

# VIAVI

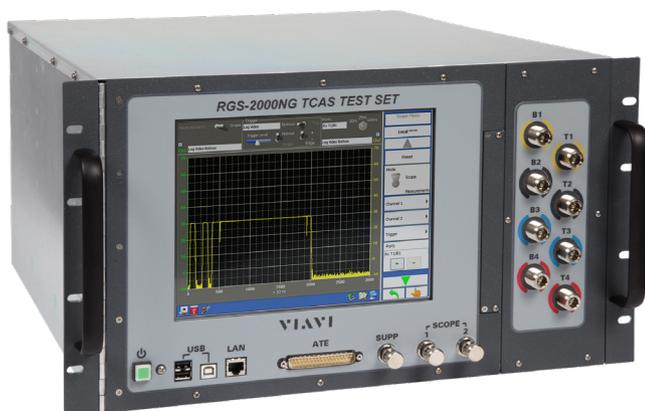
## RGS-2000NG

### NextGen TCAS Test Set and ADS-B Target Generator

#### Transmitter

Frequency	
Range	952 MHz to 1223 MHz
Resolution	100 KHz
Accuracy	±10 KHz
Power	
Range (TCAS)	-20 to -90 dBm (Low Power Mode) +1 to -69 dBm (High Power Mode)
Range (Transponder)	-20 to -90 dBm
Range (UAT)	+1 to -98 dBm, T1 port only
Range (Multi-Receiver)	+1 to -69 dBm (High Power Mode) -20 to -90 dBm (Low Power Mode)
Resolution	1 dB
Accuracy	±1 dB, 1030 and 1090 MHz (978 MHz with UAT or Multi-Receiver options installed)

Spectral Purity (Typical)	
Harmonics	< -50 dBc
Spurious	< -55 dBc, 350 to 1800 MHz
Residual FM	250 Hz Peak
Phase Noise	< -80 dBc/Hz @ 100 KHz
Diversity (Transponder)	
Power <sup>1</sup>	
Range	±20 dB
Resolution	0.1 dB
Accuracy	±1 dB
Timing	
Range	±1 µs
Resolution	±25 ns
Accuracy	±10 ns
Pulse Modulation	
Pulse On/Off Ratio	>80 dB, 1030 and 1090 MHz (978 MHz with UAT or Multi-Receiver options installed)



#### Pulse Characteristics Specifications<sup>7</sup>

Pulse Position <sup>2</sup>	
<b>ATCRBS Replies (TCAS)</b>	
Nominal (all pulses)	1.45 µs from previous pulse
Variable	
Range (from nominal)	F1 0 to 100 ns all other pulses ±1.0 µs
Resolution	25 ns
Accuracy	±10 ns
<b>Mode S Reply (TCAS)</b>	
Nominal	
P1 to P2	1.0 µs

<b>Pulse Position (continued)</b>	
P1 to P3	3.5 $\mu$ s
P1 to P4	4.5 $\mu$ s
Variable	
Range (from nominal)	P1 0 to 1 $\mu$ s P2, P3 and P4 $\pm$ 1 $\mu$ s
Resolution	25 ns
Accuracy	$\pm$ 10 ns
<b>ATCRBS Interrogation (Transponder)</b>	
Nominal	
Mode A	
P1 to P2	2.0 $\mu$ s
P1 to P3	8.0 $\mu$ s
Mode C	
P1 to P2	2.0 $\mu$ s
P1 to P3	21.0 $\mu$ s
All-Call	
P3 to P4	2.0
Variable	
Range (from nominal)	$\pm$ 1.95 $\mu$ s
Resolution	25 ns
Accuracy	
P1 to P	$\pm$ 10 ns
P1 to P2, P3 to P4	$\pm$ 15 ns
<b>Mode S Interrogation (Transponder)</b>	
Nominal	
P1 to P2	2.0 $\mu$ s
P2 to SPR	2.75 $\mu$ s
P6 to SPR	1.25 $\mu$ s
P5 to SPR	0.4 $\mu$ s
Variable	
Range (from nominal)	
P2, P5 and P6	$\pm$ 1.95 $\mu$ s
SPR	$\pm$ 1.0 $\mu$ s
Resolution	25 ns
Accuracy	
P1 to P2	$\pm$ 10 ns
P2, P6 and P5 to SPR	$\pm$ 15 ns
<b>Interference Pulse (Transponder)</b>	
Variable	
Signal #1 (relative to P1)	-17.5 to 400 $\mu$ s
Signal #2 (relative to Signal #1)	0 to 400 $\mu$ s
Resolution	25 ns

Accuracy	
Signal #1	$\pm$ 20 ns
Signal #2	$\pm$ 10 ns
<b>Double/Interlace (Transponder)</b>	
Variable (P1 to P1)	0 to 400 $\mu$ s
Resolution	25 ns
Accuracy	$\pm$ 10 ns
<b>Pulse Width (Specified accuracies apply to pulses of width <math>\geq</math> 0.2 <math>\mu</math>s.)<sup>2</sup></b>	
<b>ATCRBS Reply (TCAS)</b>	
Nominal (all pulses)	0.45 $\mu$ s
Variable	
Range (from nominal)	
F1	-400 ns to 950 ns
All other pulses	$\pm$ 400 ns
Resolution	25 ns
Accuracy	$\pm$ 20 ns
<b>Mode S Reply (TCAS)</b>	
Nominal	
P1, P2, P3 and P4	0.5 $\mu$ s
Data Bits	
Consecutive 1's or 0's	0.5 $\mu$ s
Alternating 1's or 0's	1.0 $\mu$ s
Variable	
Range (from nominal)	
P1, P2, P3 and P4:	$\pm$ 400 ns
Data Bits	$\pm$ 100 ns
Resolution	25 ns
Accuracy	$\pm$ 20 ns
<b>ATCRBS Interrogation (Transponder)</b>	
Nominal	
P1, P2, P3 and P4 short	0.8 $\mu$ s
P4 long	1.6 $\mu$ s
Variable	
Range	
P1, P2, and P3	0 to 1.95 $\mu$ s
P4	0 to 2.75 $\mu$ s
Resolution	25 ns
Accuracy	$\pm$ 10 ns
<b>Mode S Interrogation (Transponder)</b>	
Nominal	
P1, P2 and P5	0.8 $\mu$ s
P6 short	16.25 $\mu$ s
P6 long	30.25 $\mu$ s

## Intruder Simulation Specifications (TCAS)

<b>Bearing Simulation<sup>3,4</sup></b>	
<b>Low Power Mode</b>	
Phase Directional	
Range	0 to 359°
Resolution	1°
Accuracy 4-Port Antenna	4-Port Formula, $\pm 2^\circ$ Standard deviation, $< 1^\circ$ at any simulated bearing $\pm 4^\circ$ deviation between any port referenced to port 1
Accuracy 2-Port Antenna	Port to Port, $\pm 4^\circ$
Magnitude Directional	
Range	0 to 359°
Resolution	1°
Accuracy	4-Port Formula, $\pm 2^\circ$ Power Table, $\pm 0.556$ dB (equivalent to $\pm 2^\circ$ )
<b>High Power Mode</b>	
Phase Directional	
Range	0 to 359°
Resolution	1°
Accuracy	4-Port Formula, $\pm 5^\circ$ typical
Magnitude Directional	
Range	0 to 359°
Resolution	1°
Accuracy	4-Port Formula, $\pm 5^\circ$ typical
<b>Range Simulation (TCAS)</b>	
Range	
Mode S	0 to 160 nmi
Mode C	0.5 to 160 nmi
Resolution	.001 nmi
Accuracy	$\pm 200$ ft
<b>Velocity (TCAS)</b>	
Range	2000 kts
Resolution	1 kt
Accuracy	$\pm 1$ kt
<b>Vertical Speed (TCAS)</b>	
Range	$\pm 32,608$ ft/min
Resolution	64 ft/min
Accuracy	$\pm 64$ ft/min

Variable	
Range	
P1 and P2	0 to 1.95 $\mu$ s
P5	0.2 to 1.95 $\mu$ s
P6	-0.5 to +1.45 $\mu$ s
Resolution	25 ns
Accuracy	$\pm 10$ ns
<b>Interference Pulse (Transponder)</b>	
Range	0.2 to 32 $\mu$ s
Resolution	25 ns
Accuracy	$\pm 25$ ns
<b>Pulse Rise/Fall Time</b>	
<b>TCAS Test Mode</b>	
Low Power Mode Range (Available settings)	<50/<50 ns, 75/110 ns, 100/200 ns, 230/230 ns, 600/600 ns
High Power Mode Range	<50/<50 ns
Accuracy	$\pm 25$ ns
<b>Transponder Test Mode</b>	<50/<50 ns, fixed
<b>Pulse Amplitude (relative to P1)<sup>1</sup></b>	
<b>TCAS Test Mode</b>	
ATCRBS Replies (all pulses)	0 or -1 dB
Mode S Reply (All preamble pulses)	0 or -1 dB
Video Data Block	
Range	+3 to -4 dB
Resolution	1 dB
Accuracy	$\pm 1$ dB
<b>Transponder Test Mode</b>	
ATCRBS (all pulses), and Mode S Interrogation (P2, P5 and P6)	
Range	+9 to -19 dB (relative to P1)
Resolution	1 dB
Accuracy	$\pm 1$ dB
Interference Pulse	+9 to -19 dB (relative to P1)
Resolution	1 dB
Accuracy	$\pm 1$ dB
<b>Pulse Enable (TCAS)</b>	
ATCRBS Replies (all pulses)	on/off
Mode S Reply (all preamble pulses)	on/off

<b>Altitude Simulation (TCAS)</b>	
Range	-1000 to +126700 ft
Resolution	< 50175 ft altitude, 25 or 100 ft >50175 ft altitude, 100 ft
Accuracy	±25 ft

## Interrogation Specifications (Transponder)

<b>Interrogation Table/Burst Mode</b>	
# of Messages	1 to 1000 messages
Interrogations/Burst	1 to 10 K

<b>Burst Spacing</b>	
Range	0 to 20 s (0 s for single burst transmission)
Resolution	0.1 s
Accuracy	±100 ms
Burst/Trigger	1, continuous or until stop command received

<b>Block Transmissions Mode</b>	
<b>Number of Messages</b>	
TCAS	1 to 1000
Transponder	1 to 2000
Number of Blocks	1 to 50,000 or infinite

<b>Message Spacing within Block</b>	
Range	10 to 99880 µs (maximum spacing limited to the block period minus 120 µs)
Resolution	1 µs

<b>Block Period</b>	
Range	10 ms to 90 seconds
Resolution	1 ms
Accuracy	±1 ms

<b>PRF (Interrogations, Transponder)</b>	
<b>Single Interrogations</b>	
Range	1 to 10 KHz
Resolution	1 Hz
Accuracy	0.1% of setting

<b>Interrogation Table (Continuous and Burst)</b>	
Range	1 Hz to 10 KHz
Resolution	1 Hz
Accuracy	0.1% of setting

<b>Double Interrogation</b>	
Range	1 Hz to 10 KHz (PRF in sync or non-sync)
Resolution	1 Hz

Accuracy	0.1% of setting
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<b>Interlace Interrogation</b>	
Range	1 Hz to 10 KHz
Resolution	1 Hz
Accuracy	0.1% of setting

<b>Interlace Ratio</b>	
1:1 to 1:1000	

## Antenna Specifications

VSWR	<1.4 (978, 1030 and 1090 MHz)
Cross Coupling	
Adjacent Ports	-17 to -20 dB
Resistors	±10%

## Receiver<sup>5</sup>

<b>Decoding</b>	
ATCRBS	Interrogations (TCAS) and Replies (Transponder)
Mode S	Interrogations (TCAS) and Replies (Transponder)
UAT	Ground and Airborne Messages (B1 port only)

<b>Range</b>	
1030/1090 MHz (TCAS/Transponder)	+17 to +60 dBm
978 UAT	+30 to +57 dBm

## Measurement<sup>5</sup>

<b>Power (1030 and 1090 MHz)</b>	
Range	+17 to +60 dBm
Resolution	0.1 dB
Accuracy	±0.5 dB

<b>Frequency Pulse Measurement Type</b>	
Range	1030 MHz (±3 MHz) 1090 MHz (±3 MHz)
Resolution	1 KHz
Accuracy	±50 KHz

<b>Frequency 1030 Measurement Type (TCAS, DO-185, Mode S, Test-Mode 3 only)</b>	
Range	1030 MHz ±50 KHz
Resolution	100 Hz
Accuracy	±1 KHz

Phase (TCAS)	
Range	0 to 359°; any port reference to T1/B1
Resolution	1 degree
Accuracy	±4 degree
Pulse Spacing <sup>6</sup>	
Resolution	1 ns
Accuracy	±10 ns
Pulse Width <sup>6</sup>	
Resolution	1 ns
Accuracy	±15 ns
Pulse Rise/Fall Time <sup>6</sup>	
Resolution	1 ns
Accuracy	±15 ns
Reply Delay (Transponder)	
Resolution	25 ns
Accuracy	±50 ns
Reply Delay Jitter (Transponder)	
Resolution	1 ns
Accuracy	±20 ns
Percent Reply (Transponder)	
Range	0 to 100 % (Sample size equal to PRF or 200, whichever is greater.)
Resolution	0.1 %
Accuracy	±1%
Mode S Squitter (Transponder)	
Range	
DF11	0.01 s to 4.0 s
DF17	
Airborne Position	0.01 s to 2.0 s
Surface Position	0.01 s to 15.0 s
A/C Identification	0.01 s to 25.0 s
Airborne Velocity	0.01 s to 2.0 s
Event Driven	0.01 s to 25.0 s
Resolution	1 ms
Accuracy	±1 ms, ±2.5 ppm

## Scope Trigger Output (Scope 1 and Scope 2)

Width	
TCAS	2.0 ±0.5 µs
Transponder	1.0 ±0.5 µs
Position	
TCAS Test Mode (replies only)	

Mode S	2.25 ± 0.5 µs prior to P1 of reply
ATCRBS	2.25 ± 0.5 µs prior to F1 of reply
Transponder Test Mode	
Interrogation	
Default	-1.0 µs prior to P1 of interrogation
Range	-1 to +600 µs
Resolution	25 ns
Accuracy	±0.5 µs Typical
Reply	-1.0 µs prior to F1/P1 of reply (±0.5 µs Typical)

## Suppressor Pulse (TRANSPONDER)

Width	duration of transmission
Position	3.4 ±0.3 µs prior to P1 of interrogation
Level	>25 V

## Spectrum Analyzer Ports (Mod Strike 4 required)

### Insertion Loss (antenna ports to spectrum analyzer outputs)

SA AMP	-31 ±5 dB
SA Thru	-59.5 ±5 dB

## AC Input Power

Voltage Range	100 to 240 VAC, 50 to 60 Hz
Power Consumption	150 W typical

## Environmental

### Temperature

Full specified performance <sup>8</sup>	23° ±5° C (73.4°F ±5°)
Operating	0° to +40°C (32° to +104°F)
Storage	0° to +71°C (32° to +159.8°F)
Relative Humidity	0 to 95% non-condensing

## Physical Characteristics

Size:	10.5" H x 19" W x 24" D
Test Set Only	(26.67 cm x 48.26 cm x 60.9 cm)
Weight	43 lbs. (19.5 kg)

## Compliance

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CE

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UL/EN 61010-1

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EN 61326-1

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MIL-PRF-28800F (Class 3 Device)

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- <sup>1</sup> Absolute output power under any test condition is limited to the ranges shown under "Power" in section "Transmitter Specification".
- <sup>2</sup> Pulse timing accuracy specifications applicable while transmitters configured for 50/50 ns rise/fall time mode only.
- <sup>3</sup> When transitioning between operating modes (high-to-low or low-to-high) a 30 minute waiting period is required for bearing accuracy to return to the stated specifications.
- <sup>4</sup> Bearing accuracy specifications apply to the top antenna only when Avidyne OEM selected.
- <sup>5</sup> In XPDR test mode antenna measurements are taken from ports T2 and B2 when Collins Magnitude OEM is selected. For all other OEMs measurements are taken from antenna ports T1 and B1.
- <sup>6</sup> Pulse-timing, measurement-accuracy specifications applicable for input signals at amplitudes  $\geq +33$  dBm.
- <sup>7</sup> With the exception of Mode S SLS, test-set transmit pulse-timing/amplitude specifications are not guaranteed under any test condition that results in overlapping pulse transmissions.
- <sup>8</sup> Requires 1 hour warm-up period to meet specified performance.



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