

R&S®AVG050 ISDB-T BTS Gateway Specifications



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Definitions

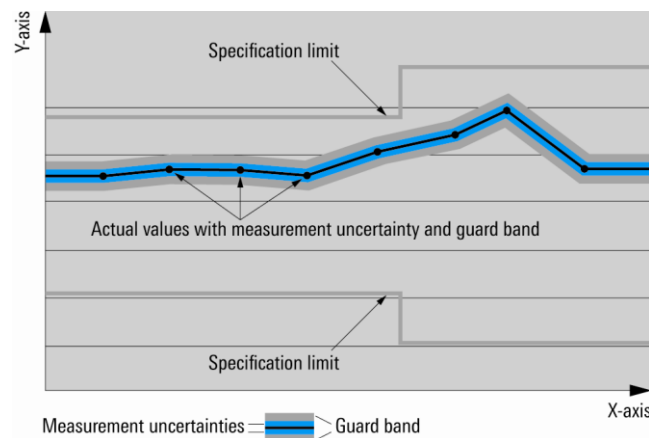
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Input

Satellite

Interfaces		
Input		F-type, 75 Ω
Satellite frequency band		C and Ku band or IF, selectable
Satellite IF		950 MHz to 2150 MHz (L band)
RF input level	for single carrier	-70 dBm to -10 dBm
	maximum RF input power (32 channels at -23 dBm and 2 channels at -13 dBm)	-5 dBm
Low-noise block (LNB) downconverter power supply	voltage	+13 V/+14 V DC (vertical), +18 V/+19 V DC (horizontal), selectable
	current	450 mA
	tone	22 kHz or off

DVB-S		
Conformity		EN 300421
Constellation		QPSK
Symbol rate		1 Msymbol/s to 45 Msymbol/s
FEC		1/2, 2/3, 3/4, 5/6, 7/8
Roll-off		0.35

DVB-S2		
Conformity		EN 302307
Constellation		QPSK, 8PSK (16 APSK, 32 APSK on request)
Symbol rate		1 Msymbol/s to 45 Msymbol/s
FEC (QPSK mode)		1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
FEC (8PSK mode)		3/5, 2/3, 3/4, 5/6, 8/9, 9/10
FEC blocks		short (16 200 bits) and normal (64 800 bits)
Roll-off		0.20, 0.25, 0.35
TS bit rate	maximum	125 Mbit/s
Multistream		configurable ISI filtering; in line with EN 302307 Annex H.2
Physical layer scrambling (PLS)		configurable PLS sequence (gold code/root of PRBS)

Decryption		
Number of different decryption methods per satellite feed		2 (via additional conditional access modules, CAMs)
DVB-CI interface		EN 50221
BISS decryption		2 built-in descramblers
Modes		BISS-1, BISS-E
Session words		default key for all services or separate key per service
Number of services	capacity	up to 64
	descrambling	up to 16 per descrambler (up 32 per chassis)
Number of PIDs		up to 16 per service

Transport stream

Interfaces		
ASI	for compressed video and audio in an MPEG-2 transport stream with ancillary data	1 × ASI; BNC, 75 Ω; 270 Mbit/s; 800 mV (V_{pp}); in line with EN 50083-9
TS over IP		1 × Ethernet (8-pin RJ-45 connector, bandwidth 1000/100/10 Mbit/s, level 2 V (V_{pp})); in line with IEEE 802.3

Protocols		
ASI	ISO/IEC MPEG-2 systems standard	ISO/IEC IS 13818-1:2000
TS over IP	IPv4	IETF RFC 791
	UDP	IETF RFC 768
	RTP	IETF RFC 3550
	MPEG-2 transport stream over IP	SMPTE 2022-1/2 (RTP incl. FEC) or UDP-only
Input redundancy		
TS input switch		automatic switchover between two selectable TS input signals; configurable time threshold for switchover

Reference frequency

Input for external reference signal		
Frequency (sine wave)		10 MHz
Input level		≥ -5 dBm to ≤ 19 dBm
Limits recommended		0 dBm to 19 dBm
Input impedance		50 Ω
Connector BNC		female, front

Output

Interfaces		
ASI	mirrored output for BTS in an MPEG-2 transport stream with ancillary data	2 × ASI; BNC, 75 Ω; 270 Mbit/s; 800 mV (V_{pp}); in line with EN 50083-9
TS over IP	1 × Ethernet (8-pin RJ-45 connector, bandwidth 1000/100/10 Mbit/s, level 2 V (V_{pp}))	IEEE 802.3
	number of IP streams	2 × IP streams with individual IP addresses, UDP ports and FEC configuration in line with SMPTE 2022-1/2

Protocols		
ASI	ISO/IEC MPEG-2 systems standard	ISO/IEC IS 13818-1:2000
TS over IP	IPv4	IETF RFC 791
	UDP	IETF RFC 768
	RTP	IETF RFC 3550
	MPEG-2 transport stream over IP	Pro-MPEG code of practice #3 release 2/SMPTE 2022 via RTP and UDP-only
Stream	output	Up to 3 transport streams can be sent out independently via the front interfaces.
	routing	For all transport streams, the signal can be routed flexibly through the conditional access modules (CAMs) or directly to the output interface.
	decryption	Decryption of a transport stream is possible via one or both inserted CAMs/ built-in BISS descrambler.

BTS generation		
Conformity		ABNT NBR 15603
Bit rate		32.5079 Mbit/s (204 byte with constant bit rate)

ISDB-T parameters

Transmission		
Transmission mode		mode 1 (8k); mode 2 (4k); mode 3 (2k)
Guard interval		1/4; 1/8; 1/16; 1/32
Modulation		QPSK; 16QAM; 64QAM
FEC rate		1/2; 2/3; 3/4; 5/6; 7/8
Time interleaving		off, approx. 100 ms (4/2/1), approx. 200 ms (8/4/2), approx. 400 ms (16/8/4)
Hierarchical transmission	for partial reception of 1seg/SD/HD	layer A; layer A+B; layer A+B+C
Number of segments		1 to 13
Generation of IIP	ISDB-T information packet	automatic

PSI/SI generation		
PSI/SI	configurable PSI/SI table generation and table repetition cycle	PAT, PMT, NIT, SDT, BIT, TOT
PAT parameters	PID	fixed (0x00)
PMT parameters	PID	configurable
	program loop descriptor bypass	configurable bypass of all descriptors in program info loop from PMT of user selectable input service
	ES loop descriptor bypass	configurable bypass of all descriptors in ES info loop from PMT of input service (user configurable per elementary stream)
	descriptors	stream identifier descriptor (0x52) generated for all stream types (with user selectable component tag) data component descriptor (0xFD) generated for captioning (0x06) only AAC audio descriptor (0x7C) generated for MPEG-4 AAC audio (0x11) only
NIT parameters	PID	fixed (0x10)
	descriptors	network name descriptor (0x40)
		system management descriptor (0xFE)
		TS information descriptor (0xCD)
		service list descriptor (0x41)
partial reception descriptor (0xFB)		
terrestrial delivery system descriptor (0xFA)		
SDT parameters	PID	fixed (0x11)
	descriptors	service descriptor (0x48) only
BIT parameters	PID	fixed (0x24)
	descriptors	SI parameter descriptor (0x27), service list descriptor descriptor (0x41), extended broadcast descriptor (0xCE) and broadcaster name descriptor (0xD8) only
TOT parameters	PID	fixed (0x14)
	descriptors	local time offset descriptor (0x58)
	reference time	selectable from UTC -12 to UTC +12 in one hour increments
TOT UTC time	option to use external NTP server for high accuracy	

Transport stream remultiplexer		
Input source		ASI input, TS over IP input, DVB-S/ DVB-S2 receiver
	R&S®AVG050-MXB R&S®AVG050-MXF	single input source selectable all input sources usable at the same time
Output muting		output of BTS remultiplexer can be muted on TS input signal loss (configurable)
Number of services		up to 16 services (8 TV, 8 1seg)
Elementary streams		up to 16 per service
Service cloning	easy selection and configuration based on detected input services possible	
Remultiplexing		PID remapping
		PCR correction with configurable interval
		PCR separation to configurable PID
Bypass		configurable bypass of up to 16 PIDs from input TS into output BTS
		adaptation of service IDs in bypassed EITs to match ISDB-T multiplex
Requirement		10 MHz reference frequency necessary

SFN adapter		
Insertion of time information for single frequency network operation	only with R&S®AVG050-MXF	network synchronization information is inserted into ISDB-T information packets (IIP) equipment control information for up to 29 separate equipment IDs is optionally inserted into ISDB-T information packets (IIP) 10 MHz reference frequency and connection to NTP server (Stratum 1) required

BTS compression/decompression		
BTS compression	only with R&S®AVG050-MXF	adaptation of ISDB-T BTS 204 into a fully valid TS 188 suitable for transmission via DVB-S/DVB-S2
		removal of null packets, PCR correction fully transparent and suitable for SFN operation
BTS decompression		recovery of a previously compressed BTS 204 fully transparent and suitable for SFN operation
	PSI/SI localization	adaptation of PSI/SI tables to parameters of local transmitter site (after BTS decompression) modified tables: PAT, NIT, SDT, H-EIT, M-EIT, L-EIT, RST, PCAT, LDT modified parameters: transport stream ID, network ID, area code, virtual channel, frequency
	requirement	10 MHz reference frequency necessary

General data

Control

Interfaces		
Network	1 × Ethernet (8-pin RJ-45 connector, bandwidth 1000/100/10 Mbit/s, level 2 V (V _{pp}))	IEEE 802.3

Protocols		
Network	IPv4	IETF RFC 791
	UDP	IETF RFC 768
	TCP	IETF RFC 793
	HTTP	IETF RFC 2616
	NTP	IETF RFC 1305
	SNMPv2c	IETF RFC 1441 to IETF RFC 1452

Electrical specifications

Power supply	average power consumption	< 40 W
	input current	1.7 A (100 V), 0.8 A (240 V)
	power supply	100 V to 240 V ± 10 %
	frequency	50 Hz to 60 Hz ± 5 %
	power factor at nominal load	0.55 (typ.) at 90 V (50 Hz), 0.45 (typ.) at 264 V (50 Hz)

Mechanical specifications

Dimensions	W × H × D	229 mm × 44.4 mm × 406 mm (9.02 in × 1.75 in × 15.98 in)
Weight		4 kg (8.82 lb)

Cooling

Air cooling		3 fans; cold air feed from left to right
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Environmental specifications

Operating temperature range		+5 °C to +45 °C, in line with EN 60068-2-1, EN 60068-2-2
Permissible temperature range		0 °C to +50 °C
Storage temperature range		-20 °C to +60 °C
Climatic resistance	cyclic test at +25 °C/+40 °C	85 % relative humidity
Immunity against RF fields		up to 10 V/m
Electromagnetic compatibility (emissions)		in line with EN 55011 class B, EN 61326
	power factor correction	in line with EN 61000-3-2
Electrical safety	CE	in line with IEC 60950-1, EN 60950-1
Noise emission		< 55 dBA
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, max. 1.8 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g constant, in line with EN 60068-2-6
	vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
	shock	40 g shock spectrum, in line with EN 60068-2-27, MIL-STD-810E

Ordering information

Designation	Type	Order No.
R&S®AVG050-MXB ISDB-T _B Gateway, for decompression of incoming BTS	R&S®AVG050-MXB	5303.9903.02
R&S®AVG050-MXF ISDB-T _B Remultiplexer/BTS Gateway, for generation of a BTS	R&S®AVG050-MXF	5303.9910.02
Kit for AVG050 tabletop unit	R&S®AVG050-TABLE	2119.0845.02
19" Rack Adapter (for one 1 HU ½ instrument)	R&S®ZZA-KN26	1175.3256.00
19" Rack Adapter (for two 1 HU ½ instruments next to each other)	R&S®ZZA-KN20	1175.3191.00
19" Rack Adapter (for ten 1 HU ½ instruments, vertical mounting)	R&S®ZZA-KN99	2115.6790.02

For product brochure, see PD 3606.8472.12 and www.rohde-schwarz.com

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The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

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- | Energy efficiency and low emissions
- | Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

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