

Incoming Results

Designation: Signalgenerator
Type: SML02
Material No.: 1090.3000K12
Serial No.: 100952

Referring to Test Documentation / Issue: 1090.3000.01-T-04.10 / 2007-01-15

Reference No.: 5000-309062642

Options: B1

Test Department: Rohde & Schwarz USA
Name: John Carduff
Date: 2017-02-17

Incoming Results



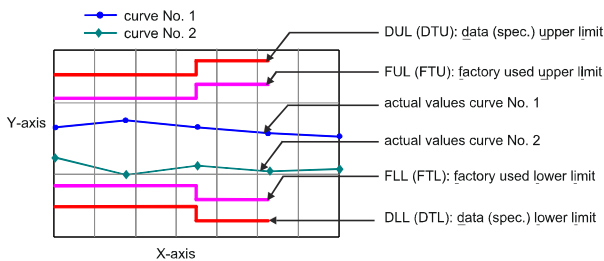
The following abbreviations may be used in this document

- {a} No measurement uncertainty stated because the errors always add together. So it is sure that a measurement result evaluated as "PASS" is pass.
- {b} The measurement uncertainty depends on the measurement result. The stated measurement uncertainty is valid for the close area around the specification. Measurement results outside the close area have a higher measurement uncertainty but are within the specification.
- {c} Functional test, therefore no measurement uncertainty is stated.
- {d} Typical value, refer to performance test.
- {e} The measurement uncertainty is taken into account when setting the measuring system.
- DL or DT Data Limit for symmetrical tolerance limits
- DLL Datasheet Lower Limit
- DUL Datasheet Upper Limit
- MU Symmetrical Measurement Uncertainty
- MLL or MLV Measurement Uncertainty Lower Value
- MUL or MUV Measurement Uncertainty Upper Value
- Nom. Nominal Value
- Dev. Deviation
- MErr. Measurement Error
- Act. Actual Value
- UGB Uncertainty Guard Band: Measuring uncertainty violates the data (spec.) limit.
- UGB1 Measurement results marked as UGB1 show conformity with a probability of >50 % and <95 %.
- UGB2 Measurement results marked as UGB2 show non-conformity with a probability of >50 % and <95 %.
- DU Datasheet Uncertainty

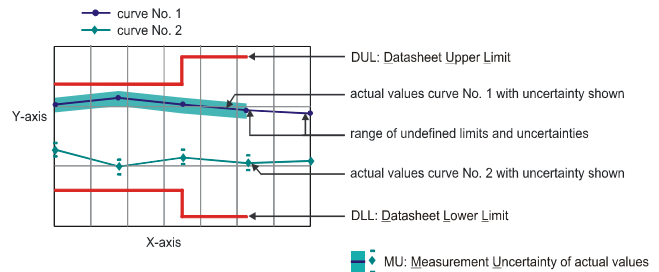
Explanation of charts

1. In case uncertainties are part of the appendix

factory used limit = data specification - uncertainty of actual value



2. In case uncertainties are part of the respective graphic



Type SML02
Test System ACS4_3522.2116.02_276039-005
Temperature 23° -3°/+7°
File (Incoming) 17022017.063_JN--ACS_1090.3000K12_100952_101...
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Serial No. 100952
Material No. 1090.3000K12
Date 2017-02-17



3.0 Internal Device Calibration

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Status Pass

3.1 Display and Keyboard

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Check Pass

3.2.1 Frequency Setting

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NOTE: RF Level 0 dBm, unmodulated, reference EXT

RF Frequency	DLL	DUL	Actual	MU
60.000 MHz	59.999999 MHz	60.000001 MHz	60.000000 MHz	1.0e-7 MHz
100.000 MHz	99.999999 MHz	100.000001 MHz	100.000000 MHz	1.0e-7 MHz
250.000 MHz	249.999999 MHz	250.000001 MHz	250.000000 MHz	1.0e-7 MHz
600.000 MHz	599.999999 MHz	600.000001 MHz	600.000000 MHz	1.0e-7 MHz
1000.000 MHz	999.999999 MHz	1000.000001 MHz	1000.000000 MHz	1.0e-7 MHz

3.2.2 Frequency Setting Time

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NOTE: RF Level 0 dBm, Setting via IEC-Bus,
 Within <1*10E-7 for f>76MHz and <90Hz for f<=76MHz

RF Start Freq	RF Stop Freq	DUL	Actual	MU
806.0 MHz	808.000000 MHz	10.0 ms	7.5 ms	0.170 ms
606.0 MHz	1075.000000 MHz	10.0 ms	8.5 ms	0.170 ms
1075.0 MHz	76.000000 MHz	10.0 ms	7.5 ms	0.170 ms
76.0 MHz	1075.000000 MHz	10.0 ms	8.3 ms	0.170 ms
1210.5 MHz	1210.500001 MHz	10.0 ms	8.3 ms	0.170 ms
1210.5 MHz	2200.000000 MHz	10.0 ms	8.4 ms	0.170 ms

3.2.3 Reference Frequency

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Option B1 is present

NOTE: Output of internal reference, RF Level 0 dBm, 1000.0MHz

Frequency error:

Nominal /MHz	DLL /Hz	DUL /Hz	Actual /Hz	MU /Hz
10.000000	-1.3	1.3	1.1	0.1

Level rms:

Nominal /V	Actual /V	MU /V
> 0.5	0.80	0.01

** This portion of the test is not accredited **

Incoming Results

Synchronisation error from nominal RF:

NOTE: Input for external reference, RF Level 0 dBm,
Output RF frequency 100 MHz

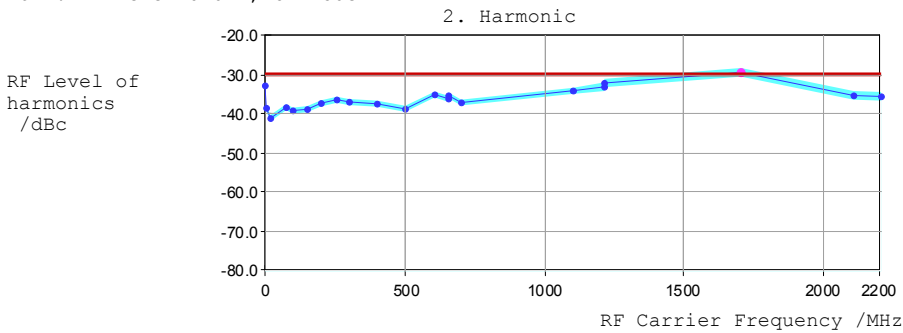
Ext. Ref. Freq. Offset /Hz	Nominal RF /MHz	DUL /Hz	Deviation /Hz	MU /Hz
0.0	100.0000000	0.1	0.0	{c}
+50.0	100.0005000	0.1	0.0	{c}
-50.0	99.9995000	0.1	0.0	{c}

** This portion of the test is not accredited **

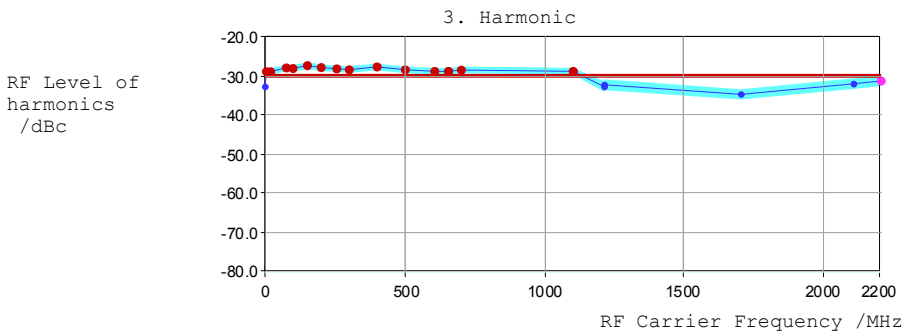
3.2.5.1 Spectral Purity - Harmonic Suppression

UGB2 (1)

NOTE: RF Level 8 dBm, CW-mode



FAIL (15)



UGB1 (1)

Incoming Results

Type SML02
 Test System ACS4_3522.2116.02_276039-005
 Temperature 23° -3°/+7°
 File (Incoming) 17022017.063_JN--ACS_1090.3000K12_100952_101...
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Serial No. 100952
 Material No. 1090.3000K12
 Date 2017-02-17



3.2.5.2 Spectral Purity - Harmonic Suppression

NOTE: RF Level 11 dBm

RF Carrier /MHz	RF Subharmonic /MHz	DUL /dBc	Actual /dBc	MU /dB
1250.000	625.000 (1f/2)	-64.0	-90.14	1.20
1250.000	1825.000 (3f/2)	-64.0	-93.87	1.20
1500.000	750.000 (1f/2)	-64.0	-78.57	1.20
1500.000	2250.000 (3f/2)	-64.0	-90.67	1.20
1800.000	900.000 (1f/2)	-64.0	-87.60	1.20
1800.000	2700.000 (3f/2)	-64.0	-83.50	1.20
2010.000	610.000 (1f/3)	-64.0	-95.52	1.20
2010.000	1229.000 (2f/3)	-64.0	-92.57	1.20
2010.000	2440.000 (4f/3)	-64.0	-91.32	1.20
2100.000	700.000 (1f/3)	-64.0	-88.01	1.20
2100.000	1400.000 (2f/3)	-64.0	-77.95	1.20
2100.000	2800.000 (4f/3)	-64.0	-83.57	1.20
2200.000	733.000 (1f/3)	-64.0	-95.10	1.20
2200.000	1466.000 (2f/3)	-64.0	-91.38	1.20
2200.000	2932.000 (4f/3)	-64.0	-91.35	1.20

3.2.5.3 Spectral Purity - Nonharmonic Suppression

NOTE: RF Level 11 dBm, scanning range: 10kHz to 2.000 MHz from carrier

Nonharmonics of synthesis:

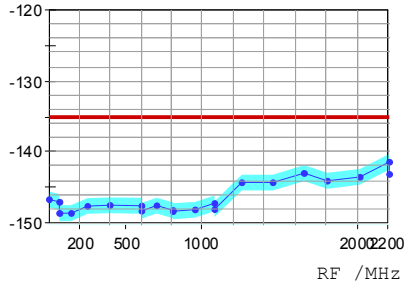
RF Carrier /MHz	Offset Freq. /kHz	DUL /dBc	Actual /dBc	MU /dB
899.0520	-100.0	-70.0	-76.88	1.2
927.2776	94.6	-70.0	-84.41	1.2
945.8210	98.4	-70.0	-83.26	1.2
979.7130	-32.4	-70.0	-74.71	1.2
980.7290	-98.9	-70.0	-80.83	1.2
987.3150	-90.3	-70.0	-83.69	1.2
999.9880	-83.8	-70.0	-82.86	1.2
1022.4380	-20.6	-70.0	-72.95	1.2
1060.8720	82.9	-70.0	-83.55	1.2
1080.0030	-79.8	-70.0	-83.42	1.2
1086.2000	-82.5	-70.0	-82.67	1.2
1086.6630	-95.1	-70.0	-83.72	1.2
1086.9535	99.8	-70.0	-77.36	1.2
1090.2800	-93.3	-70.0	-83.73	1.2
1095.0020	-99.6	-70.0	-77.64	1.2
1098.9560	-100.0	-70.0	-76.72	1.2

Nonharmonics of mixer:

RF Carrier /MHz	Offset Freq. /MHz	DUL /dBc	Actual /dBc	MU /dB
75.9	875.9	-70.0	-88.97	1.2

3.2.5.4 Spectral Purity - Broadband Noise

NOTE: RF Level 5.1 dBm, 2 MHz carrier spacing
 CW:



CW: level = 5.10dBm

Worst case:

	at RF /MHz	DUL /dBc	Actual /dBc	MU /dB
with CW:	2199.0000000	-135.0	-141.2	1.1

3.2.5.5 Spectral Purity - SSB Phase Noise

NOTE: RF Level 0 dBm, carrier spacing frequency 20 kHz

RF Frequency /MHz	DUL /(dBc/Hz)	Actual /(dBc/Hz)	MU /dB
1000.000	-122.0	-126.5	1.2

3.2.5.6 Residual FM

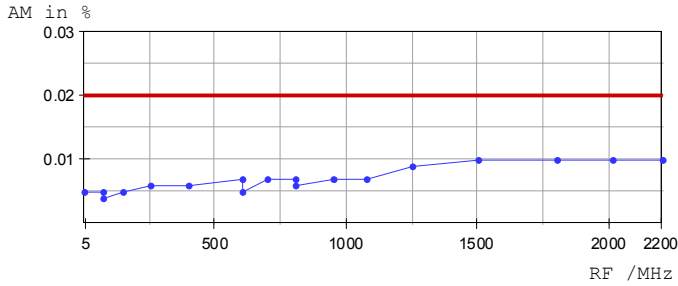
Note: DUT output power = 0.0 dBm.

RF /MHz	Filter: CCITT		Filter: 0.02...23kHz		Result	MU
	DUL /Hz	Actual /Hz	DUL /Hz	Actual /Hz		
1	2	0.3	6	1.4	pass	{a}
20	2	0.6	6	1.8	pass	{a}
76	2	0.6	6	1.9	pass	{a}
100	1	0.5	3	1.4	pass	{a}
300	1	0.6	3	1.6	pass	{a}
605	1	0.9	3	2.1	pass	{a}
750	2	1.0	6	2.5	pass	{a}
900	2	1.1	6	2.9	pass	{a}
1100	2	1.2	6	3.5	pass	{a}
1211	4	1.6	12	4.4	pass	{a}
1700	4	1.9	12	5.2	pass	{a}
2200	4	2.6	12	6.6	pass	{a}

3.2.5.7 Residual AM

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Note: DUT output power = 0.0 dBm, weighting 0.02 ... 23kHz, rms



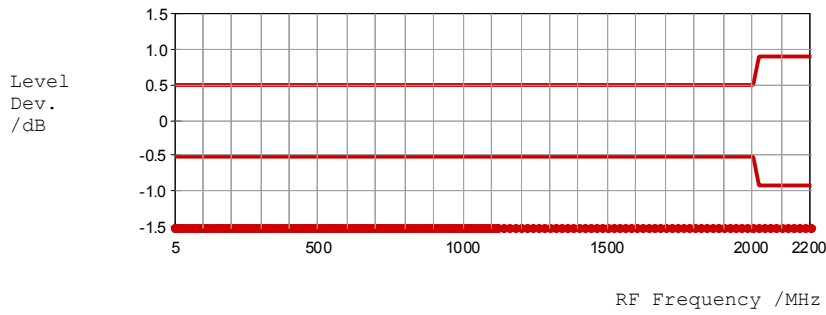
See annotation (a) for MU

FAIL (168)

3.3.1 Level - Frequency Response

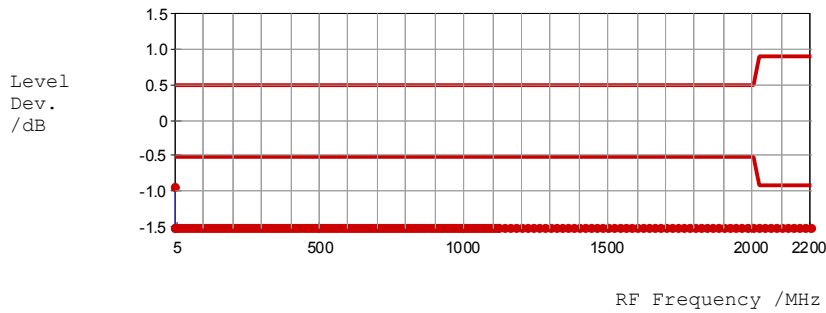
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Note: DUT output power 13 dBm



FAIL (171)

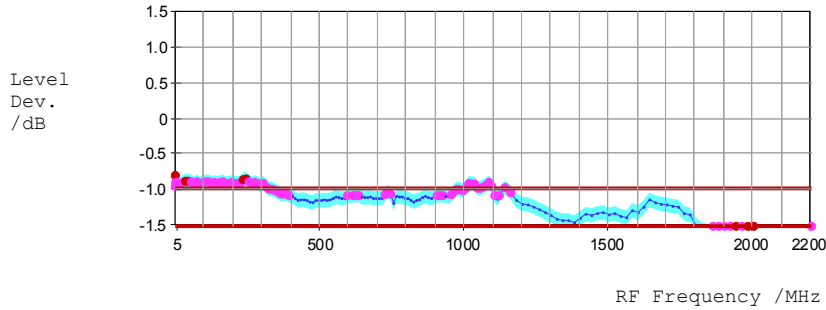
NOTE: DUT output power 11 dBm



Incoming Results

FAIL (8)
 UGB2 (48)
 UGB1 (26)

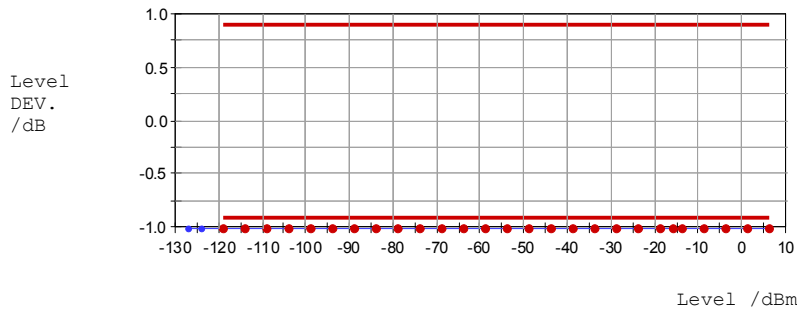
NOTE: DUT output power 0 dBm



Max. error of -3.98 dB at RF = 2140.000000 MHz, test level = 13.00 dBm.

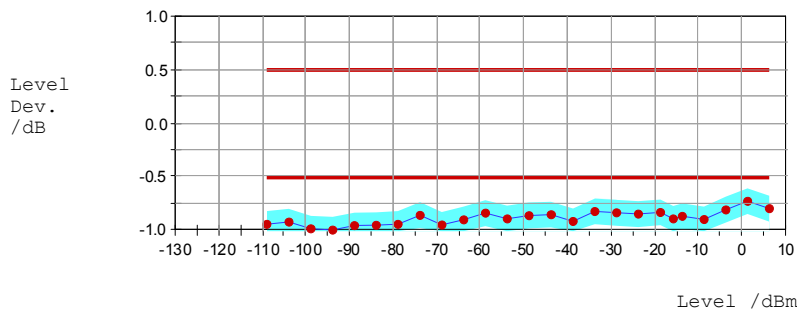
3.3.2 Level - Linearity

Note: Test frequency 2140.000000 MHz



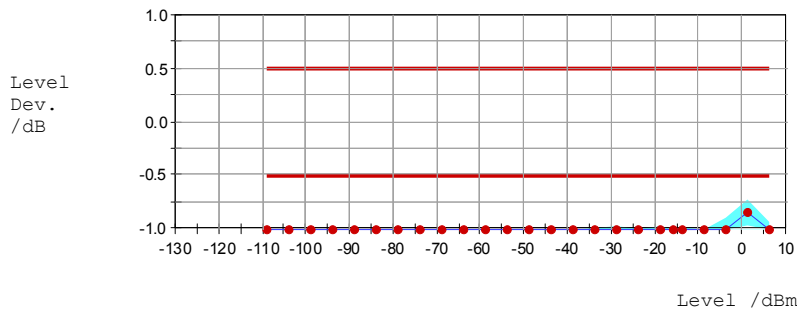
FAIL (27)

Note: Test frequency 0.120 MHz



FAIL (25)

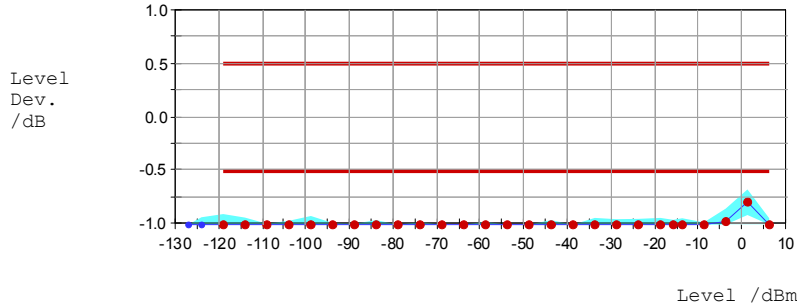
Note: Test frequency 5.0 MHz



FAIL (25)

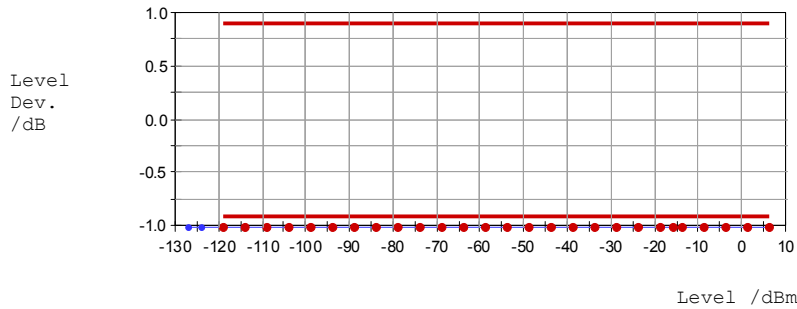
Note: Test frequency 50.000 MHz

FAIL (27)



Note: Test frequency 2200.000 MHz

FAIL (27)



3.3.3 Level setting time

Start level /dBm	Target level /dBm	Frequency /MHz	DUL /ms	Actual /ms	MU /ms
-140.0	+13.0	100	10.0	5.0	0.1
+13.0	-54.9	100	10.0	5.1	0.1
-14.9	+13.0	ATT FIXED 100	10.0	4.4	0.1

3.3.4 Non-interrupting level setting

referred to measured value at 5.1dBm

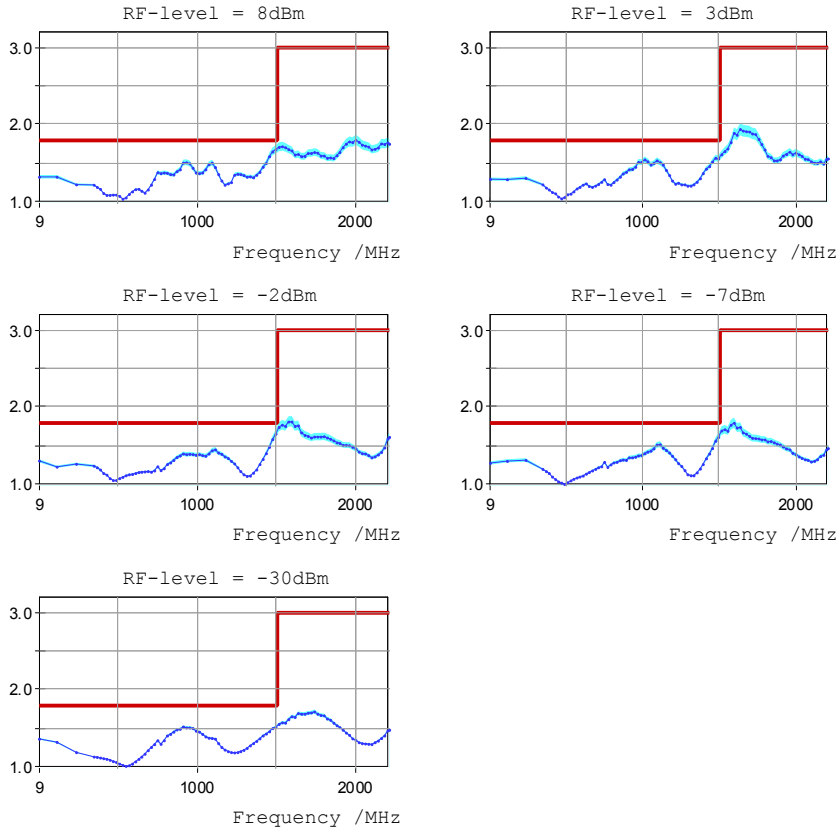
Freq. /MHz	----- attenuation ----->								Result
	-5 dB		-10 dB		-15 dB		-20.0 dB		
	Dev. /dB	DL /dB	Dev. /dB	DL /dB	Dev. /dB	DL /dB	Dev. /dB	DL /dB	
0.12	-0.05	±0.25	-0.08	±0.50	-0.10	±0.75	-0.08	±1.5	pass
5.1	-0.02	±0.25	-0.26	±0.50	-0.35	±0.75	-0.11	±1.5	pass
1100	0.19	±0.25	-0.01	±0.50	-0.16	±0.75	-0.12	±1.5	pass
1211	0.26	±0.25	0.15	±0.50	0.04	±0.75	-0.05	±1.5	fail
2200	0.56	±0.25	0.62	±0.50	0.53	±0.75	0.39	±1.5	fail

FAIL
 FAIL

For measurement uncertainty see annotation {c}

3.3.6 VSWR RF-output

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3.3.7 Overvoltage Protection

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Note: RF Frequency 100.0 MHz, RF Level -140 dBm, Test Frequency 20.0 kHz

DLL /Vpeak	DUL /Vpeak	Actual /Vpeak	MU
3.7 V	7.5 V	4.4	{c}

3.4.1 Internal modulation generator - Frequency Error

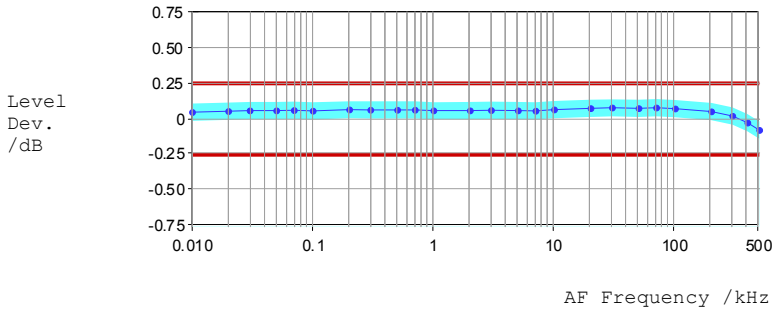
=====

DUL: as for reference frequency + 0.0024Hz,

Nominal /kHz	DUL /Hz	Deviation /Hz	MU /Hz
50.0	120.0	+0.0	0.1
100.0	240.0	+0.0	0.1
500.0	1200.1	+0.0	0.1
1000.0	2400.1	+0.1	0.1

3.4.2 Internal Modulation Generator - Frequency Response

Note: AF Level 1 V

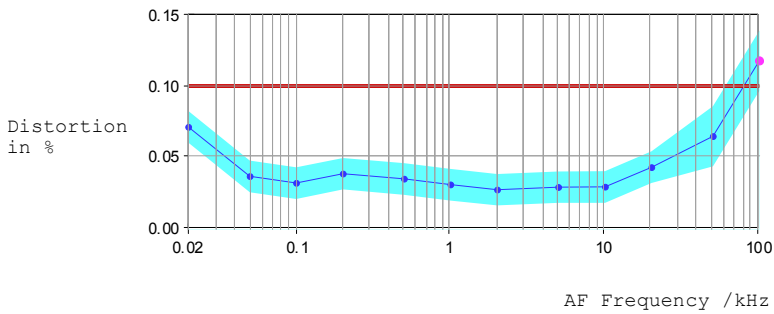


Frequency Response	DUL	Actual	MU
	0.50 dB	0.16 dB	0.120 dB

3.4.3 Int. Mod. Gen. - Distortion

UGB2 (1)

Note: AF Level 4.0 V, 20.Hz to 100kHz



3.4.4 Int. Mod. Gen. - Output voltage (open-circuit)

Note: DUL: 1% + 1mV

Deviation from rated setting voltage:

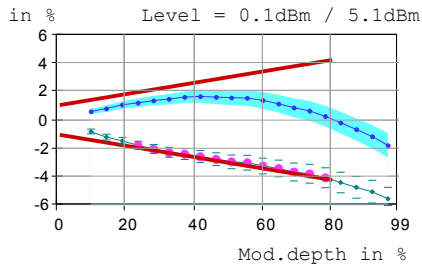
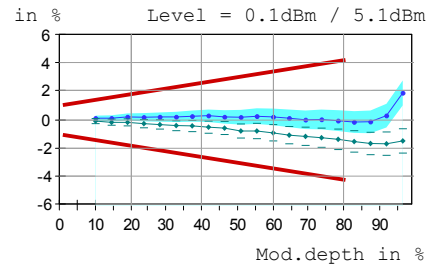
Nominal /mV	Frequency /kHz	DUL /mV	Deviation /mV	MU /mV
1	1.0	1.001	-0.01	0.0011
10	1.0	1.01	-0.21	0.011
100	1.0	2.0	-0.39	0.11
1000	1.0	11.0	-0.95	1.1
4000	1.0	41.0	-4.07	4.4

3.5.1 AM - Deviation Setting

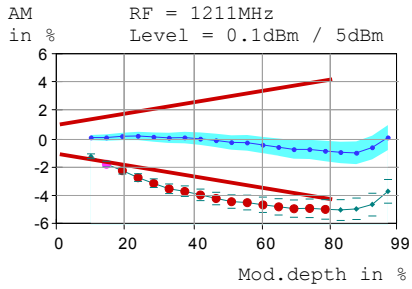
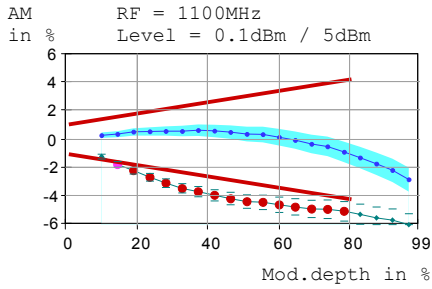
Setting error at AF = 1kHz

DUL for m < 80%: <4% of reading +-1%

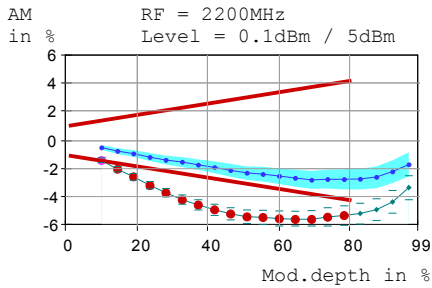
AM RF = 0.1MHz AM RF = 5.1MHz



UGB1 (13)



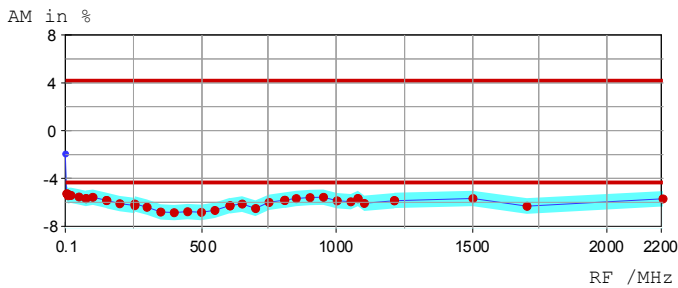
FAIL (28)
 UGB2 (2)



FAIL (15)
 UGB1 (1)

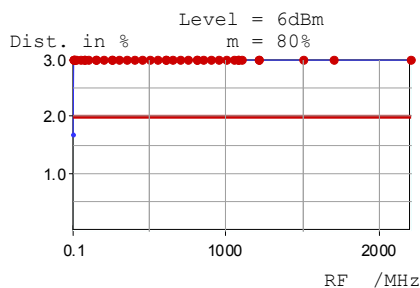
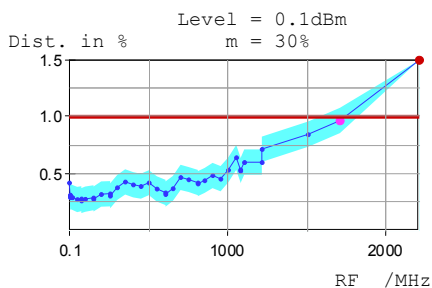
FAIL (40)

3.5.2a Mod.Depth versus RF-Frequency
 =====
 m = 80%, AF = 1kHz, RF-level = 6dBm



FAIL (41)

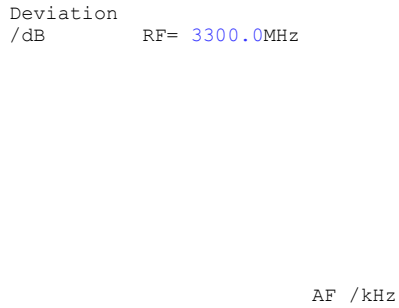
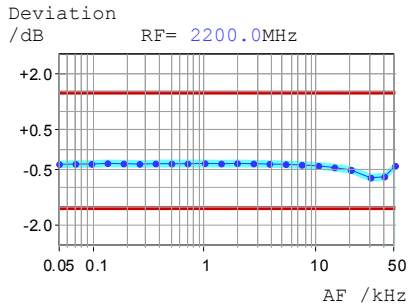
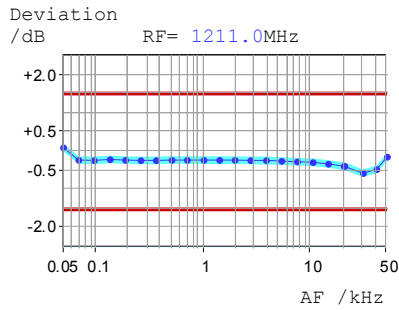
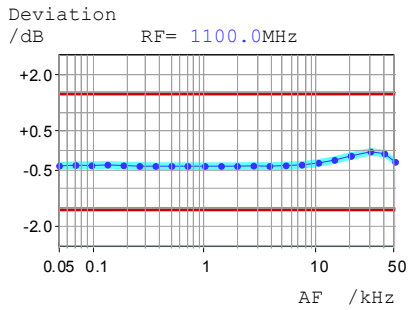
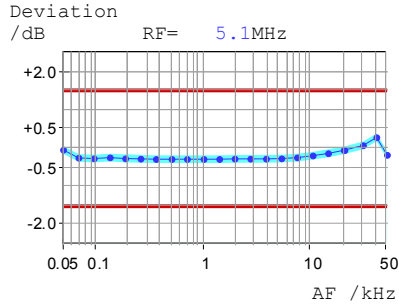
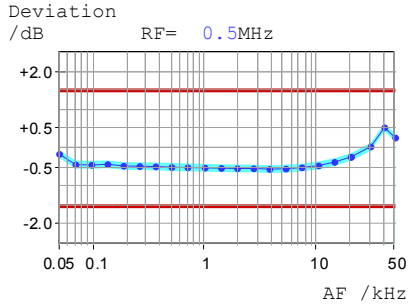
3.5.2B AM Distortion at 1kHz
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UGB1 (1)

3.5.3 AM Frequency Response

m = 60%, RF-level = 3dBm
 ext. modulation, AF-level = 1V, AF = 50Hz...50kHz



3.5.4 AM - Residual PhiM

m = 30%, AF = 1kHz, RF-level = 2.1dBm
 filter HP 30Hz, LP 23kHz, detector +-Pk/2

Frequency / MHz	DUL / rad	Actual / rad	MU
77	0.2	0.019	{a}
1100	0.2	0.048	{a}

3.6.1 FM - Deviation Setting Error

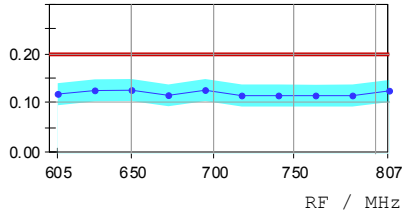
AF = 1kHz, DUL: <4% of reading +20Hz

RF-Freq. / MHz	FM-deviation / kHz	DUL in %	Deviation in %	MU in %
1000	500.00	4.0	-1.4	0.5

3.6.2 FM distortion

at AF = 1kHz and 50% of max. deviation (= 500kHz)

Dist. in %



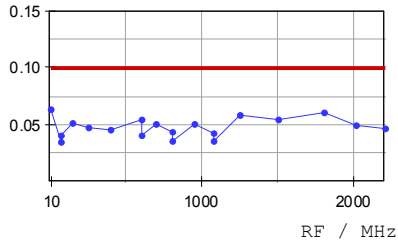
distortion measurement at different deviations:

Carrier / MHz	Freq. Dev. / kHz	DUL in %	Actual in %	MU in %
50	500	0.2	0.124	0.022
100	75	0.2	0.034	0.022
200	125	0.2	0.033	0.022
400	250	0.2	0.054	0.022
1600	500	0.2	0.126	0.022
2200	500	0.2	0.126	0.022

3.6.4 Incidental AM

FM INT, dev. = 40kHz, AF = 1kHz, RF-level = 0dBm
 detector +-Pk/2, filter 20Hz...3kHz

AM in %



See annotation {a} for MU

3.6.5 Carrier frequency offset with FM-DC

Note: no external modulating signal

Mod. Source	Carrier / MHz	Freq. Dev. / kHz	FL +/-Hz	Deviation / Hz	MU / Hz
FM INT, AF = 1kHz	1000	500	1000	-88	1
FM EXT AC	1000	500	1000	+144	1
FM EXT DC	1000	500	1000	+175	1
FM two-tone	1000	500	1000	+357	1

3.6.6 Test two-tone FM

AF-Signal 1kHz at MOD EXT, internal AF-Generator: 10kHz
 Set freq. deviation: 100kHz

Carrier \MHz	Nominal \kHz	FUL in %	Deviation in %	MU
100	200	4	-1.15	{c}

Type SML02
 Test System ACS4_3522.2116.02_276039-005
 Temperature 23° -3°/+7°
 File (Incoming) 17022017.063_JN--ACS_1090.3000K12_100952_101...
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Serial No. 100952
 Material No. 1090.3000K12
 Date 2017-02-17



3.6.7 FM - Stereo-Modulation

-Stereo cross-talk attenuation at FM-DC Ext, Dev. = 40kHz, AF = 1kHz

Carrier /MHz	Direction	DLL /dB	Actual /dB	MU /dB
87	L-->R	50	58.4	{a}
87	R-->L	50	57.9	{a}
98	L-->R	50	57.4	{a}
98	R-->L	50	57.8	{a}
108	L-->R	50	58.8	{a}
108	R-->L	50	58.3	{a}

-Distortion at Dev. = 40kHz, AF = 1kHz

Carrier /MHz	Channel	DUL in %	Actual in %	MU in %
87	L	0.2	0.035	0.022
87	R	0.2	0.040	0.022
98	L	0.2	0.030	0.022
98	R	0.2	0.034	0.022
108	L	0.2	0.035	0.022
108	R	0.2	0.040	0.022

-Signal to Noise Ratio:

	Carrier /MHz	DLL /dB	Actual /dB	MU /dB
-unweighted S/N ratio:	87	70	75.4	{a}
	98	70	75.1	{a}
	108	70	75.6	{a}
-weighted S/N ratio:	87	70	78.4	{a}
	98	70	78.5	{a}
	108	70	78.3	{a}

3.7.1 Phase Modulation - Deviation Setting

AF = 1kHz, DL: < 4% of reading + 0.02rad

RF-Freq. /MHz	Nominal /rad	DL +- in %	Deviation in %	MU in %
1000	10.0	4.0	-1.3	0.5

3.7.2 Phase Modulation - Distortion

RF = 1075MHz, AF source int 1kHz

RF-Freq. /MHz	Nominal /rad	DUL in %	FL in %	Deviation in %	MU in %
1075	5	0.2	---	0.07	0.022
1075	10	---	< 0.5	0.05	0.054

Type SML02
Test System ACS4_3522.2116.02_276039-005
Temperature 23° -3°/+7°
File (Incoming) 17022017.063_IN--ACS_1090.3000K12_100952_101...
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Serial No. 100952
Material No. 1090.3000K12
Date 2017-02-17



3.7.3. Phase Modulation - Modulation Frequency Response

Modulation frequency range: 10Hz ... 100kHz/500kHz
RF = 1GHz, Deviation = 0.2 rad

