CERTIFICATION TEST REPORT

Report Number. : U-4792013161-FR6V3

Applicant	:	SOLiD, Inc. 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Model	:	nMRFM_25
FCC ID	:	W6UNMRFM25
EUT Description	:	nGENESIS
Test Standard(s)	:	FCC CFR47 PART 2 FCC CFR47 PART 27

Date Of Issue:
2026-03-09

Prepared by:
UL KOREA LTD.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Uiwang Test Site: UL Korea, Ltd. Uiwang Laboratory
42, Obongsandan 1-ro, Uiwang-si, Gyeonggi-do, Republic of Korea,

TEL: (031) 389-9603
FAX: (031) 462-8355

IAS ACCREDITED Testing Laboratory TL-1087

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2026-01-05	Initial issue	Jungi Shin
V2	2026-02-16	Updated to address TCB`s question	Jungi Shin
V3	2026-03-09	Updated to address TCB`s question	Jungi Shin

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42, Obongsandan 1-ro, Uiwang-si, Gyeonggi-do, Republic of Korea TEL: (031) 389-9603 FAX: (031) 462-8355

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SOLiD, Inc.

EUT DESCRIPTION: nGENESIS

MODEL NUMBER: nMRFM_25

SERIAL NUMBER: Identical prototype

DATE TESTED: 2025-10-03 – 2026-03-05

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 2	Complies
FCC PART 27	Complies

UL KOREA LTD. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL KOREA LTD. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Changmin Kim
Senior Laboratory Engineer
UL Korea, Ltd.

Tested By:

Jungi Shin
Laboratory Engineer Associate
UL Korea, Ltd.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 27.
3. ANSI C63.26, 2015
4. KDB 935210 D05 v01r04 Indus Booster Basic Meas
5. KDB 971168 D01 v03r01 Power Meas License Digital Systems v03r01
6. KDB 662911 D01 Multiple Transmitter Output v02r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 42, Obongsandan 1-ro, Uiwang-si, Gyeonggi-do, Republic of Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

42, Obongsandan 1-ro
☐ Chamber 1
☒ Chamber 2

Used ISED Test Site Reg.(company number): 32001
CAB Identifier: KR0161

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-1087. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2022/05/TL-1087-Cert-New.pdf

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:
ERP (dBm) = Measured Voltage (dBuV) – 107 dB + Conversion Factor (dB) + Antenna Factor (dB/m) + Total Loss [Cable Loss (dB) – Preamp Gain (dB)]

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Common Items

PARAMETER	UNCERTAINTY
RF Output Power	0.94 dB
Occupied Bandwidth	0.06 %
Conducted Spurious Emissions	1.21 dB

Uncertainty figures are valid to a confidence level of 95%, k=2

Chamber 2

PARAMETER	UNCERTAINTY
Radiated Disturbance, below 30 MHz	1.93 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.64 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.48 dB
Radiated Disturbance, above 18 GHz	6.25 dB

Uncertainty figures are valid to a confidence level of 95%, k=2

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

<table>
<tr><td>Power Supply</td><td>DC 12 V, 50.2 V Note1
nMRN : DC 48 V, AC 100 ~ 240 V(50 / 60 Hz)</td></tr>
<tr><td>Frequency Range</td><td><table><tr><th>Band Name</th><th>Downlink (MHz)</th></tr><tr><td>BRS</td><td>2496 ~ 2690</td></tr></table></td></tr>
<tr><td>Tx Output Power</td><td>ANT1: 35 dBm
ANT2: 35 dBm
2TX MIMO: 38 dBm</td></tr>
<tr><td>Antenna Gain</td><td>SISO: 17 dBi
2TX MIMO: 20 dBi</td></tr>
</table>

Note1: The device operates be receiving power from two sources simultaneously.
Note2: When configured in nMRN, this device enable 2x2 MIMO operation by configuring two identical units, each equivalent to a SISO operation.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.

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5.3. WORST-CASE ORIENTATION

The test was generally based on the method of KDB 935210 D05 v01r04 and only followed ANSI C63.26-2015 if there was no test method in KDB standard.

EUT was tested with following modulated signals.

KDB 935210 D05 v01r04
3.1 Commercial Mobile Radio Services (CMRS) non-consumer RF repeaters, amplifiers, and industrial boosters shall be tested for compliance with the applicable regulatory technical requirements. Input and output power and emissions measurements must be performed using test signals that are intended to bound the typical signal space encountered within the CMRS bands. Broadband amplifiers/boosters shall be tested using a representative band-limited AWGN signal. The AWGN test signal must have a 4.1 MHz 99 % occupied bandwidth (OBW) (representative of a 5 MHz LTE channel). Narrowband test signals shall use a representative MSK modulated signal, with a Gaussian Filter of 0.3 and a data rate of 270 kbps (representative of a GSM-TDMA signal).

The frequency stability measurement has been omitted in accordance with section 4.8 of KDB 935210 D05 v01r04.
: It can be confirmed through occupied bandwidth and input-versus-output signal comparison test that EUT does not alter the input signal.

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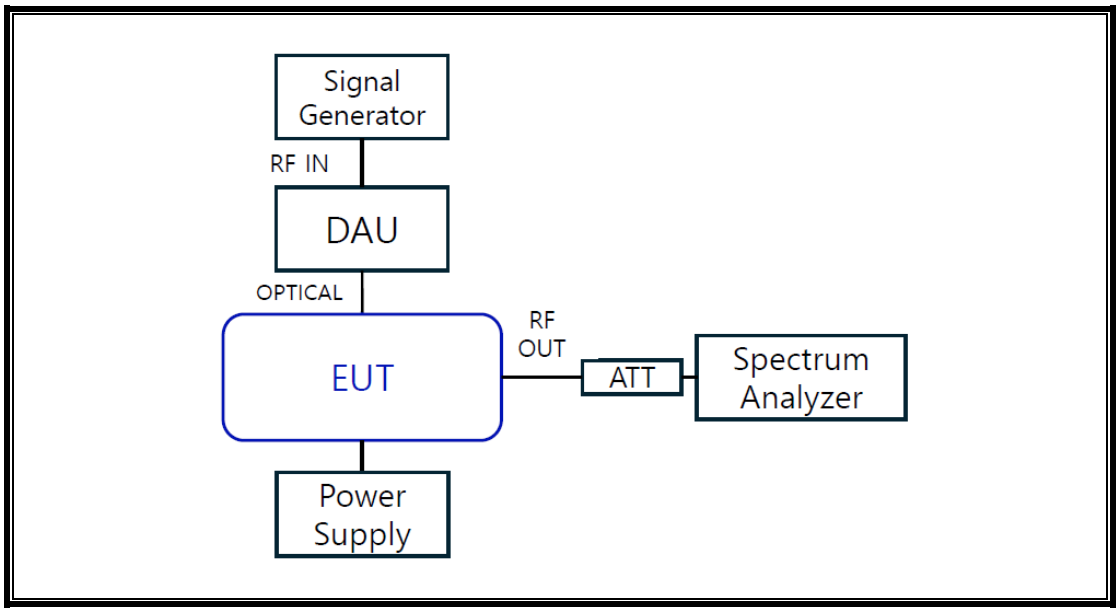
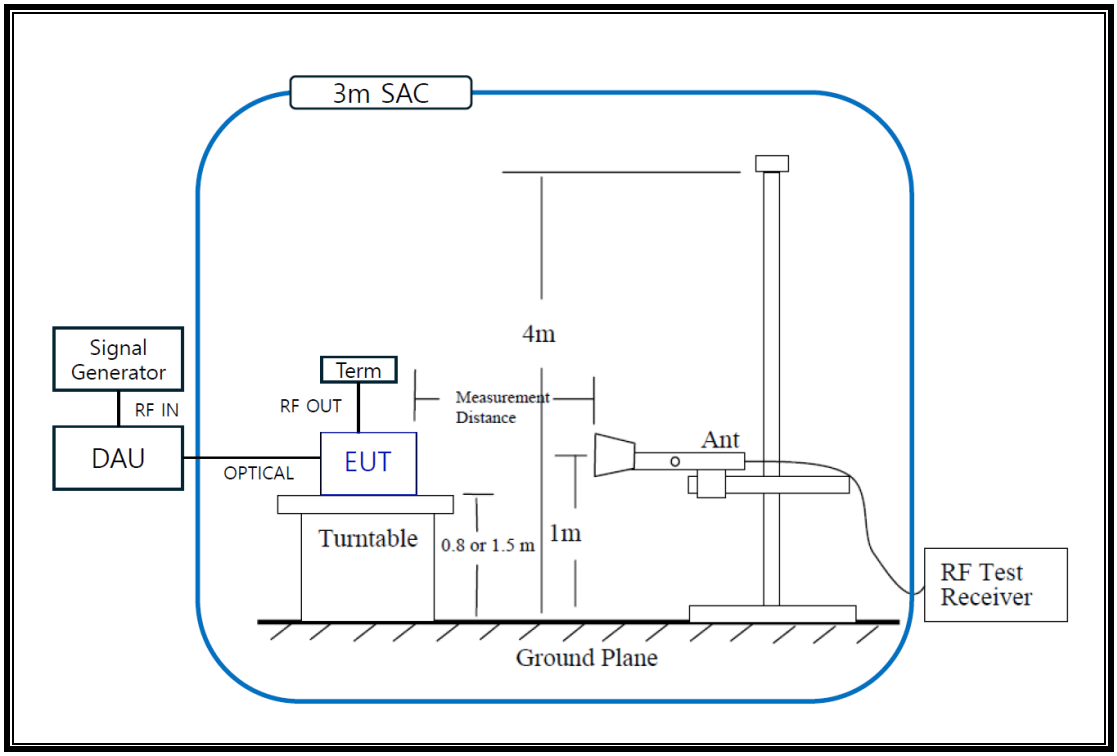
5.4. DESCRIPTION OF TEST SETUP

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Description	Manufacturer	Model	Identifier	Cal. Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESW44	103313	2025-01-22	2026-01-22
				2026-01-20	2027-01-20
Spectrum Analyzer	Rohde & Schwarz	FSW50	101567	2025-07-14	2026-07-14
Vector Signal Generator	Rohde & Schwarz	SMW200A	107161	2025-07-14	2026-07-14
Signal Generator	Rohde & Schwarz	SMB100A	184060	2025-07-14	2026-07-14
Attenuator	Reach-Line	RLA2925020-40-F	N/A	2025-07-16	2026-07-16
Attenuator	Reach-Line	RLA2925020-40-F	N/A	2025-07-16	2026-07-16
Attenuator	Reach-Line	RLA25040-18-F	N/A	2025-07-14	2026-07-14
Attenuator	Reach-Line	RLA25040-18-F	N/A	2025-07-14	2026-07-14
Loop Antenna	TESEQ	HLA 6121	65111	2025-07-17	2027-07-17
TRILOG BROADBAND ANTENNA	Schwarzbeck	VULB 9163	01661	2024-03-18	2026-03-18
Signal Conditioning Unit	Rohde & Schwarz	SCH01F	100316	2025-03-11	2026-03-11
Double-Ridged Guide Antenna	ETS LINDGREN	3117	00261463	2025-07-31	2026-07-31
DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS LINDGREN	3116C	00262045	2025-03-11	2026-03-11
Amplifier	ETS LINDGREN	3116C-PA	00262045	2025-03-11	2026-03-11
Humidity/Baro/Temp DATA RECORDER	Lutron	MHB-382SD	AM.00223	2025-01-02	2026-01-02
				2025-12-30	2026-12-30
Humidity/Baro/Temp DATA RECORDER	Lutron	MHB-382SD	AM.00227	2025-01-02	2026-01-02
				2025-12-30	2026-12-30
Temperature & Humidity Chamber	ESPEC	PL-3J	15030190	2025-10-30	2026-10-30
Attenuator	EXYNOD	RLAN-210-18G	10A001	2025-01-22	2026-01-22
				2025-12-30	2026-12-30
Amplifier	BNZ	BZR-01001800-231040-182020	28452	2025-01-22	2026-01-22
				2025-12-30	2026-12-30
Attn. Switch	Agilent	11713A	3748A09520	-	-
Antenna Mast	Innco Systems	MA4640	N/A	-	-
Turn Table	Innco Systems	DS2000	N/A	-	-
Controller	Innco Systems	CO3000	CO3000/1280/49380520/P	-	-

Measurement Software			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	toyo corporation	TOYO EMI	6.0.130

7. SUMMARY TABLE

Test Description	FCC Rule	Test Condition	Test Result
AGC Threshold	KDB 935210 D05 v01r02 3.2, 4.2	Conducted	Compliant
Out-of-band rejection	KDB 935210 D05 v01r02 3.3, 4.3		Compliant
Input-versus-output signal comparison	§2.1049		Compliant
Input/output power and amplifier/booster gain	§2.1046, §27.50(h)		Compliant
Out-of-band/Out-of-block and spurious emissions	§2.1051, §27.53(m)		Compliant
Frequency Stability	§2.1055, §27.54		N/A[Note1]
Spurious emission radiated	§2.1053, §27.53(m)	Radiated	Compliant

Note1: The frequency stability measurement has been omitted in accordance with section 3.7 of KDB 935210 D05 v01r04.
Note2: No need to implement uplink test as it is optical cable connect to nDAU(No air radiation), then no tests have been performed about uplink.

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8. CONDUCTED RESULTS

8.1. AGC THRESHOLD

Rules

Test Requirement:
KDB 935210 D05 v01r04
Testing at and above the AGC threshold is required.

Test Procedure

Measurements were in accordance with the test methods KDB 935210 D05 v01r04.

3.2 Measuring AGC threshold level

a) Connect a signal generator to the input of the EUT.
b) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
c) The signal generator should initially be configured to produce either of the required test signals (i.e., broadband or narrowband).
d) Set the signal generator frequency to the center frequency of the EUT operating band.
e) While monitoring the output power of the EUT, measured using the methods of 3.5.3 or 3.5.4, increase the input level until a 1 dB increase in the input signal power no longer causes a 1 dB increase in the output signal power.
f) Record this level as the AGC threshold level.
g) Repeat the procedure with the remaining test signal.

Output power measurement in subclause 5.2.4.4.1 of ANSI C63.26

h) Set span to 2 × to 3 × the OBW.
i) Set RBW = 1% to 5% of the OBW.
j) Set VBW ≥ 3 × RBW.
k) Set number of measurement points in sweep ≥ 2 × span / RBW.
l) Sweep time: auto-couple
m) Detector = power averaging (rms).
n) If the EUT can be configured to transmit continuously, then set the trigger to free run.
o) Omit
p) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.
q) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

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RESULTS

Operating frequency band	Antenna	Frequency	Input signal type	AGC Threshold Level	
				Input [dBm]	Output [dBm]
2496 MHz ~ 2690 MHz (BRS)	ANT 1	2593 MHz	Narrowband	0.00	35.28
			Broadband	0.00	34.37
	ANT 2	2593 MHz	Narrowband	0.00	35.36
			Broadband	0.00	34.43

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8.2. OUT-OF-BAND REJECTION

Rules

KDB 935210 D05 v01r04

Test Procedure

Measurements were in accordance with the test methods KDB 935210 D05 v01r04. Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

3.3 Out-of-band rejection

a) Connect a signal generator to the input of the EUT.
b) Configure a swept CW signal with the following parameters:
   1) Frequency range = ± 250 % of the passband, for each applicable CMRS band (see also KDB Publication 935210 D02 [R7] and KDB Publication 634817 [R5] about selection of frequencies for testing and for grant listings).
   2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.
   3) Dwell time = approximately 10 ms.
   4) Number of points = SPAN/(RBW/2).
c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.
e) Set the resolution bandwidth (RBW) of the spectrum analyzer to be 1 % to 5 % of the EUT passband, and the video bandwidth (VBW) shall be set to ≥ 3 × RBW.
f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.
g) Place a marker to the peak of the frequency response and record this frequency as f0.
h) 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 −20 dB down amplitude, to determine the 20 dB bandwidth.
i) Capture the frequency response of the EUT.
j) Repeat for all frequency bands applicable for use by the EUT.

4.3 Out-of-band rejection

a) Connect a signal generator to the input of the EUT.
b) Configure a swept CW signal with the following parameters:
   1) Frequency range = ± 250 % of the manufacturer's specified pass band.
   2) The CW amplitude shall be 3 dB below the AGC threshold (see 4.2), and shall not activate the AGC threshold throughout the test.
   3) Dwell time = approximately 10 ms.
   4) Frequency step = 50 kHz.
c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
d) Set the RBW of the spectrum analyzer to between 1 % and 5 % of the manufacturer's rated passband, and VBW = 3 × RBW.
e) Set the detector to Peak and the trace to Max-Hold.
f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the level has fallen by 20 dB).
g) Capture the frequency response plot for inclusion in the test report.

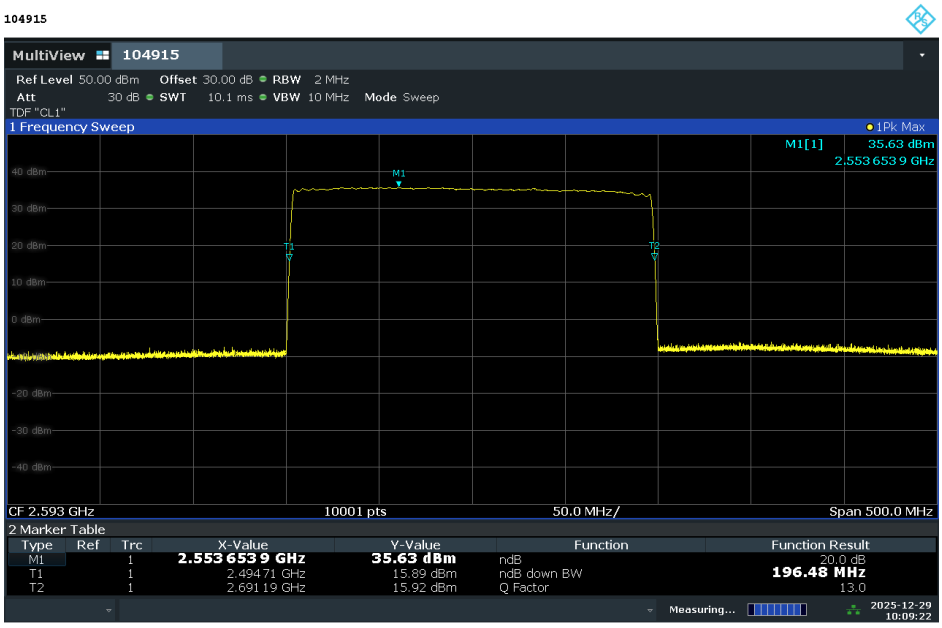
RESULTS

See the following pages.

8.2.1. OUT-OF-BAND REJECTION TEST PLOT

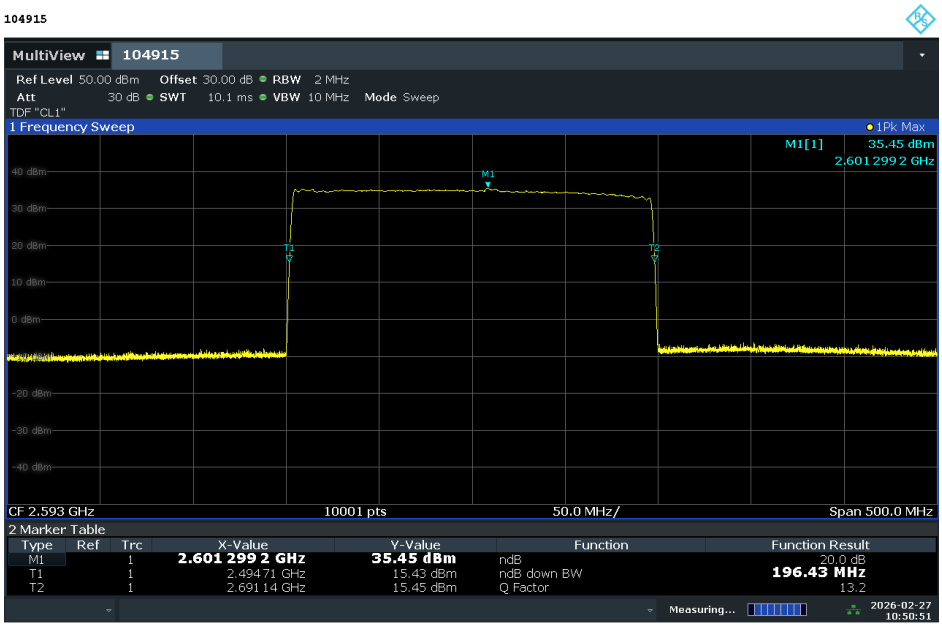
- ANT 1

Band	Frequency Range [MHz]	F_0 [MHz]	F_L [MHz]	F_H [MHz]
BRS	2496 ~ 2690	2553.6539	2494.7100	2691.1900



- ANT 2

Band	Frequency Range [MHz]	F_0 [MHz]	F_L [MHz]	F_H [MHz]
BRS	2496 ~ 2690	2601.2992	2494.7100	2691.1400



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8.3. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON

RULE PART(S)

FCC: § 2.1049

The spectral shape of the output should look similar to input for all modulations.

TEST PROCEDURE

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal; alternatively, the 99% OBW can be measured and used. See KDB Publication 971168 [R8] for more information on measuring OBW.

a) Connect a signal generator to the input of the EUT.
b) Configure the signal generator to transmit the AWGN signal.
c) Configure the signal amplitude to be just below the AGC threshold level, but not more than 0.5 dB below.
d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 × to 5 × the emission bandwidth (EBW) or alternatively, the OBW.
f) The nominal RBW shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be ≥ 3 × RBW.
g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level. Steps f) and g) may require iteration to enable adjustments within the specified tolerances.
h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.
i) Set spectrum analyzer detection function to positive peak.
j) Set the trace mode to max hold.
k) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency.
l) 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 −26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the −26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the −26 dB down amplitude point.
m) Repeat steps e) to l) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).
n) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step l) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.
o) Repeat the procedure [steps e) to n)] with the input signal amplitude set to 3 dB above the AGC threshold.
p) Repeat steps e) to o) with the signal generator set to the narrowband signal.
q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.

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RESULTS

- ANT 1

Band	Description	Signal	Frequency [MHz]	Measurement Bandwidth [MHz]				
				Input	Output	Output +3dB	Variant of input and output (%)	Variant of input and 3 dB above the AGC threshold output (%)
BRS	OBW	Narrowband	2593.0	0.247	0.247	0.247	0.00	0.00
		Broadband	2593.0	4.056	4.051	4.057	-0.12	0.02
	26 dB BW	Narrowband	2593.0	0.308	0.308	0.308	0.00	0.00
		Broadband	2593.0	4.380	4.390	4.380	0.23	0.00

- ANT 2

Band	Description	Signal	Frequency [MHz]	Measurement Bandwidth [MHz]				
				Input	Output	Output +3dB	Variant of input and output (%)	Variant of input and 3 dB above the AGC threshold output (%)
BRS	OBW	Narrowband	2593.0	0.247	0.247	0.247	0.00	0.00
		Broadband	2593.0	4.057	4.039	4.044	-0.44	-0.32
	26 dB BW	Narrowband	2593.0	0.308	0.308	0.308	0.00	0.00
		Broadband	2593.0	4.380	4.380	4.380	0.00	0.00

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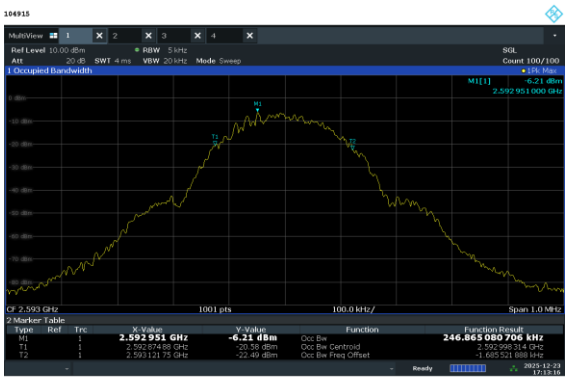
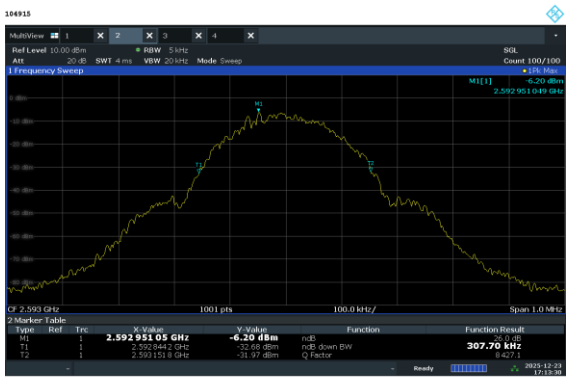
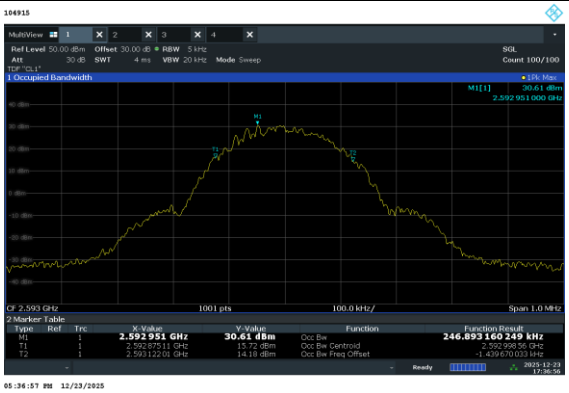
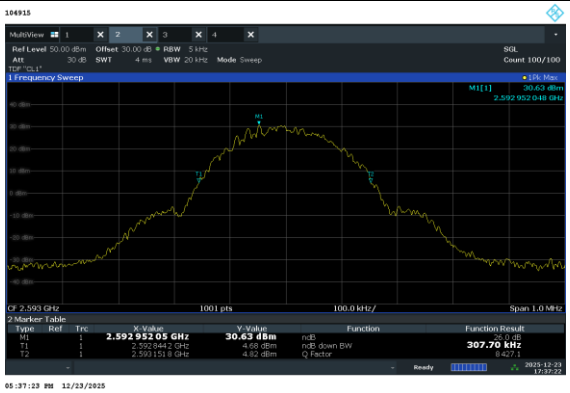
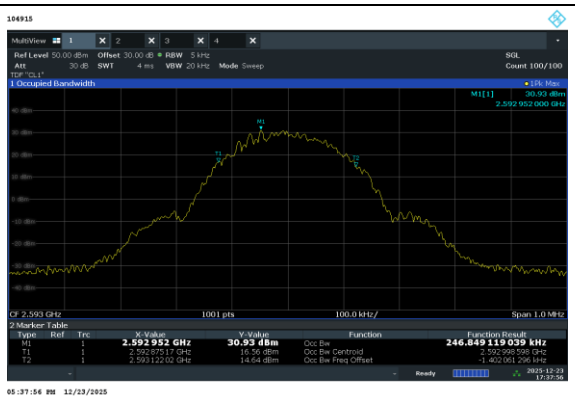
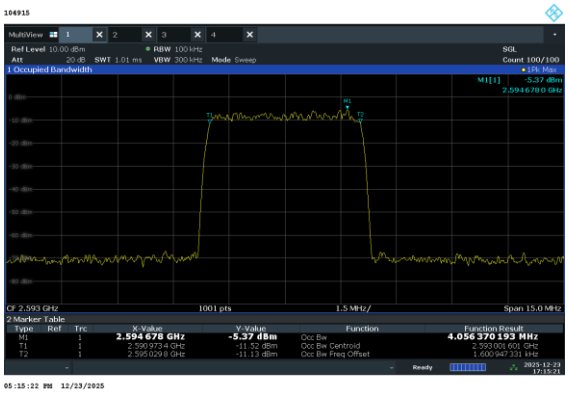
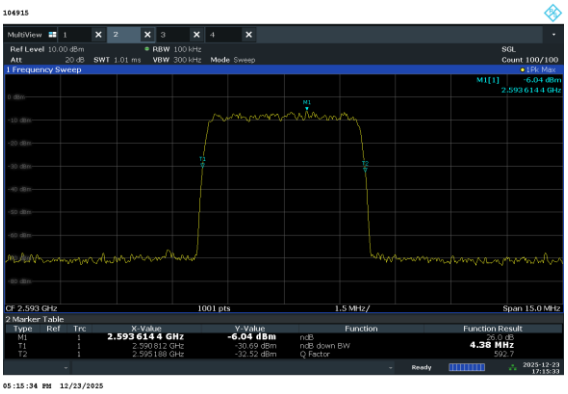
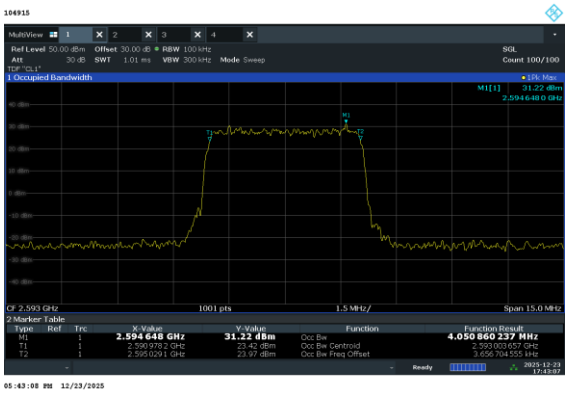
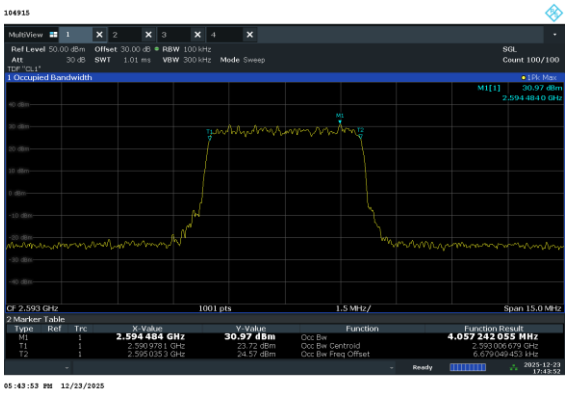
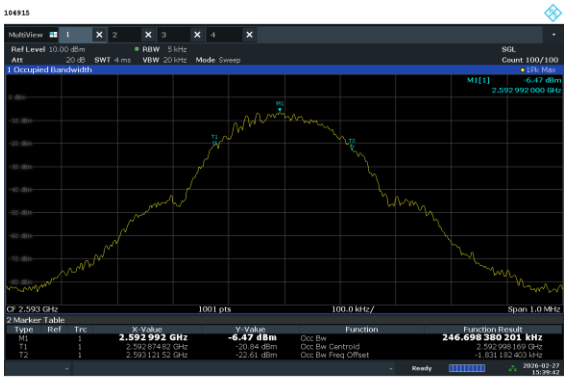
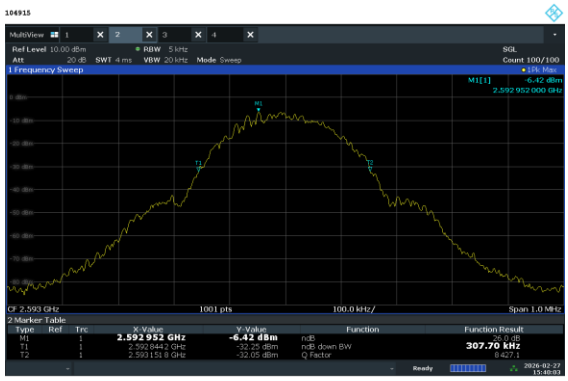
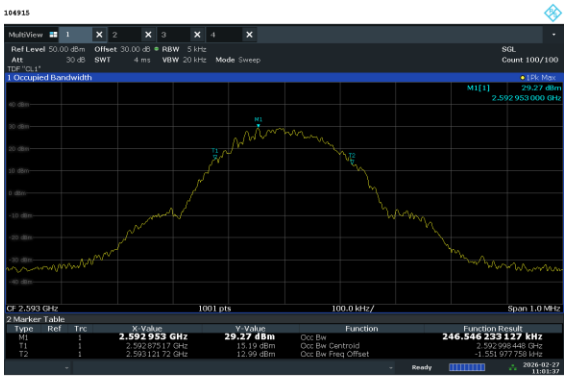
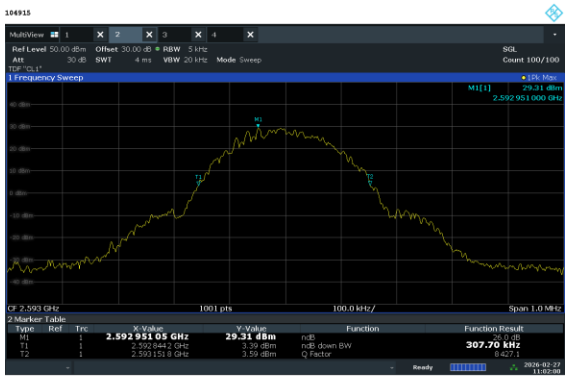
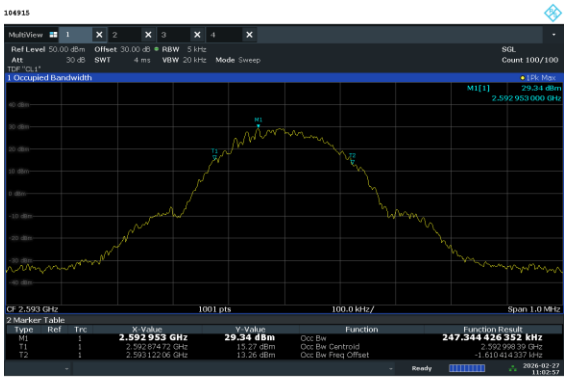
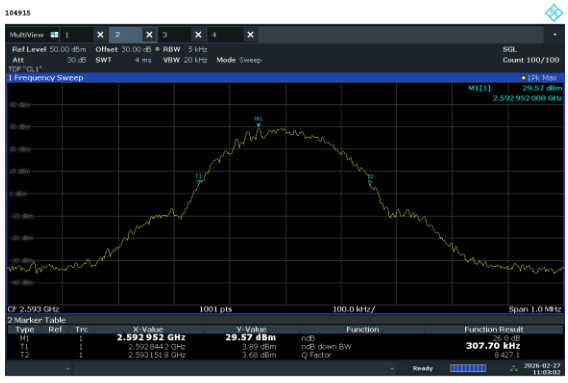
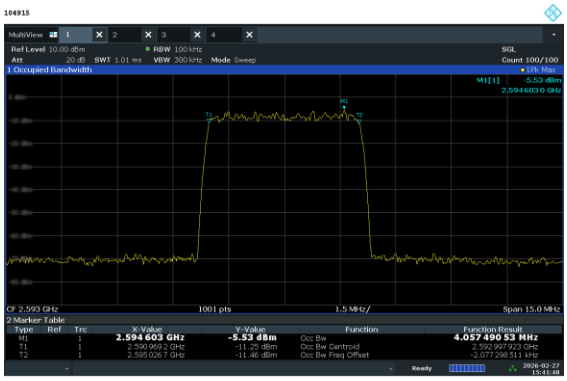
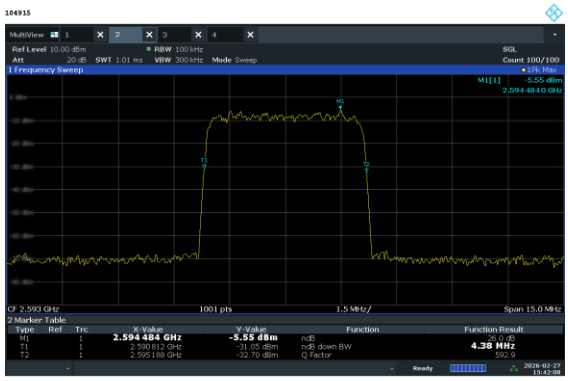
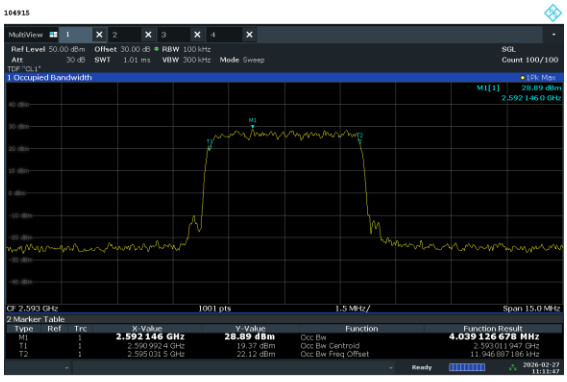
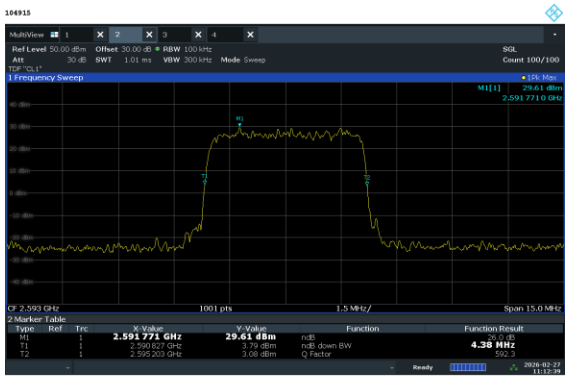
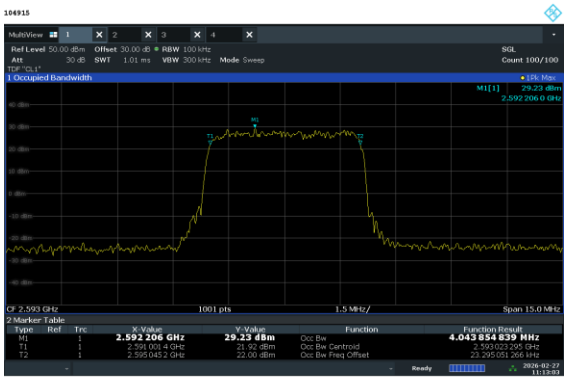
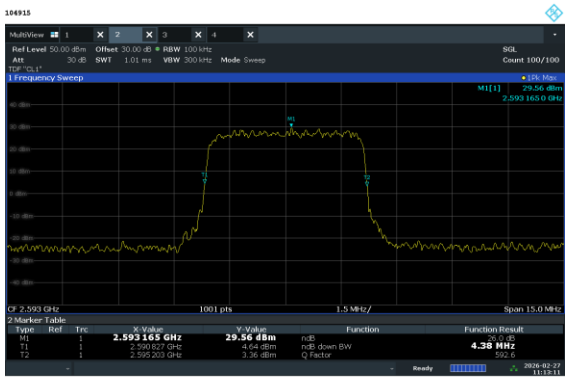
8.3.1. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON TEST PLOT

BRS / ANT 1		
Narrow band	**99% OBW**	**26 dB bandwidth**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 1		
Broad band	**99% OBW**	**26 dB bandwidth**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 2		
Narrow band	**99% OBW**	**26 dB bandwidth**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 2		
Broad band	**99% OBW**	**26 dB bandwidth**
Input		
Output		
Output 3dB above AGC threshold		

8.4. INPUT/OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN

RULE PART(S)

FCC: §2.1046, §27.50

LIMITS

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle.

(h) The following power limits shall apply in the BRS and EBS:

(1) Main, booster and base stations.

(i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula: EIRP = 33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW, where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

TEST PROCEDURE

Measurements were in accordance with the test methods KDB 935210 D05 v01r04.

3.5.2 Measuring input and output power levels for determining amplifier/booster gain

a) Connect a signal generator to the input of the EUT.
b) Configure to generate the AWGN (broadband) test signal.
c) The frequency of the signal generator shall be set to the frequency f0 as determined from 3.3.
d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.
g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.

i) Repeat steps e) to h) with the narrowband test signal.
j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

3.5.3 Power measurement Method 1: using a spectrum or signal analyzer

Guidance for performing input/output power measurements using a spectrum or signal analyzer is provided in KDB Publication 971168 [R8].

The power of AWGN signals was measured using the integration bandwidth method via the spectrum analyzer Channel Power function.

3.5.5 Calculating the mean gain of the CMRS non-consumer amplifier, repeater, or industrial booster

After the mean input and output power levels have been measured as described in the preceding subclauses, the mean gain of the EUT can be determined from:

Gain (dB) = output power (dBm) − input power (dBm).

Report the mean gain for each authorized operating frequency band and each test signal stimulus.

UL Korea, Ltd. Uiwang Laboratory FORM ID: FCC_15C(05)
42, Obongsandan 1-ro, Uiwang-si, Gyeonggi-do, Republic of Korea TEL: (031) 389-9603 FAX: (031) 462-8355

RESULTS

Band	Antenna	Input Level	Signal	Frequency [MHz]	Input [dBm]	Output [dBm]	Gain [dB]	0.1% PARR [dB]
BRS	Ant 1	AGC level	Narrowband	2553.6539	-0.01	35.49	35.50	0.34
			Broadband	2553.6539	-0.02	34.74	34.76	8.36
		AGC level + 3 dB	Narrowband	2553.6539	2.99	35.36	32.37	0.36
			Broadband	2553.6539	2.98	34.55	31.57	8.32
	Ant 2	AGC level	Narrowband	2601.2992	-0.02	35.73	35.75	0.36
			Broadband	2601.2992	-0.01	34.80	34.81	8.24
		AGC level + 3 dB	Narrowband	2601.2992	2.98	35.86	32.88	0.36
			Broadband	2601.2992	2.99	34.75	31.76	8.20

E.I.R.P

Band	Antenna	Input Level	Signal	Output [dBm]	ANT Gain [dBi]	E.I.R.P [dBm]	E.I.R.P [W]	Limit [W]
BRS	Ant 1	AGC level	Narrowband	35.49	17.00	52.49	177.42	1995.31
			Broadband	34.74	17.00	51.74	149.28	1996.09
		AGC level + 3 dB	Narrowband	35.36	17.00	52.36	172.19	1995.31
			Broadband	34.55	17.00	51.55	142.89	1996.09
	Ant 1	AGC level	Narrowband	35.73	17.00	52.73	187.50	1995.31
			Broadband	34.80	17.00	51.80	151.36	1996.09
		AGC level + 3 dB	Narrowband	35.86	17.00	52.86	193.20	1995.31
			Broadband	34.75	17.00	51.75	149.62	1996.09
	Ant 1 + 2	AGC level	Narrowband	38.62	20.00	58.62	728.11	1995.31
			Broadband	37.78	20.00	57.78	599.85	1996.09
		AGC level + 3 dB	Narrowband	38.63	20.00	58.63	729.04	1995.31
			Broadband	37.66	20.00	57.66	583.64	1996.09

Note 1: E.I.R.P = Output Power + ANT Gain(dBi)
Note 2: Limit Calculation
33 dBW + 10log(X/Y) (where X is the actual channel width in MHz and Y is either 6 MHz)
If X= 5 MHz,
= 33 dBW + 10log(5/6)
= 1995.26 W + 0.83 W = 1996.09 W

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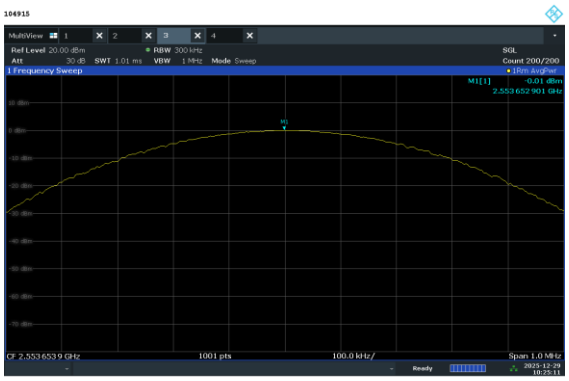
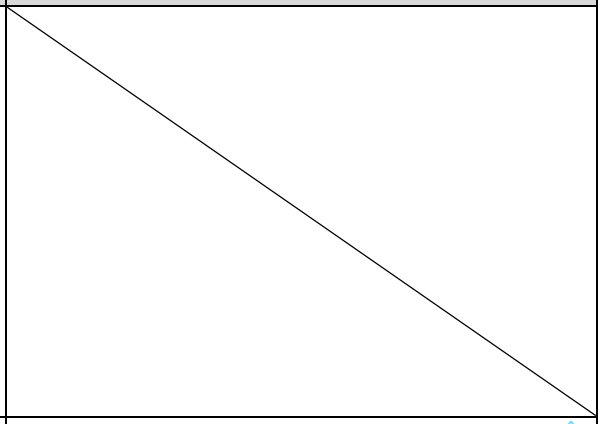
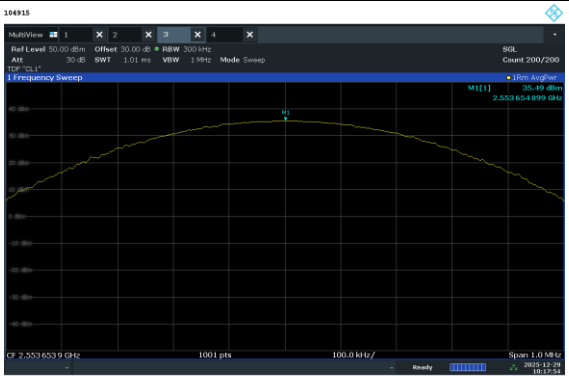
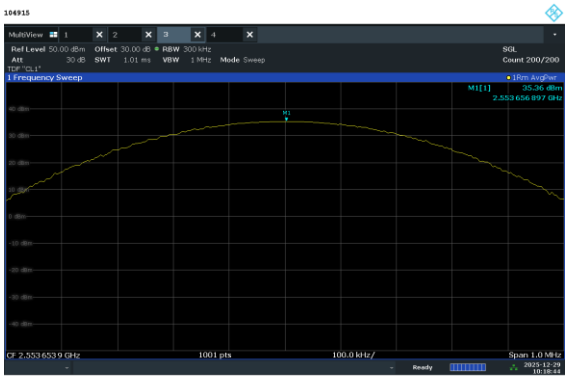
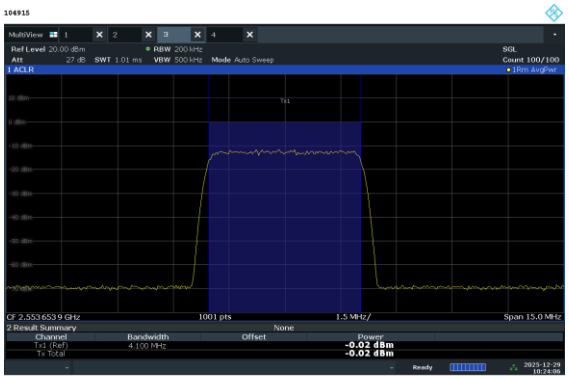
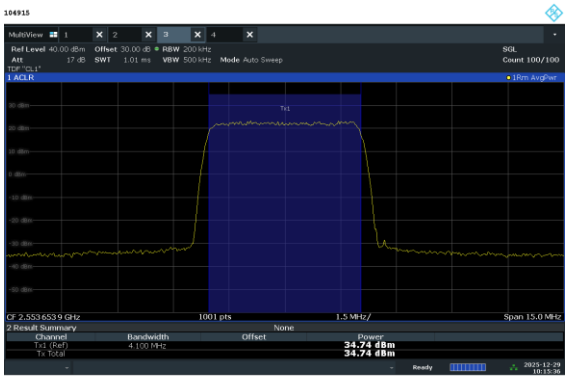
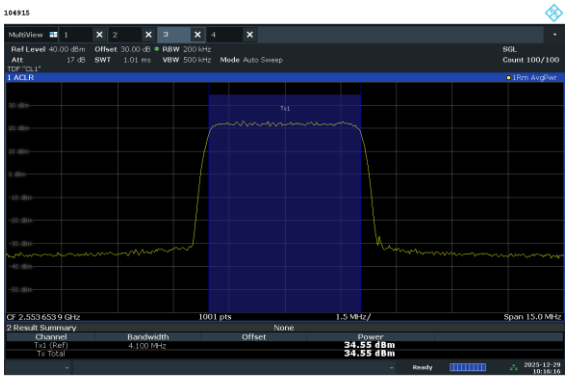
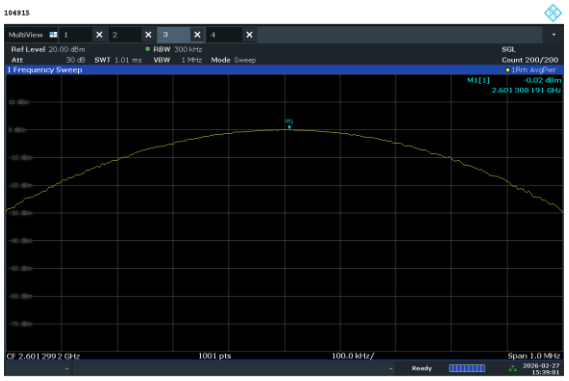
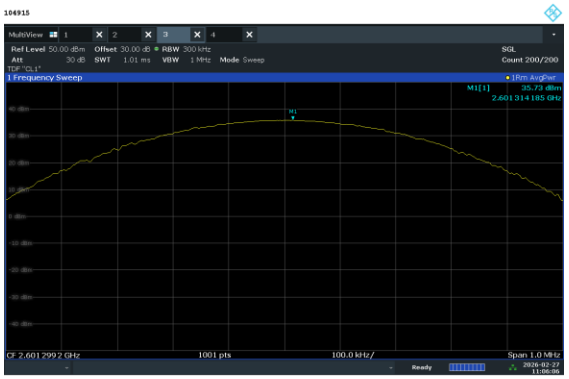
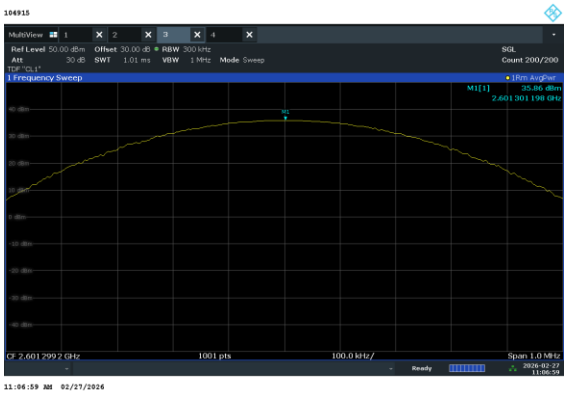
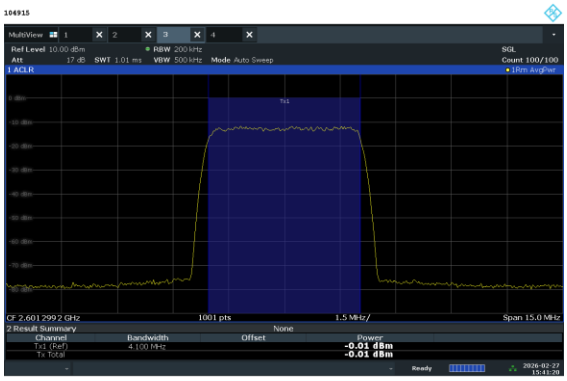
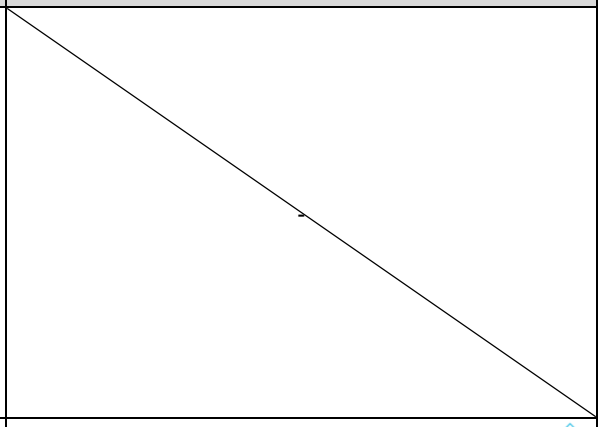
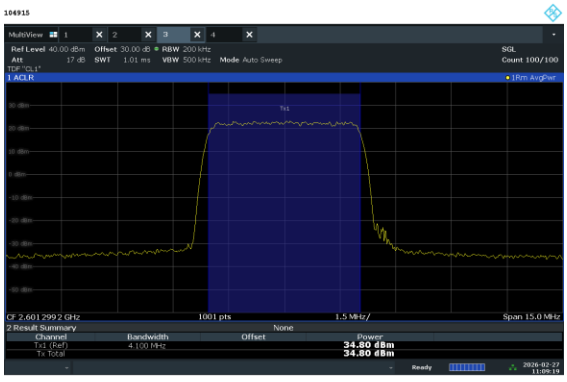
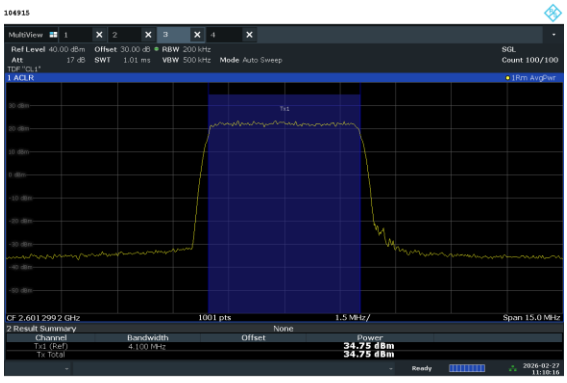
8.4.1. OUTPUT POWER AND PARR TEST PLOT

BRS / ANT 1		
Narrow band	**Output Power**	**PARR**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 1		
Broad band	**Output Power**	**PARR**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 2		
Narrow band	**Output Power**	**PARR**
Input		
Output		
Output 3dB above AGC threshold		

BRS / ANT 2		
Broad band	**Output Power**	**PARR**
Input		
Output		
Output 3dB above AGC threshold		

8.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §27.53

LIMITS

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 27.53 Emission limits.

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(2) For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline, then the following additional attenuation requirements shall apply:

(i) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located 1.5 km or more away, within 24 hours of the receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 + 10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block and shall immediately notify the complaining licensee upon implementation of the additional attenuation. No later than 60 days after the implementation of such additional attenuation, the licensee of the complaining base station must attenuate its base station emissions by at least 67 + 10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(ii) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located less than 1.5 km away, within 24 hours of receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 + 10 log (P)−20 log (Dkm/1.5) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the complaining licensee, or if both base stations are co-located, limit its undesired signal level at the pre-existing base station receiver(s) to no more than −107 dBm measured in a 5.5 megahertz bandwidth and shall immediately notify the complaining licensee upon such reduction in the undesired signal level. No later than 60 days after such reduction in the undesired signal level, the complaining licensee must attenuate its base station emissions by at least 67 + 10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(iii) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located 1.5 km or more away, within 60 days of receipt of a documented interference complaint the licensee of each base station must attenuate its base station emissions by at least 67 + 10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the other licensee.

(iv) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located less than 1.5 km away, within 60 days of receipt of a documented interference complaint: (a) The licensee of the new or modified base station must attenuate its OOBE by at least 67 + 10 log (P)−20 log (Dkm/1.5) measured 3 megahertz above or below, from the channel edge of its frequency block of the other licensee, or if the base stations are co-located, limit its undesired signal level at the other base station receiver(s) to no more than −107 dBm measured in a 5.5-megahertz bandwidth; and (b) the licensee causing the interference must attenuate its emissions by at least 67 + 10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(v) For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

TEST PROCEDURE

3.6.2 Out-of-band/out-of-block emissions conducted measurements

a) Connect a signal generator to the input of the EUT.If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test.
b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW). Set the signal generator amplitudes so that the power from each into the EUT is equivalent.
c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.
d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168 [R8], but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168 [R8].
e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the EBW or 100 kHz or 1 MHz)
g) Set the VBW = 3 × RBW.
h) Set the detector to power averaging (rms) detector.
i) Set the Sweep time = auto-couple.
j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.
k) Trace average at least 100 traces in power averaging (rms) mode.
l) Use the marker function to find the maximum power level.

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m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.
n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.
o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.
p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.
q) Repeat steps k) to n).
r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.
s) Repeat steps a) to r) with the narrowband test signal.
t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

3.6.3 Spurious emissions conducted measurements

a) Connect a signal generator to the input of the EUT.
b) Set the signal generator to produce the broadband test signal as previously described (i.e., 4.1 MHz OBW AWGN).
c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.
d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).
g) Set the VBW ≥ 3 × RBW.
h) Set the Sweep time = auto-couple.
i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part.The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.4
j) Select the power averaging (rms) detector function.
k) Trace average at least 10 traces in power averaging (rms) mode.
l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.
m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to 10 × the highest frequency of the fundamental emission (see Section 2.1057). The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
n) Trace average at least 10 traces in power averaging (rms) mode.
o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.
p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.
q) Repeat steps c) to p) with the narrowband test signal.
r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

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Note: In accordance with ANSI C63.26-2015 section 5.7.2, measurements in certain frequency bands were conducted with a reduced RBW calculated using the following formula:

Measured with a reduced RBW per ANSI C63.26-2015 section 5.7.2, with corresponding compensation applied to the limit.

Limt RBW Factor = 10 log(Reference RBW / Measured RBW)

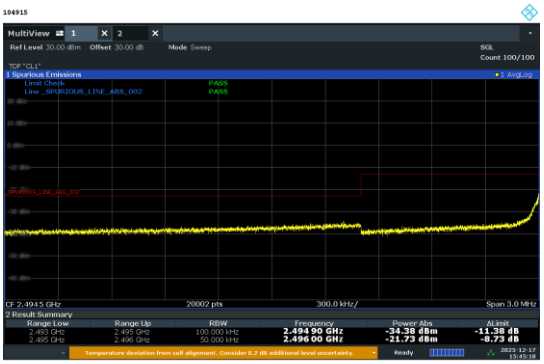
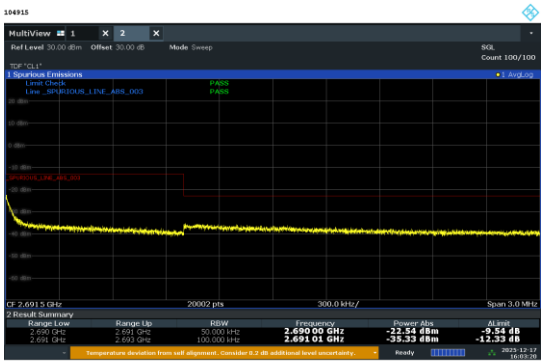
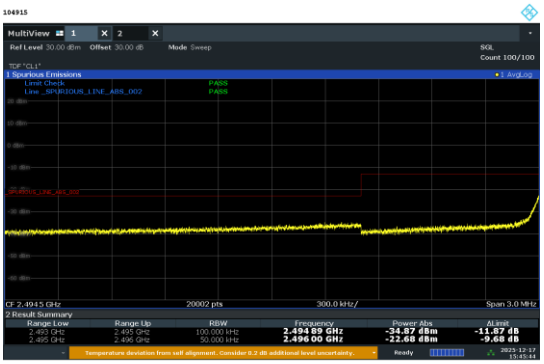
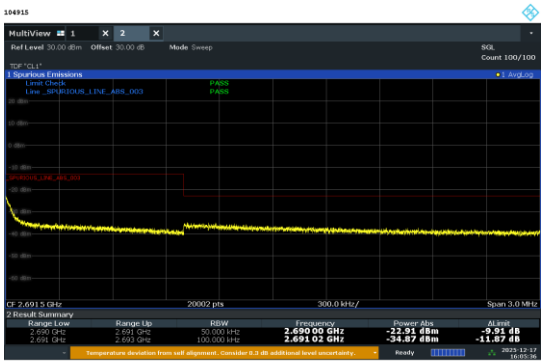
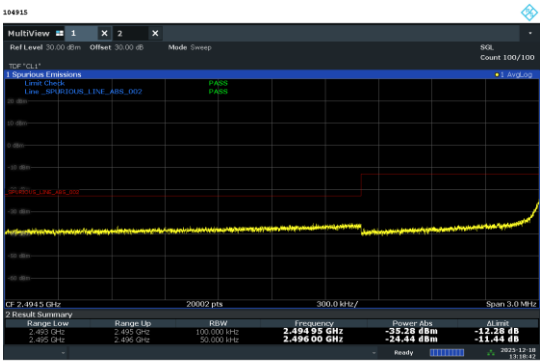
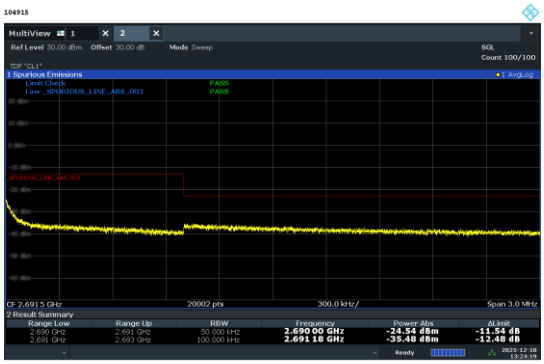
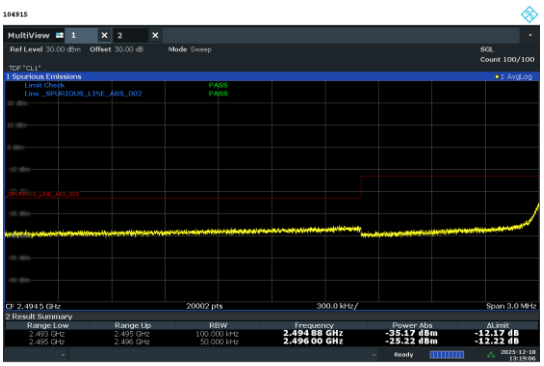
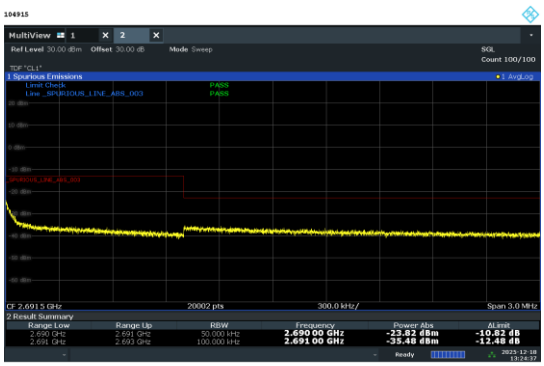
662911 D01 Multiple Transmitter Output v02r01
When performing measurements outside of the band of operation of a transmitter (i.e., out-of-band and spurious emissions), any of the three techniques below may be used to combine the emission measurements from multiple outputs prior to comparing to the emission limit. The first is the most accurate method. The second and third techniques are offered as simpler alternatives, but they may lead to overestimates of the total emission level when emission levels differ between outputs; consequently, if measurements performed using methods (ii) or (iii) exceed the emission limit, the test lab may wish to retest using method (i) before declaring that the device fails the emission test. With any of the methods, existing rules and guidance shall be applied in performing the measurements on the individual outputs and in determining the maximum permitted emission level for the device.

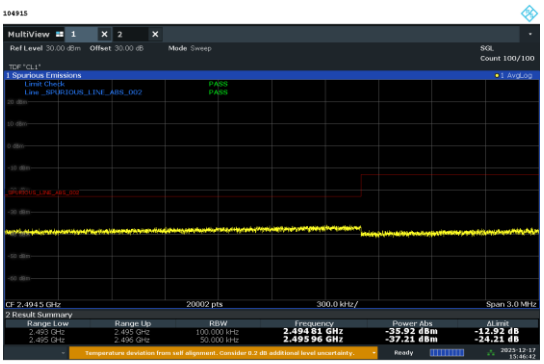
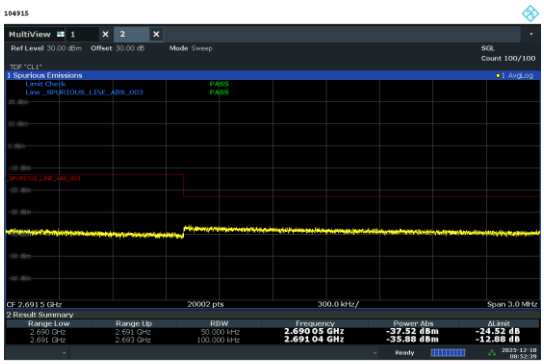
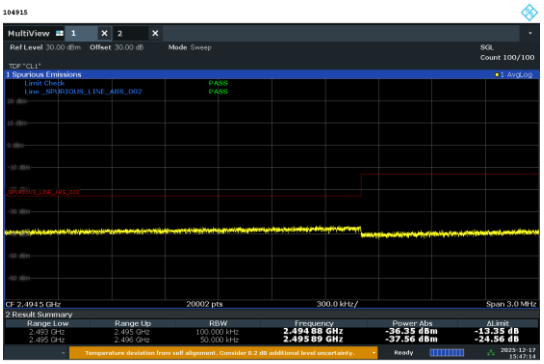
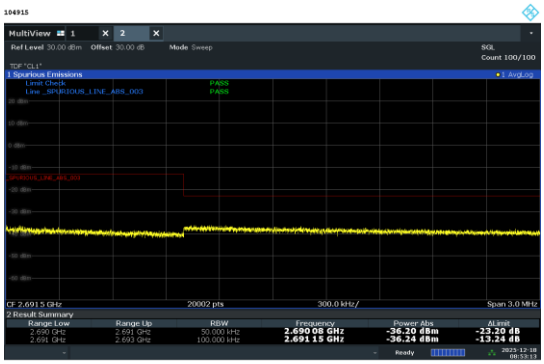
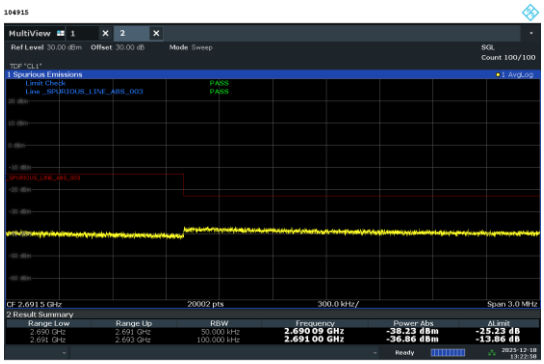
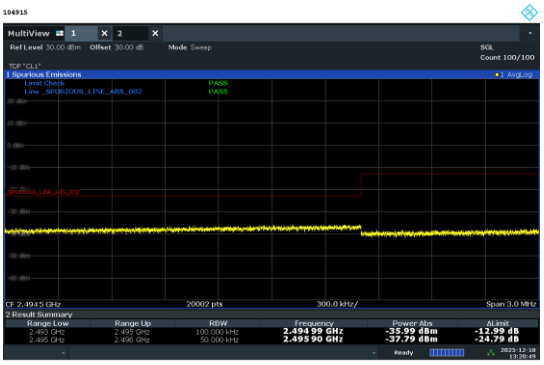
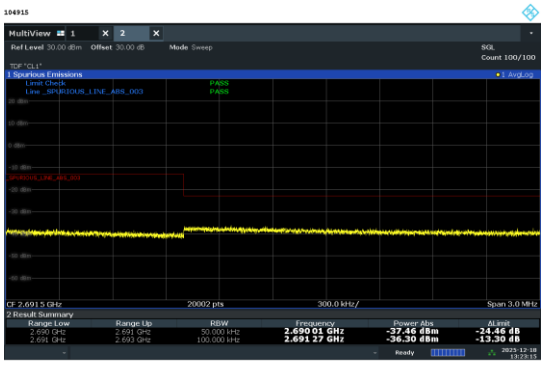
a) Absolute Emission Limits
(iii) Measure and add 10 log(N_{ANT}) dB, where N_{ANT} is the number of outputs, as described in section E)2)c).

RESULTS

Complied with emission limits by adding 10log(N_{ANT}) dB to the individual port measurements, in accordance with KDB 662911 D01 section E)3)a)iii). Detailed data is provided on the following pages.

8.5.1. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS PLOT

BRS / ANT 1		
Narrow band	**Low band Edge**	**High band Edge**
1 signal AGC threshold		
1 signal 3 dB above AGC threshold		
2 signal AGC threshold		
2 signal 3 dB above AGC threshold		

BRS / ANT 1		
Broad band	**Low band Edge**	**High band Edge**
1 signal AGC threshold		
1 signal 3 dB above AGC threshold		
2 signal AGC threshold		
2 signal 3 dB above AGC threshold		

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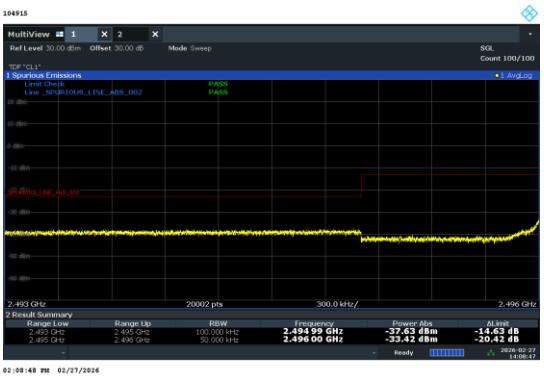
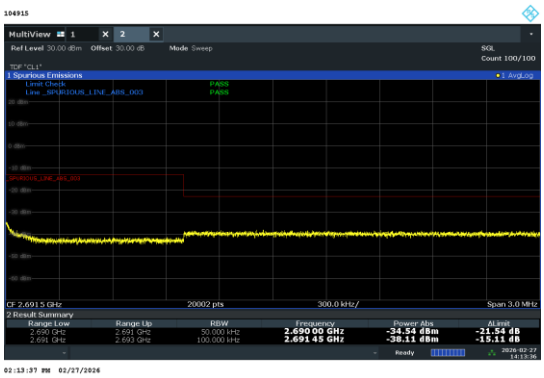
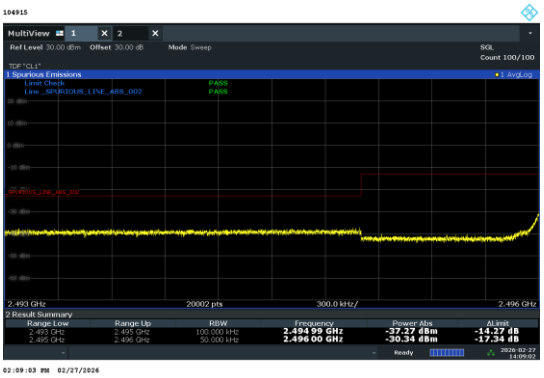
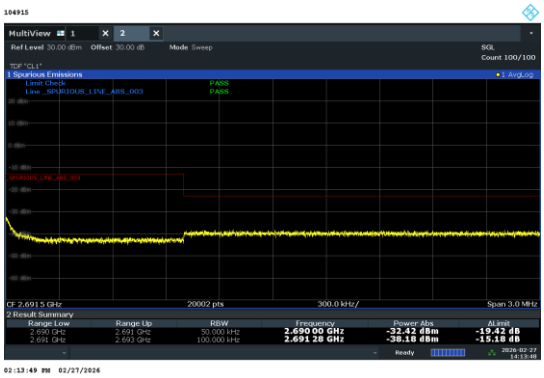
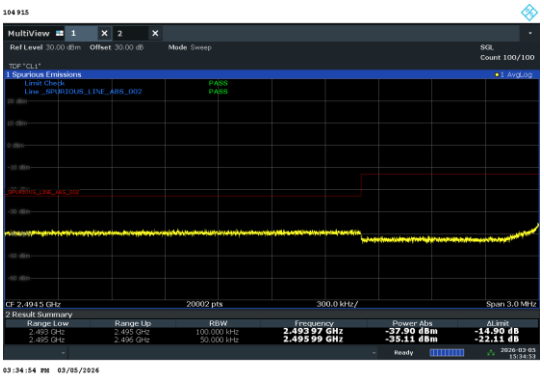
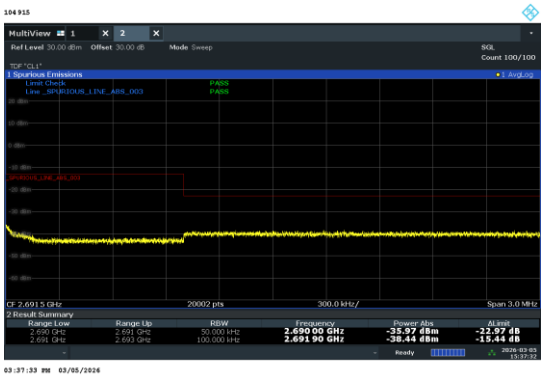
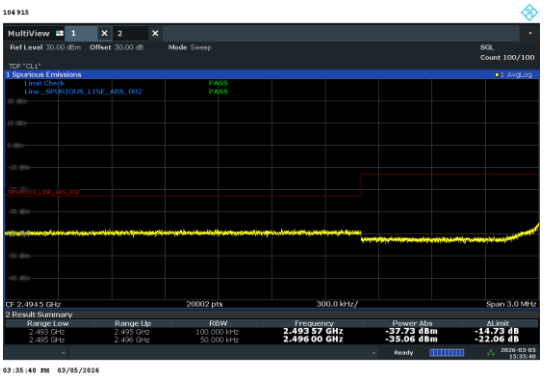
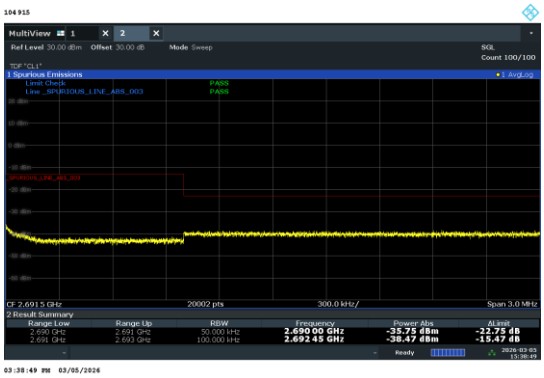
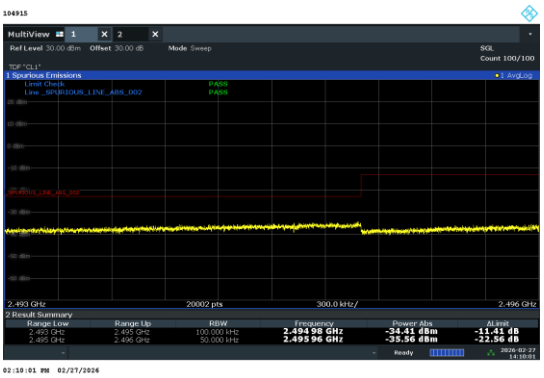
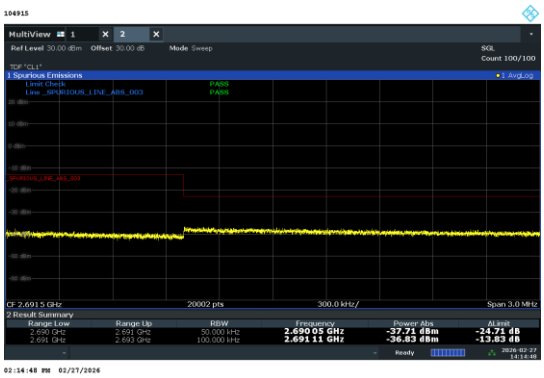
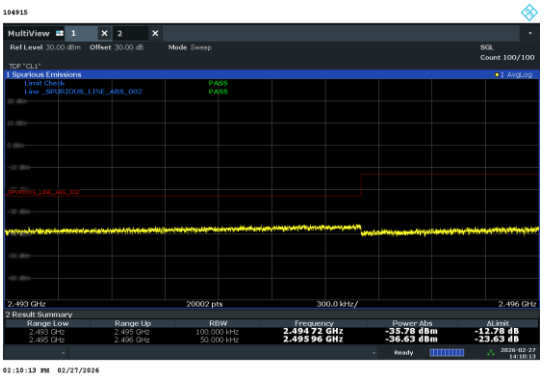
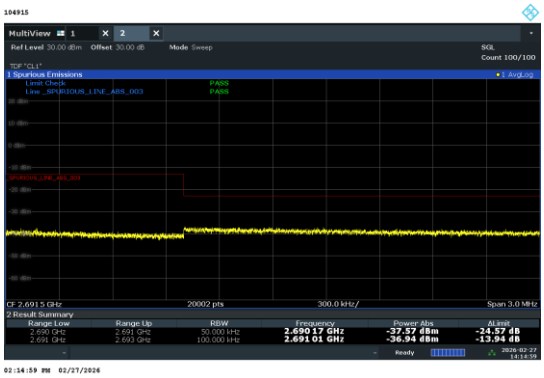
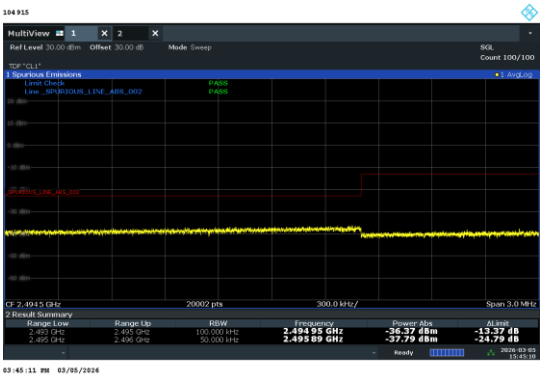
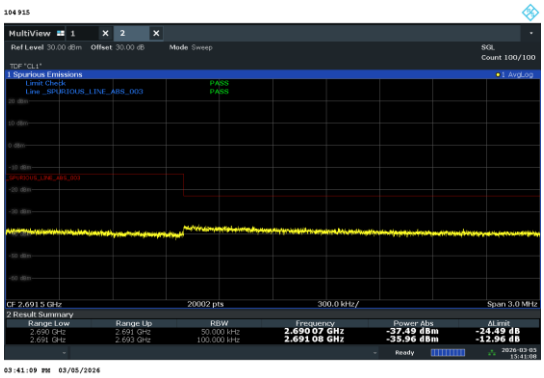
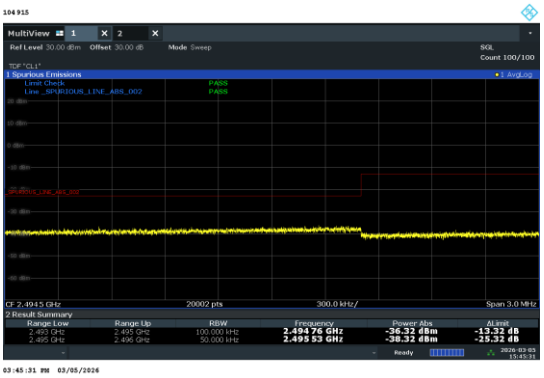
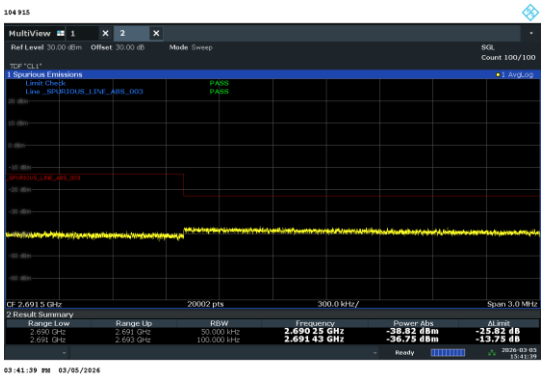
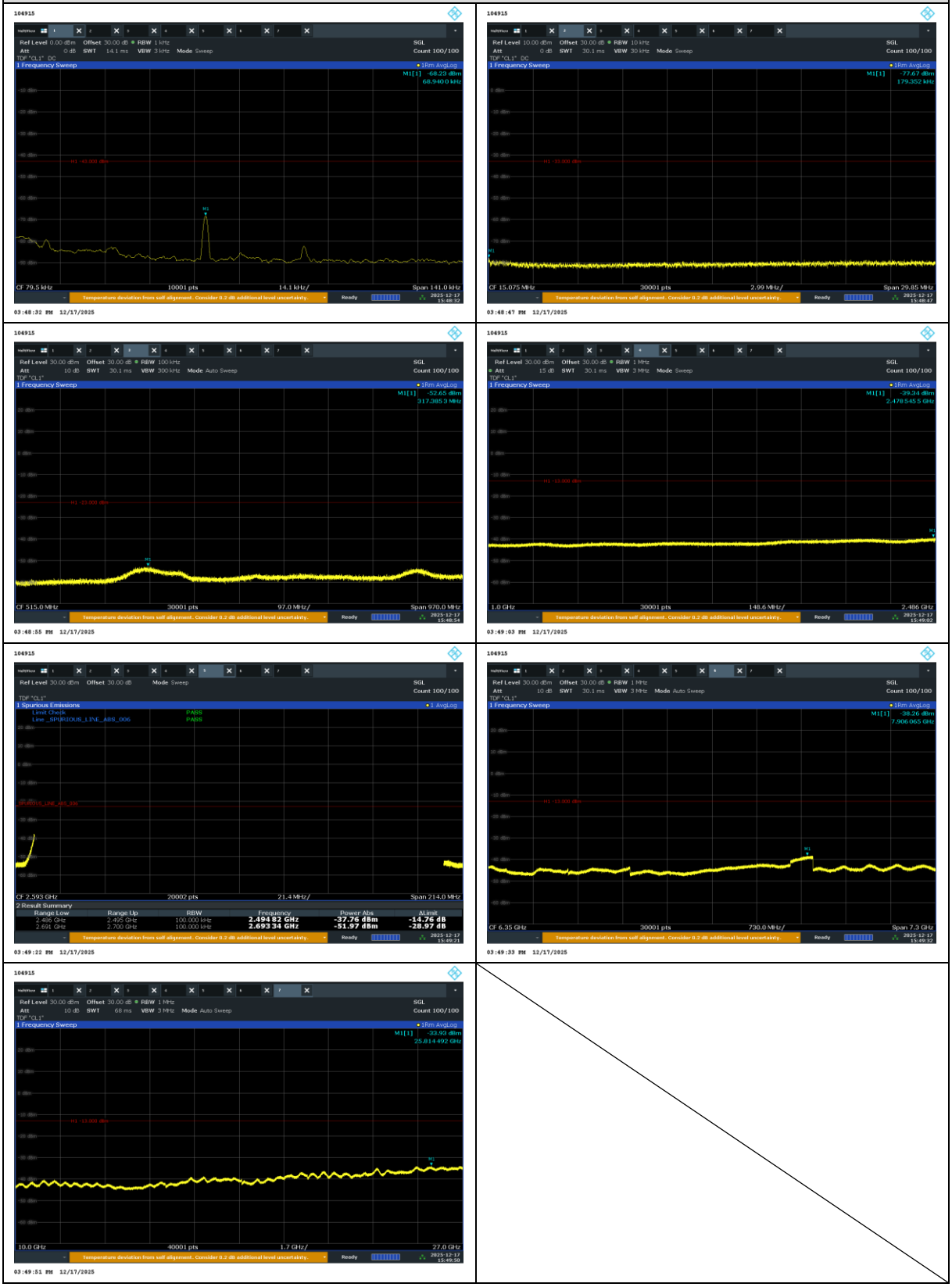
BRS / ANT 2		
Narrow band	**Low band Edge**	**High band Edge**
1 signal AGC threshold		
1 signal 3 dB above AGC threshold		
2 signal AGC threshold		
2 signal 3 dB above AGC threshold		

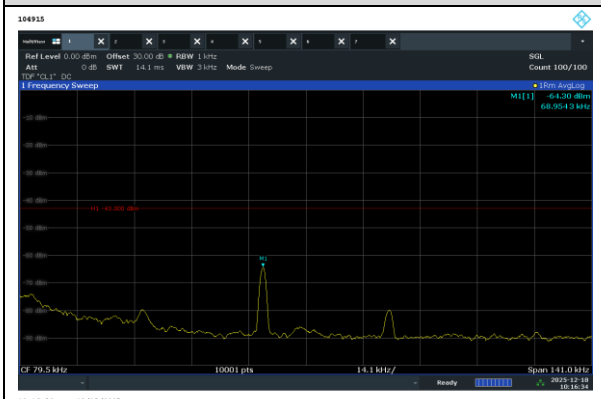
BRS / ANT 2		
Broad band	**Low band Edge**	**High band Edge**
1 signal AGC threshold		
1 signal 3 dB above AGC threshold		
2 signal AGC threshold		
2 signal 3 dB above AGC threshold		

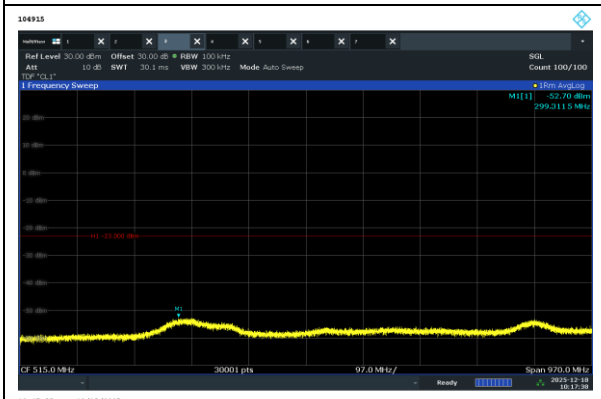
8.5.2. CONDUCTED SPURIOUS EMISSIONS PLOT

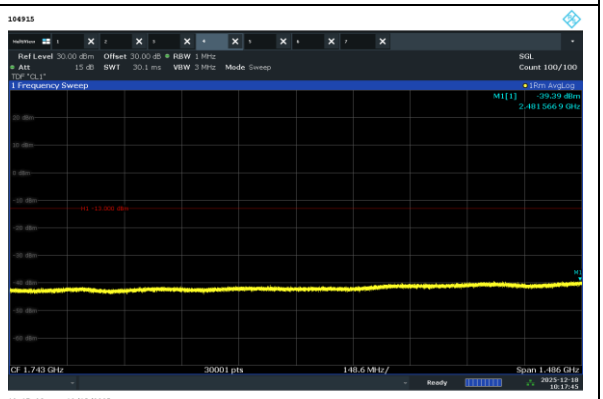
BRS / ANT 1 / Narrowband / Low channel

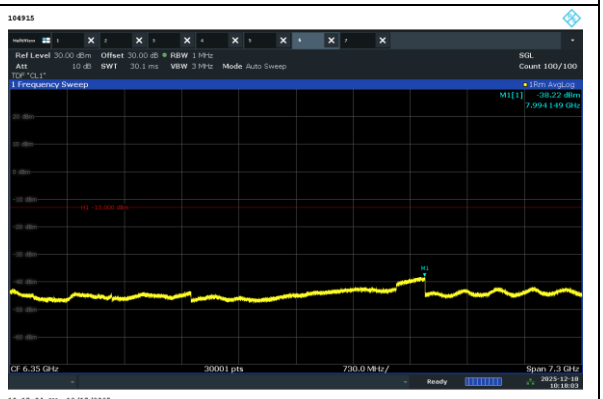


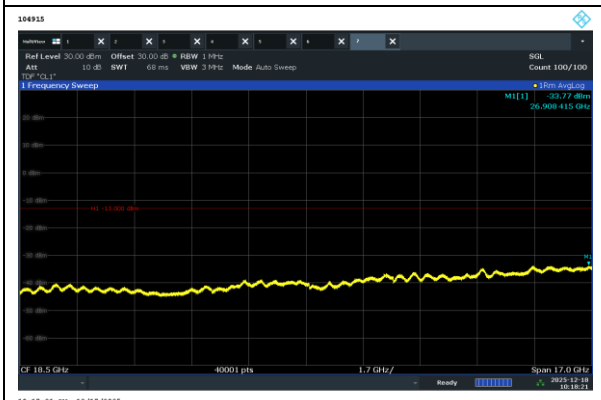
BRS / ANT 1 / Narrowband / Mid channel



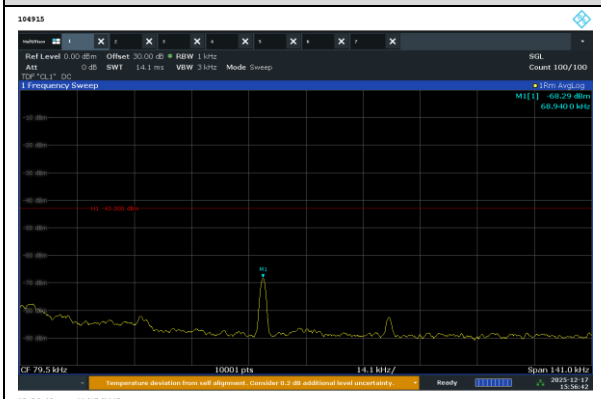


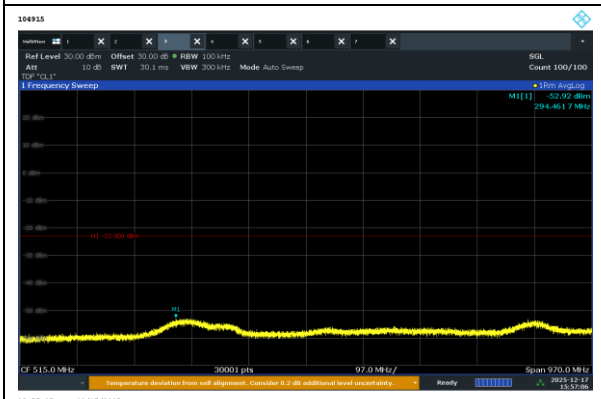


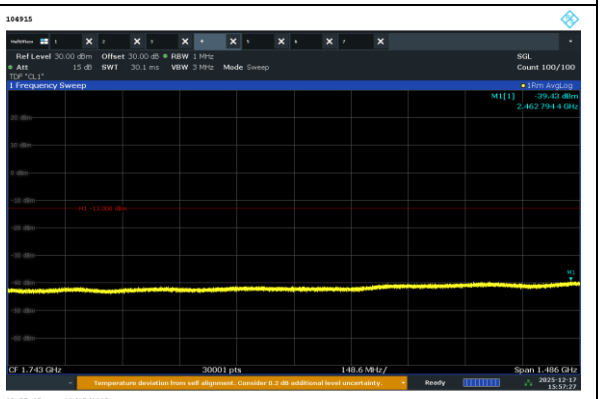


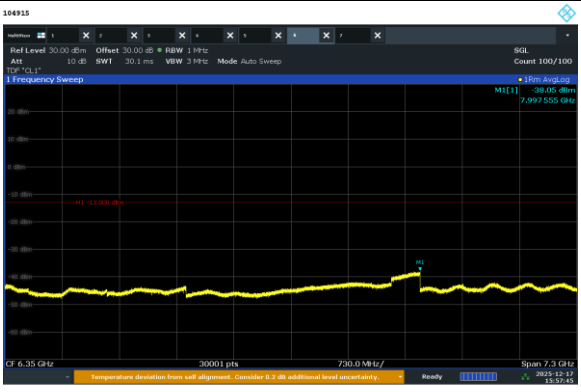


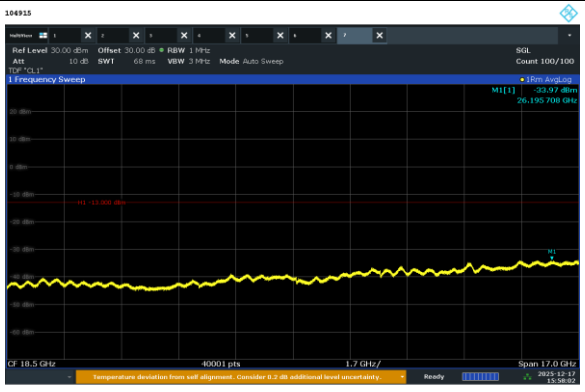
BRS / ANT 1 / Narrowband / High channel



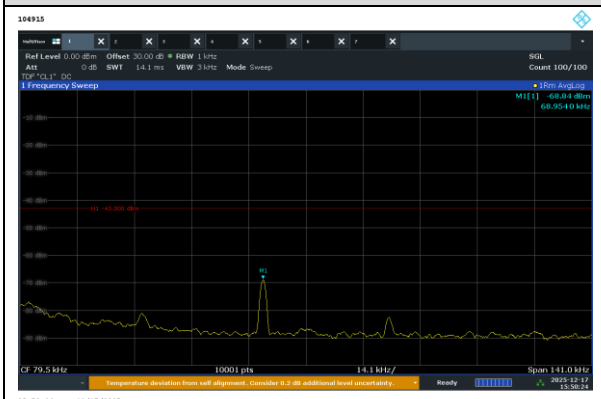


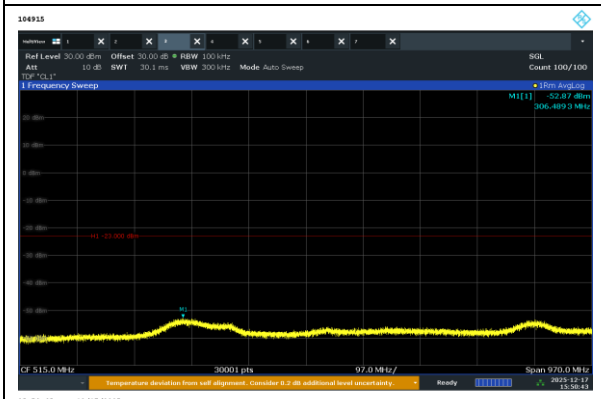


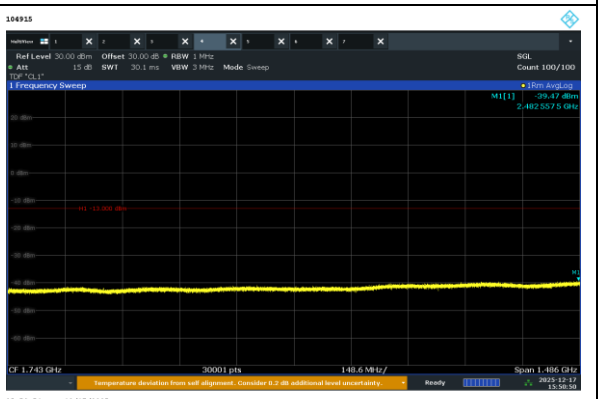


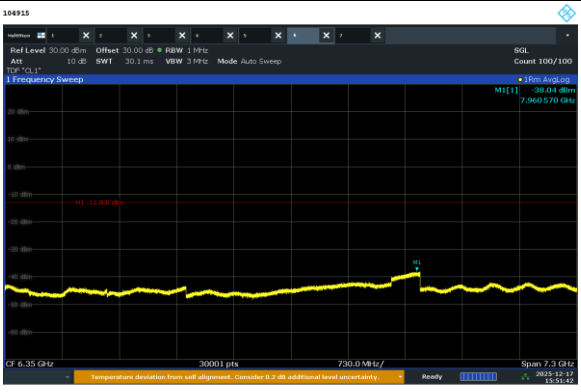


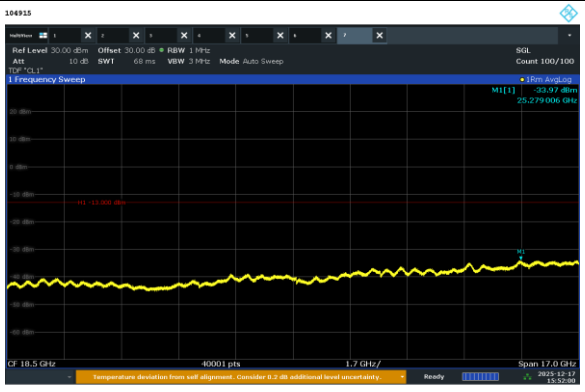
BRS / ANT 1 / Broadband / Low channel



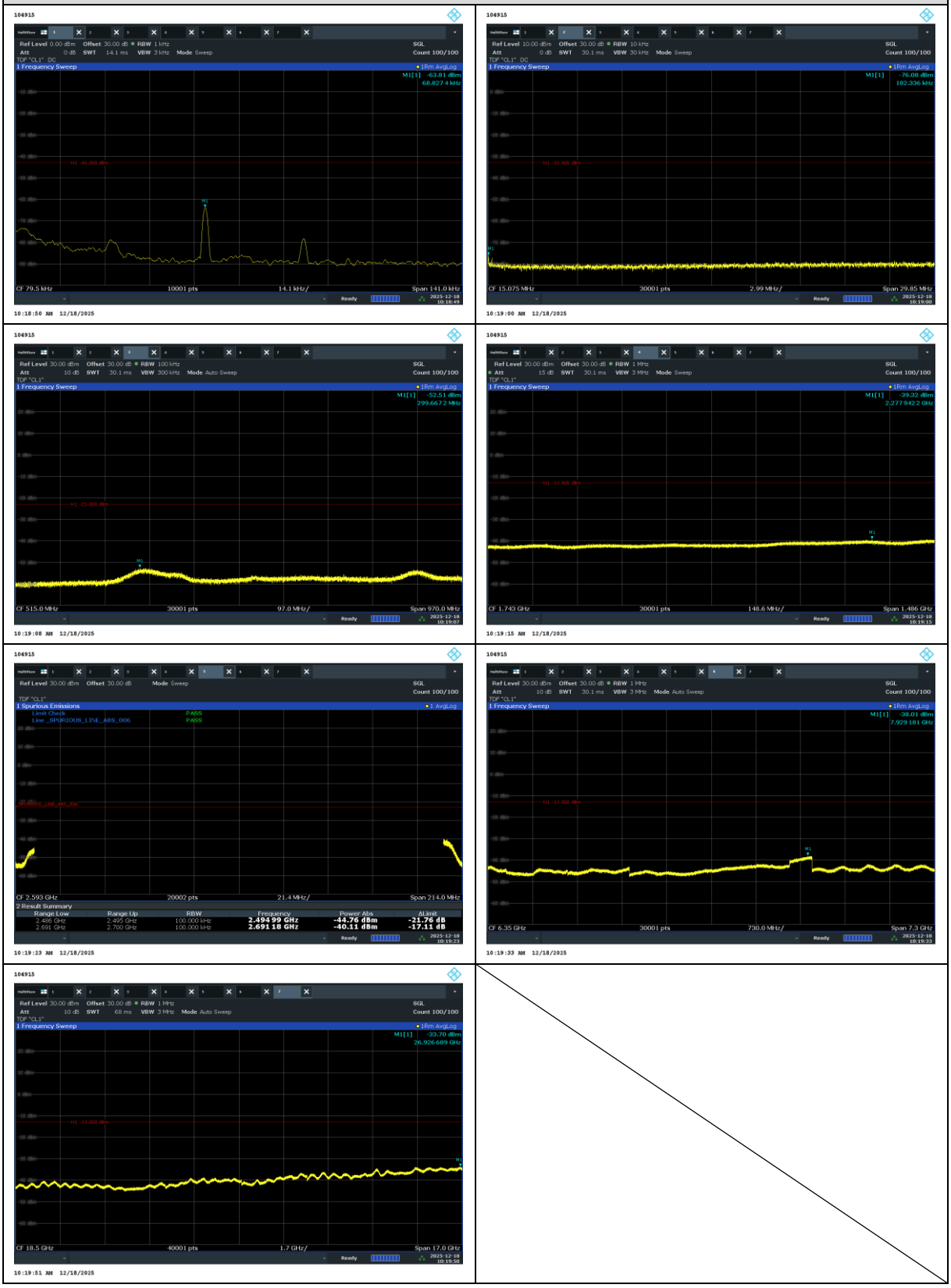




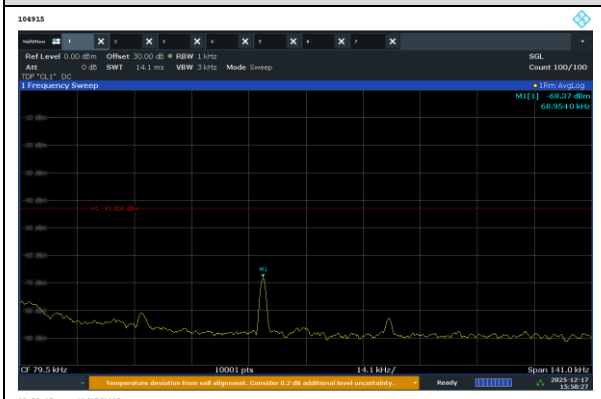


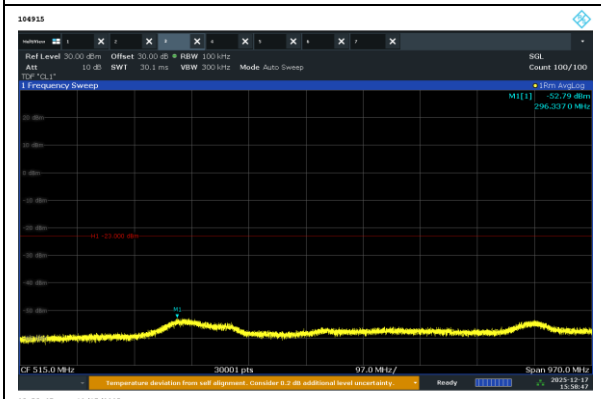


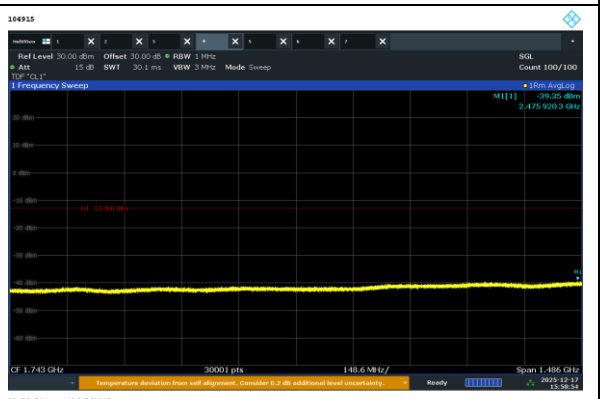
BRS / ANT 1 / Broadband / Mid channel

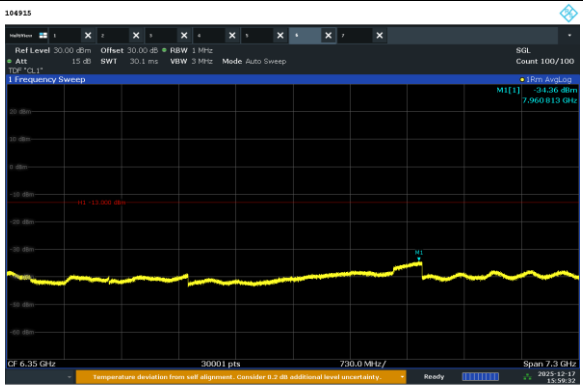


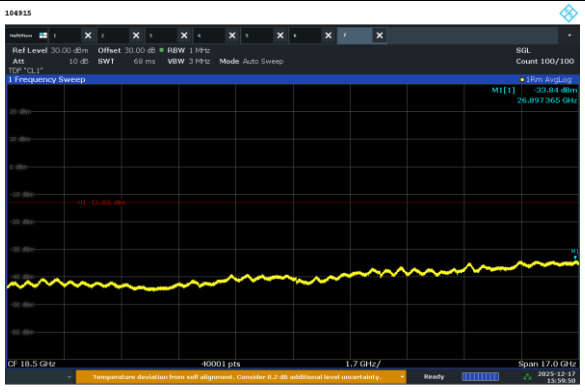
BRS / ANT 1 / Broadband / High channel



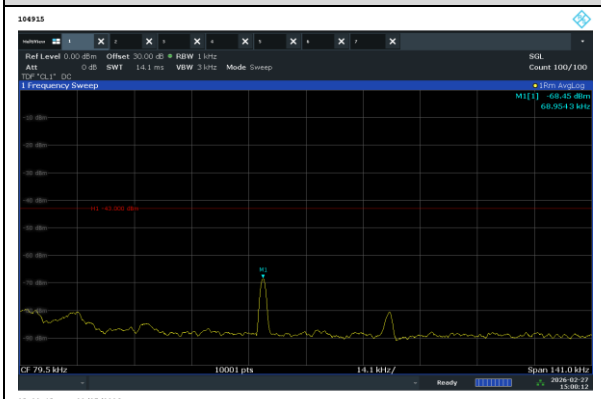


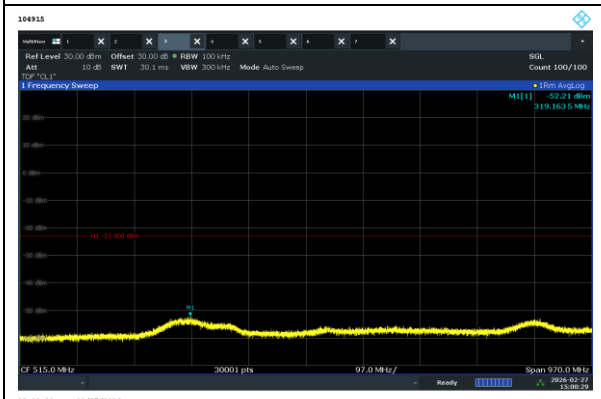


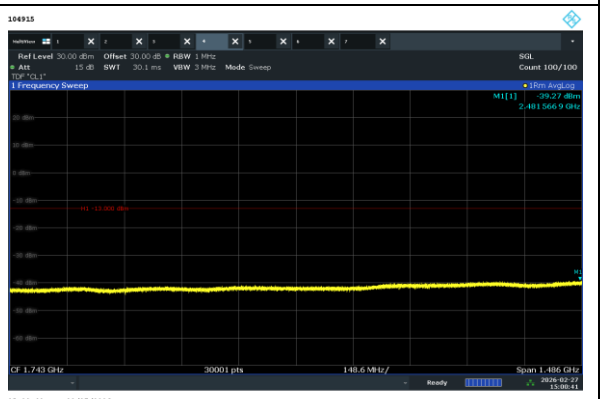


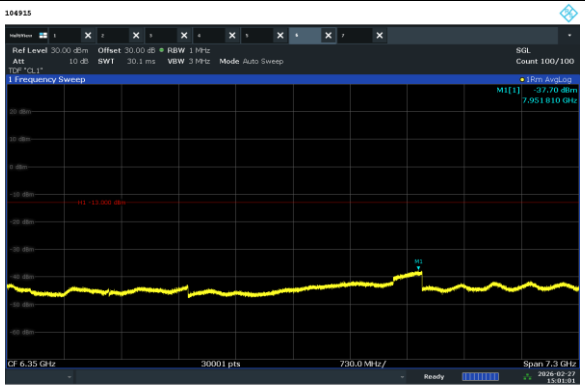


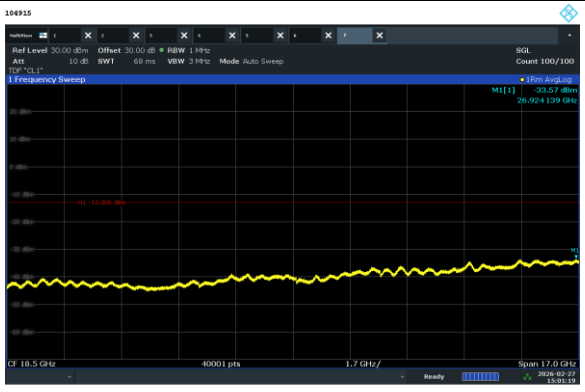
BRS / ANT 2 / Narrowband / Low channel











BRS / ANT 2 / Narrowband / Mid channel