density

Mode	FR1 n53 / 10MHz / DFT-S OFDM / Conducted Power Density (8dBm/3kHz)			
BW	10MHz			
Mod.	BPSK	QPSK	16QAM	64QAM
RB Size	1RB1	1RB1	1RB1	1RB1
Lowest CH	6.24	5.42	4.34	4.30
Middle CH	6.05	5.51	4.67	3.73
Highest CH	5.96	6.54	5.26	3.66
Mod.	256QAM			
RB Size	1RB1			
Lowest CH	2.87			
Middle CH	3.09			
Highest CH	1.28			

FR1 n53 / 10MHz / DFT-S OFDM / Lowest Channel / 1RB1	
PI/2 BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

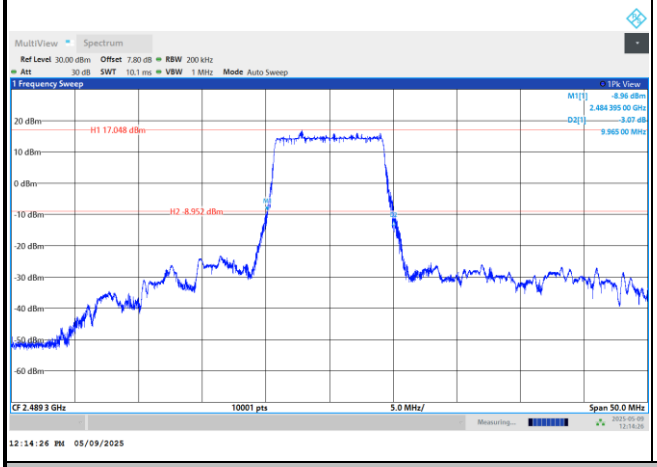
FR1 n53 / 10MHz / DFT-S OFDM / Middle Channel / 1RB1	
PI/2 BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

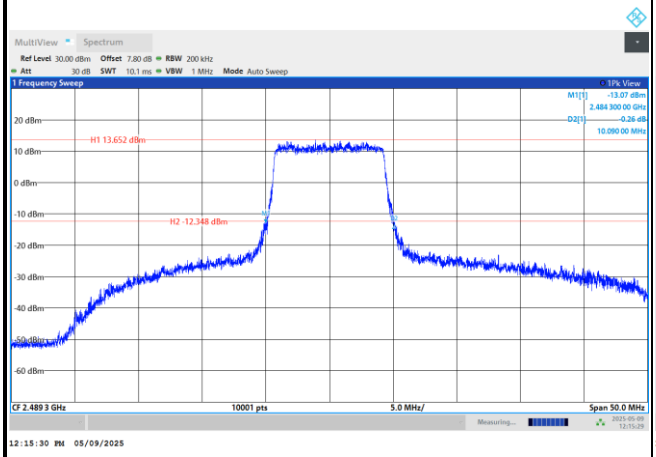
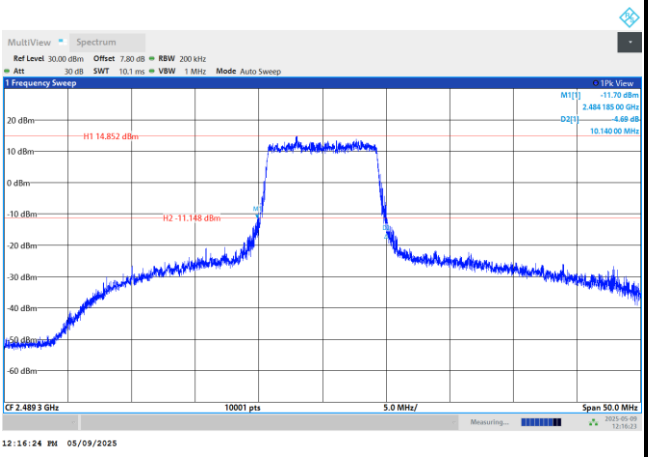
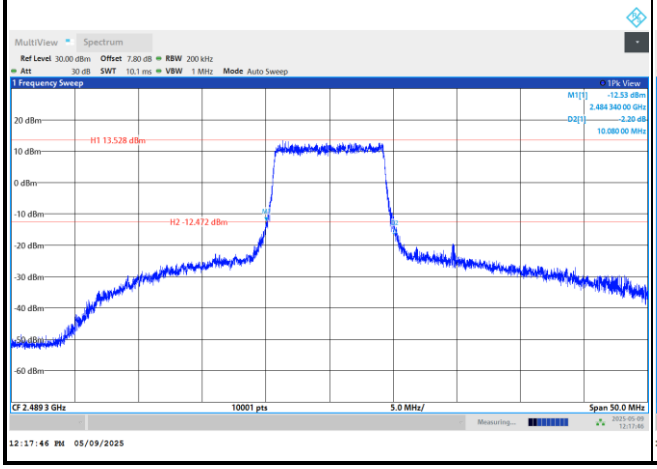
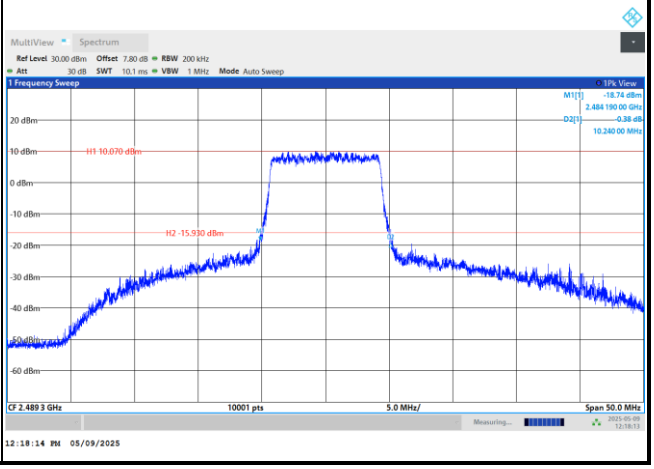
FR1 n53 / 10MHz / DFT-S OFDM / Highest Channel / 1RB1	
PI/2 BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

26dB Bandwidth

Mode	FR1 n53 : 26dB BW(MHz) / DFT-S OFDM							
BW	10MHz							
Mod.	PI/2 BPSK							
Middle CH	9.97							

Mode	FR1 n53 : 26dB BW(MHz) / CP OFDM							
BW	10MHz							
Mod.	QPSK	16QAM						
Middle CH	10.09	10.14						
Mod.	64QAM	256QAM						
Middle CH	10.08	10.24						

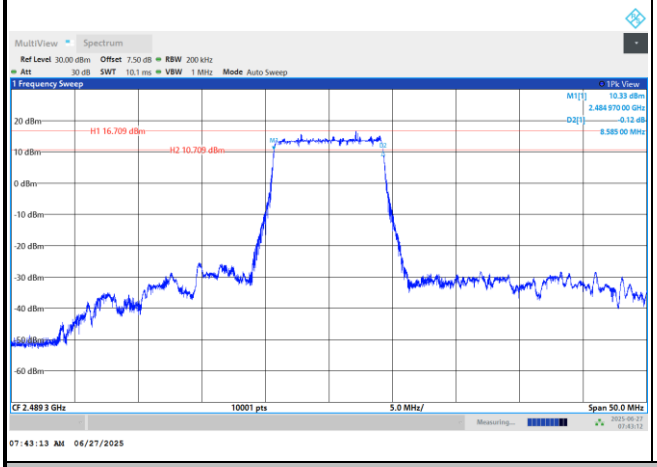
FR1 n53 / 10MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	
	

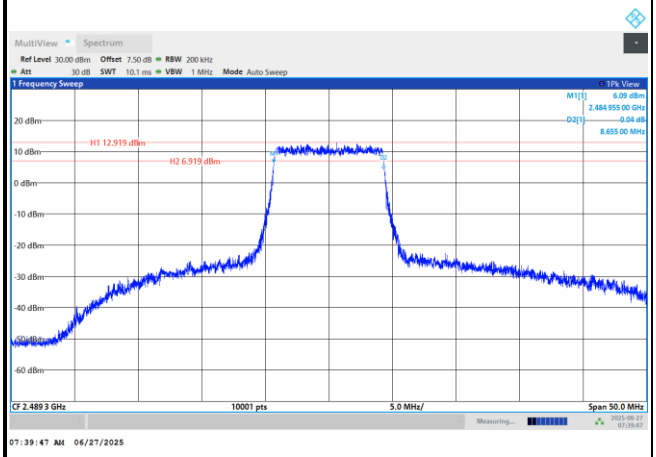
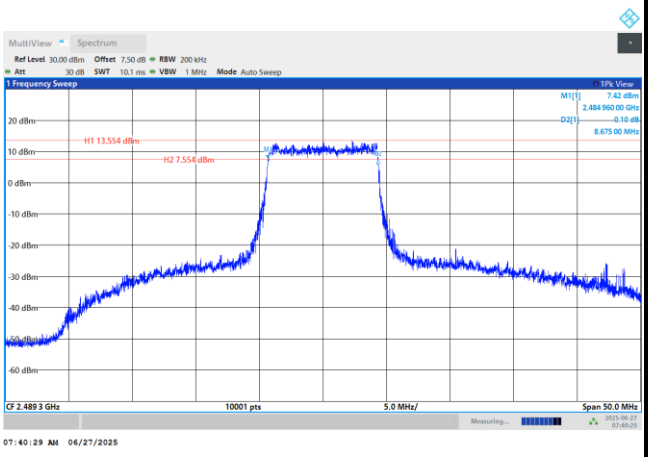
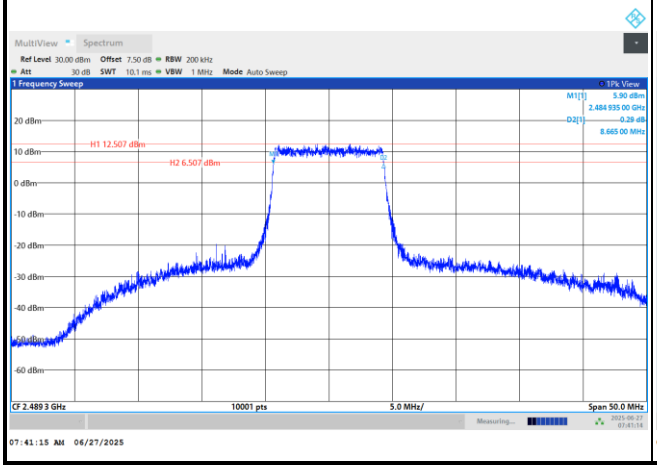
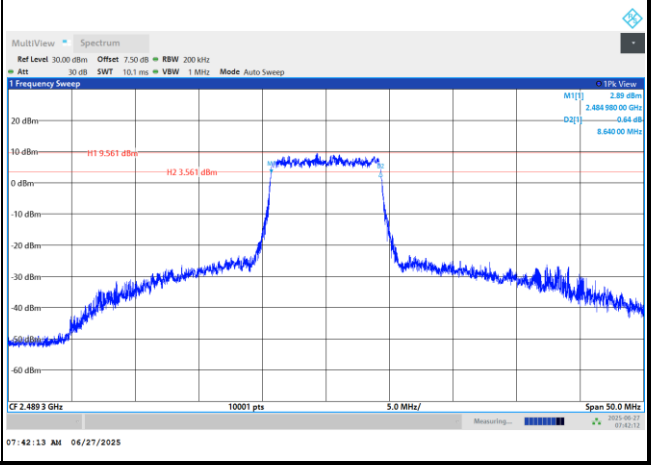
FR1 n53 / 10MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

6dB Bandwidth

Mode	FR1 n53 : 26dB BW(MHz) / DFT-S OFDM							
BW	10MHz							
Mod.	PI/2 BPSK							
Middle CH	8.58							

Mode	FR1 n53 : 26dB BW(MHz) / CP OFDM							
BW	10MHz							
Mod.	QPSK	16QAM						
Middle CH	8.65	8.67						
Mod.	64QAM	256QAM						
Middle CH	8.66	8.64						

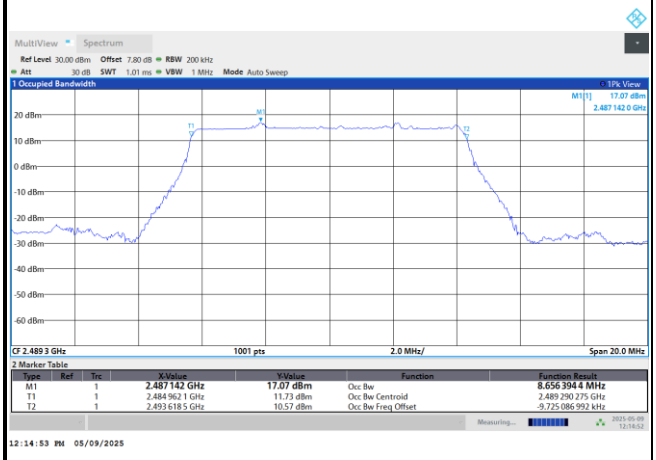
FR1 n53 / 10MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	
	

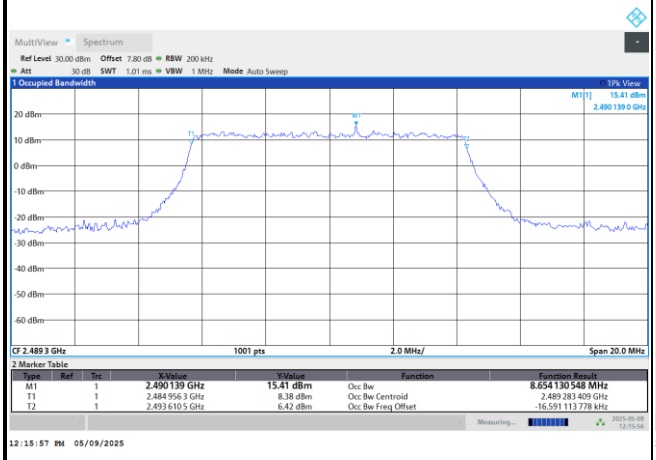
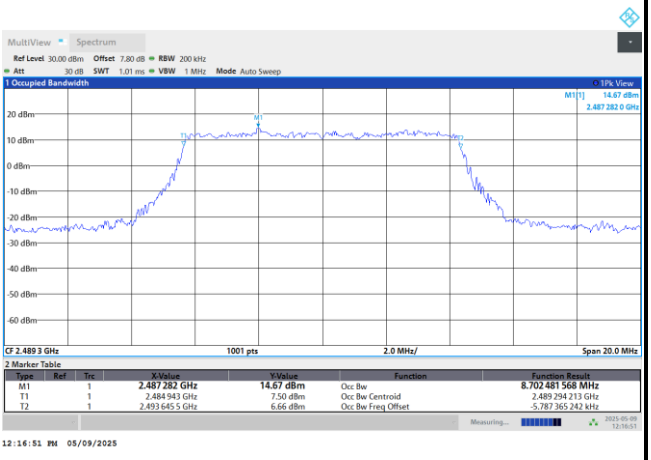
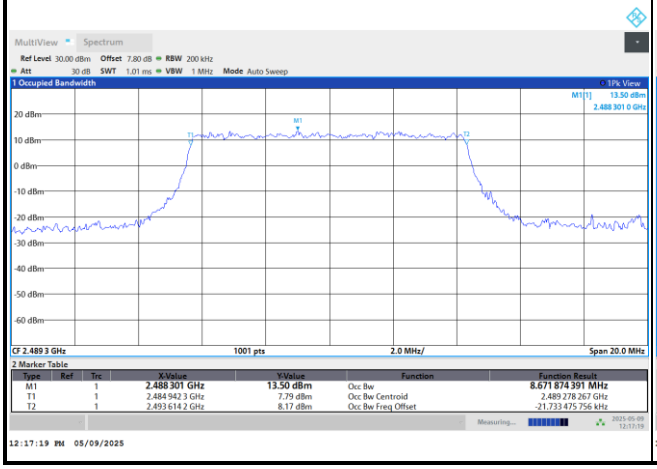
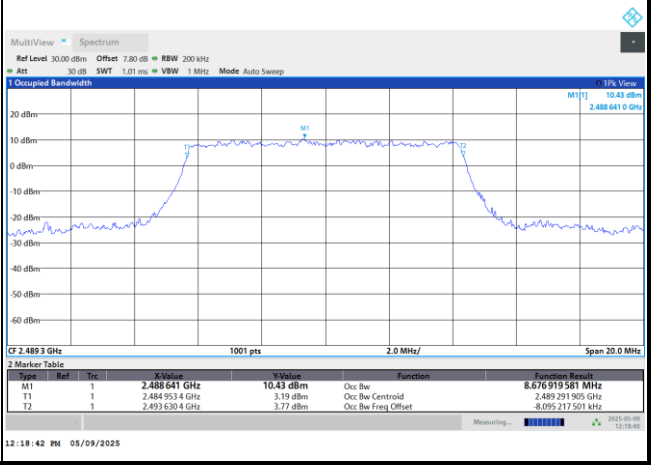
FR1 n53 / 10MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

Occupied Bandwidth

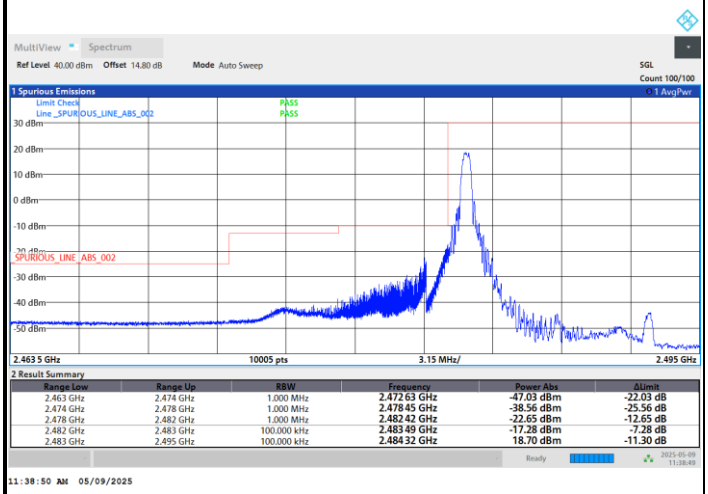
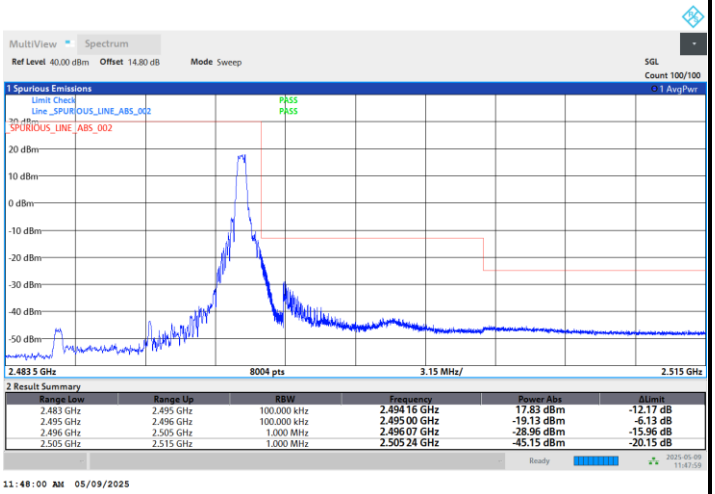
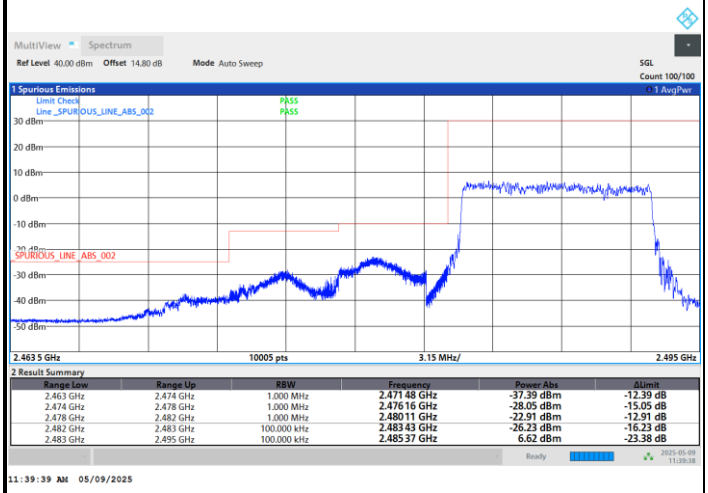
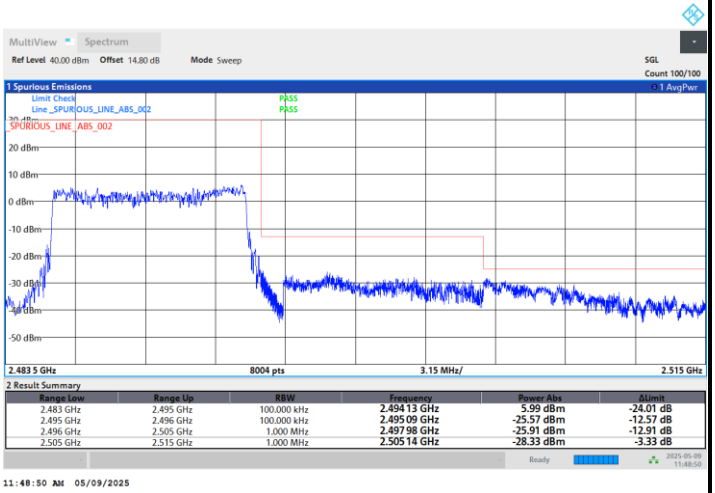
Mode	FR1 n53 : 99%OBW(MHz) / DFT-S OFDM							
BW	10MHz							
Mod.	PI/2 BPSK							
Middle CH	8.66							

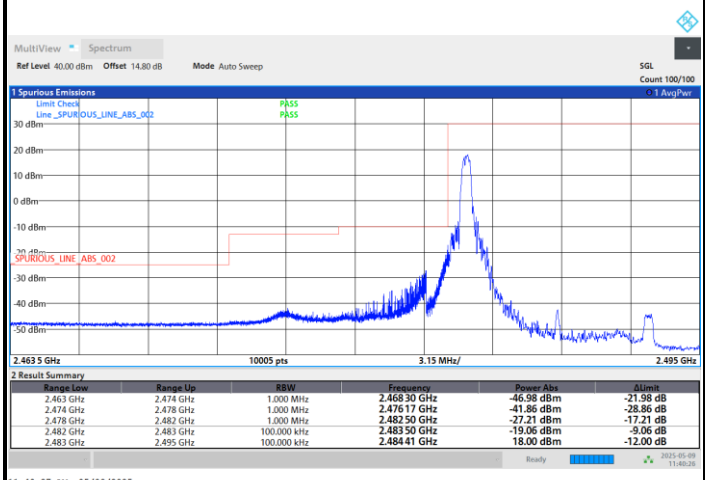
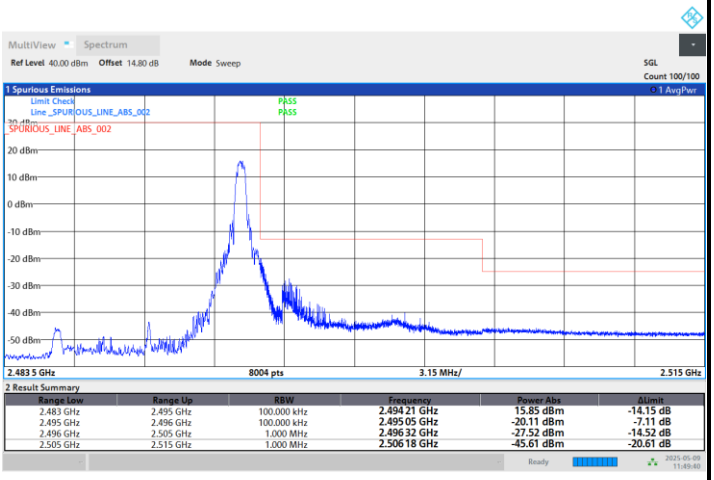
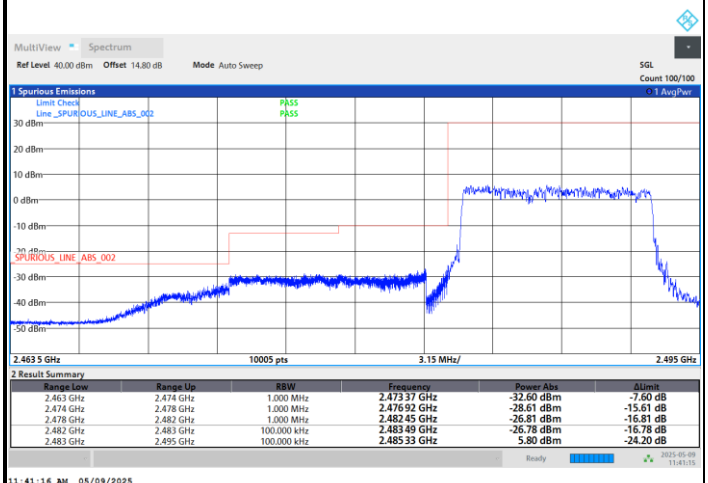
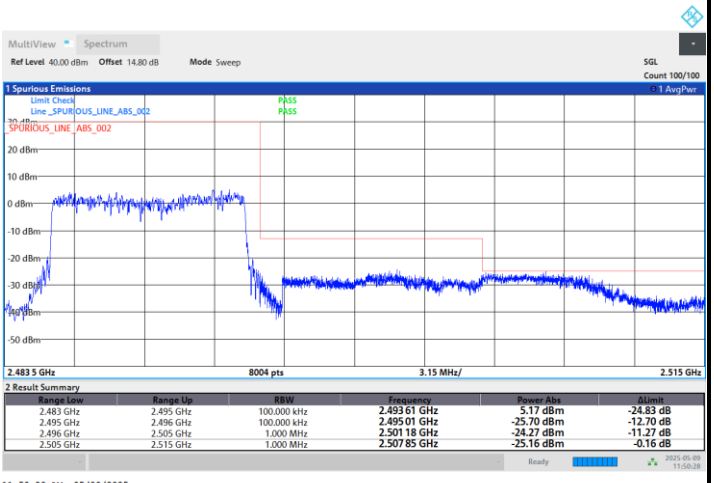
Mode	FR1 n53 : 99%OBW (MHz) / CP OFDM							
BW	10MHz							
Mod.	QPSK	16QAM						
Middle CH	8.65	8.70						
Mod.	64QAM	256QAM						
Middle CH	8.67	8.68						

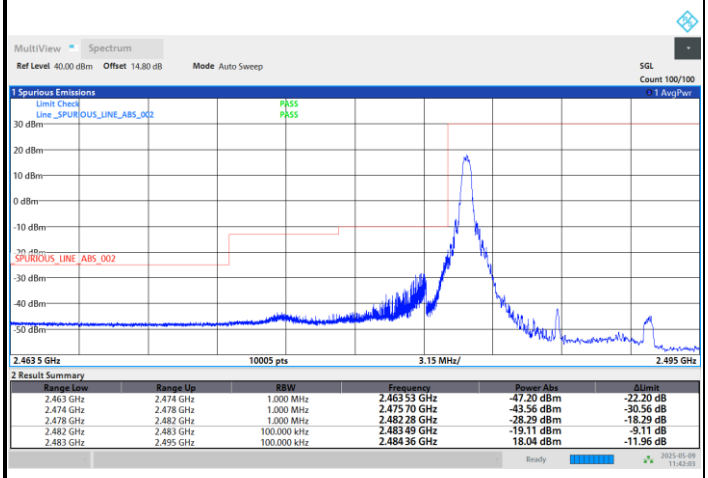
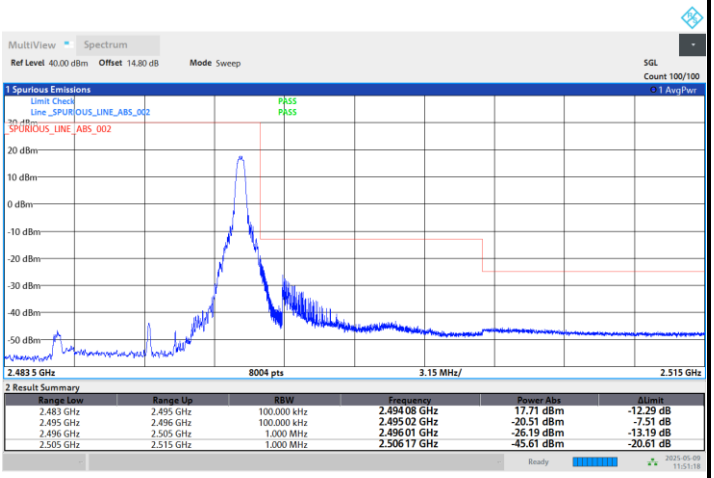
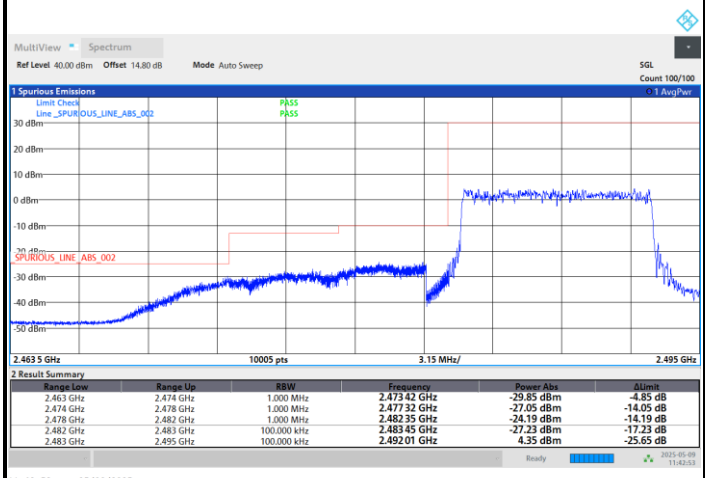
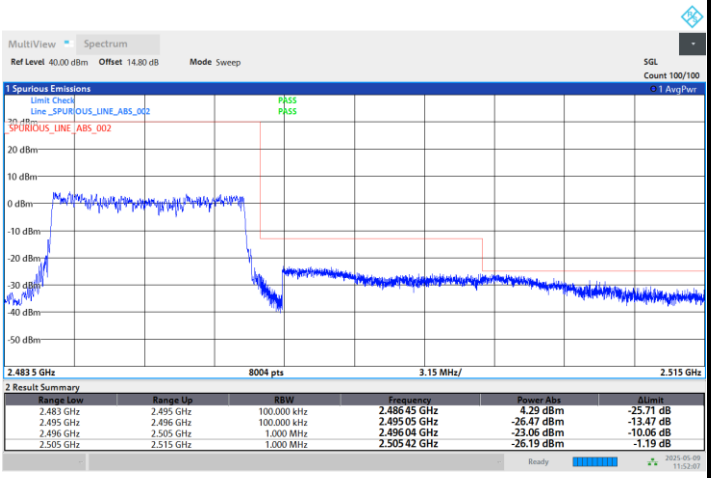
FR1 n53 / 10MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	
	

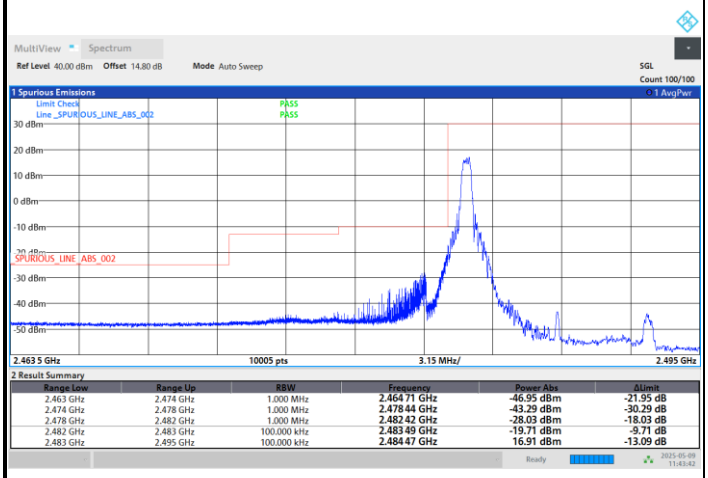
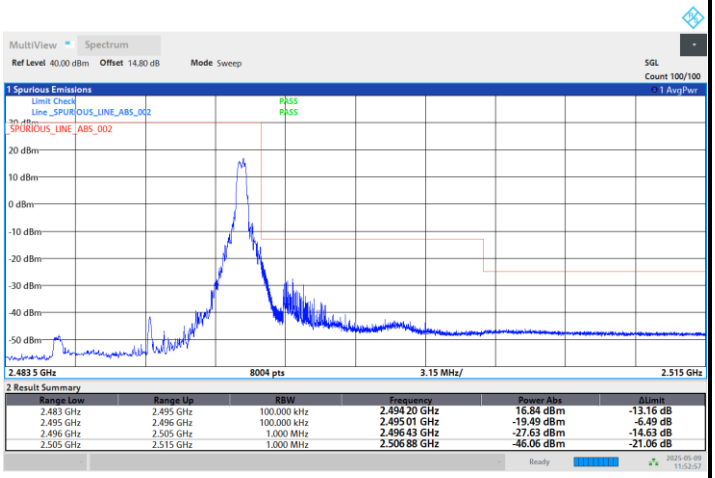
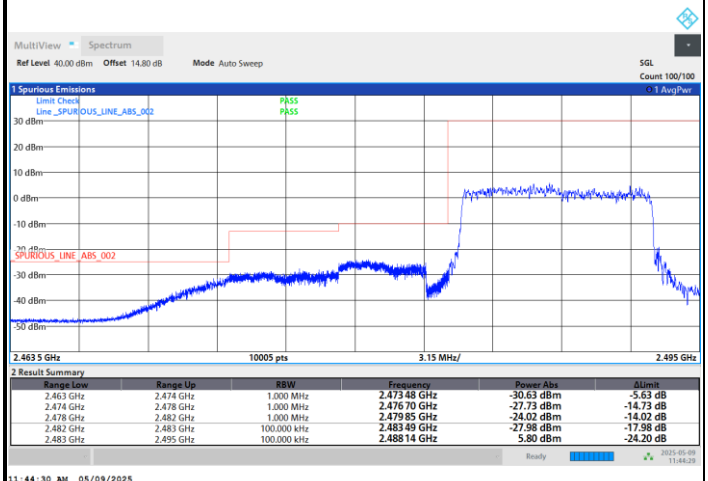
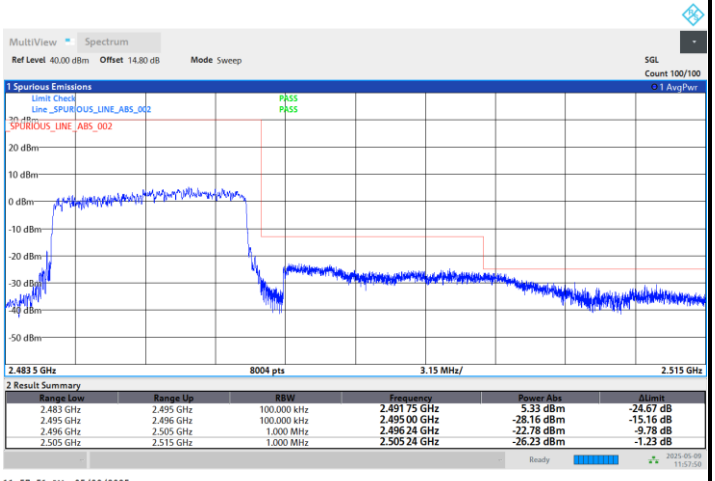
FR1 n53 / 10MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

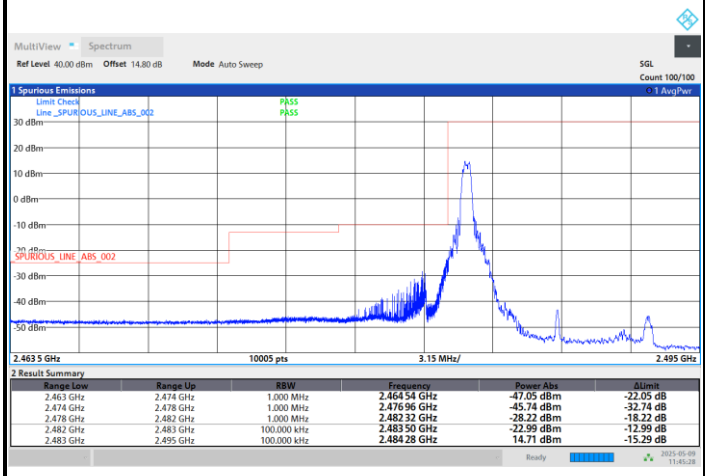
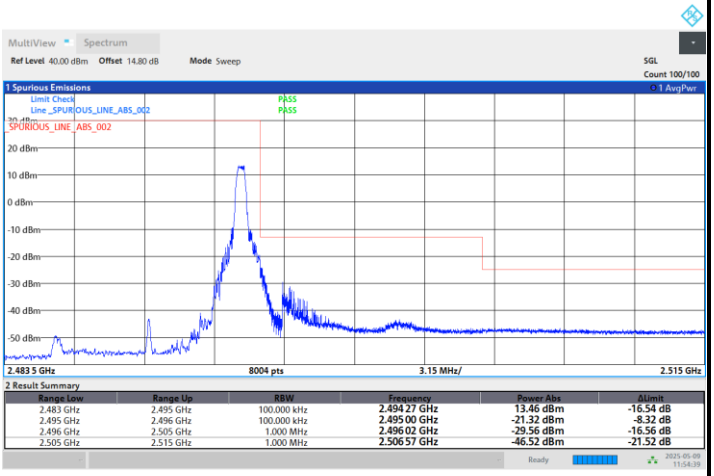
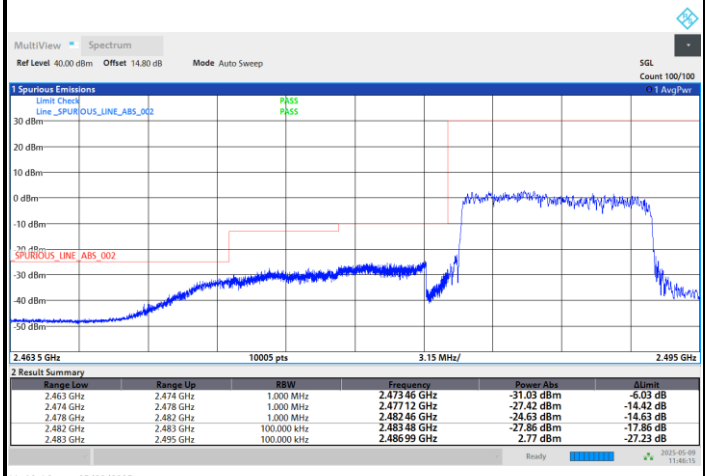
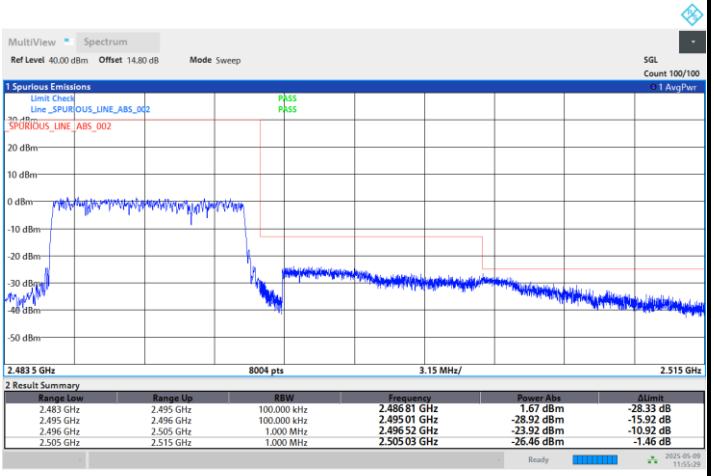
Conducted Band Edge

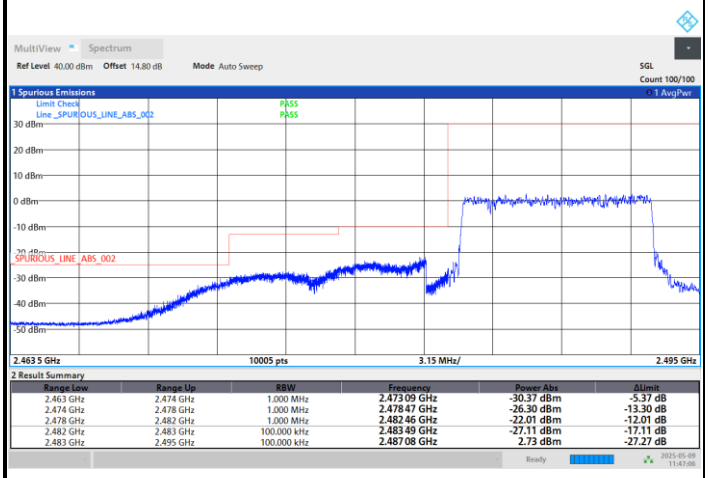
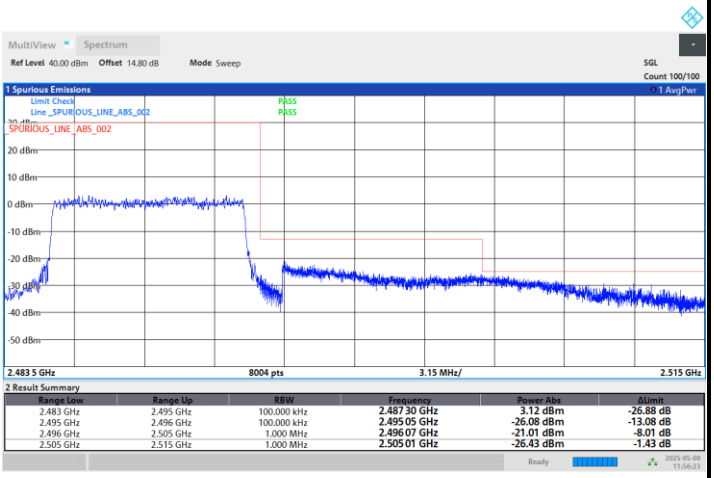
FR1 n53 / 10MHz / DFT-S OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n53 / 10MHz / DFT-S OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n53 / 10MHz / DFT-S OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n53 / 10MHz / DFT-S OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

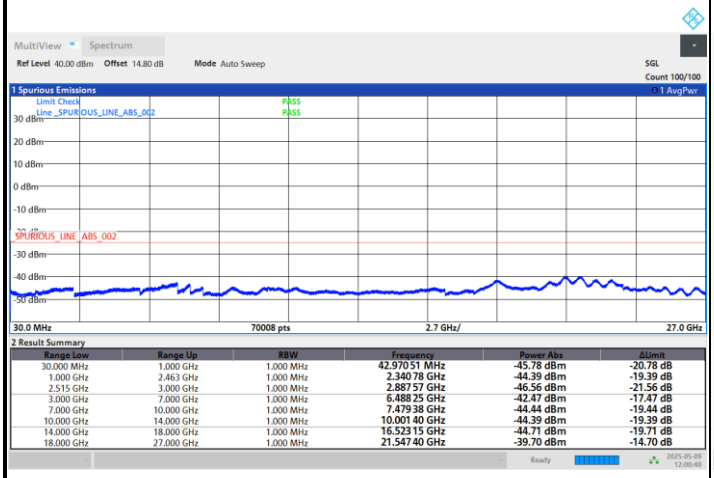
FR1 n53 / 10MHz / DFT-S OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n53 / 10MHz / CP OFDM / QPSK / Full RB	
Lowest Band Edge	Highest Band Edge
	

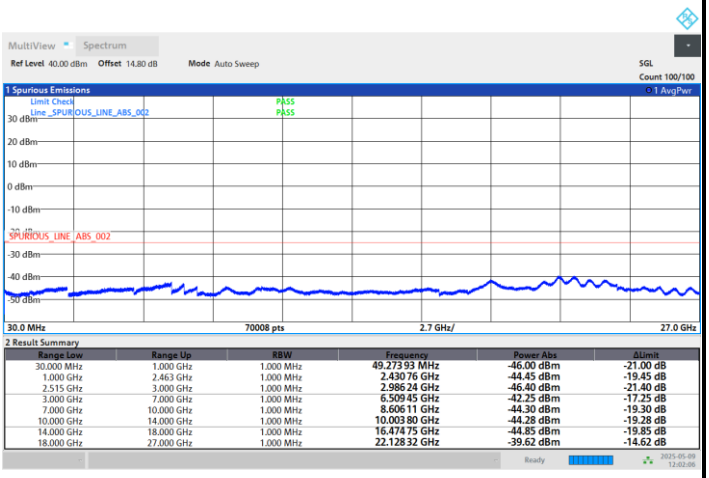
Conducted Spurious Emission

FR1 n53 / 10MHz / DFT-S OFDM / QPSK / 1RB1

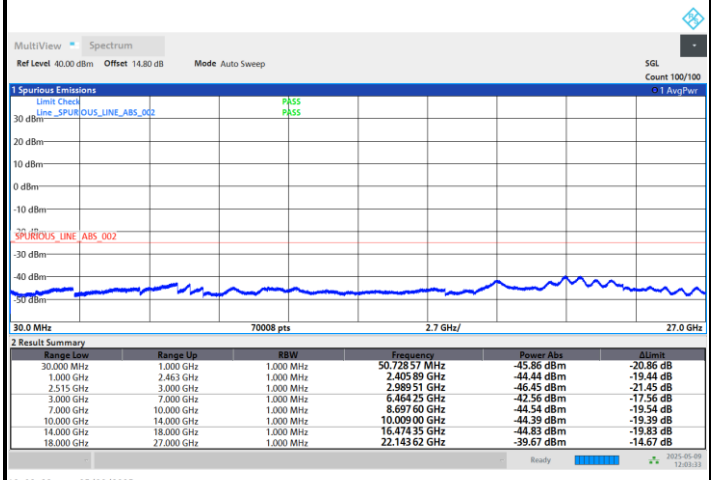
Lowest Channel



Middle Channel



Highest Channel



Frequency Stability

Test Conditions		FR1 n53 (BPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0004	PASS
40	Normal Voltage	0.0017	
30	Normal Voltage	0.0018	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0003	
0	Normal Voltage	0.0035	
-10	Normal Voltage	0.0014	
-20	Normal Voltage	0.0019	
-30	Normal Voltage	0.0013	
20	Maximum Voltage	0.0010	
20	Normal Voltage	0.0000	
20	Minimum Voltage	0.0027	

Note:

1. Normal Voltage = 3.3 V.；Minimum Voltage = 3.135 V.；Maximum Voltage = 4.4 V.
2. The frequency fundamental emissions stay within the authorized frequency block.
3. The frequency variation is sufficient to ensure that the occupied bandwidth of all operation channels stay within the operating frequency block or frequency block group.

Appendix B. Test Results of Radiated Test

B1. Summary of each worse mode

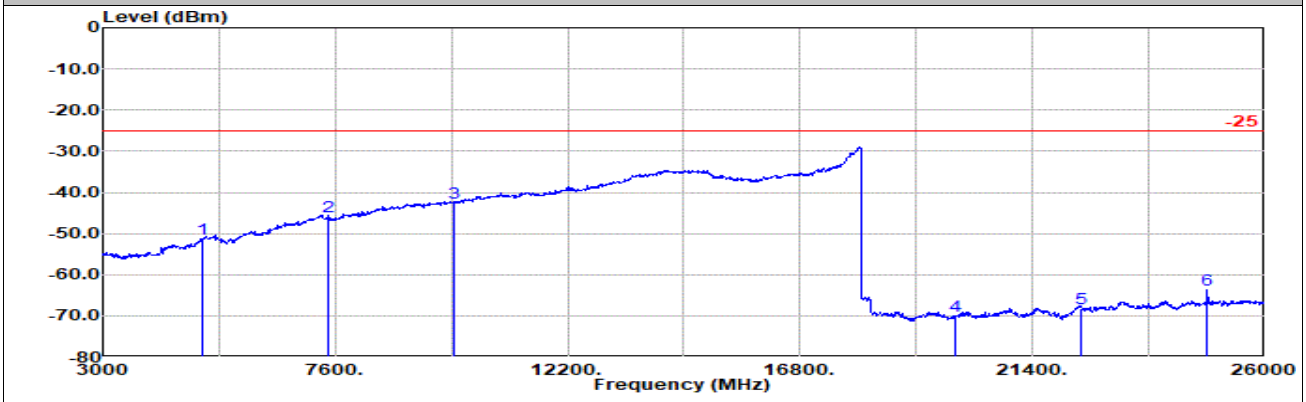
Mode	Part	Band	Ch	Freq (MHz)	Level (dBm)	Det	Ant Factor (dB)	Amp\Cbl (dB)	Filter (dB)	EIRPCF (dB)	Reading (dBuV)	Limit (dBm)	Margin (dB)	Pol	Ant
2	Part 25	NR SA n53	H	9942	-42.41	RMS	38.12	-20.44	0.09	-95.23	35.05	-25.00	-17.41	V	0

ANT 0

Part 25 Mode 2

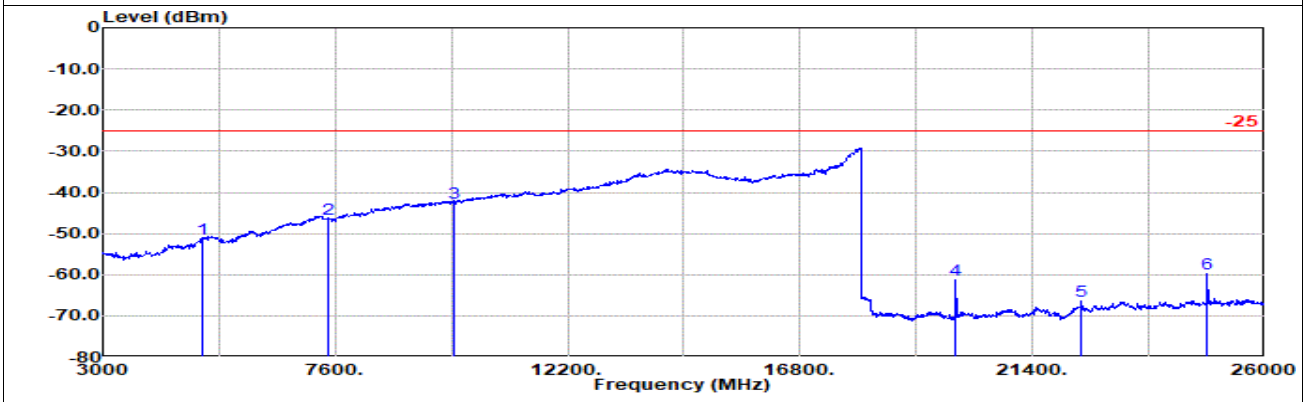
NR SA n53 10M Ch497700 1RB1 BPSK

L



Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Horizontal
: SA NR n53 10M Ch498000 1RB1 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4968.00	-51.43	RMS	33.34	-24.16	0.60	-95.23	34.02	-25.00	-26.43	Horizontal
2	7452.00	-46.02	RMS	36.70	-22.11	0.20	-95.23	34.42	-25.00	-21.02	Horizontal
3	9936.00	-42.46	RMS	38.13	-20.44	0.09	-95.23	34.99	-25.00	-17.46	Horizontal
4	19873.00	-69.93	RMS	37.95	-32.82	-9.54	-95.23	29.71	-25.00	-44.93	Horizontal
5	22357.00	-68.20	RMS	38.31	-31.43	-9.54	-95.23	29.69	-25.00	-43.20	Horizontal
6	24841.00	-63.58	RMS	39.38	-30.10	-9.54	-95.23	31.91	-25.00	-38.58	Horizontal



Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Vertical
: SA NR n53 10M Ch498000 1RB1 QPSK

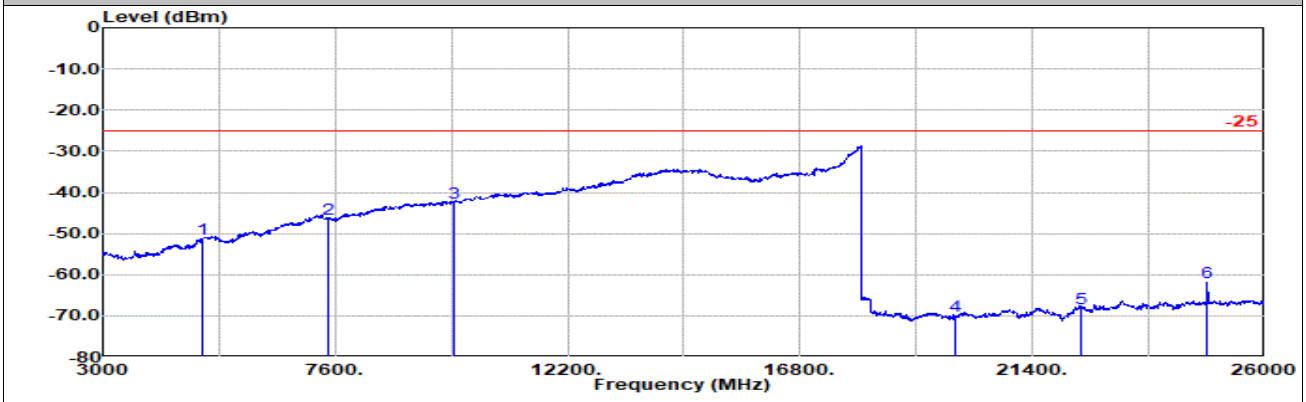
	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4968.00	-51.35	RMS	33.34	-24.16	0.60	-95.23	34.10	-25.00	-26.35	Vertical
2	7452.00	-46.41	RMS	36.70	-22.11	0.20	-95.23	34.03	-25.00	-21.41	Vertical
3	9936.00	-42.58	RMS	38.13	-20.44	0.09	-95.23	34.87	-25.00	-17.58	Vertical
4	19873.00	-61.37	RMS	37.95	-32.82	-9.54	-95.23	38.27	-25.00	-36.37	Vertical
5	22357.00	-66.31	RMS	38.31	-31.43	-9.54	-95.23	31.58	-25.00	-41.31	Vertical
6	24841.00	-59.87	RMS	39.38	-30.10	-9.54	-95.23	35.62	-25.00	-34.87	Vertical

ANT 0

Part 25 Mode 2

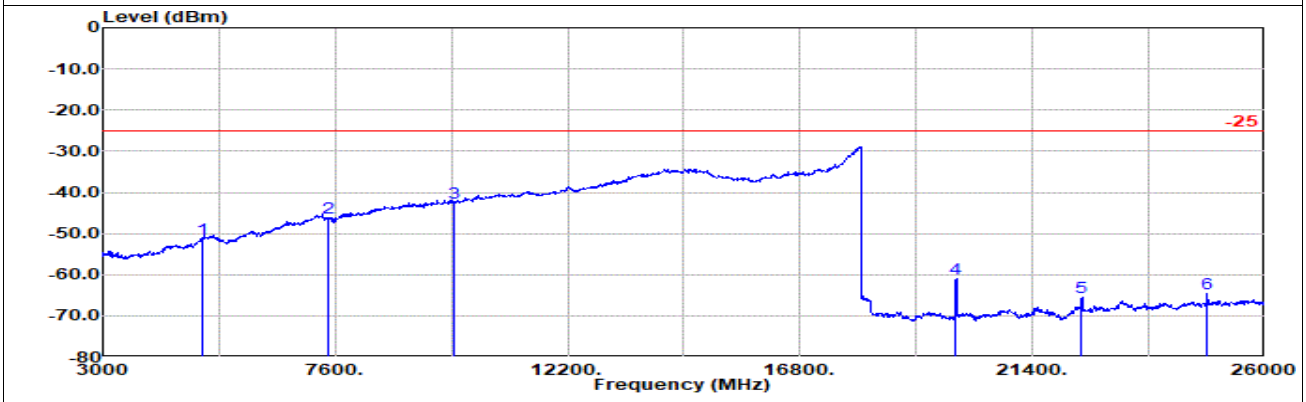
NR SA n53 10M Ch497860 1RB1 BPSK

M



Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Horizontal
: SA NR n53 10M Ch498000 1RB1 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4970.00	-51.20	RMS	33.34	-24.16	0.60	-95.23	34.25	-25.00	-26.20	Horizontal
2	7455.00	-46.34	RMS	36.69	-22.11	0.19	-95.23	34.12	-25.00	-21.34	Horizontal
3	9940.00	-42.59	RMS	38.12	-20.44	0.09	-95.23	34.87	-25.00	-17.59	Horizontal
4	19879.00	-70.15	RMS	37.96	-32.82	-9.54	-95.23	29.48	-25.00	-45.15	Horizontal
5	22364.00	-68.38	RMS	38.33	-31.43	-9.54	-95.23	29.49	-25.00	-43.38	Horizontal
6	24849.00	-61.74	RMS	39.40	-30.10	-9.54	-95.23	33.73	-25.00	-36.74	Horizontal



Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Vertical
: SA NR n53 10M Ch498000 1RB1 QPSK

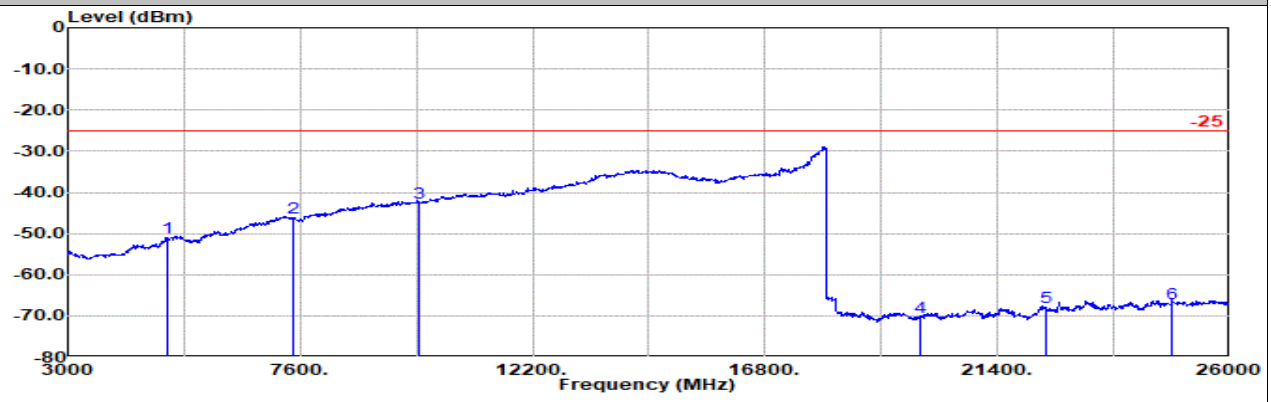
	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4970.00	-51.30	RMS	33.34	-24.16	0.60	-95.23	34.15	-25.00	-26.30	Vertical
2	7455.00	-46.23	RMS	36.69	-22.11	0.19	-95.23	34.23	-25.00	-21.23	Vertical
3	9940.00	-42.45	RMS	38.12	-20.44	0.09	-95.23	35.01	-25.00	-17.45	Vertical
4	19879.00	-60.89	RMS	37.96	-32.82	-9.54	-95.23	38.74	-25.00	-35.89	Vertical
5	22364.00	-65.46	RMS	38.33	-31.43	-9.54	-95.23	32.41	-25.00	-40.46	Vertical
6	24849.00	-64.58	RMS	39.40	-30.10	-9.54	-95.23	30.89	-25.00	-39.58	Vertical

ANT 0

Part 25 Mode 2

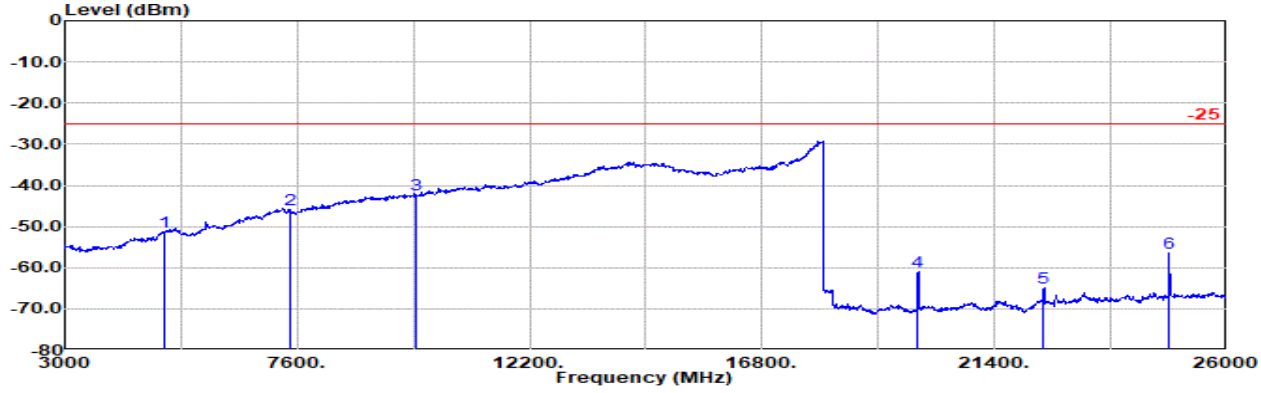
NR SA n53 10M Ch498000 1RB1 BPSK

H



Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Horizontal
: SA NR n53 10M Ch498000 1RB1 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4971.00	-51.15	RMS	33.34	-24.15	0.60	-95.23	34.29	-25.00	-26.15	Horizontal
2	7457.00	-46.16	RMS	36.69	-22.11	0.19	-95.23	34.30	-25.00	-21.16	Horizontal
3	9942.00	-42.49	RMS	38.12	-20.44	0.09	-95.23	34.97	-25.00	-17.49	Horizontal
4	19885.00	-70.24	RMS	37.97	-32.81	-9.54	-95.23	29.37	-25.00	-45.24	Horizontal
5	22370.00	-67.90	RMS	38.34	-31.42	-9.54	-95.23	29.95	-25.00	-42.90	Horizontal
6	24856.00	-67.10	RMS	39.36	-30.10	-9.54	-95.23	28.41	-25.00	-42.10	Horizontal

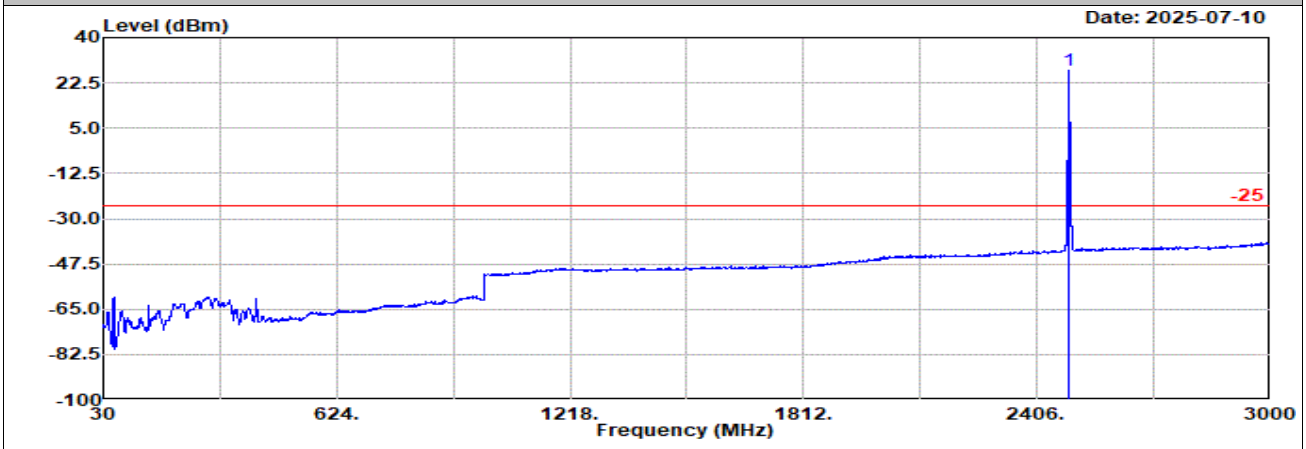


Site : 03CH12-HY
Condition: -25 3m 9120D-02114-240711 Vertical
: SA NR n53 10M Ch498000 1RB1 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	4971.00	-51.44	RMS	33.34	-24.15	0.60	-95.23	34.00	-25.00	-26.44	Vertical
2	7457.00	-46.02	RMS	36.69	-22.11	0.19	-95.23	34.44	-25.00	-21.02	Vertical
3	9942.00	-42.41	RMS	38.12	-20.44	0.09	-95.23	35.05	-25.00	-17.41	Vertical
4	19885.00	-61.05	RMS	37.97	-32.81	-9.54	-95.23	38.56	-25.00	-36.05	Vertical
5	22370.00	-64.96	RMS	38.34	-31.42	-9.54	-95.23	32.89	-25.00	-39.96	Vertical
6	24856.00	-56.45	RMS	39.36	-30.10	-9.54	-95.23	39.06	-25.00	-31.45	Vertical

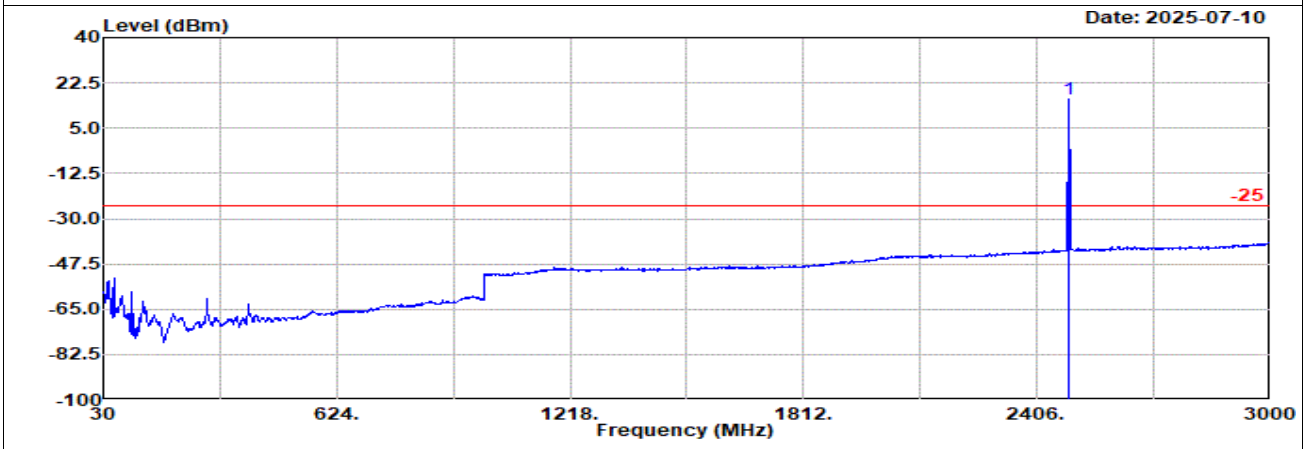
ANT 0

Part 25 Mode 2
NR SA n53 10M Ch498000 1RB1 BPSK
H




```
Site      : 03CH12-HY
Condition: -25 3m 9120D-02038-240729 Horizontal
         : NR Band 53 10M Ch498000 1RB1 BPSK
         : #1 is fundamental signal which can be ignored.
```

	Freq	Level	Detector	Ant Factor	Amp\Cbl	Filter	EIRPCF	Reading	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	2485.77	27.41	RMS	27.74	6.90	0.00	-95.23	88.00	-25.00	52.41	Horizontal




```
Site      : 03CH12-HY
Condition: -25 3m 9120D-02038-240729 Vertical
         : NR Band 53 10M Ch498000 1RB1 BPSK
         : #1 is fundamental signal which can be ignored.
```

	Freq	Level	Detector	Ant Factor	Amp\Cbl	Filter	EIRPCF	Reading	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	2485.77	16.13	RMS	27.74	6.90	0.00	-95.23	76.72	-25.00	41.13	Vertical

Remark: #1 is fundamental signal which can be ignored.