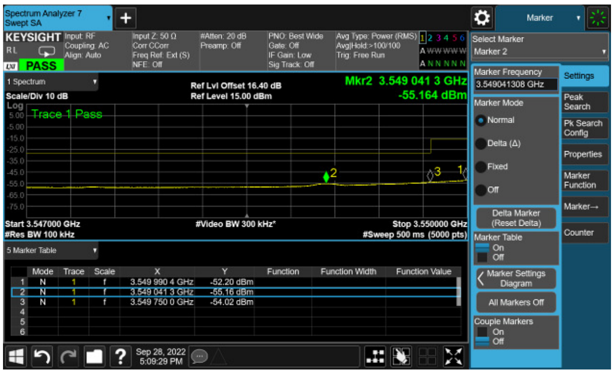
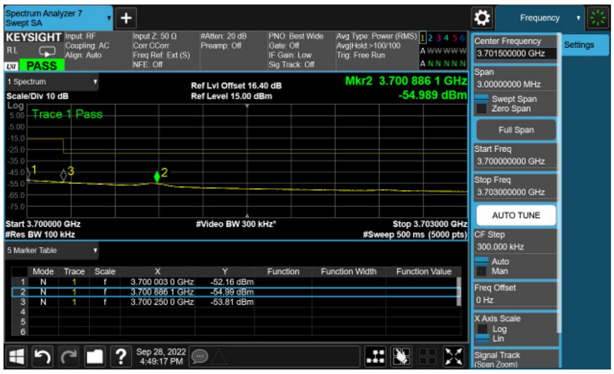
conveniently. 2.The max level in -52.15dBm/100KHz = -62.15dBm/MHz	conveniently. 2.The max level in -52.14dBm/100KHz = -62.14dBm/MHz
3dB Above AGC _ Low Edge	3dB Above AGC _ Up Edge



1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result conveniently.

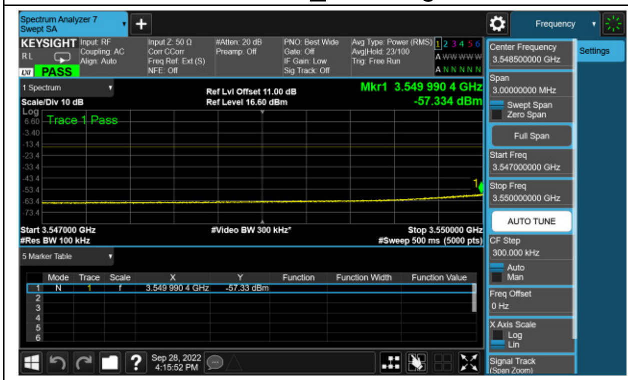
2.The max level in -52.20dBm/100KHz = -62.20dBm/MHz



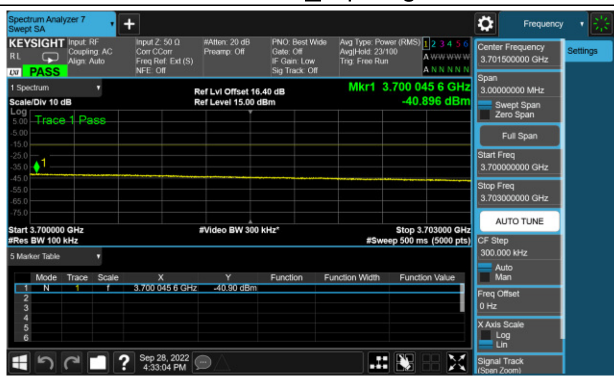
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result conveniently.

2.The max level in -52.16dBm/100KHz = -62.16dBm/MHz

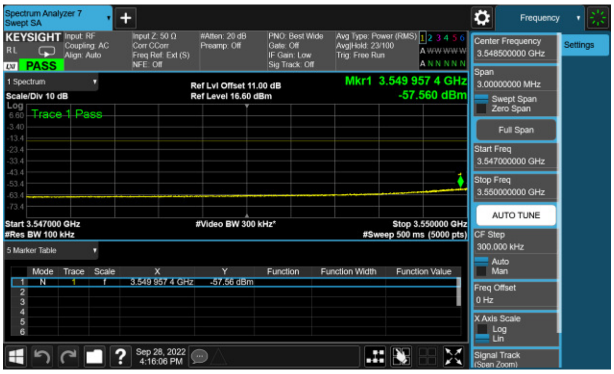
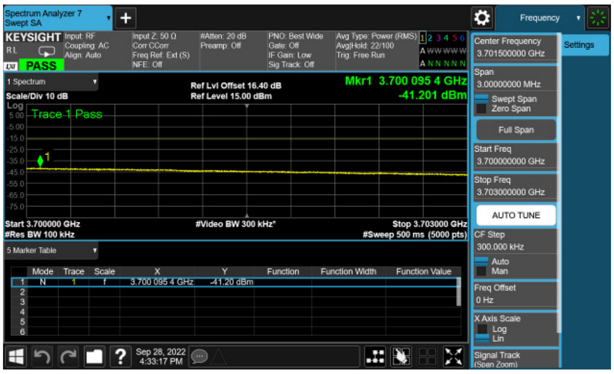
TDD Band 48 _ AWGN _ Two signal input	
Pre-AGC _ Low Edge	Pre-AGC _ Up Edge

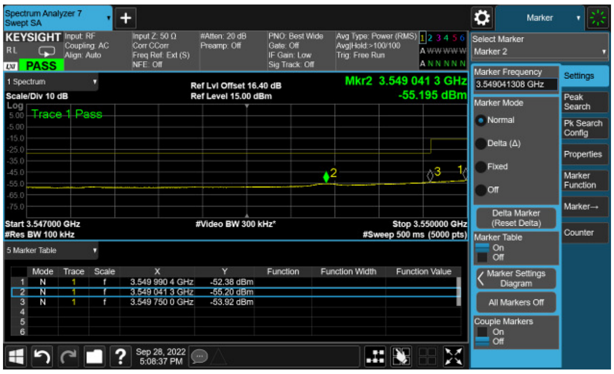
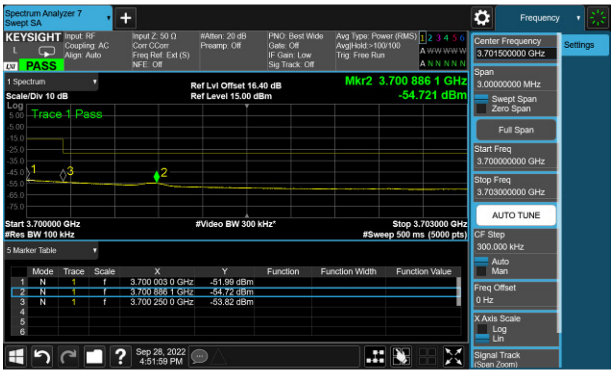


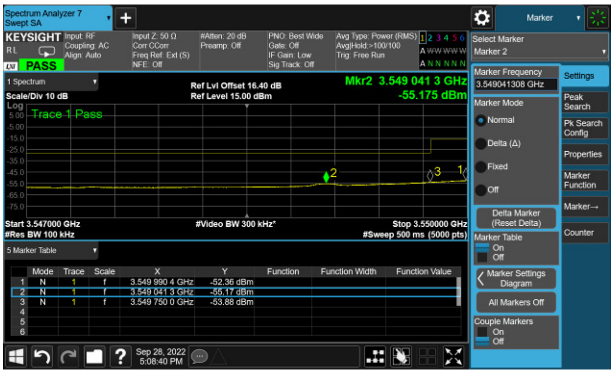
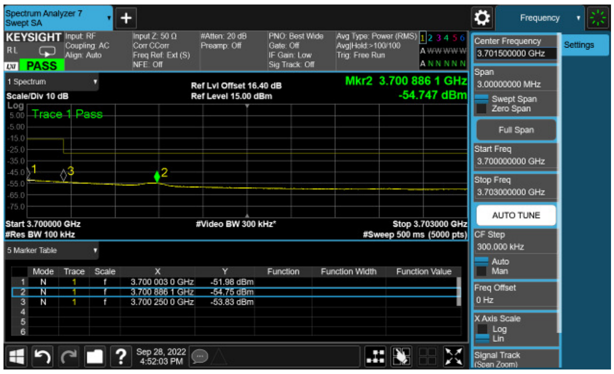
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz in order to determine the test result conveniently.

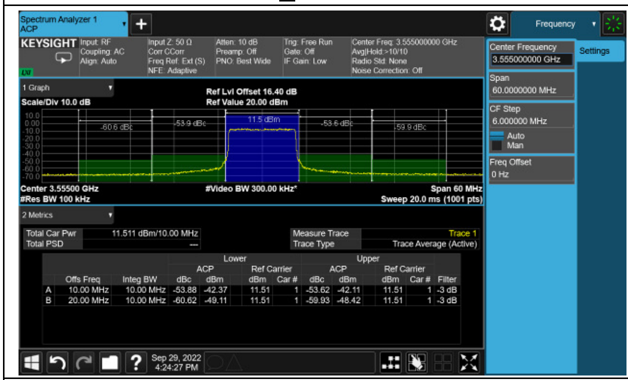
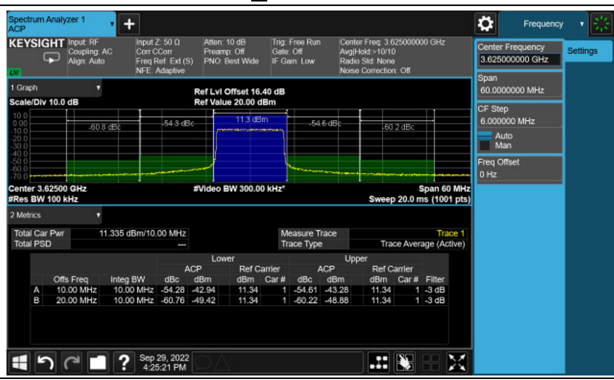


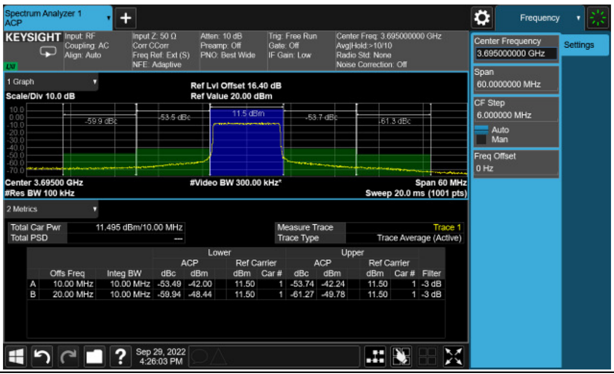
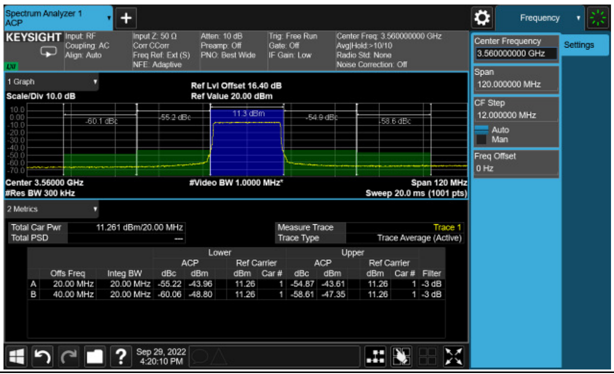
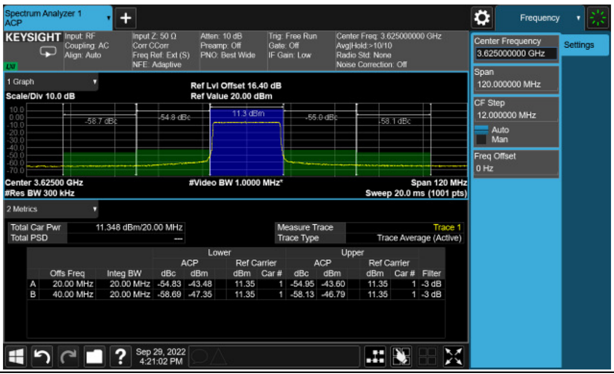
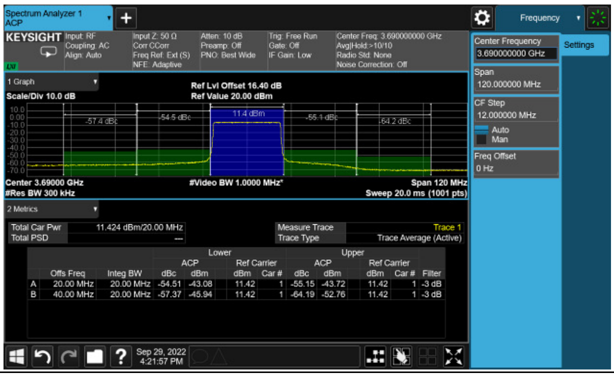
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz in order to determine the test result conveniently.

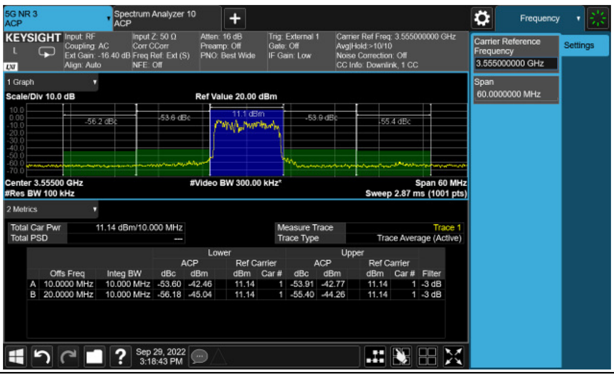
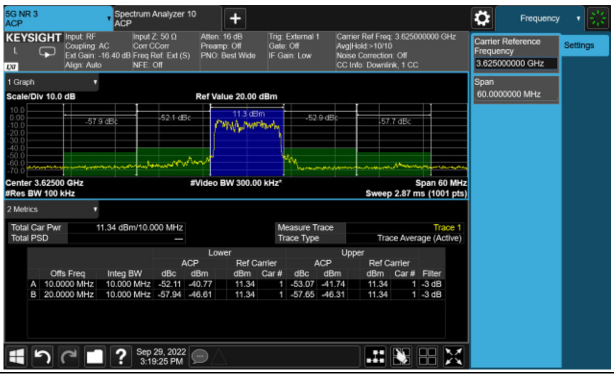
2.The level in -57.334dBm/100KHz = -67.334dBm/MHz	2.The level in -40.896dBm/100KHz = -40.896dBm/MHz
3dB Above AGC _ Low Edge	3dB Above AGC _ Up Edge
	
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz in order to determine the test result conveniently. 2.The level in -57.560dBm/100KHz = -67.560dBm/MHz	1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz in order to determine the test result conveniently. 2.The level in -41.201dBm/100KHz = -51.201dBm/MHz

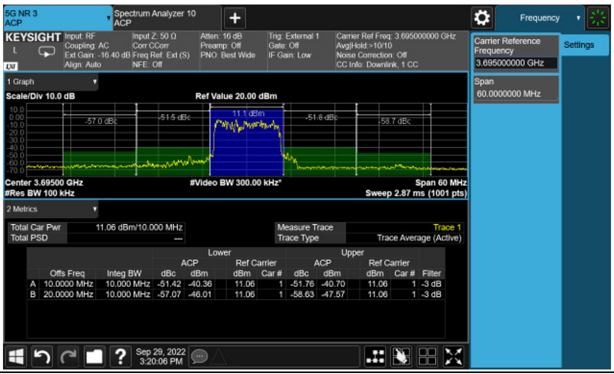
TDD Band 48 _ GSM _ Two signal input	
Pre-AGC _ Low Edge	Pre-AGC _ Up Edge
	
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result	1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result

conveniently. 2.The max level in -52.38dBm/100KHz = -62.38dBm/MHz	conveniently. 2.The max level in -51.99dBm/100KHz = -61.99dBm/MHz
3dB Above AGC _ Low Edge	3dB Above AGC _ Up Edge
	
1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result conveniently. 2.The max level in -52.36dBm/100KHz = -62.36dBm/MHz	1.For 2*2MIMO, one of ANT ports was measured and the limit shall be reduced by 10lg(2), so the limit was calculated to show -16dBm/MHz and -28dBm/MHz in order to determine the test result conveniently. 2.The max level in -51.98dBm/100KHz = -61.98dBm/MHz

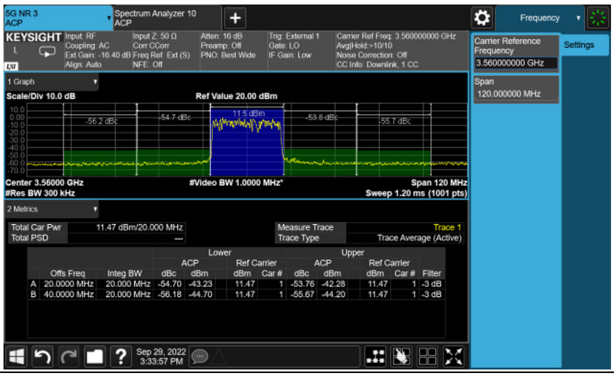
LTE_TDD Band 48 _ Adjacent Channel Leakage Power Ratio	
10MHz_Low Channel	10MHz_Middle Channel
	
10MHz_High Channel	20MHz_Low Channel

	
20MHz_Middle Channel	20MHz_High Channel
	

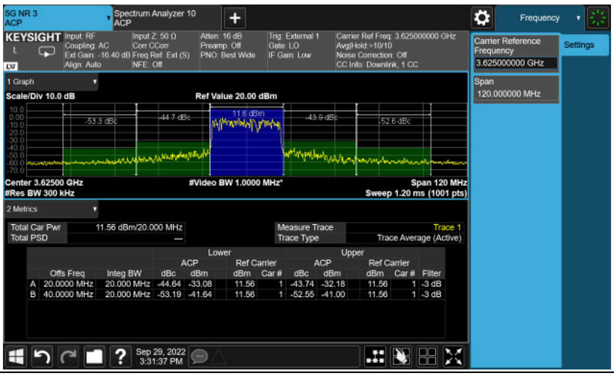
NR_TDD Band 48 _ Adjacent Channel Leakage Power Ratio	
10MHz_Low Channel	10MHz_Middle Channel
	
10MHz_High Channel	20MHz_Low Channel



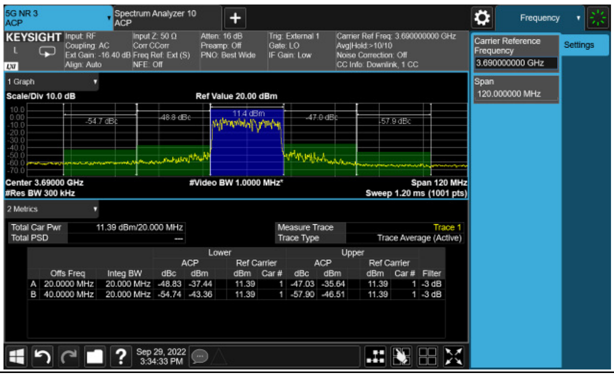
20MHz_Middle Channel



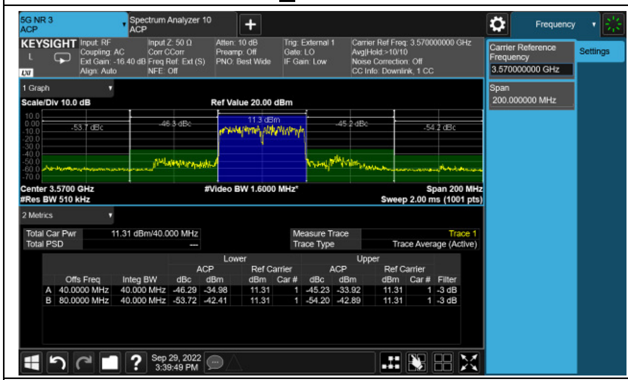
20MHz_High Channel



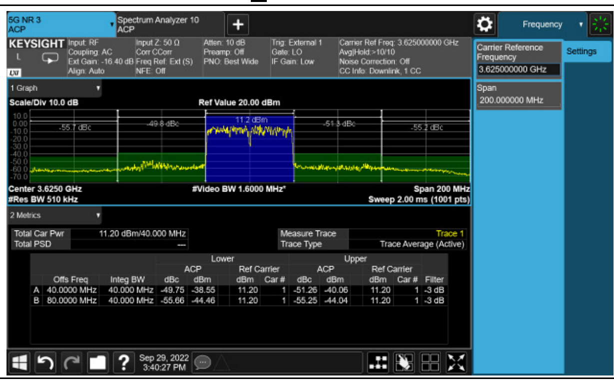
40MHz_Low Channel



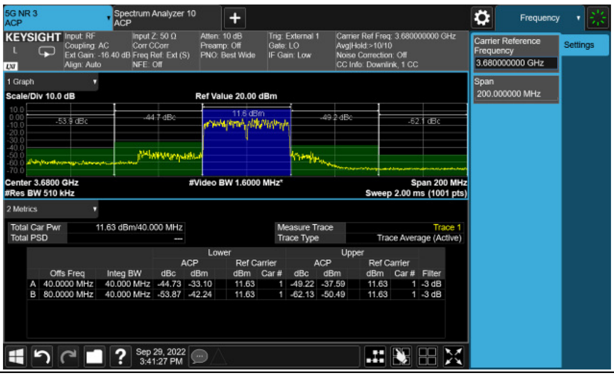
40MHz_Middle Channel



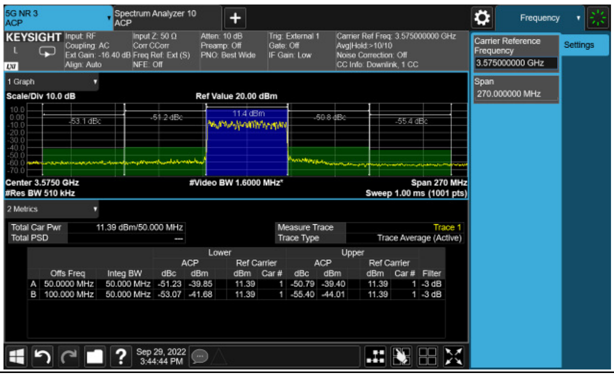
40MHz_High Channel



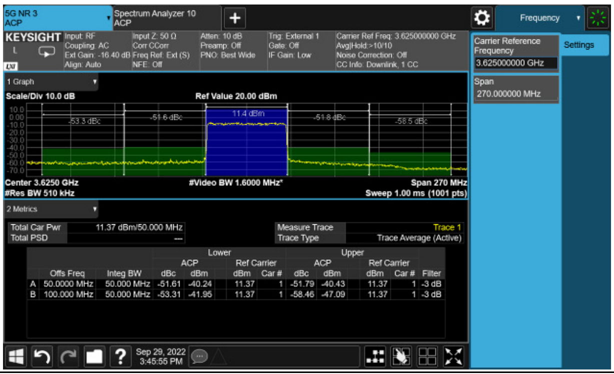
50MHz_Low Channel



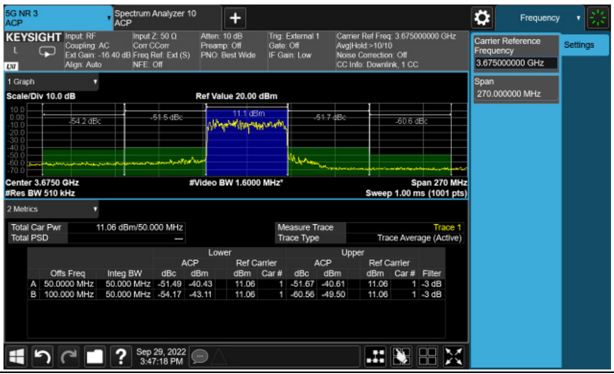
50MHz_Middle Channel



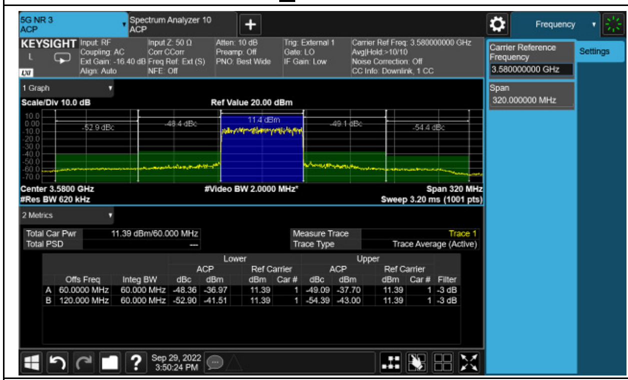
50MHz_High Channel



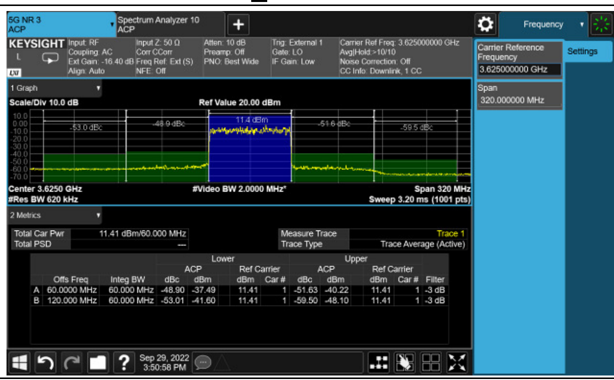
60MHz_Low Channel



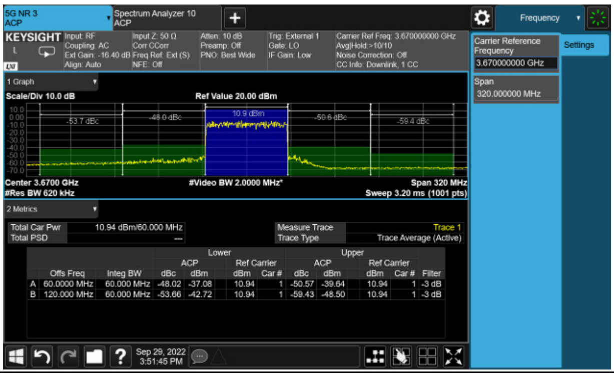
60MHz_Middle Channel



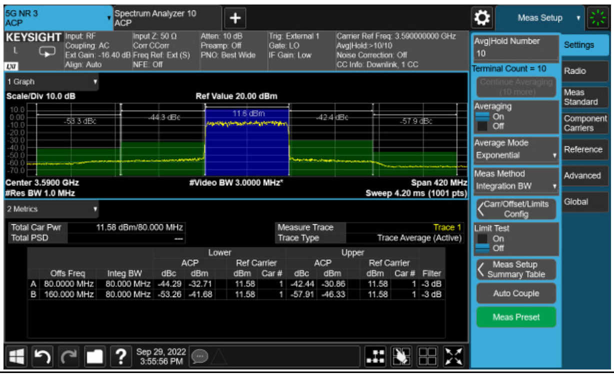
60MHz_High Channel



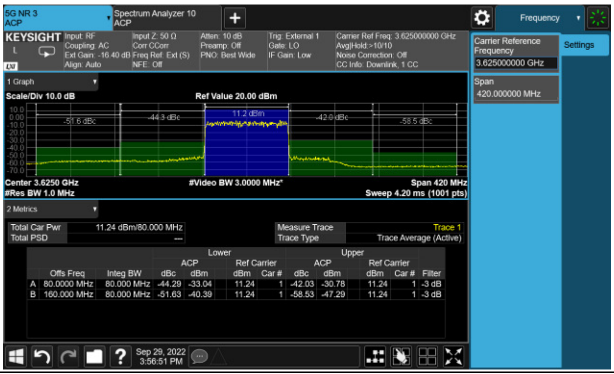
80MHz_Low Channel



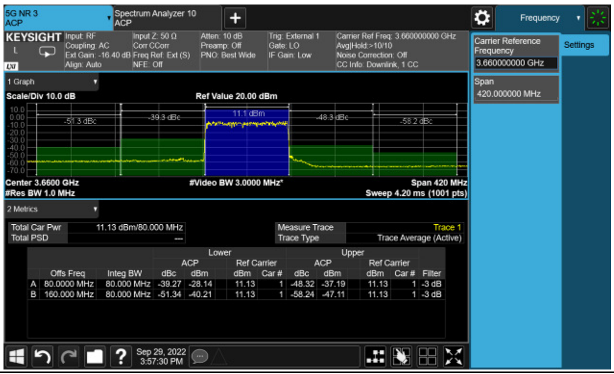
80MHz_Middle Channel



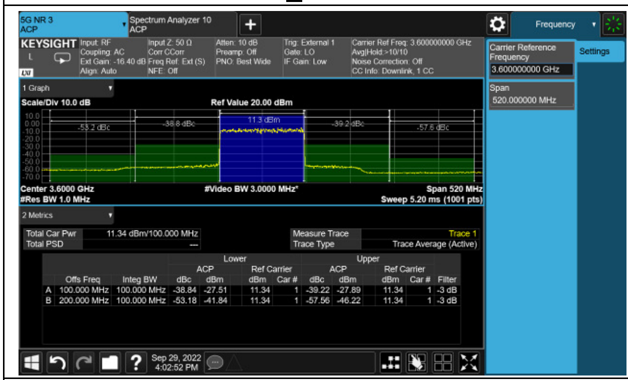
80MHz_High Channel



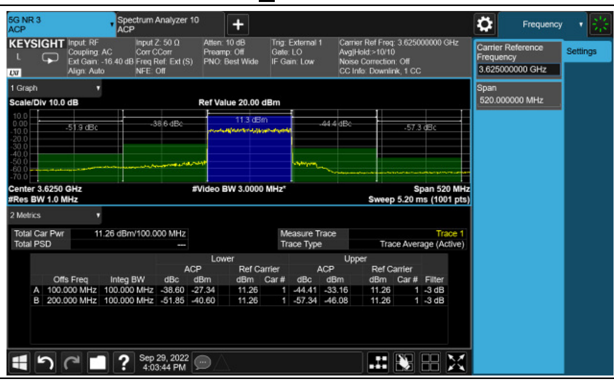
100MHz_Low Channel

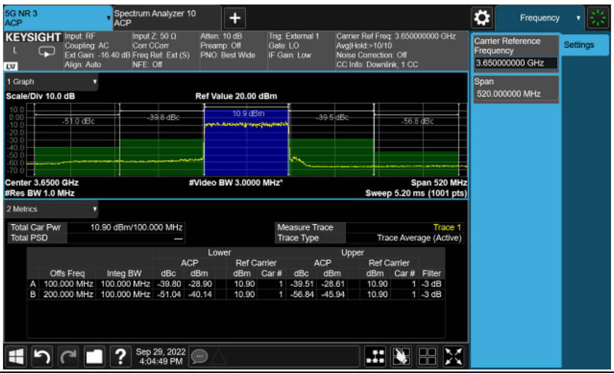


100MHz_Middle Channel



100MHz_High Channel





All modes have been tested and only the worst test result has been recorded.

6.5 Radiated Spurious Emissions

Test Requirement: FCC Part 2.1053

Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04

EUT Operation:

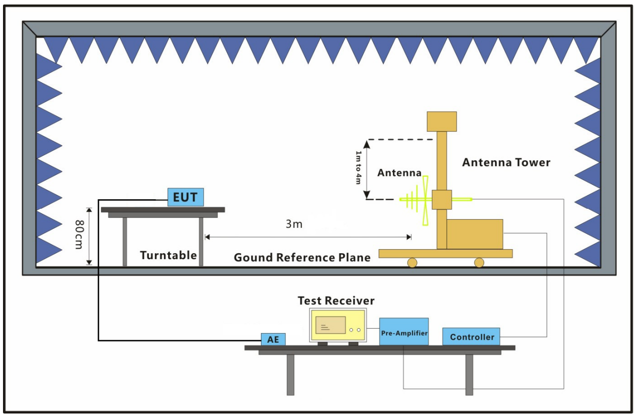
Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

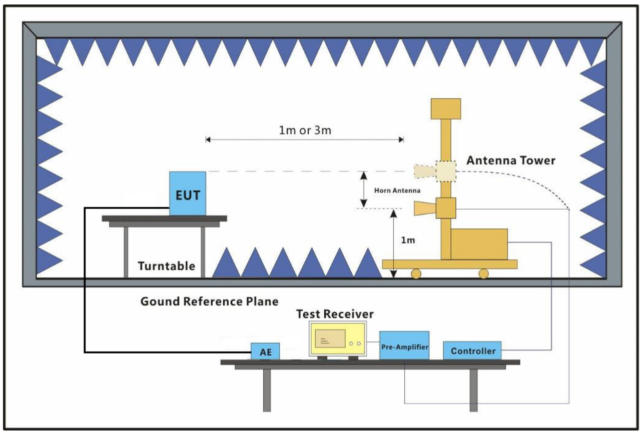
Application: Enclosure

Test Configuration:

30MHz to 1GHz emissions:

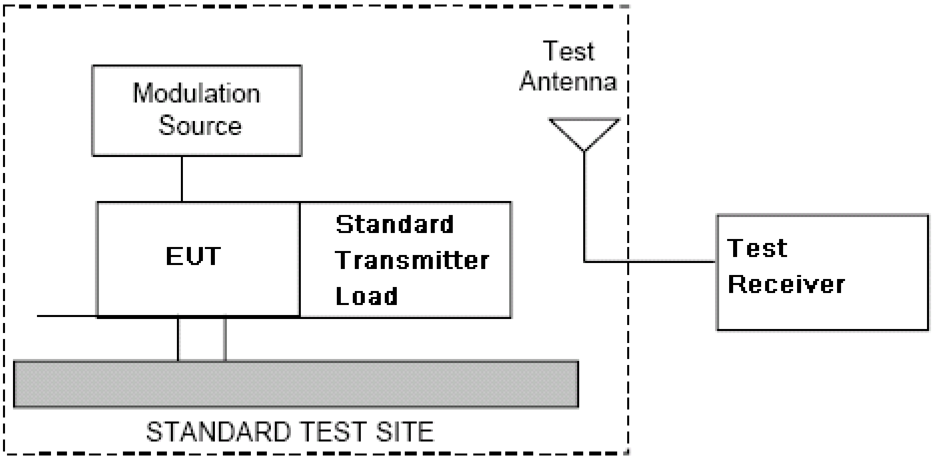


1GHz to 40GHz emissions:



Test Procedure:
1. Test the background noise level with all the test facilities;
2. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
3. Select the suitable RF notch filter to avoid the test receiver or spectrum analyzer produce unwanted spurious emissions;
4. Keep the EUT continuously transmitting in max power;
5. Read the radiated emissions of the EUT enclosure.

Radiated Emissions Test Procedure:



a) Connect the equipment as illustrated.

b) Adjust the spectrum analyzer for the following settings:
   1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
   2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
   3) Sweep Speed slow enough to maintain measurement calibration.
   4) Detector Mode = Positive Peak.

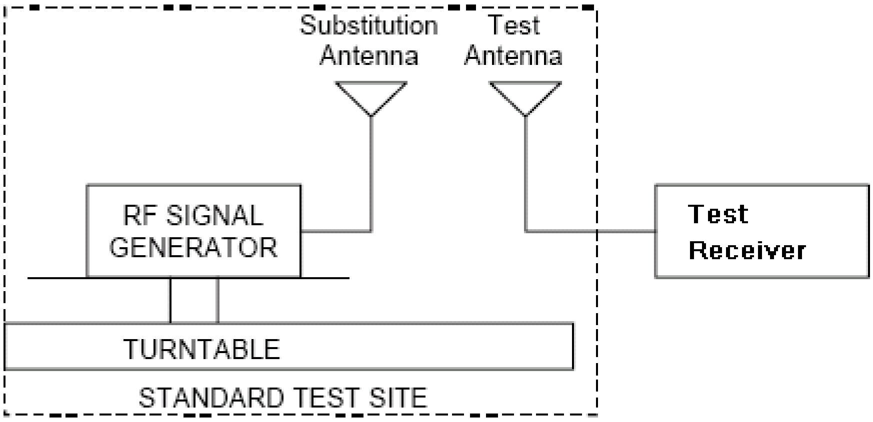
c) Place the transmitter to be tested on the turntable in the standard test site, The transmitter is transmitting into a no radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

d) Measurements shall be made from30MHz to 10 times of fundamental carrier, except for the region close to the carrier equal to ± the carrier bandwidth.

e) Key the transmitter without modulation or normal modulation base the standard.

f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.



h) Reconnect the equipment as illustrated.

i) Keep the spectrum analyzer adjusted as in step b).

j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a no radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

l) Repeat step k) with both antennas vertically polarized for each spurious frequency.

m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

Pd(dBm) = *Pg*(dBm) – *cable loss* (dB) + *antenna gain* (dB)

where:

Pd is the dipole equivalent power and

Pg is the generator output power into the substitution antenna.

NOTE:

1) It is permissible to use other antennas provided they can be referenced to a dipole.

2)For below 1GHz signal, the *antenna gain* (dB) is dBd, and for above 1GHz signal, the *antenna gain* (dB) is dBi

3) Effective radiated power (e.r.p) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.

e.r.p (dBm) = e.i.r.p. (dBm) - 2.15

4) For this test, the AU and EU are put outside of the chamber; connect to the RU through the optical fiber

6.5.1 Measurement Data

BAND 48-3550MHz-3700MHz-AWGN Low channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2030.214	-50.38	-40	-10.38	-55.65	0.53	5.8	Horizontal	Pass
5179.049	-50.31	-40	-10.31	-59.09	0.82	9.6	Horizontal	Pass
17844.59	-56.8	-40	-16.8	-67.68	1.52	12.4	Horizontal	Pass
2077.705	-49.51	-40	-9.51	-52.63	0.53	5.8	Vertical	Pass
7411.461	-51.64	-40	-11.64	-63.54	1	12.9	Vertical	Pass
18000	-58.29	-40	-18.29	-68.74	1.65	12.1	Vertical	Pass

BAND 48-3550MHz-3700MHz-AWGN Middle channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2006.877	-49.68	-40	-9.68	-54.95	0.53	5.8	Horizontal	Pass
10068.45	-54.02	-40	-14.02	-65.46	1.26	12.7	Horizontal	Pass
18000	-57.36	-40	-17.36	-67.81	1.65	12.1	Horizontal	Pass
2169.767	-49.07	-40	-9.07	-52.19	0.53	5.8	Vertical	Pass
7606.788	-51.56	-40	-11.56	-63.77	0.99	13.2	Vertical	Pass
17948.05	-57.28	-40	-17.28	-68.16	1.52	12.4	Vertical	Pass

BAND 48-3550MHz-3700MHz-AWGN High channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2071.708	-49.64	-40	-9.64	-54.91	0.53	5.8	Horizontal	Pass
9923.991	-52.66	-40	-12.66	-64.39	1.27	13	Horizontal	Pass
17896.25	-57.99	-40	-17.99	-68.87	1.52	12.4	Horizontal	Pass
2107.95	-49.32	-40	-9.32	-52.44	0.53	5.8	Vertical	Pass
9981.525	-53.41	-40	-13.41	-65.14	1.27	13	Vertical	Pass
17844.59	-56.55	-40	-16.55	-67.43	1.52	12.4	Vertical	Pass

All modes have been tested and only the worst test result has been recorded. The emission below 1GHz is low so it is not shown here.

BAND 48-3550MHz-3700MHz-GSM Low channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2163.504	-49.25	-40	-9.25	-54.52	0.53	5.8	Horizontal	Pass
9981.525	-53.63	-40	-13.63	-65.36	1.27	13	Horizontal	Pass
17844.59	-57.2	-40	-17.2	-68.08	1.52	12.4	Horizontal	Pass
2163.504	-49.11	-40	-9.11	-52.23	0.53	5.8	Vertical	Pass
7015.42	-51.05	-40	-11.05	-62.95	1	12.9	Vertical	Pass
17844.59	-57.86	-40	-17.86	-68.74	1.52	12.4	Vertical	Pass

BAND 48-3550MHz-3700MHz-GSM Middle channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2065.729	-49.18	-40	-9.18	-54.45	0.53	5.8	Horizontal	Pass
7015.42	-50.62	-40	-10.62	-62.52	1	12.9	Horizontal	Pass
17948.05	-58.75	-40	-18.75	-69.63	1.52	12.4	Horizontal	Pass
1983.808	-49.46	-40	-9.46	-52.79	0.52	6	Vertical	Pass
7056.092	-50.61	-40	-10.61	-62.51	1	12.9	Vertical	Pass
17948.05	-58.32	-40	-18.32	-69.2	1.52	12.4	Vertical	Pass

BAND 48-3550MHz-3700MHz-GSM High channel								
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
2233.396	-49.8	-40	-9.8	-55.07	0.53	5.8	Horizontal	Pass
6954.852	-51.16	-40	-11.16	-62.01	0.95	11.8	Horizontal	Pass
15003.42	-53.21	-40	-13.21	-65.07	1.44	13.3	Horizontal	Pass
1983.808	-50.16	-40	-10.16	-53.49	0.52	6	Vertical	Pass
7476.006	-50.89	-40	-10.89	-62.79	1	12.9	Vertical	Pass
18000	-58.05	-40	-18.05	-68.5	1.65	12.1	Vertical	Pass

All modes have been tested and only the worst test result has been recorded.

6.6 Occupied bandwidth and Input-versus-output signal comparison

Test Requirement: FCC part 2.1049
The spectral shape of the output should look similar to input for all modulations.

EUT Operation:

Status: Drive the EUT to maximum output power. .

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

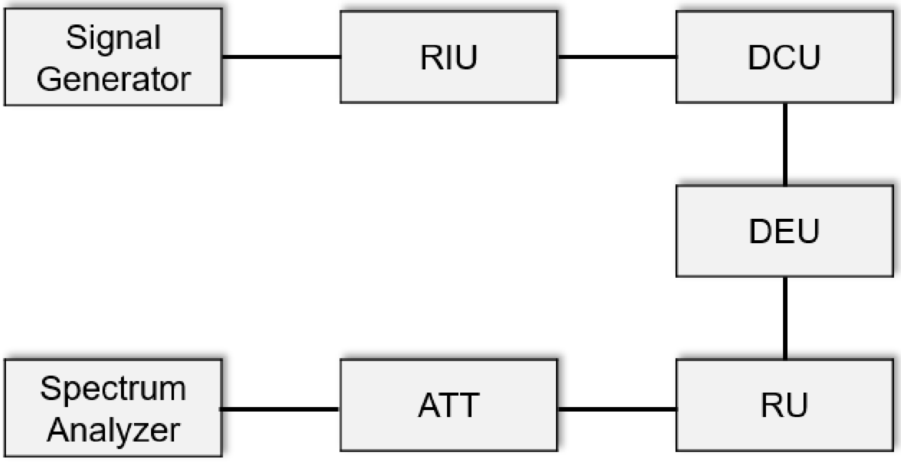


Fig.5. Occupied bandwidth test configuration

Test Procedure:

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 (see 3.2), 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 times to 5 times 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 as f0.

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.

6.6.1 Measurement Data

TDD Band 48				
Signal Level	Test Channel	Signal Type	99% Occupied Channel Bandwidth (MHz)	
			AWGN	GSM
Pre-AGC	Middle Channel	Input	4.1157	0.24514
		Output	4.0992	0.24626
3dB Above AGC	Middle Channel	Input	4.1119	0.24523
		Output	4.0979	0.24704

<table>
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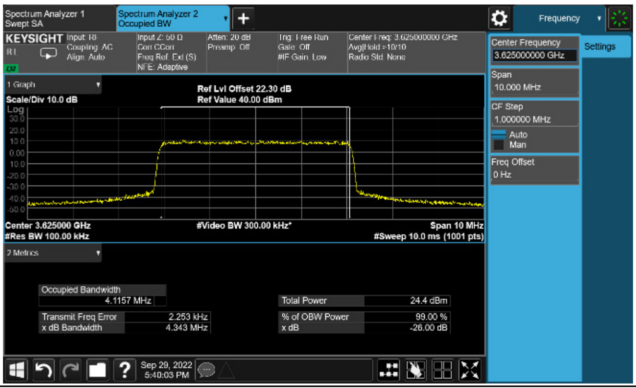
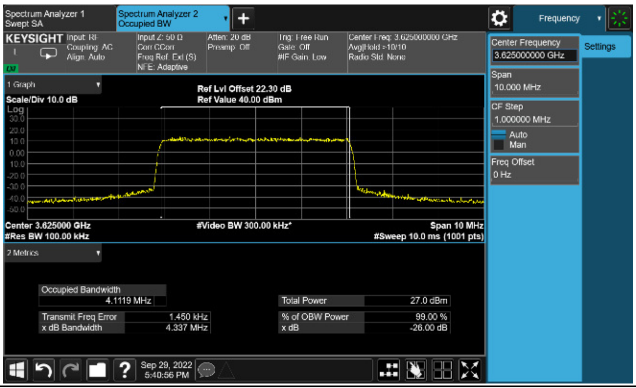
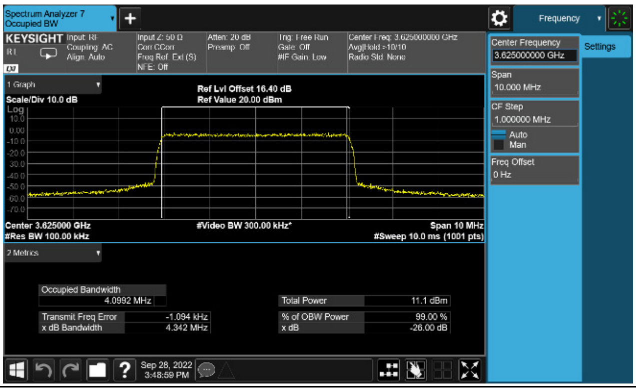
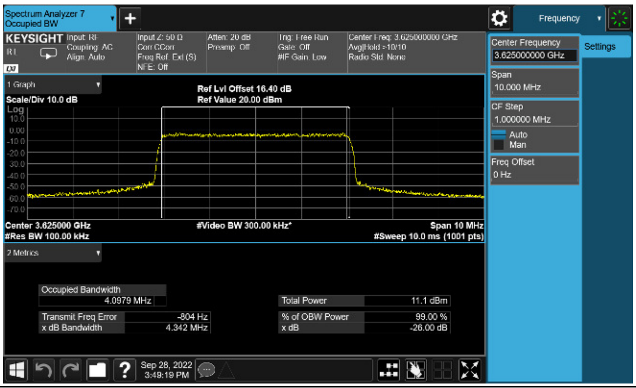
<tr><th>Pre-AGC _ Input</th><th>3dB Above AGC _ Input</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><th>Pre-AGC _ Output</th><th>3dB Above AGC _ Output</th></tr>
<tr><td>
</td><td>
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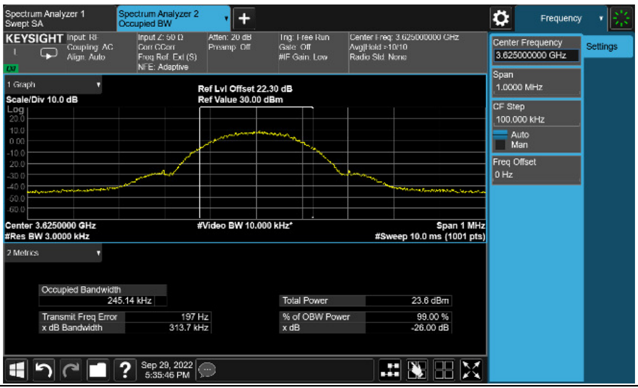
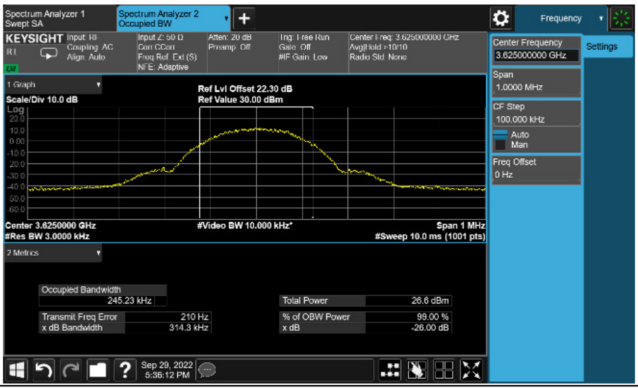
TDD Band 48 _ GSM

Pre-AGC _ Input



3dB Above AGC _ Input



Pre-AGC _ Output

3dB Above AGC _ Output

6.7 Frequency stability

Test Requirement:	FCC Part 2.1055; FCC Part 24.135 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.
EUT Operation:	
Status:	Drive the EUT to maximum output power.
Conditions:	Temperature conditions, voltage conditions
Application:	Cellular Band RF output ports
Test Procedure:	1. Temperature conditions: a) The RF output port of the EUT was connected to Frequency Meter; b) Set the working Frequency in the middle channel; c) record the 20°C and norminal voltage frequency value as reference point; d) vary the temperature from -30°C to 50°C with step 10°C e) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status; f) read the frequency at the relative temperature. 2. Voltage conditions: a) record the 20°C and norminal voltage frequency value as reference point; b) vary the voltage from -15% norminal voltage to +15% voltage; c) read the frequency at the relative voltage.

6.7.1 Measurement Data

Test Data:

Frequency Stability vs temperature:

1.Test for TDD Band 48 Downlink (Middle Channel: 3625MHz)

Temperature(°C)	Voltage (V ac)	Frequency Error (Hz)	Tolerance(ppm)
50	110	48	0.0132
40	110	52	0.0143
30	110	47	0.0130
20	110	76	0.0210
10	110	58	0.0160
0	110	53	0.0146
-10	110	63	0.0174
-20	110	43	0.0119
-30	110	56	0.0154

Frequency Stability vs voltage:

1. Test for TDD Band 48 Downlink (Middle Channel: 3625MHz)

Voltage (V ac)	Temperature(°C)	Frequency Error (Hz)	Tolerance(ppm)
93.5	20	45	0.0124
110	20	56	0.0154
126.5	20	54	0.0149

7 Photographs

7.1 Setup photo

Please refer to setup photos for FYCR2207000385AT.

7.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for FYCR2207000385AT for details.

- End of the Report -