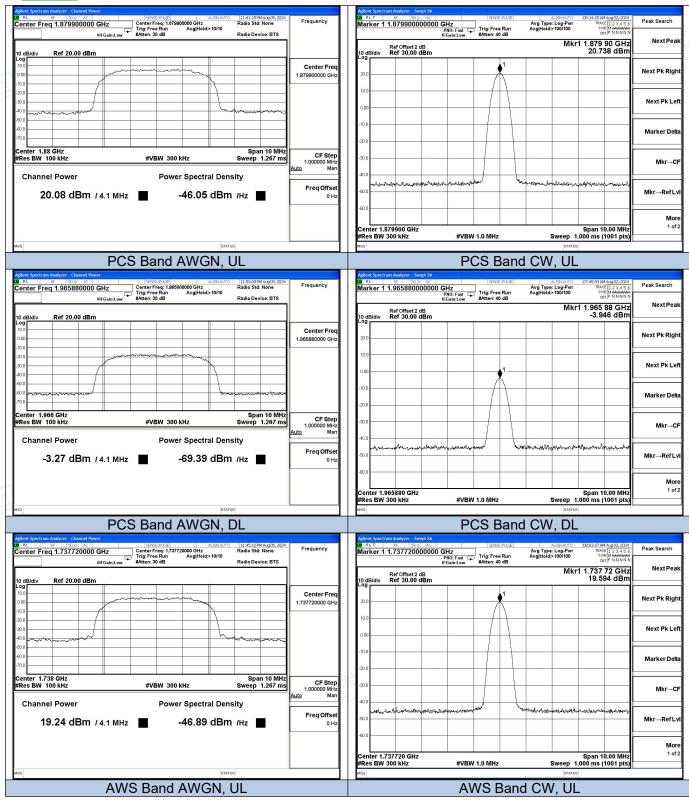


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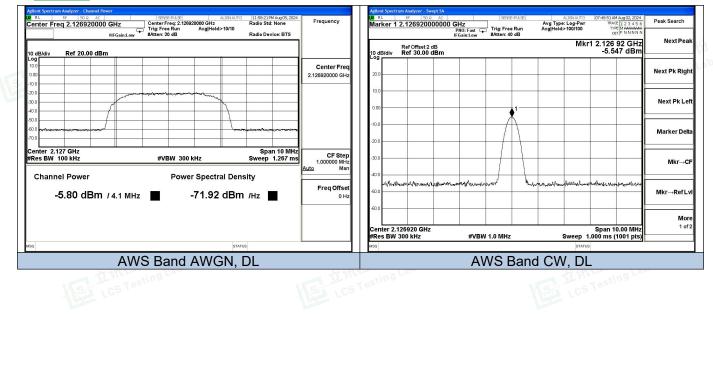




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6.4 Gain Limits and Bidirectional Capability&Variable Gain&Variable Uplink Gain Timing

6.4.1 Applicable Standard

According to §20.21(e)(8)(i)(C)(2) Booster Gain Limits (maximum gain);§20.21(e)(8)(i)(B) Bidirectional Capability (equivalent uplink and downlink gain):

The uplink and downlink maximum gain of a Consumer Booster referenced to its input and output ports shall not exceed the following limits:

(i) Fixed Booster maximum gain shall not exceed 6.5 dB + 20 Log10 (Frequency)

(ii) Where, Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.

(iii) Mobile Booster maximum gain shall not exceed 50 dB when using an inside antenna (e.g., inside a vehicle), 23 dB when using direct contact coupling (e.g., cradle-type boosters), or 15 dB when directly connected (e.g., boosters with a physical connection to the phone).

6.4.2 Test Procedure

According to section 7.3 of KDB 935210 D03 Signal Booster Measurement v04r04:

This subclause provides guidance for the calculation of the maximum gain, based on the results obtained from the 7.1 and 7.2 measurements. The NPS limits on maximum gain for fixed and mobile wideband consumer signal boosters are provided in 20.21(e)(8)(i)(C)(2). Additionally, 20.21(e)(8)(i)(B) requires that wideband consumer signal boosters be able to provide equivalent uplink and downlink gain, i.e., within 9 dB.

a) Calculate the maximum gain of the booster as follows to demonstrate compliance to the applicable gain limits as specified.

b) For both the uplink and downlink in each supported frequency band, use each of the POUT and PIN result pairs for all signal types used in 7.2 in the following equation to obtain the maximum gain, G:

G(dB) = POUT(dBm) - PIN(dBm).

c) Record the maximum gain of the uplink and downlink paths for each supported frequency band, and verify that the each gain value complies with the applicable limit.

d) Provide tabulated results in the test report

6.4.3 Test Data

Temperature	23.6 ℃	Humidity	52.3%
Test Engineer	Nick Peng	Test Mode	Transmitting



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				Max Gain			
Mode	Operation Band	Signal Type	Pre AGC Input Level (dBm)	Conducted Output Level (dBm)	Max Gain (dB)	Gain Limit (dB)	Verdict
0	Lower	CW	-26	18.569	44.27		PASS
	700 Band	AWGN	-26	18.270	44.31	1	PASS
	Upper	CW	-26			PASS	
	700 Band	AWGN	-26	18.530	44.66		PASS
Uplink	Cellular	CW	-24	19.388	43.69		PASS
Оршик	Band	AWGN	-24	19.250	43.26		PASS
	PCS	CW	-16	20.738	36.47		PASS
	Band	AWGN	-16	20.080	36.34		PASS
	AWS	CW	-19	19.594	38.12		PASS
	Band	AWGN	-20	19.240	38.77	LI THINK	PASS
-193	Lower	CW	-50	-5.748	43.91	≤50.0	PASS
	700 Band	AWGN	-48	-4.810	43.20		PASS
	Upper	CW	-49	-5.533	43.39		PASS
	700 Band	AWGN	-49	-5.290	43.24		PASS
	Cellular	CW	-50	-7.478	42.15		PASS
ownlink	Band	AWGN	-50	-7.900	42.36		PASS
	PCS	CW	-48	-3.946	43.91		PASS
	Band	AWGN	-46	-3.270	43.05] [PASS
S THE	AWS	CW	-47	-5.547	41.19	1	PASS
R Maring	^{ூல்} Band	AWGN	-48	-5.800	41.70		PASS

		Uplink	Gain VS Dow	nlink Gain		
Band	Signal Type	Uplink Gain (dB)	Downlink Gain (dB)	Caculated (dB)	Limit (dB)	Verdict
Lower 700	CW	44.27	43.91	0.36		PASS
Band	AWGN	44.31	43.20	1.11		PASS
Upper 700	CW	44.03	43.39	0.64		PASS
Band	AWGN	44.66	43.24	1.42 ماري	, triff	PASS
Callular Dand	CW	43.69	42.15	1.54	≤9	PASS
Cellular Band	AWGN	43.26	42.36	0.9		PASS
DCC Dand	CW	36.47	43.91	-7.44		PASS
PCS Band	AWGN	36.34	43.05	-6.71		PASS
AWS Band	CW	38.12	41.19	-3.07		PASS
Avvo banu	AWGN	38.77	41.70	-2.93		PASS





6.4.4 Variable Gain Test Procedure

According to §20.21(e)(8)(i)(C)(1) Booster Gain Limits (variable gain); §20.21(e)(8)(i)(H) Transmit Power Off Mode (uplink gain):

The uplink gain in dB of a consumer booster referenced to its input and output ports shall not exceed -34 dB - RSSI + MSCL.

(i) Where RSSI is the downlink composite received signal power in dBm at the booster donor port for all base stations in the band of operation. RSSI is expressed in negative dB units relative to 1 mW.

(ii) Where MSCL (Mobile Station Coupling Loss) is the minimum coupling loss in dB between the wireless device and input port of the consumer booster. MSCL must be calculated or measured for each band of operation and provided in compliance test reports.

According to section 7.9.1 of KDB 935210 D03 Signal Booster Measurement v04r04:

a) Connect the EUT to the test equipment as shown in Figure 5 with the uplink output (donor) port connected to signal generator #1. Affirm that the coupled path of the RF coupler is connected to the spectrum analyzer.

b) Configure downlink signal generator #1 for AWGN operation with a 99% OBW of 4.1 MHz, tuned to the center of the operational band.

c) Set the power level and frequency of signal generator #2 to a value that is 5 dB below the AGC level determined from 7.2. The signal type is AWGN with a 99% OBW of 4.1 MHz.

- d) Set RBW = 100 kHz.
- e) Set VBW ≥ 300 kHz.
- f) Select the CHANNEL POWER measurement mode.
- g) Select the power averaging (rms) detector.
- h) Affirm that the number of measurement points per sweep \geq (2 span)/RBW.
- i) Sweep time = auto couple or as necessary (but no less than auto couple value).
- j) Trace average at least 10 traces in power averaging (i.e., rms) mode.

k) Measure the maximum channel power and compute maximum gain when varying the signal generator #1 output to a level from -90 dBm to -20 dBm, as measured at the input port (i.e., downlink signal level at the booster donor port node of Figure 5), in 1 dB steps inside the RSSI-dependent region, and 10 dB steps outside the RSSI-dependent region. Report the six values closest to the limit, including at least two points from within the RSSI-dependent region of operation. See gain limit in charts in Appendix D for uplink gain requirements. Additionally, document that the EUT provides equivalent uplink and downlink gain, and when operating in shutoff mode that the uplink and downlink gain is within the transmit power off mode gain limits. I) Repeat 7.9.1b) to 7.9.1k) for all operational uplink bands.



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6.4.5 Variable uplink gain timing Test Procedure

According to section 7.9.2 (Variable uplink gain timing) of KDB 935210 D03 Signal Booster Measurement v04r04:

m) Connect the EUT to the test equipment as shown in Figure 5 with the uplink output (donor) port connected to signal generator #1. Affirm that the coupled path of the RF coupler is connected to the spectrum analyzer.

n) Configure downlink signal generator #1 for AWGN operation with a 99% OBW of 4.1 MHz, tuned to the center of the operational band.

o) Set the power level and frequency of signal generator #2 to a value that is 5 dB below the AGC level determined from 7.2. The signal type is AWGN with a 99% OBW of 4.1 MHz.

- p) Set RBW = 100 kHz.
- q) Set VBW ≥ 300 kHz.
- r) Select the CHANNEL POWER measurement mode.
- s) Select the power averaging (rms) detector.

t) Affirm that the number of measurement points per sweep \geq (2 span)/RBW.

u) Sweep time = auto couple or as necessary (but no less than auto couple value).

v) Trace average at least 10 traces in power averaging (i.e., rms) mode.

w) Measure the maximum channel power and compute maximum gain when varying the signal generator #1 output to a level from -90 dBm to -20 dBm, as measured at the input port (i.e., downlink signal level at the booster donor port node of Figure 5), in 1 dB steps inside the RSSI-dependent region, and 10 dB steps outside the RSSI-dependent region. Report the six values closest to the limit, including at least two points from within the RSSI-dependent region of operation. See gain limit in charts in Appendix D for uplink gain requirements. Additionally, document that the EUT provides equivalent uplink and downlink gain, and when operating in shutoff mode that the uplink and downlink gain is within the transmit power off mode gain limits. x) Repeat 7.9.1b) to 7.9.1k) for all operational uplink bands.

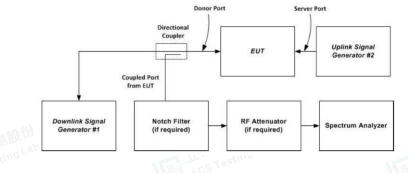


Figure 5 – Variable gain instrumentation test setup



6.4.6 Test data

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Temperature	23.6 ℃	Humidity	52.3%	g Lab
Test Engineer	Nick Peng	Test Mode	Transmitting	

			Variable u	olink gain			
Operation Band	RSSI (dBm)	P _{in} (dBm)	P _{out} (dBm)	Measured Value(dB)	MSCL	Limit (dB)	Results
	-80.0	-40.0	4.31	44.31	40.29	50.0	PASS
	-70.0	-40.0	4.31	44.31	40.29	50.0	PASS
Lower 700	-63.0	-40.0	-1.76	38.24	40.29	49.0	PASS
Band	-62.0	-40.0	-0.98	39.02	40.29	48.0 🛸	PASS
LCS .	-20.0	-40.0	-39.64	0.36	40.29	20.0	PASS
	-10.0	-40.0	-39.53	0.47	40.29	20.0	PASS
	-80.0	-38.0	6.66	44.66	41.22	50.0	PASS
	-70.0	-38.0	6.66	44.66	41.22	50.0	PASS
Upper 700	-63.0	-38.0	2.13	40.13	41.22	49.0	PASS
Band	-62.0	-38.0	-0.39	37.61	41.22	48.0	PASS
	-20.0	-38.0	-37.35	0.65	41.22	20.0	PASS
	-10.0	-38.0	-37.48	0.52	41.22	20.0	PASS
	-80.0	-39.0	4.69	43.69	37.65	50.0	PASS
一個時代	-70.0	-39.0	4.69	43.69	37.65	50.0	PASS
estingLab	-63.0	-39.0	1.26	40.26	37.65	49.0	PASS
Cellular Band	-62.0	-39.0	0.77	39.77	37.65	48.0	PASS
	-20.0	-39.0	-38.84	0.16	37.65	20.0	PASS
	-10.0	-39.0	-38.75	0.25	37.65	20.0	PASS
	-80.0	-41.0	-4.53	36.47	49.01	50.0	PASS
	-70.0	-41.0	-4.53	36.47	49.01	50.0	PASS
	-63.0	-41.0	-7.98	33.02	49.01	49.0	PASS
PCS Band	-62.0	-41.0	-8.84	32.16	49.01	48.0	PASS
-	-20.0	-41.0	-40.34	0.66	49.01	20.0	PASS
	-10.0	-41.0	-40.66	0.34	49.01	20.0	PASS
A STATE	-80.0	-40.0	-1.23	38.77	47.28	50.0	PASS
ASA ICS Testin	-70.0	-40.0	-1.23	38.77	47.28	50.0	PASS
	-63.0	-40.0	-2.36	37.64	47.28	49.0	PASS
AWS Band	-62.0	-40.0	-4.09	35.91	47.28	48.0	PASS
F	-20.0	-40.0	-39.85	0.15	47.28	20.0	PASS
F	-10.0	-40.0	-39.57	0.43	47.28	20.0	PASS





	- TALLER (A)		th BH Wit
	Variable Uplink	c Gain Timing	
Operation Band	Measured (s)	Limit (s)	Result
Lower 700 Band	0.120	3.0	PASS
Upper 700 Band	0.120	3.0	PASS
Cellular Band	0.120	3.0	PASS
PCS Band	0.120	3.0	PASS
AWS Band	0.120	3.0	PASS

Variable Uplink Gain Timing-Test Graphs ΟΛΙRET RF 50Ω AL Marker 1 Δ 120.000 ms arker 1 Δ 120.000 ms ALIGNAUTO Avg Type: RMS Marker ALIGN AL Avg Type: RMS Marke PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 40 dB PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 40 dB TYPE WWWWWW Select Marker Select Marker ∆Mkr1 120.0 ms -47.75 dB ∆Mkr1 120.0 ms -50.13 dB Ref Offset 2 dB Ref 30.00 dBm Ref Offset 2 dB Ref 30.00 dBm 10 dB/div Log 10 d Norm Norm 10.0 Del Delt ₩2 10. Fixed Fixed -30.0 01 01 1Δ2 1∆2 -60 Properties Properties More 1 of 2 More 1 of 2 Center 782.000000 MHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 s (1001 pts) Span 0 Hz Sweep 10.00 s (1001 pts) Center 707.000000 MHz Res BW 1.0 MHz #VBW 3.0 MHz* #VBW 3.0 MHz* Lower 700 Band Upper 700 Band ALIGN AU Avg Type: RMS 04:35 Marker ALIGNAL Avg Type: RMS Marke arker 1 Δ 120.000 ms arker 1 Δ 120.000 ms PNO: Fast +++ Trig: Free Run PNO: Fast +++ Trig: Free Run IEGain:Low #Atten: 40 dB TYPE Select Marker Select Marker ΔMkr1 120.0 ms -50.83 dB ΔMkr1 120.0 ms -48.32 dB Ref Offset 2 dB Ref 30.00 dBm Ref Offset 2 dB Ref 30.00 dBm 10 dB/di 10 d Log Norm Norm 20 20 10.0 Delt Delt 0.0 10.0 Fixed Fixed 20. -30. 0 of 1∆2 **∮**^{1∆2} Properties -50.0 Properties More More 1 of 2 1 of 2 Center 1.882500000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 s (1001 pts) Center 836.500000 MHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 s (1001 pts) #VBW 3.0 MHz* #VBW 3.0 MHz*

Cellular Band

PCS Band





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6.5 Anti-Oscillation

6.5.1 Applicable Standard

According to §20.21(e)(8)(ii)(A) Anti-Oscillation:

1. Consumer boosters must be able to detect and mitigate (i.e., by automatic gain reduction or shut down), any oscillations in uplink and downlink bands. Oscillation detection and mitigation must occur automatically within 0.3 seconds in the uplink band and within 1 second in the downlink band. In cases where oscillation is detected, the booster must continue mitigation for at least one minute before restarting. After five such restarts, the booster must not resume operation until manually reset.

2. Use of two EUTs is permitted for this measurement, which can greatly reduce the test time required. One EUT shall operate in a normal mode, and the second EUT shall operate in a test mode that is capable of disabling the uplink inactivity function and/or allows a reduction to 5 seconds of the time between restarts.

The procedures in 7.11.3 and 7.11.4 do not apply for devices that operate only as direct-connection mobile boosters having gain of less than or equal to 15 dB.

6.5.2 Test Procedure

Oscillation restart tests

According to section 7.11.2 of KDB 935210 D03 Signal Booster Measurement v04r04:

a) Connect the normal-operating mode EUT to the test equipment as shown in Figure 6 beginning with the spectrum analyzer on the uplink output (donor) port. Confirm that the RF coupled path is connected to the spectrum analyzer.

NOTE-The band-pass filter shall provide sufficient out-of-band rejection to prevent oscillations from occurring in bands not under test.

b) Spectrum analyzer settings:

- 1) Center frequency at the center of the band under test
- 2) Span equal or slightly exceeding the width of the band under test
- 3) Continuous sweep, max-hold
- 4) RBW \geq 1 MHz, VBW > 3 RBW

c) Decrease the variable attenuator until the spectrum analyzer displays a signal within the band under test. Using a marker, identify the approximate center frequency of this signal on the max-hold display, increase the attenuation by 10 dB, then reset the EUT (e.g., cycle ac/dc power).

d) Repeat 7.11.2c) twice to ensure that the center of the signal created by the booster remains within 250 kHz of the spectrum analyzer display center frequency. If the frequency of the signal is unstable, confirm that the spectrum analyzer display is centered between the frequency extremes observed. If the signal is wider than 1 MHz, ensure that the spectrum analyzer display is centered on the signal by increasing the RBW. Reset the EUT (e.g., cycle ac/dc power) after each oscillation event, if necessary. Set the spectrum analyzer sweep trigger level to just below the peak amplitude of the displayed EUT oscillation signal.

e) Set the spectrum analyzer to zero-span, with a sweep time of 5 seconds, and single-sweep with max-hold. The spectrum analyzer sweep trigger level in this and the subsequent steps shall be the level identified in 7.11.2d).

f) Decrease the variable attenuator until the spectrum analyzer sweep is triggered, increase the attenuation by 10 dB, then reset the EUT (e.g., cycle ac/dc power).



Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www Scan code to check authenticity g) Reset the zero-span trigger of the spectrum analyzer, then repeat 7.11.2f) twice to ensure that the spectrum analyzer is reliably triggered, resetting the EUT (e.g., cycle ac/dc power) after each oscillation event if necessary.

h) Reset the zero-span sweep trigger of the spectrum analyzer, and reset the EUT (e.g., cycle ac/dc power).

i) Force the EUT into oscillation by reducing the attenuation.

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j) Use the marker function of the spectrum analyzer to measure the time from the onset of oscillation until the EUT turns off, by setting Marker 1 on the leading edge of the oscillation signal and Marker 2 on the trailing edge. The spectrum analyzer sweep time may be adjusted to improve the time resolution of these cursors.

k) Capture the spectrum analyzer zero-span trace for inclusion in the test report. Report the power level associated with the oscillation separately if it can't be displayed on the trace.

I) Repeat 7.11.2b) to 7.11.2k) for all operational uplink and downlink bands.

m) Set the spectrum analyzer zero-span sweep time for longer than 60 seconds, then measure the restart time for each operational uplink and downlink band.

n) Replace the normal-operating mode EUT with the EUT that supports an anti-oscillation test mode.

o) Set the spectrum analyzer zero-span time for a minimum of 120 seconds, and a single sweep.

p) Manually trigger the spectrum analyzer zero-span sweep, and manually force the booster into oscillation as described in 7.11.2i).

q) When the sweep is complete, place cursors between the first two oscillation detections, and save the plot for inclusion in the test report. The time between restarts must match the manufacturer's timing for the test mode, and there shall be no more than 5 restarts.

r) Repeat 7.11.2m) to 7.11.2q) for all operational uplink and downlink bands.

Oscillation mitigation or shutdown

According to section 7.11.3 of KDB 935210 D03 Signal Booster Measurement v04r04:

a) Connect the normal-operating mode EUT to the test equipment as shown in Figure 7.

b) Set the spectrum analyzer center frequency to the center of band under test, and use the following settings:

1) RBW=30 kHz, VBW \ge 3 × RBW,

2) power averaging (rms) detector,

3) trace averages \geq 100,

4) span \geq 120% of operational band under test,

5) number of sweep points $\geq 2 \times \text{Span/RBW}$.

c) Configure the signal generator for AWGN operation with a 99% OBW of 4.1 MHz, tuned to the frequency of 2.5 MHz above the lower edge or below the upper edge of the operating band under test. Adjust the RF output level of the signal generator such that the measured power level of the AWGN signal at the output port of the booster is 30 dB less than the maximum power of the booster for the band under test. Affirm that the input signal is not obstructing the measurement of the strongest oscillation peak in the band, and is not included within the span in the measurement.

1) Boosters with operating spectrum passbands of 10 MHz or less may use a CW signal source at the band edge rather than AWGN.

2) For device passbands greater than 10 MHz, standard CMRS signal sources (i.e., CDMA, W-CDMA, LTE) may be used instead of AWGN at the band edge.

d) Set the variable attenuator to a high attenuation setting such that the booster will operate at maximum gain when powered on. Reset the EUT (e.g., cycle ac/dc power). Allow the EUT to





complete its boot-up process, to reach full operational gain, and to stabilize its operation. e) Set the variable attenuator such that the insertion loss for the center of the band under test (isolation) between the booster donor port and server port is 5 dB greater than the maximum gain, as recorded in the maximum gain test procedure (see 7.3), for the band under test. f) Verify the EUT shuts down, i.e., to mitigate the oscillations. If the booster does not shut

down, measure and verify the peak oscillation level as follows.

1) Allow the spectrum analyzer trace to stabilize.

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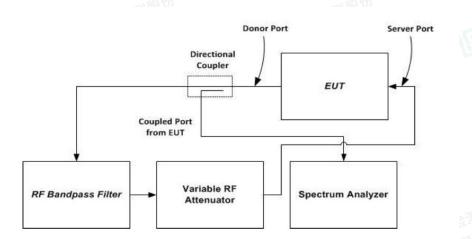
2) Place the marker at the highest oscillation level occurring within the span, and record its output level and frequency.

3) Set the spectrum analyzer center frequency to the frequency with the highest oscillation signal level, and reduce the span such that the upper and lower adjacent oscillation peaks are within the span.

4) Use the Minimum Search Marker function to find the lowest output level that is within the span, and within the operational band under test, and record its output level and frequency.
5) Affirm that the peak oscillation level measured in 7.11.3f2), does not exceed by 12.0 dB the minimal output level measured in 7.11.3f)4). Record the measurement results of 7.11.3f2) and 7.11.3f4) in tabular format for inclusion in the test report.

6) The procedure of 7.11.3f1) to 7.11.3.f5) allows the spectrum analyzer trace to stabilize, and verification of shutdown or oscillation level measurement must occur within 300 seconds.20

g) Decrease the variable attenuator in 1 dB steps, and repeat step 7.11.3f) for each 1 dB step.
Continue testing to the level when the insertion loss for the center of band under test (isolation) between the booster donor port and server port is 5 dB lower than the maximum gain (see 7.3).
h) Repeat 7.11.3a) to 7.11.3g) for all operational uplink and downlink bands.



NOTE—This figure shows the test setup for uplink bands transmission path tests; i.e., signal flow is out from the donor port into the directional coupler. For downlink bands transmission path tests, the feedback signal flow path direction and equipment connections shall be reversed, i.e., signal flow is out from the server port into the directional coupler, and signal flow is into the donor port from the variable RF attenuator.

Figure 6 – Oscillation detection (7.11.2) test setup



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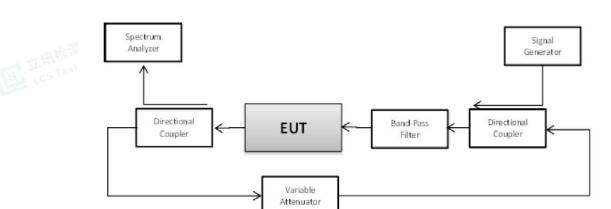


Figure 7 – Oscillation mitigation/shutdown test setup

6.5.3 Test data

.3 Test data			中 本語检測版的
Temperature	23.6 ℃	Humidity	52.3%
Test Engineer	Nick Peng	Test Mode	Transmitting

	Test	Results Of Detect	ion Time		
Opera	ation Band	Detection Time (s)	Limit (s)	Result	
	Lower 700 Band	0.220	0.300	PASS	
	Upper 700 Band	0.215	0.300	PASS	
Uplink	Cellular Band	0.265	0.300	PASS	an REAL
A B Jon Lab	PCS Band	0.250	0.300	PASS	ving Lab
STes"	AWS Band	0.280	0.300	PASS	3.4.
	Lower 700 Band	0.205	1.000	PASS	
	Upper 700 Band	0.205	1.000	PASS	
Downlink	Cellular Band	0.160	1.000	PASS	
	PCS Band	0.265	1.000	PASS	
	AWS Band	0.250	1.000	PASS	

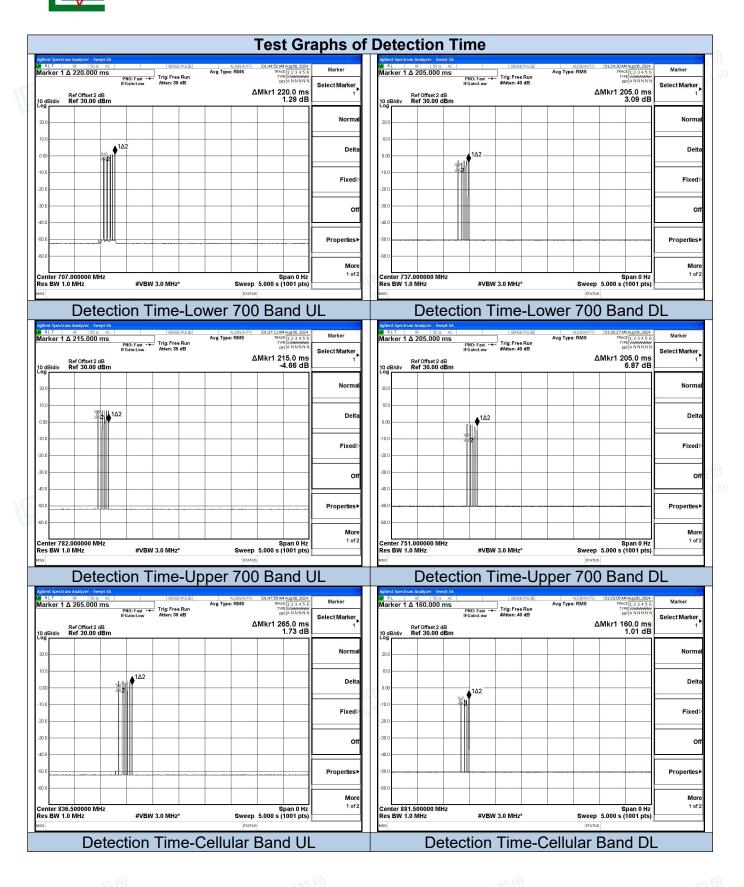
	Те	est Results	Of Resta	arting Time		
Ope	ration Band	Restarting Time (s)	Limit (s)	Restarting Counts	Limit	Result
TT IN O	Lower 700 Band		60	4	5	PASS
	Upper 700 Band	19A	60	4	5	PASS
Uplink	Cellular Band		60	4	5	PASS
	PCS Band	See Test	60	4	5	PASS
	AWS Band	Graphs of	60	4	5	PASS
	Lower 700 Band	Restarting	60	4	5	PASS
	Upper 700 Band	Time	60	4	5	PASS
Downlink	Cellular Band		60	4	5	PASS
	PCS Band		60	4	5	PASS
	AWS Band		60	4	5	PASS
(拉洲版份	工工	(检测版例) Testing Lab		立词 推测的	a Lap	立语称



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FCC ID: 2A34B-SFZN007

Report No.: LCSA07234101EA

Agilent Spectrum Analyzer - Swept SA 00 RLT RF SO Ω AC Marker 1 Δ 250.000 ms Ref Offset 2 dB 10 dB/div Ref 30.00 dBm	PNO: Fast	Δ132/AUTO 01:52:59 AU Aug 06, 5004 Avg Type: RMS TRACE [2:2:3:4:5:6 real ANNNN ΔMkr1 250.0 ms -3,65 dB	Marker Select Marker 1		SBNSE-RULSE PNO: Fast Gain:Low #Atten: 40 dB	Аціяналто (012007 АМ Андо 6, 2024 Аvg Туре: RMS тексе тексе тексе МКГ1 2635.0 ms 4.14 dB	Marker Select Marker
20.0			Normal	20.0			Normal
0.00	1Δ2		Delta	0.00	102		Delta
-10.0			Fixed⊳	-10.0			Fixed⊳
-30.0			Off	-40.0			Off
-50.0			Properties►	-50.0			Properties▶
Center 1.882500000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz*	Span 0 Hz Sweep 5.000 s (1001 pts)	More 1 of 2	Center 1.962500000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz*	Span 0 Hz Sweep 5.000 s (1001 pts)	More 1 of 2
Dete	ection Time	-PCS Band UL			otion Time	-PCS Band DL	
		-FUS Danu UL					
Agilent Spectrum Analyzer - Swept SA 00 8L T 8F 50.2 AC Marker 1 Δ 280.000 ms Ref Offset 2 dB 10 dB/div Ref 30.00 dBm	PNO: Fast	- ГСЗ Вапа UL ALIONAUTO 01.492.38 M Aug 06, 2024 Avg Type: RMS ПКАСЕ [12:3 4:5 6 техсе [12:3 4:5 6 сет Антинан АМКr1 288.00 ms 14.18 dB	Marker Select Marker	Agilent Spectrum Analyzer - Swept SA A RL RF 50 Ω AC Marker 1 Δ 250.000 ms	SPNS: PUSE	Ацельного 01:22:01 АМ Андебо, 2004 Ауд Туре: RMS Мист 12:3 4:5 6 тест (2):3 4:5 6 тест (2	Marker Select Marker
Addred Spectrum Analyzer - Souget AA Marker 1 A 280.000 m Marker 1 A 280.000 m Ref Offset 2 dB 10 dB/div Ref 30.00 dBm 200	SENSE:PULSE	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms		Agileri Spectrum Analyzer - Swept SA R.L. 1 DF (500 - 24) Marker 1 A 250.000 ms Ref Offset 2 dB Log 200	SENSE:PULSE	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	
Aglent Spectrum Analyzer - Swept SA 0	SENSE:PULSE	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms	Select Marker 1	Agileri Spectrum Analyzer - Swept SA Di RL BF 1000 AC Marker 1 A 250,000 ms Ref Offset 2 dB 10 dB/div Ref 30,00 dBm 200 100	SERVE PLASE Trig. Free Run Gaint.ov #Atten: 40 dB	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	Select Marker
Aglent Spectrum Analyzer - Sweyt SA R T Be 1200 AC Marker 1 & 280.000 ms Ref Offset 2 dB 10 dB/div Ref 30.00 dBm 200	SPREPLICE PHO: Fuel	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms	Select Marker	Apiteri Spectrum Analyzer - Swept SA R L BP (500 AC) Marker 1 A 250.000 ms Ref Offset 2 dB Log 20.0 10.0 0.00	SERVE PLASE Trig. Free Run Gaint.ov #Atten: 40 dB	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	Select Marker 1 Normal
Actient Spectrum Analyzer / Sweet SA Marker 1 A 280.000 ms Ref Offset 2 dB 10 dB/div Ref 30.00 dBm 200 100 100 100	SPREPLICE PHO: Fuel	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms	Select Marker 1 Normal Delta	Agiteri Spectrum Analyzer - Swept SA PR RL BP 1930 AC Marker 1 A 250.000 ms Ref Offset2 dB Log 20.0 10	SERVE PLASE Trig. Free Run Gaint.ov #Atten: 40 dB	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	Select Marker 1 Normal Deita
Action System Andrew Source A. Marker 1 A 280.000 m Marker 1 A 280.000 m 10 dB/div Ref 30.00 dBm 200 100 100 100 100 100 100 100	SPREPLICE PHO: Fuel	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms	Select Marker	Agileri Spectrum Analyzer - Swept SA R.L. 10F 1500 - 26 Marker 1 A 250.000 ms Ref Offset 2 dB Log 200 100 100 	SERVE PLASE Trig. Free Run Gaint.ov #Atten: 40 dB	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	Select Marker, 1 Normal Deita Fixed
Addent Spectrum Analyzer / Sweet SA Marker 1 A 280.000 ms 10 dB/div Ref 30.00 dBm 10 dB/div R	SPREPLICE PHO: Fuel	ALIGNAUTO 01:49:38 AM Aug 06, 2024 Avg Type: RMS TPACE [1:2:3:4:5:6] TYPE UNAWAYANY DETA NINN Ν ΔMkr1 280.0 ms	Select Marker	Agiteri Spectrum Analyzer - Swept SA PR RL BP 1930 AC Marker 1 A 250.000 ms Ref Offset2 dB 10 dB/div Ref 30.00 dBm 20 0 10 0	SERVE PLASE Trig. Free Run Gaint.ov #Atten: 40 dB	ALIGNAUTO [01:22:01.4M Aug 06,2024 Avg Type: RMS TRACE [1:2:3:4:5:6 TYPE [VALUATION IN N N ΔΜκr1 250.0 ms	Select Marker, 1 Normal Delta FixedP





ent Spectrum Analyzer - Swept Si		10	st Gra	ipns of	Restarting T			
RLT RF 50Ω AC rker 2 Δ 71.3000 s	SENSE:PULSE	ALIGNAUTO 04: Avg Type: RMS	14:04 AM Aug 06, 2024 TRACE 1 2 3 4 5 6	Peak Search	OX RLT RF 50 Ω AC Marker 2 Δ 73.7800 s	SENSE:PULSE	ALIGNAUTO 04:38:05 AM Aug 06, 2024 Avg Type: RMS TRACE 1 2 3 4 5 6	Peak Searc
	PNO: Fast Trig: Free Run IFGain:Low #Atten: 40 dB		TRACE 123456 TYPE WWWWWWWWWWW DET A NNNNN	Next Peak		PNO: Fast Trig: Free Run IFGain:Low #Atten: 40 dB	Avg Type: RMS TYPE WWWWWWW DET A N N N N ΔMkr2 73.78 s	Next
B/div Ref 30.00 dBm	1		0.32 dB		Ref Offset 2 dB 10 dB/div Ref 30.00 dBm		-1.10 dB	
				Next Pk Right				Next Pk F
					20.0			
°	♦2∆1			Next Pk Left	10.0			Next Pk
					0.00	♦ 2∆1		
			[Marker Delta	-10.0			Marker
p					-20.0			
,			[Mkr→CF	-30.0			Mkr
					-40.0			
				Mkr→RefLvl	-50.0			Mkr→R
					-60.0			
				More				I
nter 707.000000 MHz BW 1.0 MHz	#VBW 3.0 MHz*	Sweep 310	Span 0 Hz 0.0 s (1001 pts)	1 of 2	Center 737.000000 MHz Res BW 1.0 MHz	#VBW 3.0 MHz*	Span 0 Hz Sweep 310.0 s (1001 pts)	
		STATUS			MSG		STATUS	
Resta	rting Time-L	ower 700 l	Band L	JL	Restart	ing Time-Lo	wer 700 Band	DL
nt Spectrum Analyzer - Swept Si L T RF 50 Ω A0	SENSE:PULSE	ALIGNAUTO 04:	:21:12 AM Aug 06, 2024 TRACE 1 2 3 4 5 6	Peak Search	Agilent Spectrum Analyzer - Swept SA	SENSE:PULSE	ALIGNAUTO 04:31:08 AM Aug 06, 2024	Peak Sear
rker 2 Δ 72.5400 s	PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 40 dB	Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE WWWAWWW DET A N N N N N		Marker 2 Δ 70.6800 s	PNO: Fast Trig: Free Run IFGain:Low #Atten: 40 dB	Avg Type: RMS TRACE 1 2 3 4 5 6 TYPE WWWWWWWW DET A N N N N	
Ref Offset 2 dB B/div Ref 30.00 dBm		ΔM	/kr2 72.54 s 0.09 dB	Next Peak	Ref Offset 2 dB 10 dB/div Ref 30.00 dBm		∆Mkr2 70.68 s 1.02 dB	Next
Line SUUU aBr					Log			
)		+ + +		Next Pk Right	20.0			Next Pk I
	2∆1		i		10.0			
				Next Pk Left	0.00	▲2∆1		Next Pk
					-10.0			
				Marker Delta	-20.0			Marker
,					-30.0			
				Mkr→CF	-40.0			Mkr
0			ſ		-50.0			
				Mkr→RefLvl				Mkr→R
				More	-60.0			
nter 782.000000 MHz	#VBW 3.0 MHz*	Swaap 210	Span 0 Hz	1 of 2	Center 751.000000 MHz	#1/B1W 2 0 MU-*	Span 0 Hz Swaan, 210 0 c (1001 ptc)	
BW 1.0 MHz	#VBW 3.0 MH2"	Sweep 310 STATUS	0.0 s (1001 pts)		Res BW 1.0 MHz	#VBW 3.0 MHz*	Sweep 310.0 s (1001 pts)	
Resta	rting Time-U	pper 700	Band l	JL	Restart	ing Time-U	oper 700 Band	DL
nt Spectrum Analyzer - Swept Si LT RF 50 Ω AC *ker 2 Δ 67.8900 s		ALIGNAUTO 02: Avg Type: RMS	24:40 AM Aug 06, 2024	Peak Search	Agilent Spectrum Analyzer - Swept SA Δ RLT RF SO Ω AC Marker 2 Δ 72.8500 s	SENSE: PULSE	ALIGNAUTO 04:44:25 AM Aug 06, 2024 Avg Type: RMS TRACE 1 2 3 4 5 6	Peak Sear
Kel 2 4 07.0900 S	PNO: Fast Trig: Free Run IFGain:Low #Atten: 40 dB		TRACE 1 2 3 4 5 6 TYPE WWWWWWWW DET A N N N N N			PNO: Fast Trig: Free Run IFGain:Low #Atten: 40 dB	DET A N N N N	
Ref Offset 2 dB B/div Ref 30.00 dBm	1	ΔN	/lkr2 67.89 s -0.01 dB	NextPeak	Ref Offset 2 dB 10 dB/div Ref 30.00 dBm		∆Mkr2 72.85 s -1.70 dB	Next
				New Press	Log			
		+ + +		Next Pk Right	20.0			Next Pk I
01				North Director	10.0			
				Next Pk Left	0.00	▲2∆1		Next Pk
			I		-10.0			
				Marker Delta	-20.0			Marker
					-30.0			
				Mkr→CF	-40.0			Mkr
J				Mkr→RefLvl	-50.0			Mkr→R
					-60.0			
,				More	100.0			
			Span 0 Hz	More 1 of 2	Center 881.500000 MHz		Span 0 Hz	
2	#VBW 3.0 MHz*	Sweep 310	Span 0 Hz 0.0 s (1001 pts)			#VBW 3.0 MHz*	Span 0 Hz Sweep 310.0 s (1001 pts)	





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FCC ID: 2A34B-SFZN007

Report No.: LCSA07234101EA

lent Spectrum Analyzer - Swept SA					Agilent Spectrum A								
RLT RF 50 Ω AC arker 2 Δ 67.2400 s		Avg Type: RMS	UTO 02:11:08 AM Aug 06, 2024 TRACE 1 2 3 4 5 6	Properties	Marker 2 Δ	72.2300 s		SENSE:PULSE	Avg Typ	ALIGNAUTO RMS	04:57:02 AM A TRACE	123456	Peak Sear
	PNO: Fast Trig: Free IFGain:Low #Atten: 40	Run dB	DET A N N N N N	Select Marker			PNO: Fast +++ IFGain:Low	Trig: Free Run #Atten: 40 dB			TYPE DET	ANNNN	
Ref Offset 2 dB dB/div Ref 30.00 dBm			∆Mkr2 67.24 s -0.03 dB	2	Re 10 dB/div Re	ef Offset 2 dB ef 30.00 dBm					ΔMkr2 7 0.	2.23 s .86 dB	Nex
g				Relative To	Log							h	
1.0				Relative Io	20.0								Next Pk
	▲2∆1			X Axis Scale	10.0					-	-	i	
	• • • • • • •			Time►									Next F
10				Auto Man	0.00		2∆1						
0				Marker Trace	-10.0			1		Î			
				[Trace1, Auto Init]									Marke
0				1	-20.0				-				
0				Lines	-30.0							1	
5				On <u>Off</u>	-30.0								M
.0					-40.0				_				
												1	
0					-50.0								Mkr→
0					-60.0							-	
					100.0							II.	
nter 1.882500000 GHz			Span 0 Hz		Center 1.962	500000 CH2					Sn	an 0 Hz	
s BW 1.0 MHz	#VBW 3.0 MHz*	Sw	eep 310.0 s (1001 pts)		Res BW 1.0 M		#VBW :	3.0 MHz*		Sweep	310.0 s (1		
			STATUS	· · · · · · · · · · · · · · · · · · ·	MSG					STATU	IS		
Re	starting Ti	me-PCS	Band UL			Res	starting	g Tim	e-PC	SB	and	DL	
lent Spectrum Analyzer - Swept SA					Agilent Spectrum A	analyzer - Swept SA	startine	-					
Res Ient Spectrum Analyzer - Swept SA RLT RF 50 Q AC arker 2 & 70.3700 s	SBYSE	PULSE ALIGN	UTO 02:17:29 AM Aug 06, 2024	Peak Search	Agilent Spectrum A OX RLT F Marker 2 A	Analyzer - Swept SA RF 50 Ω AC		SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE	ug06,2024	Peak Se
ent Spectrum Analyzer - Swept SA RLT RF 50 Ω AC		PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 AM Aug 06, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET A N N N N	Peak Search	LXI RLT F	Analyzer - Swept SA RF 50 Ω AC	PNO: East	-		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	4ug 06, 2024 1 2 3 4 5 6 WWWWWWW	
RLT RF 50 Ω AC RLT RF 50 Ω AC Irker 2 Δ 70.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm	PNO: Fast Trig: Free IFGain:Low #Atten: 40	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 AM Aug 06, 2024	Next Peak	Marker 2 A	Analyzer - Swept SA RF 50 Ω AC	PNO: Fast ↔	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	4ug 06, 2024 1 2 3 4 5 6 WWWWWWW	
ent Spectrum Analyzer - Swept SA RLT RF 50 Q AC arker 2 A 70.3700 s dB/div Ref 01fiset 2 dB dB/div Ref 30.00 dBm	PNO: Fast Trig: Free IFGain:Low #Atten: 40	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	Next Peak	Marker 2 A	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PNO: Fast ↔	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex
ent Spectrum Analyzer - Swept SA RLT RF 50 Q AC arker 2 A 70.3700 s dB/div Ref 01fiset 2 dB dB/div Ref 30.00 dBm	PNO: Fast Trig: Free IFGain:Low #Atten: 40	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	NextPeak	Marker 2 A	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PNO: Fast ↔	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex
ent Spectrum Analyzer Swept SA RLT SF 100 AC rrker 2 Δ 70.3700 s Ref Offset 2 dB Ref 30.00 dBm	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	NextPeak	Marker 2 A	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PNO: Fast ↔	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex
nit Spectrum Analyzer - Smpd SA RLT BP 1005 AC rrker 2 Δ 70.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm	PNO: Fast Trig: Free IFGain:Low #Atten: 40	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	NextPeak	10 dB/div Re 10 dB/div Re 200	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex Next Pi
nit Spectrum Analyzer - Smpd SA RLT BP 1005 AC rrker 2 Δ 70.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	Next Peak	10 dB/div Rd	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PNO: Fast ↔	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex Next Pk
nit Spectrum Analyzer Singd SA ALT = 67 100 ± 670 C av rker 2 ∆ 70.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	Next Peak	10 dB/div Re 10 dB/div Re 200	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex Next Pk
nit Spectrum Analyzer Singd SA ALT = 67 100 ± 670 C av rker 2 ∆ 70.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak	Marker 2 Δ 3	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next Pi Next Pi
Ind Spectrum Analyzer Scrept 53 RLT 92 900 # 26 RLT 92 900 # 26 Ref Offset 2 dB dB/dlv Ref 30.00 dBm 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak	Marker 2 Δ 3	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Nex Next Pk Next F
end Syschum Analyzer Sorge 32 1 RLT _ 1 = 100 2 A.C. rkter 2 Δ 70.3700 s Bef Offset 2 dB dB/div Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN/ Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta	00 RUT 1 Marker 2 A 10 dB/div R 200 100 100 	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next Pi Next Pi
an Syschillan Anityzen Sorge 25 1 RLT 5 50 2 A.C. Krkor 2 Δ 70.3700 s Bildiv Ref Offset 2 dB Geldiv Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak	00 RUT 1 Marker 2 A 10 dB/div Ru 200 10.0 0.00 0.00	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next Pi Next Pi Next I
Ind System Analyses Support Sector Se	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta	00 RUT 1 Marker 2 A 10 dB/div R 200 100 100 	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Peak Sea Nex Next Pk Next F Marke
nd Spectrum Analyzer - Single SA At T = 12 = 150 a Ac 150 a Ac Berl Chiefer 2 A 7 0.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF	00 RUT / Marker 2 A	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next Pk Next Pk Next F Marke
nd Spectrum Analyzer - Single SA At T = 12 = 150 a Ac 150 a Ac Berl Chiefer 2 A 7 0.3700 s Ref Offset 2 dB dB/div Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta	10 Rt 1 1 Marker 2 A 1 10 dB/div Rt 20.0 10.	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next PH Next PH Next F
end Spectrum Analyzer - Songel 53 RLT 52 500 ± 26 RLT 52 500 ± 26 Ref Offset 2 dB GB/div Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF	OB R.Y J Marker 2 Δ Marker 2 Δ 10 aB/div Rt 200	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next Pk Next Pk Next F
end Spectrum Analyzer - Songel 53 RLT 52 500 ± 26 RLT 52 500 ± 26 Ref Offset 2 dB GB/div Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0	PND: Fast	PULSE ALIGN Avg Type: RMS Run	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре страниции Derla NNNN ΔMkr2 70.37 s	Next Peak Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF	00 RUT / Marker 2 A	nalyzer - Swept SA F 50 Ω AC 70.9900 S of Offset 2 dB	PN0: Fast IFGain:Low	SENSE:PULSE		ALIGNAUTO	D4:50:42 AM A TRACE TYPE DET ΔMkr2 7	44906,2024 1 2 3 4 5 6 A NNNNN 70.99 S	Next PH Next PH Next F
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Int Spectrum Analyzer - Swept SA RLT RF 50 Ω AC arker 2 Δ 70.3700 s Ref Offset 2 dB	PND: Fast	RAGE AVG Type: RM: Avg Type: RM: dB	UTO 02:17:29 АМ Анд 06, 2024 таксе 12 3 4 5 6 туре туре стра NNNN ΔMkr2 70.37 s	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2	OB R.Y J Marker 2 Δ Marker 2 Δ 10 aB/div Rt 200	Indyzer Surgit St 70.9900 s 90 Offset 2 dB ef 30.00 dBm 500000 GHz	PHD: Fast - Φ- PEaint aw PEaint aw	SENSE:PULSE			00430.452M marcel Tra	400.004 123436 ANNMN 20.99 s .23 dB .23 dB	Next PH Next PH Next F
en Syscium Amiyon Singl 53 RLT 57 507 x 20 RLT 57 507 x 20 Ref Offset 2 dB GB/div Ref 30.00 dBm	PRO: Fost	Run dB	102:12:30 MI Agros. 2020 10:20:12:30 MI Agros. 2020 10:20:20:20:20:20:20:20:20:20:20:20:20:20	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2	OR R.Y I Marker 2 A Marker 2 A Marker 2 A 10 aB/cliv R 200 Incomparison R 100 Incomparison R 200 Incomparison R 200 Incomparison R 200 Incomparison R 200 Incomparison R 300 Incomparison Incomparison 400 Incomparison Incomparison 600 Incomparison Incomparison	Indyzer Surgit St 70, 9900 s of Offset 2 dB ef 30.00 dBm	PHD: Fast - Φ- PEaint aw PEaint aw	SPIEFALSE			00:30:42.24 Tracci	400.004 123436 ANNMN 20.99 s .23 dB .23 dB	Next PH Next PH Next F
at Systemia Analyzer Sorge 32. Rtr 1 5 55 1002 AC rtr 2 4 70.3700 5 Ref 0ffset 2 dB Ref 30.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0	PRO: Fost	Run dB	ито 102-1230 И Андио, 2020 11462 [2:2:4:2:4 11462 [2:2:4:4 11462 [2:2:4:4]	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2	OR R.Y J Marker 2 A A Marker 2 A A 10 dB/div R 100 A 300 A -00 A <td>nahyar Swept SA 5 500 2 K- 70.9900 S of Offset 2 dB ef 30.00 dBm 500000 GHz HHz</td> <td>PHD: Fast - Φ- PEaint aw PEaint aw</td> <td>SPEEPALE Trig:Free Run #Atten: 40 dB</td> <td>Avg Typ</td> <td>AUSUAUTO RMS</td> <td>00:30:42.24/ Trace Tr</td> <td>12 3 3 4 5 6 12 3 3 4 5 6 4 A HINN N 2 3 3 4 5 6 4 A HINN N 2 3 3 4 5 6 2 4 5 7 7 2 4 5 7 7</td> <td>Next PH Next PH Next F</td>	nahyar Swept SA 5 500 2 K- 70.9900 S of Offset 2 dB ef 30.00 dBm 500000 GHz HHz	PHD: Fast - Φ- PEaint aw PEaint aw	SPEEPALE Trig:Free Run #Atten: 40 dB	Avg Typ	AUSUAUTO RMS	00:30:42.24/ Trace Tr	12 3 3 4 5 6 12 3 3 4 5 6 4 A HINN N 2 3 3 4 5 6 4 A HINN N 2 3 3 4 5 6 2 4 5 7 7 2 4 5 7 7	Next PH Next PH Next F



Oscillation mitigation or shutdown:

Lower 700 Band	Uplink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	6.37	<12	Pass	
+4	8.50	<12	Pass	
+3	8.03	<12	Pass	
+2	10.09	<12	Pass	
+1	10.11	<12	Pass	
0	t	shutdown	Till Harson Lab	
Sã Los Is	1891	C5 107	Les Les In	

Lower 700 Band		Downlink			
Signal Type		AWGN			
Isolation	Deffrence	Limit	Result		
dB	dB	dB			
+5	7.17	<12	Pass		
+4	7.57	<12	Pass	~ IN RE 197	
+3	8.81	<12	Pass	Lasting La	
+2	10.19	<12	Pass	I was	
+1	10.34	<12	Pass		
0	11.62	<12	Pass		
-1	·	shutdown			

Upper 700 Band	Uplink			
Signal Type		AWGN		
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	6.70	<12	Pass	
+4	7.45	<12	Pass	
+3	9.14	<12	Pass	
+2	9.40	<12	Pass	
+1	10.10	<12	Pass	
0	11.16	<12	Pass	
-1	Al and	shutdown		
sting Lab	立 其 派 松 派 Ing Lab	I I Will Wing Lab	加加	





Upper 700 Band	Downlink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	6.57	<12	Pass	
+4	7.92	<12	Pass	
+3	9.41	<12	Pass	
+2	9.30	<12	Pass	
+1	11.17	<12	Pass	
0		shutdown	Testing Lab	
LCS LCS	184	100	They read	

Cellular Band	Uplink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	8.16	<12	Pass	
+4	9.64	<12	Pass	
+3	10.36	<12 Testing	Pass	
+2	11.26	<12	Pass	
+1	shutdown			

Cellular Band	Downlink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	5.55	<12	Pass	
+4	8.71	<12	Pass	
+3	9.42	<12	Pass	
+2	10.20	<12	Pass	
+1	10.48	<12	Pass	
0	shutdown			



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PCS Band	Uplink				
Signal Type		AWGN		\$711B	
Isolation	Deffrence Limit		Result	(g. pering	
dB	dB	dB			
+5	6.30	<12	Pass		
+4	7.37	<12	Pass		
+3	7.22	<12	Pass		
+2	7.83	<12	Pass		
+1	10.39	<12	Pass		
0	10.54	<12	Pass		
-1		shutdown	I SL II MARSting Law		

PCS Band	Downlink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	7.42	<12	Pass	
+4	8.79	<12	Pass	
+3	10.51	<12	Pass	
+2	10.75	<12	Pass	
+1	11.36	<12	Pass	
0		shutdown		

0	shutdown				
+1	10.71	<12	Pass		
+2	10.76	<12	Pass		
+3	10.10	<12	Pass		
+4	9.30	<12	Pass		
+5	7.51	<12	Pass		
dB	dB	dB			
Isolation	Deffrence	Limit	Result		
Signal Type		AWGN			
AWS Band	Uplink				



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AWS Band	Downlink			
Signal Type	AWGN			
Isolation	Deffrence	Limit	Result	
dB	dB	dB		
+5	6.81	<12	Pass	
+4	8.75	<12	Pass	
+3	8.95	<12	Pass	
+2	9.79	<12	Pass	
+1	10.63	<12	Pass	
0	shutdown			
St Desting	NGL I	s Testing	NGL I Maresting	













6.6 Intermodulation Limits

6.6.1 Applicable Standard

According to §20.21(e)(8)(i)(F) Intermodulation Limits:

The transmitted intermodulation products of a consumer booster at its uplink and downlink ports shall not exceed the power level of -19 dBm for the supported bands of operation.

6.6.2 Test Procedure

According to section 7.4 of KDB 935210 D03 Signal Booster Measurement v04r04:

a) Connect the signal booster to the test equipment as shown in Figure 9. Begin with the uplink output (donor) port connected to the spectrum analyzer.

b) Set the spectrum analyzer RBW = 3 kHz.

c) Set the VBW \geq 3 RBW.

d) Select the rms detector.

e) Set the spectrum analyzer center frequency to the center of the supported operational band under test.

f) Set the span to 5 MHz. Affirm that the number of measurement points per sweep \geq (2 × span)/RBW.

g) Configure the two signal generators for CW operation with generator #1 tuned 300 kHz below the operational band center frequency and generator #2 tuned 300 kHz above the operational band center frequency. If the maximum output power is not at the operational-band (booster pass band) center frequency, configure the test signal pair around the frequency with maximum output power as determined per 7.2.

h) Set the signal generator amplitudes so that the power from each into the EUT is equivalent, then turn on the RF output.

i) Simultaneously increase each signal generators' amplitude equally until just before the EUT begins AGC, then affirm that all intermodulation-product emissions (if any occur) are below the specified limit of -19 dBm.

j) Use the trace averaging function of the spectrum analyzer, and wait for the trace to stabilize. Place a marker at the highest amplitude intermodulation-product emission.

k) Record the maximum intermodulation product amplitude level that is observed.

I) Capture the spectrum analyzer trace for inclusion in the test report.

m) Repeat 7.4e) to 7.4l) for all uplink and downlink operational bands.

NOTE-If using a single signal generator with dual outputs, affirm that intermodulation products are not the result of the generator.

n) Increase the signal generator amplitude in 2 dB steps to 10 dB above the AGC threshold determined in 7.4i), but not exceeding the maximum input level of 5.5, to affirm that the EUT maintains compliance with the intermodulation limit. The test report shall include either a statement describing that the device complies at 10 dB above AGC or at the 5.5 power levels, or a table showing compliance at the additional input power(s) required.



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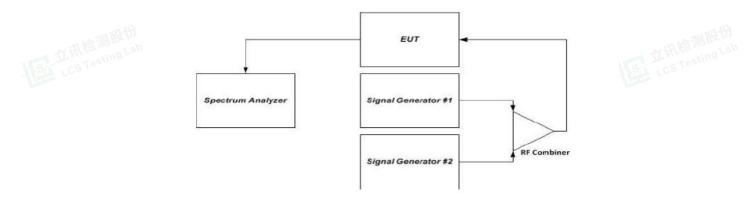
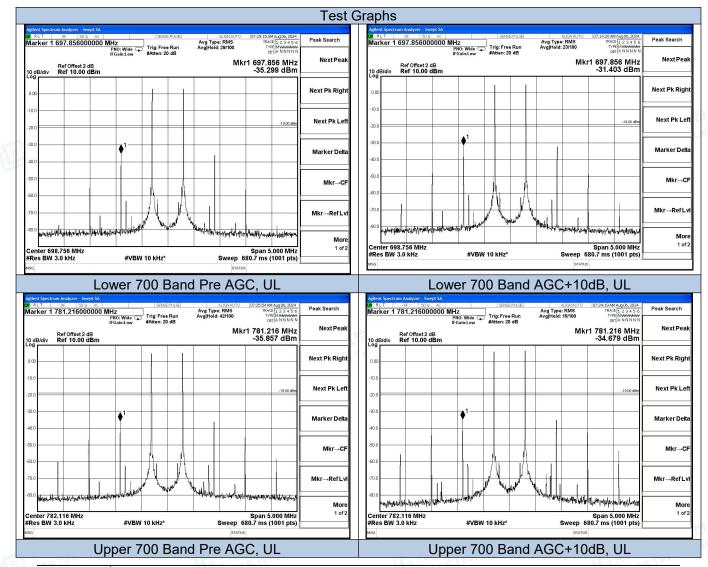


Figure 9 – Intermodulation product instrumentation test setup

6.6.3 Test Data

Figure 9 – Intermodulation product instrumentation test setup						
6.6.3 Test Data						
Temperature	23.6 ℃	Humidity	52.3%			
Test Engineer	Nick Peng	Test Mode	Transmitting			



3<u>9</u>7

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