





COMMERICAL-IN-CONFIDENCE





MultiView == Spectrum 🐣 🗙 Spectrum 2	🐣 🗙 Spectrum 3 📥 🎽	Spectrum 4 🐣 🗙 Spectra	m S 🗙 Spectrum 6	×	•
Reflevel -10.00 dBm	BBW 10 kHz Compat	ible R&S FSV			
<ul> <li>Att 10 dB • SWT 100 m</li> <li>TDE "20 dB Att SDGE041534"</li> </ul>	is • VBW 30 kHz Mode	Auto Sweep			Count 100/100
1 Frequency Sweep					●1Pk Max
				M1[1]	-71.56 dBm 797.969 30 MHz
-20 dBm-					
-30 dBm					
-40 d8m-					
H1 -46.000 dBm					
-50 dBm-					
-60 dBm					
-70 d8m	M1				
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-80 dBm					
-90 d8m					
-100 dBm					
793.0 MHz	10000 pts		.3 MHz/		806.0 MHz

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MultiView 믐 Spe	ctrum 🕂 🗙	Spectrum 2	🗧 🗙 🛛 Spectrum S	* <b>* ×</b>	Spectrum 4	关 🗙 Spect	trum 5 🗙	Spectrum 6	×	
Ref Level -1	0.00 dBm		RBW 10 kHz	Compatible	R&S FS					
Att TDF "20 dB Att	10 dB ● SW SDGE041534"	<b>∕T</b> 500 ms ●	VBW 30 kHz	Mode	Auto Sweej					Count 100/100
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									м1[1]	-70.38 dBm 796.989 10 MHz
			M1							
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-80 dBm	and for the second second	in a state ball the second	anati di seta di anaka katal	CALIFORNIA DE LA CALIFICIA DE LA	Managala da da	lyd y thing is a straight of a	te L MAR Solid and State	dia tanà dia kana dia kaominina dia	and the support of the	where we we we we wanted the second
793.0 MHz			100	000 pts			1.3 MHz/			806.0 MHz

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MultiView 📑 Spum	×	Spm2	Spem3	× Spem4	* ×	Spem5 😽	X Spem6	× Spem7	×	
Ref Level -10. Att TDF "20 dB Att SF	00 dBm 5 dB • <b>S</b> 0GE041534"	e WT 500 ms e	RBW 10 kHz VBW 30 kHz	Compatib Mode	ile R&S I Auto Sw	=SV eep				Count 100/100
1 Frequency Sw	/eep								M1[1]	• 1Pk Max
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-30 dBm										
-40 dBm										
-50 dBm-										
-60 dBm										
M1/0 dBm										
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00 40										
50 UDIN										
-100 dBm										
793.0 MHz			10	000 pts			1.3 MHz/			806.0 MHz

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MultiView <b>=</b> Spu	m X	Spm2	X Spem3	X Spem4	🐣 🗙 Spem5	¥ x	Spem6	X Spem7	x	
BefLevel -20	.00 dBm		<ul> <li>RBW 10 kHz</li> </ul>	Compatible	R&S ESV					
Att     TDF "20 dB Att S	10 dB •	<b>SWT</b> 500 ms	• VBW 30 kHz	Mode	Auto Sweep					Count 100/10
1 Frequency S	weep									• 1Pk Max
								М1[	1]	-70.00 dB
-30 dBm										7501000000
-40 dBm										
-50 dBm										
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-80 dBm						bit constant				
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Multi¥iew 📰 Spum 🗙	Spm2 🗙 Sj	yem3 🗙	Spem4 🛛 🔆 🗙	Spem5 🔆	X Spem6	X Spem7	×	
Ref Level -10.00 dBm	● RB\	N/ 10 kHz Con	npatible R&S	FSV				
<ul> <li>Att 10 dB = S'</li> <li>TDF "20 dB Att SDGE041534"</li> </ul>	WT 500 ms = VBV	N 30 kHz Mod	le Auto Sw	reep			с	ount 100/100
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793.0 MHz		10000 p	ts	1	L.3 MHz/			806.0 MHz

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MultiView 📑 Spu	m 🗙 s	ipm2 🗙 1	ipem3 💙	Spem4	<mark>∗</mark> ×	Spem5 😽	<b>X</b> Spem6	× Spem7	×	
RefLevel -10	0.00 dBm 10 dB = SM	● RB VT 500 ms ● VB	W 10 kHz C W 30 kHz N	Compatible	e R&SI Auto Sw	=SV				Count 100/100
TDF "20 dB Att S	SDGE041534"									1 Dk May
Threquency o	weep							M1[	1]	-48.47 dBn 793.238 60 MH
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-30 dBm										
-40 dBm										
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793.0 MHz			1000	) pts			1.3 MHz/			806.0 MH;

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![](_page_22_Picture_2.jpeg)

# 2.7 Noise Limit

# 2.7.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(A) FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I) KDB935210 D04, Clause 7.7

## 2.7.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(A) Noise Limits.:

The transmitted noise power in dBm/MHz of frequency selective consumer boosters outside the licensee's spectrum blocks at their uplink and downlink ports shall not exceed the following limits:

(1) -103 dBm/MHz - RSSI

(i) Where RSSI is the downlink composite signal power received in dBm for frequencies in the band of operation outside the licensee's spectrum block as measured after spectrum block filtering is applied and is referenced to the booster's donor port for each band of operation. RSSI is expressed in negative dB units relative to 1 mW.

(ii) Boosters with MSCL less than 40 dB, shall reduce the Noise output in (A) by 40 dB - MSCL, where MSCL is the minimum coupling loss in dB between the wireless device and booster's server port. MSCL must be calculated or measured for each band of operation and provided in compliance test reports.

(2)(i) Maximum downlink noise power shall not exceed -102.5 dBm/MHz + 20 Log10(Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.
(ii) Compliance with Noise limits will use instrumentation calibrated in terms of RMS equivalent voltage, and with booster input ports terminated or without input signals applied within the band of measurement.

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I) Transmit Power Off Mode. When the consumer booster cannot otherwise meet the noise and gain limits defined herein it must operate in "Transmit Power OFF Mode." In this mode of operation, the uplink and downlink noise power shall not exceed -70 dBm/MHz and uplink gain shall not exceed the lesser of 23 dB or MSCL.

# 2.7.3 Equipment Under Test and Modification State

Serial No: 560311000026 / Test Configuration A and B

# 2.7.4 Date of Test/Initial of test personnel who performed the test

August 29 and September 29, 2023/MARG

### 2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

![](_page_23_Picture_2.jpeg)

# 2.7.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	24.5 - 26.7°C
Relative Humidity	45.0 - 49.6%
ATM Pressure	98.9 - 99.0kPa

# 2.7.7 Additional Observations

- This is conducted Test. Test procedure is per Section 7.7 of KDB935210 (D04 Provider Specific Booster Measurements v02r03). Appropriate offset (line losses) applied.
- The EUT operated in Test Mode with the gain set to the maximum gain and a minimum bandwidth setting (5MHz).
- For Maximum Noise (frequency Dependent) testing, setup the EUT according to Figure 6 of Section 7.7 of KDB935210.
- Maximum Noise (frequency Dependent) evaluations are conducted at Server Port. Operational downlink band for LTE Band 2, 4, 5, 12, 13 and 25 were tested.
- For Maximum Noise (RSSI Dependent and Transmit Power off mode) and Noise Response Time tests, set up the EUT according to Figure 7 or 8 of Section 7.7 of KDB935210 as appropriate.
- Maximum Noise (RSSI Dependent and Transmit Power off mode) and Noise Response Time evaluations are conducted at Donor Port and Server Port. Operational uplink and downlink bands for LTE Band 2, 4, 5, 12, 13 and 25 were tested. The signal generator was configured to transmit: 4.1 MHz AWGN.

	Maximum Noise (Frequency Dependent)										
Band	Frequency Range (MHz)	Max Noise (dBm/MHz)	Limit* (dBm/MHz)	Margin (dB)							
LTE Band 2 Downlink	1930-1990	-54.33	-37.01	17.32							
LTE Band 4 Downlink	2110 - 2155	-53.72	-37.72	16							
LTE Band 5 Downlink	869 - 894	-53.59	-44.05	9.54							
LTE Band 12 Downlink	729 - 746	-53.82	-45.50	8.32							
LTE Band 13 Downlink	746 - 756	-54.35	-44.65	9.7							
LTE Band 25 Downlink	1930 - 1995	-53.93	-37	16.93							

# 2.7.8 Test Results

\*: -102.5 dBm/MHz + 20 Log<sub>10</sub>(Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz. (Downlink only)

![](_page_24_Picture_2.jpeg)

Maximu	um Noise (RS	SI Dependent and Tra	ansmit Power	off mode)	
Band	Frequency	RRSI level (dBm)	Max Noise (dBm/MHz)	Limit	Margin
	(MHz)			(dBm/MHz)	(dB)
		-57.11	-55.9	-51	4.9
		-56.82	-56.86	-51.8	5.06
LTE Band 2	1930 -	-56.92	-57.1	-51.9	5.2
Downlink	1990	-56.89	-57.29	-51.8	5.49
		-57.12	-57.26	-51	6.26
		-56.84	-57.27	-51.8	5.47
		-57.84	-56.83	-50.3	6.53
		-57.51	-56.87	-50.5	6.37
LTE Pand 2 Unlink	1850 -	-57.3	-56.87	-50.6	6.27
LIE Band 2 Oplink	1910	-57.67	-56.9	-50.4	6.5
		-57.67	-56.85	-50.4	6.45
		-57.29	-56.89	-50.6	6.29
		-56.42	-55.75	-51.5	4.25
		-56.03	-56.17	-51.9	4.27
LTE Band 4 Downlink	2110 -	-56.67	-56.15	-50.4	5.75
	2155	-56.44	-56.6	-51.5	5.1
		-56.32	-56.62	-51.5	5.12
		-56.11	-56.55	-51.9	4.65
	1710 -	-57.22	-56.43	-51.1	5.33
		-57.22	-56.51	-51.1	5.41
LTE Devel 4 Heliote		-57.37	-57.1	-50.8	6.3
LIE Band 4 Uplink	1755	-57.13	-57.19	-51	6.19
		-57.31	-57.3	-50.8	6.5
		-56.97	-57.31	-51	6.31
		-56.38	-56.36	-51	5.36
		-56.34	-56.32	-51	5.32
LTE Band 5	000 00/	-56.19	-56.22	-50.8	5.42
Downlink	869 - 894	-56.16	-56.18	-50.8	5.38
		-56.24	-56.23	-51	5.23
		-56.46	-56.46	-51.2	5.26
		-54.12	-54.04	-54	0.04
LTE Band 5 Uplink	824 - 849	-54.29	-54.14	-54.1	0.04
		-54.13	-54.06	-54	0.06

![](_page_25_Picture_2.jpeg)

		-54.11	-54.03	-54	0.03
		-54.14	-54.35	-54	0.35
		-54.18	-54.28	-54	0.28
		-56.64	-56.65	-51.3	5.35
		-56.94	-56.92	-52	4.92
I TE Band 12		-56.17	-56.18	-50.8	5.38
Downlink	729 - 746	-56.37	-56.67	-51	5.67
		-56.64	-56.66	-51.3	5.36
		-56.46	-56.48	-51.2	5.28
		-54.15	-54.04	-54	0.04
		-54.27	-54.14	-54.1	0.04
		-54.16	-54.06	-54	0.06
LTE Band 12 Uplink	699 - 716	-54.1	-54.03	-54	0.03
		-54.13	-54.35	-54	0.35
		-54.18	-54.28	-54	0.28
		-56.46	-56.43	-51.2	5.23
		-56.43	-56.45	-51.2	5.25
LTE Band 13		-56.92	-56.87	-52	4.87
Downlink	746 - 756	-56.78	-56.75	-51.5	5.25
		-56.28	-56.32	-50.9	5.42
		-56.92	-56.9	-52	4.9
	777 - 787	-54.1	-54.04	-54	0.04
		-54.25	-54.14	-54.1	0.04
		-54.1	-54.06	-54	0.06
LTE Band 13 Uplink		-54.1	-54.03	-54	0.03
		-54.11	-54.35	-54	0.35
		-54.16	-54.28	-54	0.28
		-57.11	-55.65	-50.9	4.75
		-57.19	-55.84	-50.9	4.94
LTE Band 25	1930 -	56.9	-56.92	-50.8	6.12
Downlink	1995	-57.29	-57.24	-51	6.24
		-56.94	-57.29	-50.8	6.49
		-56.62	-57.35	-51	6.35
		-57.49	-56.56	-50.09	6.47
		-57.73	-57.05	-50.5	6.55
LTE Band 25 Uplink	1850 - 1915	-57.66	-57.33	-50.4	6.93
	1010	-57.4	-57.43	-50.3	7.13
		-57.43	-57.4	-50.3	7.1

![](_page_26_Picture_1.jpeg)

	-57.35	-57.37	-50.2	7.17

	Nois	se Response Time		
Band	Frequency (MHz)	Noise Response Time (Sec)	Limit (Sec)	Margin (Sec)
LTE Band 2 Downlink	1930-1990	0.422	3	2.575
LTE Band 2 Uplink	1850-1910	0.762	3	2.238
LTE Band 4 Downlink	2110 - 2155	0.442	3	2.558
LTE Band 4 Uplink	1710 - 1755	0.788	3	2.212
LTE Band 5 Downlink	869 - 894	0.462	3	2.538
LTE Band 5 Uplink	824 - 849	0.918	3	2.082
LTE Band 12 Downlink	729 - 746	0.496	3	2.504
LTE Band 12 Uplink	699 - 716	0.576	3	2.424
LTE Band 13 Downlink	746 - 756	0.473	3	2.527
LTE Band 13 Uplink	777 - 787	0.678	3	2.322
LTE Band 25 Downlink	1930 - 1995	0.427	3	2.573
LTE Band 25 Uplink	1850 - 1915	0.718	3	2.282

N/A\*: Not Applicable. Maximum Noise always complies with Noise Limit requirement. There is no noise limit change during testing.

![](_page_27_Picture_2.jpeg)

## 2.8 Uplink Inactivity

## 2.8.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(J) KDB935210 D04, Clause 7.8

## 2.8.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(J) Uplink Inactivity:

Uplink Inactivity. When a consumer booster is not serving an active device connection after 5 seconds the uplink noise power shall not exceed -70 dBm/MHz.

## 2.8.3 Equipment Under Test and Modification State

Serial No: 560311000026 / Test Configuration C and D

## 2.8.4 Date of Test/Initial of test personnel who performed the test

August 31, 2023/MARG

# 2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

#### 2.8.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.8°C
Relative Humidity	53.3%
ATM Pressure	99.0kPa

# 2.8.7 Additional Observations

- This is conducted Test.
- Test procedure is per Section 7.8 of KDB935210 (D04 Provider Specific Booster Measurements v02r03). Appropriate offset (line losses) applied.
- The EUT operated in Normal Mode with a minimum bandwidth setting (5MHz).
- Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210.
- Evaluations are conducted at NU antenna ports.
- Operational uplink bands for LTE Band 2, 4, 5, 12, 13, 25 were tested.
- Signal: 5MHz LTE.

![](_page_28_Picture_2.jpeg)

# 2.8.8 Test Results

Uplink Inactivity				
Band	Frequency (MHz)	UL Inactive Time (Sec)	Limit (Sec)	Margin (Sec)
LTE Band 2	1880	1.51	5.0	3.49
LTE Band 4	1732.5	1.52	5.0	3.48
LTE Band 5	836.6	1.49	5.0	3.51
LTE Band 12	707.5	1.53	5.0	3.47
LTE Band 13	782	1.54	5.0	3.46
LTE Band 25	1882.5	1.50	5.0	3.5