



ROHDE & SCHWARZ

Kalibrierlaboratorium für Geräte der Nachrichtentechnik
Calibration laboratory for measuring instruments of telecommunication engineering

akkreditiert durch die / *accredited by the*

Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / *as calibration laboratory in the*

Deutschen Kalibrierdienst **DKD**

Kalibrierschein
Calibration Certificate



Deutsche
Akkreditierungsstelle
D-K-15012-01-00

560982
D-K- 15012-01-00
2020-07

Kalibrierzeichen
Calibration Mark

Gegenstand <i>Object</i>	Signal & Spectrum Analyzer
Hersteller <i>Manufacturer</i>	ROHDE & SCHWARZ
Typ <i>Type</i>	FSW43
Fabrikat/Serien-Nr. <i>Serial number</i>	100560
Auftraggeber <i>Customer</i>	RISE Research Institutes of Sweden AB Brinellgatan 4 SE 504 62 Borås
Auftragsnummer <i>Order No.</i>	IA 9487145
Anzahl der Seiten des Kalibrierscheins <i>Number of pages of the certificate</i>	18
Ort und Datum der Kalibrierung <i>Place and date of calibration</i>	Köln, 2020-07-20

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European cooperation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

The DAkkS is signatory to the multilateral agreements of the European cooperation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the German Accreditation Body and the issuing laboratory. Calibration certificates without signature are not valid.

Datum
Date


2020-07-20

Leiter des Kalibrierlaboratoriums
Head of the calibration laboratory

Bernhard Kistingner

Bearbeiter
Person in charge

Christian Flügemann

Object	Signal & Spectrum Analyzer			
Type	FSW43	Serial No.	100560	ROHDE & SCHWARZ
Date	2020-07-20	Material No.	1312.8000K43	International Service
Page	2 of 18	Calibration Mark	560982-D-K-15012-01-00-2020-07	

V1-08/Temp/Eng/2016-01

Object Data

Firmware version: 4.60

Installed options: B24, B21, B8, B3, K14, K9, B28, B40, B80, B13, K104

Calibration Procedure

The calibration was performed according to service manual 1173.9428.02-13 following the procedures as described in calibration guideline VDI/VDE/DGQ/DKD 2622 part 11 by comparing the relevant measurands of the instrument under test with the numerical values of the quantities represented by the reference standards used.

Measurement Results

see from page 4 on

All measurement results are metrologically traced to the International System of Units (SI) by means of an unbroken chain of calibrations to relevant primary standards of the SI units of measurements.

Statement of Compliance

Incoming: All measured values are within the datasheet specifications.

Outgoing: All measured values are within the datasheet specifications.

Working Standards used

Item	Type	Serial Number	Calibration Certificate Number	Cal. Due
Signal Generator	SMF100A	105796	523139-D-K-15195-01-01-2019-09	2020-09
Signal Generator	SMA100B	102330	799756-D-K-15195-01-01-2019-04	2021-04
Signal Generator	SMF100A	105285	K20-068-D-K-15012-01-00-2020-03	2021-03
Power Meter	NRX	101025	K19-649-D-K-15012-01-00-2019-07	2021-07
Power Sensor	NRP18A	101217	K20-185-D-K-15012-01-00-2020-03	2021-03
Power Sensor	NRP-Z55	130785	K20-182-D-K-15012-01-00-2020-03	2021-03
Spectrum Analyzer	FSW50	103192	K20-337-D-K-15012-01-00-2020-05	2021-05
Network Analyzer	ZVA40	100418	K20-069-D-K-15012-01-00-2020-02	2021-02
Step Attenuator 139dB 6GH RSC		102402	K20-340-D-K-15012-01-00-2020-05	2021-05
Power Splitter	1870A	11909	K19-663-D-K-15012-01-00-2019-05	2021-05
Power Splitter	1534	1319	556014-D-K-15195-01-01-2020-06	2021-06
Frequency Standard	XSRM	300877/030	K19-1196-D-K-15012-01-00-2019-11	2020-11

Remarks

Firmware Update Version 4.51 => 4.60

SelfTest passed

TotalCal passed

Object Signal & Spectrum Analyzer
 Type FSW43
 Date 2020-07-20
 Page 3 of 18

Serial No. 100560
 Material No. 1312.8000K43
 Calibration Mark 560982-D-K-15012-01-00-2020-07

Measurement Uncertainty

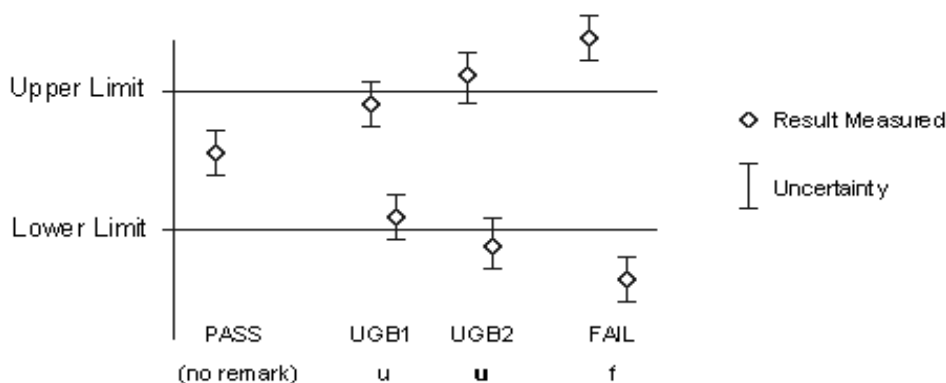
Together with the results on the following pages the extended measurement uncertainty is stated which was calculated from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. It was determined in accordance with EA-4/02 M: 2013. The true value is located in the corresponding interval with a probability of 95 %.

Environmental Conditions

Ambient temperature $(23 \pm 3) ^\circ\text{C}$ Relative humidity $(45 \pm 30) \%$

Comments on the measured results

The measurement results in the test report stated below have been tested for compliance with the given specifications and marked if necessary. In doing so, the associated uncertainty of measurement has been taken into account.



The following abbreviations may be used in this certificate:

- ¹ Measurement results that are not covered by the DAkkS accreditation.
- {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} , ² 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 , DT Data Limit for symmetrical tolerance limits
- UGB Uncertainty guard band: Measuring uncertainty violates the data sheet tolerance
- UGB1 , u Measurement results marked as UGB1 show conformity with a probability of >50 % and <95 %.
- UGB2 , u Measurement results marked as UGB2 show non-conformity with a probability of >50 % and <95 %.
- FAIL , f Measurement results marked as FAIL show non-conformity
- n. i. not installed: Does not apply due to instrument configuration
- n. m. not measured
- ref. Reference value, used for relative measurements

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 4 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

Page	Section	Test Description	Result
5	1	Ref.-Frequency Accuracy	PASS
5	2	Immunity to Interference	PASS
6	3.1	3rd order Intercept (freq < 2 GHz)	PASS
6	3.2	3rd order Intercept (freq > 2 GHz)	PASS
6	4.1	2nd order Intercept	PASS
6	4.2	2nd order Intercept (Opt FSW-B13)	PASS
7	5	Resolution Bandwidths Accuracy	PASS
7	6	Full Span Spurious Response	PASS
8	7.1	Average Noise Level	PASS
8	7.2	Average Noise Level (FSW-B13 ON)	PASS
8	7.3	Average Noise Level (FSW-B24 ON)	PASS
9	7.4	Average Noise Level (YIG OFF)	PASS
9	8	Level Accuracy	PASS (3 n. i.)
9	9.1	Freq. Resp Att 10 dB DC-Coup.	PASS
9	9.2	Freq. Resp Att 0 dB AC-Coup.	PASS
10	9.3	Freq. Resp Att 5 dB AC-Coup.	PASS
10	9.4	Freq. Resp Att 10 dB AC-Coup.	PASS
10	9.5	Freq. Resp Att 20 dB AC-Coup.	PASS
10	9.6	Freq. Resp Att 40 dB AC-Coup.	PASS
11	9.7	Freq. Resp Att 10 dB DC-Coup. (FSW-B24 on)	PASS
11	9.8	Freq. Resp Att 10 dB AC-Coup. YIG OFF	PASS
11	10	Display Nonlinearity	PASS
11	11	RF Attenuator Accuracy	PASS
12	12	Phase Noise	PASS
12	13.1.1	VSWR at RF Input Att 5 dB DC-Coup.	PASS
12	13.2.1	VSWR at RF Input Att 10 dB DC-Coup.	PASS
12	13.3.1	VSWR at RF Input Att 20 dB DC-Coup.	PASS
13	13.4.1	VSWR at RF Input Att 40 dB DC-Coup.	PASS
13	13.5.1	VSWR at RF Input Att 10 dB AC-Coup.	PASS
14	14.1	Baseband Inputs abs. Amplitude Accuracy	n. i.
15	14.2	Baseband Inputs Frequency Response	n. i.
16	15.1	Ext Mixer LO Level Acc. of 13 dBm nominal Power	PASS
17	15.2	Ext Mixer LO Level Acc. of 15.5 dBm nominal Power	PASS
18	15.3	Ext Mixer LO Level Acc. of 17 dBm nominal Power	PASS
18	15.4	Ext Mixer Level Display	PASS

**Object** Signal & Spectrum Analyzer**Type** FSW43**Serial No.** 100560**Date** 2020-07-20**Material No.** 1312.8000K43**Page** 5 of 18**Calibration Mark** 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/MeaFsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/Eng/2012-01

V1-08/Temp/Eng/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
1 Ref.-Frequency Accuracy measured at: 1000 MHz	-100 Hz	-12 Hz	100 Hz	2 Hz
2 Imunity to Interference				
2nd IF Image Freq. Rejection center freq: 2nd IF freq:				
1000 MHz 1317 MHz	--	¹ -120,6 dBc	-90,0 dBc	0,5 dB
9000 MHz 1317 MHz	--	¹ -118,2 dBc	-90,0 dBc	0,6 dB
3rd IF Image Freq. Rejection center freq: 3rd IF freq:				
63 MHz 37 MHz	--	¹ -122,0 dBc	-90,0 dBc	0,5 dB
100 MHz 37 MHz	--	¹ -119,9 dBc	-90,0 dBc	0,5 dB
900 MHz 37 MHz	--	¹ -119,3 dBc	-90,0 dBc	0,5 dB
1100 MHz 37 MHz	--	¹ -122,3 dBc	-90,0 dBc	0,5 dB
7990 MHz 37 MHz	--	¹ -115,8 dBc	-90,0 dBc	0,6 dB
2nd IF Rejection center freq: 2nd IF freq:				
50 MHz 1317 MHz	--	¹ -121,7 dBc	-90,0 dBc	0,5 dB
200 MHz 1317 MHz	--	¹ -120,9 dBc	-90,0 dBc	0,5 dB
500 MHz 1317 MHz	--	¹ -120,3 dBc	-90,0 dBc	0,5 dB
900 MHz 1317 MHz	--	¹ -118,6 dBc	-90,0 dBc	0,5 dB
1100 MHz 1317 MHz	--	¹ -120,9 dBc	-90,0 dBc	0,5 dB
7990 MHz 1317 MHz	--	¹ -119,6 dBc	-90,0 dBc	0,6 dB
9000 MHz 1317 MHz	--	¹ -118,5 dBc	-90,0 dBc	0,6 dB
12000 MHz 1317 MHz	--	¹ -119,0 dBc	-90,0 dBc	0,6 dB
25000 MHz 1317 MHz	--	¹ -113,8 dBc	-90,0 dBc	0,9 dB
38000 MHz 1317 MHz	--	¹ -113,2 dBc	-90,0 dBc	1,2 dB
3rd IF Rejection center freq: 3rd IF freq:				
100 MHz 37 MHz	--	¹ -122,4 dBc	-90,0 dBc	0,5 dB
200 MHz 37 MHz	--	¹ -120,0 dBc	-90,0 dBc	0,5 dB
500 MHz 37 MHz	--	¹ -119,1 dBc	-90,0 dBc	0,5 dB
900 MHz 37 MHz	--	¹ -118,7 dBc	-90,0 dBc	0,5 dB
1100 MHz 37 MHz	--	¹ -121,9 dBc	-90,0 dBc	0,5 dB
7990 MHz 37 MHz	--	¹ -118,7 dBc	-90,0 dBc	0,6 dB
9000 MHz 37 MHz	--	¹ -118,3 dBc	-90,0 dBc	0,6 dB
12000 MHz 37 MHz	--	¹ -117,8 dBc	-90,0 dBc	0,6 dB
25000 MHz 37 MHz	--	¹ -113,6 dBc	-90,0 dBc	0,9 dB
38000 MHz 37 MHz	--	¹ -113,1 dBc	-90,0 dBc	1,2 dB

Object Signal & Spectrum Analyzer

Type FSW43

Serial No. 100560

Date 2020-07-20

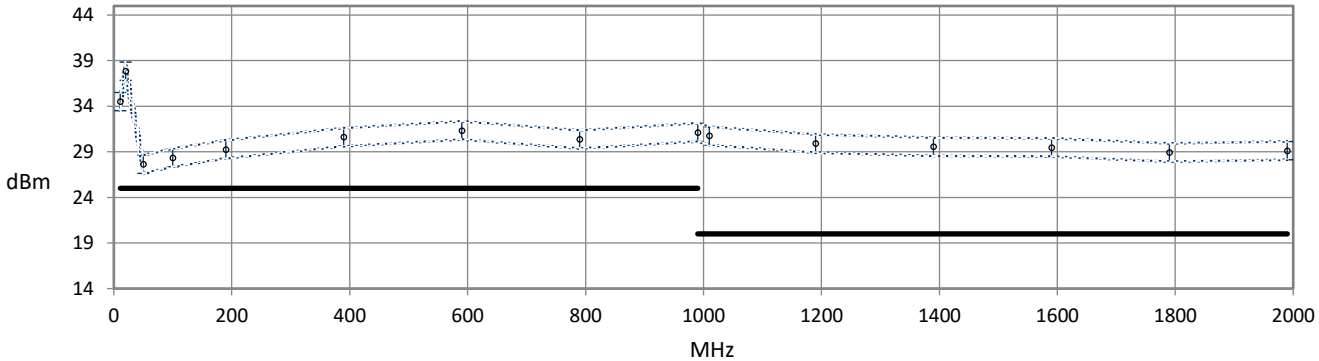
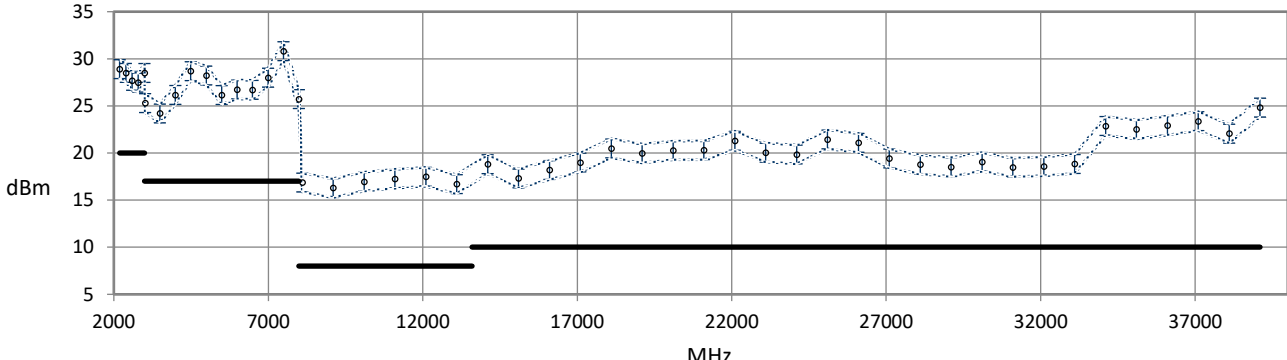
Material No. 1312.8000K43

Page 6 of 18

Calibration Mark 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/Meafsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/Eng/2012-01

V1-08/Temp/Eng/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
3.1 3rd order Intercept (freq < 2 GHz) 				
3.2 3rd order Intercept (freq > 2 GHz) 				
4.1 2nd order Intercept results calculated from power and attenuation measurements fin =				
9 MHz	45,0 dBm	49,5 dBm	--	1,5 dB
21 MHz	45,0 dBm	50,2 dBm	--	1,5 dB
106 MHz	45,0 dBm	49,0 dBm	--	1,5 dB
274 MHz	45,0 dBm	57,7 dBm	--	1,5 dB
449,9 MHz	45,0 dBm	53,4 dBm	--	1,5 dB
699,9 MHz	47,0 dBm	62,5 dBm	--	1,5 dB
999,9 MHz	47,0 dBm	63,6 dBm	--	1,5 dB
1499,9 MHz	47,0 dBm	63,8 dBm	--	1,5 dB
1749,9 MHz	62,0 dBm	78,1 dBm	--	1,5 dB
2699,9 MHz	62,0 dBm	79,8 dBm	--	1,5 dB
3449,9 MHz	62,0 dBm	78,3 dBm	--	1,5 dB
4.2 2nd order Intercept (Opt FSW-B13) results calculated from power and attenuation measurements fin =				
699,9 MHz	52,0 dBm	56,6 dBm	--	1,5 dB
1499,9 MHz	52,0 dBm	75,7 dBm	--	1,5 dB

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 7 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

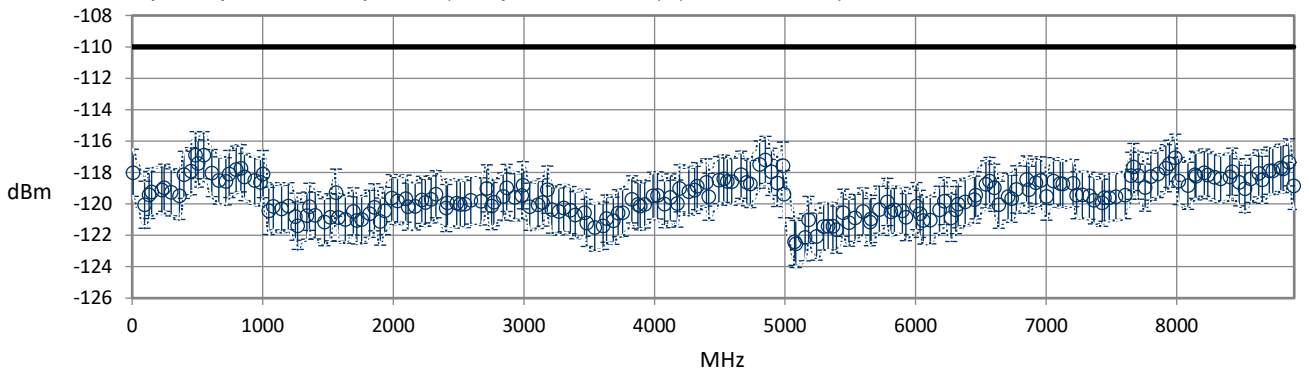
International Service

EXE-Vers: 3.1.10.0/Meafsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/End/2012-01

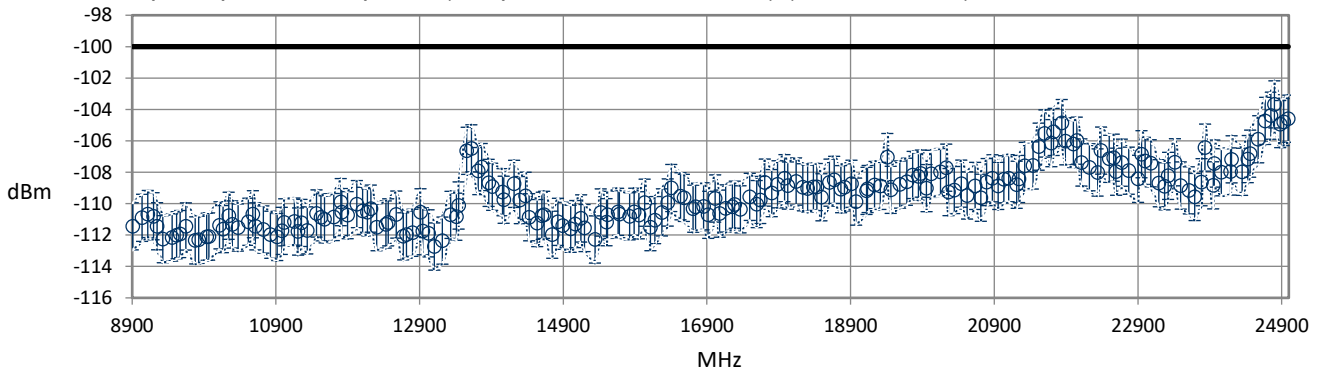
V1-08/Temp/End/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
5 Resolution Bandwidths Accuracy				
RBW level uncertainty				
80 MHz (only FSW-B8)	-0,10 dB	0,05 dB	0,10 dB	0,02 dB
50 MHz (only FSW-B8)	-0,10 dB	0,05 dB	0,10 dB	0,02 dB
28 MHz (only FSW-B8)	-0,10 dB	0,04 dB	0,10 dB	0,02 dB
20 MHz (only FSW-B8)	-0,10 dB	0,04 dB	0,10 dB	0,02 dB
10 MHz	-0,10 dB	-0,02 dB	0,10 dB	0,02 dB
1 MHz	-0,10 dB	-0,01 dB	0,10 dB	0,02 dB
100 kHz	-0,10 dB	-0,01 dB	0,10 dB	0,02 dB
10 kHz	--	0,00 dB	--	reference
1 kHz	-0,10 dB	-0,04 dB	0,10 dB	0,02 dB
100 Hz	-0,10 dB	-0,04 dB	0,10 dB	0,02 dB

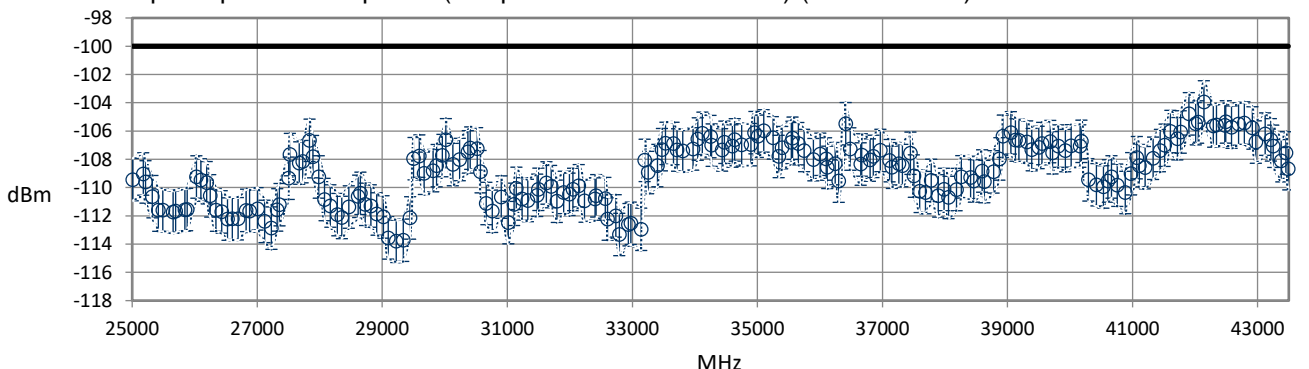
6.1 Full Span Spurious Response (Freq < 8900 MHz) (RBW=200Hz)



6.2 Full Span Spurious Response (Freq = 8900 ... 25000 MHz) (RBW=1000Hz)



6.3 Full Span Spurious Response (Freq = 25000 ... 43500 MHz) (RBW=300Hz)



Object Signal & Spectrum Analyzer

Type FSW43

Serial No. 100560

Date 2020-07-20

Material No. 1312.8000K43

Page 8 of 18

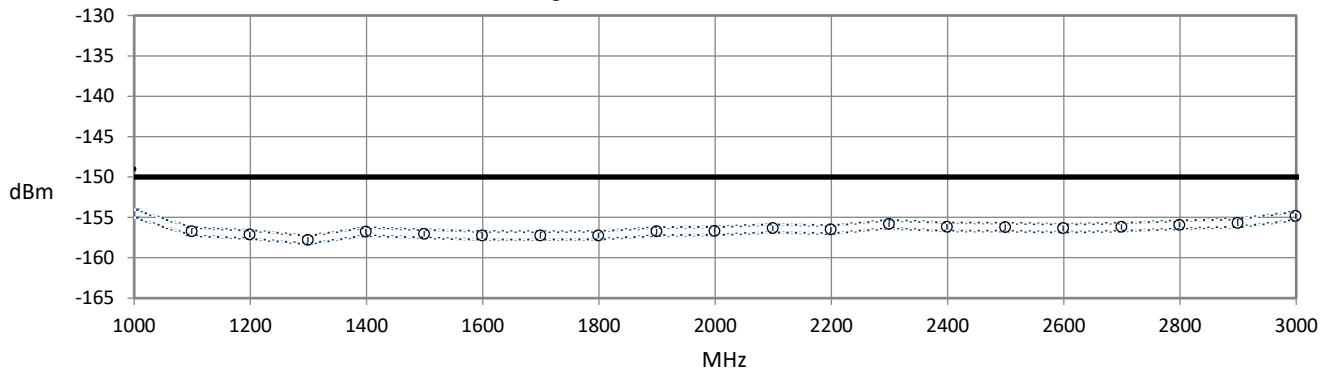
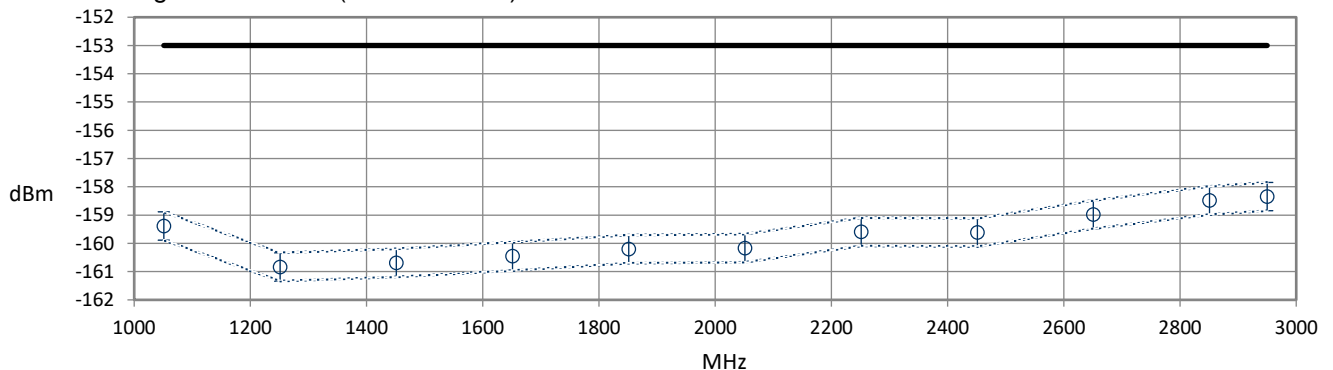
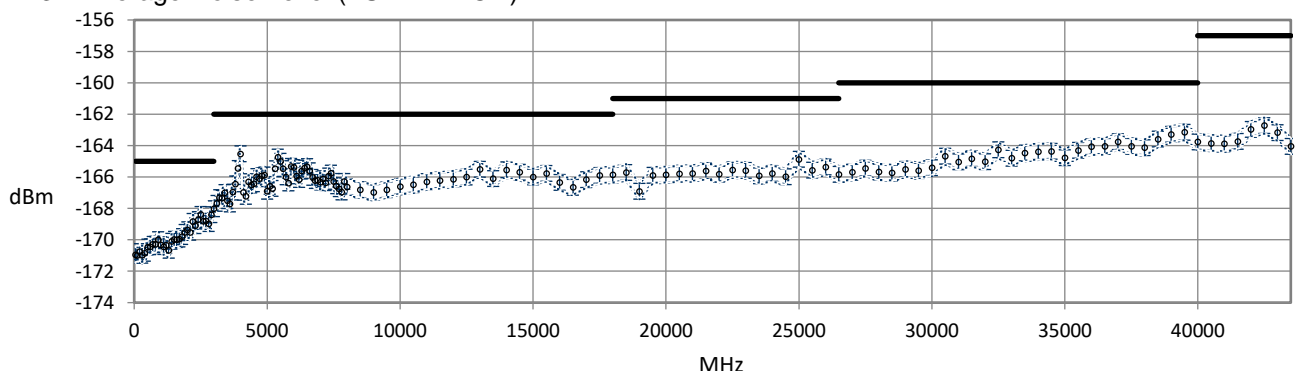
Calibration Mark 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/Meafsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/End/2012-01

V1-08/Temp/End/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
7.1 Average Noise Level				
results calculated from power and attenuation measurements				
fin = 2 Hz	--	1 -117,7 dBm	-110,0 dBm	0,5 dB
10 Hz	--	1 -130,6 dBm	-110,0 dBm	0,5 dB
30 Hz	--	1 -122,1 dBm	-110,0 dBm	0,5 dB
90 Hz	--	1 -134,0 dBm	-110,0 dBm	0,5 dB
300 Hz	--	1 -139,6 dBm	-120,0 dBm	0,5 dB
980 Hz	--	1 -142,0 dBm	-120,0 dBm	0,5 dB
9,8 kHz	--	1 -149,8 dBm	-145,0 dBm	0,5 dB
98 kHz	--	1 -151,2 dBm	-145,0 dBm	0,5 dB
998 kHz	--	1 -154,5 dBm	-145,0 dBm	0,5 dB
9800 kHz	--	1 -154,9 dBm	-149,0 dBm	0,5 dB

Average Noise Level > 10 MHz


7.2 Average Noise Level (FSW-B13 ON)

7.3 Average Noise Level (FSW-B24 ON)


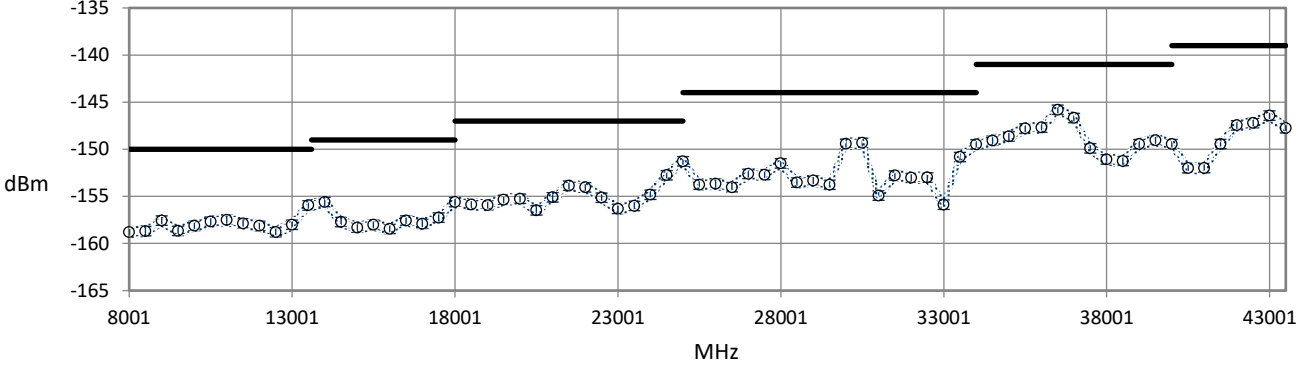
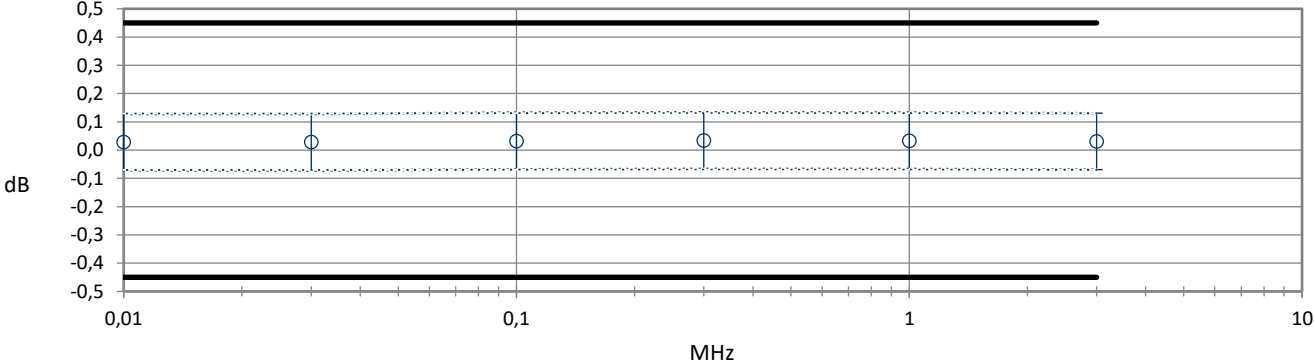
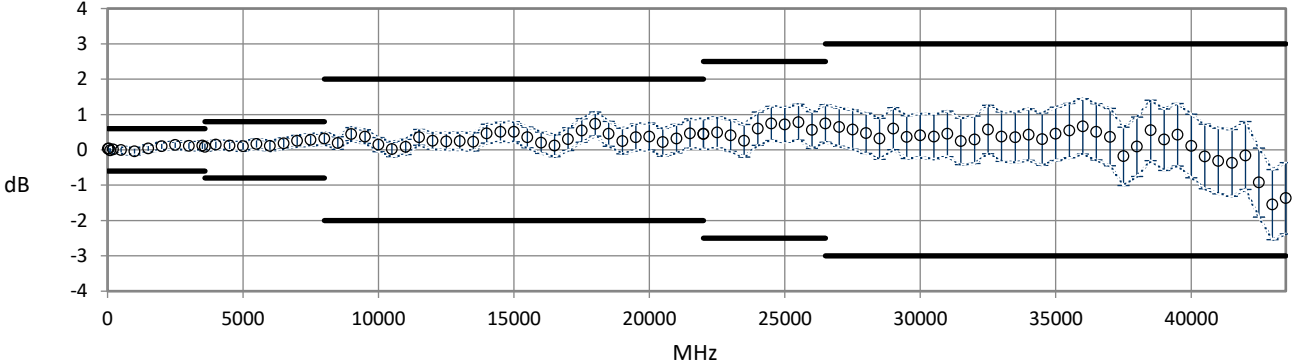
Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 9 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

International Service

EXE-Vers: 3.1.10.0/MeaFsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/Enq/2012-01

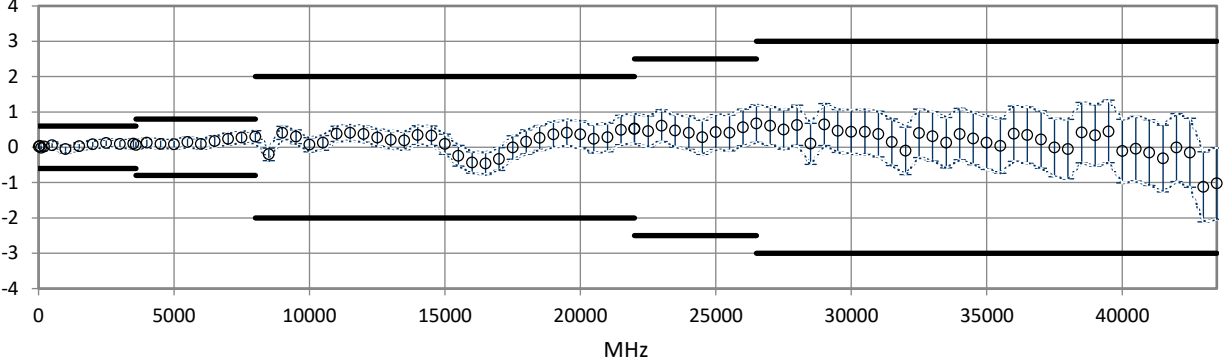
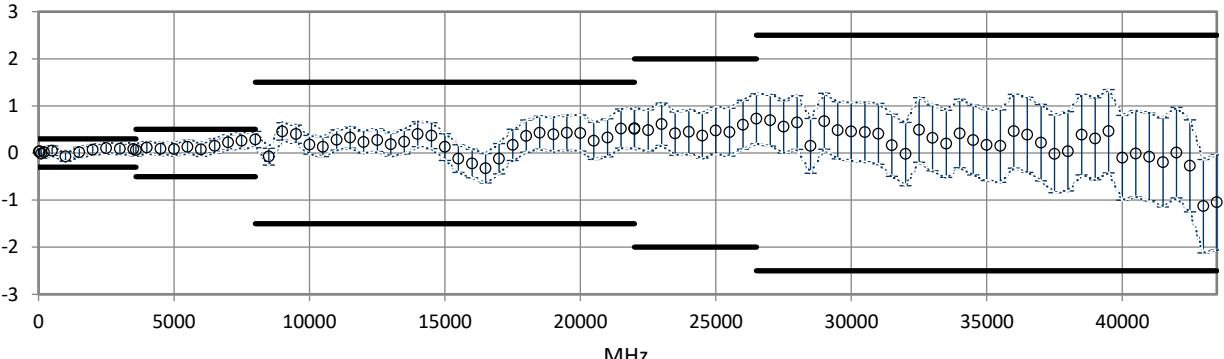
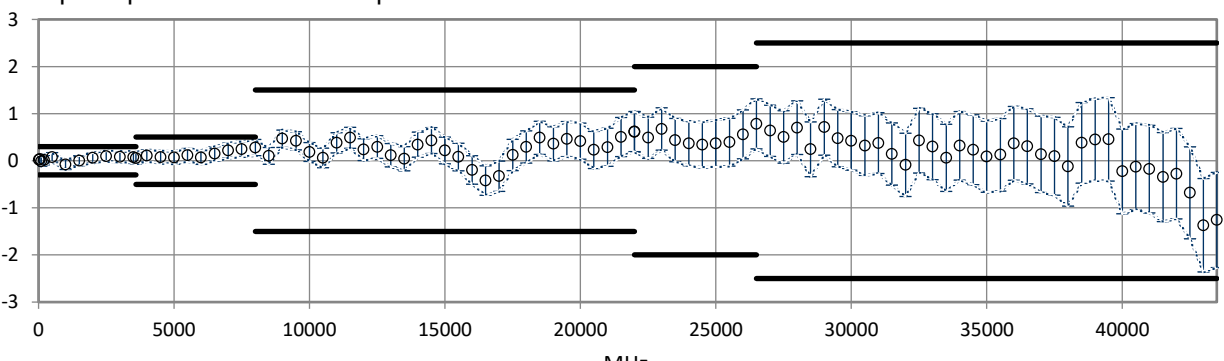
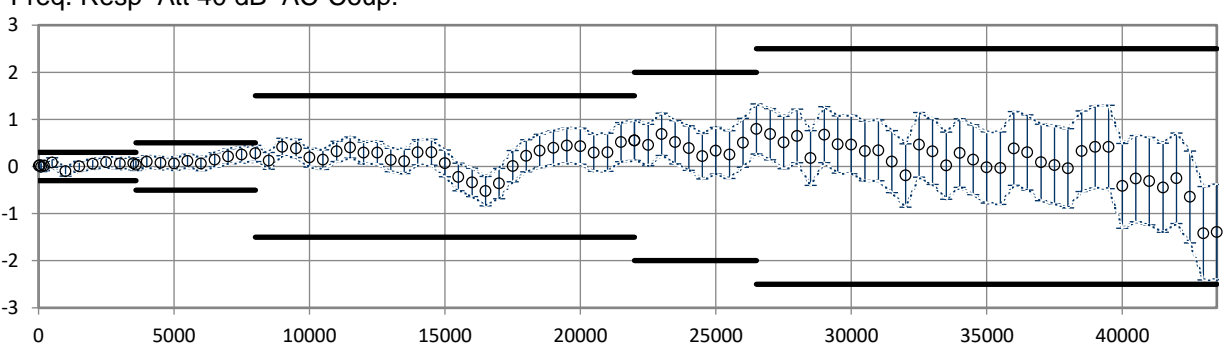
V1-08/Temp/Enq/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
<p>7.4 Average Noise Level (YIG OFF)</p> 				
<p>8 Level Accuracy</p> <p>Ref. lev= -10 dBm Freq= 64 MHz RF Att = 10 dB</p> <p>electr. Att:</p> <ul style="list-style-type: none"> 0 dB (only FSW-B25) 10 dB (only FSW-B25) 20 dB (only FSW-B25) 	<p>-0,20 dB</p> <p>-0,40 dB</p> <p>-0,40 dB</p> <p>-0,40 dB</p>	<p>-0,06 dB</p> <p>n. i.</p> <p>n. i.</p> <p>n. i.</p>	<p>0,20 dB</p> <p>0,40 dB</p> <p>0,40 dB</p> <p>0,40 dB</p>	<p>0,05 dB</p> <p>0,05 dB</p> <p>0,05 dB</p> <p>0,05 dB</p>
<p>9.1 Freq. Resp Att 10 dB DC-Coup.</p> 				
<p>9.2 Freq. Resp Att 0 dB AC-Coup.</p> 				

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 10 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

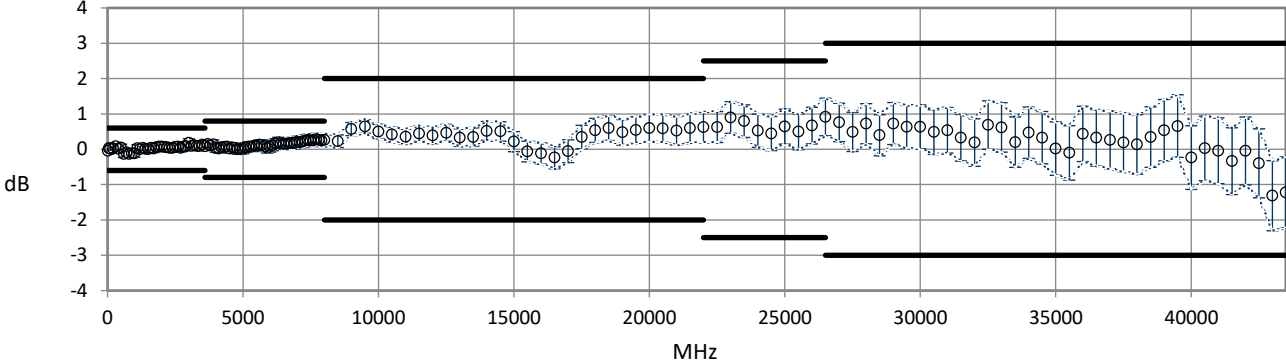
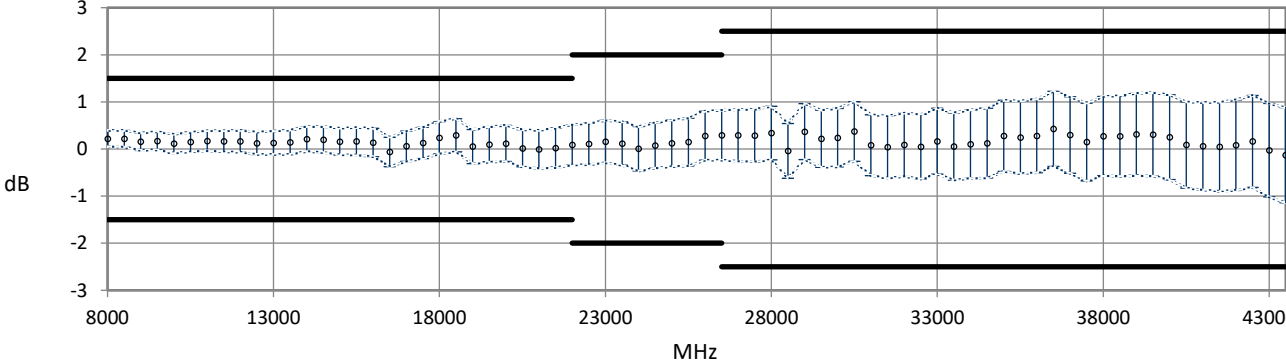
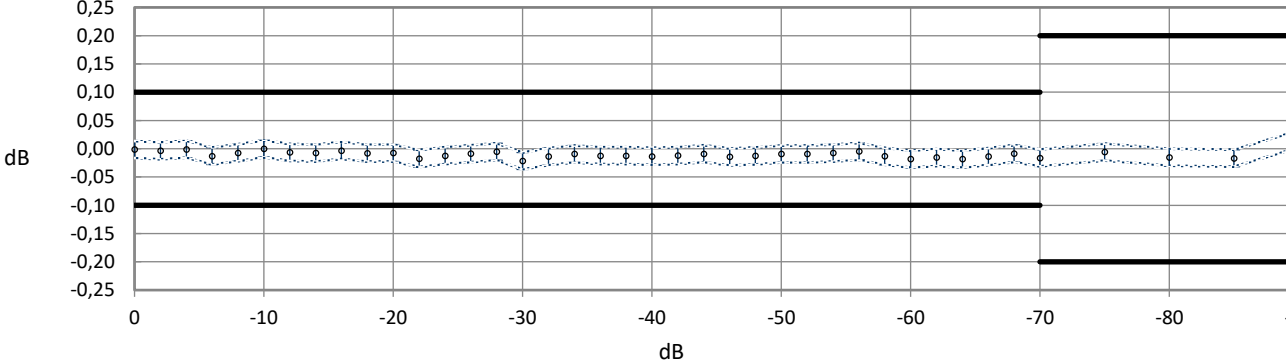
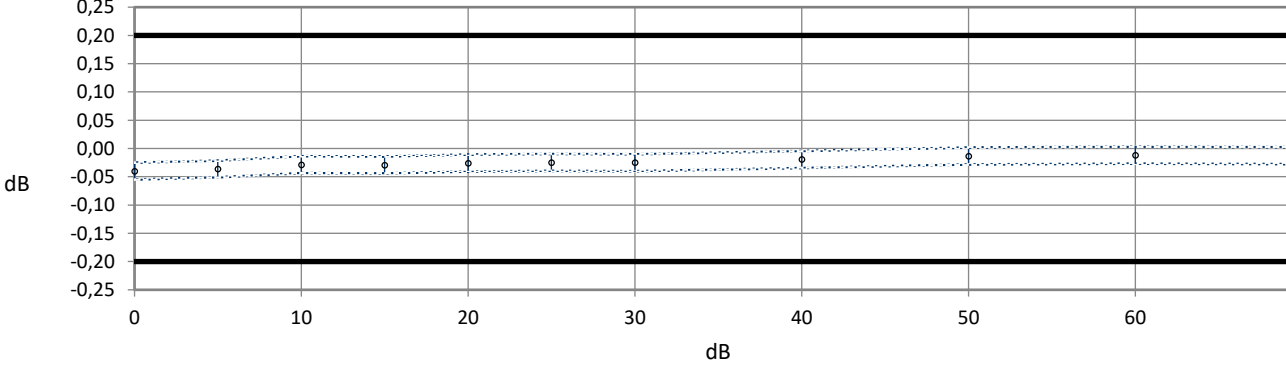
International Service

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
9.3 Freq. Resp Att 5 dB AC-Coup. 				
9.4 Freq. Resp Att 10 dB AC-Coup. 				
9.5 Freq. Resp Att 20 dB AC-Coup. 				
9.6 Freq. Resp Att 40 dB AC-Coup. 				

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 11 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

International Service

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
9.7 Freq. Resp Att 10 dB DC-Coup. (FSW-B24 on)				
9.8 Freq. Resp Att 10 dB AC-Coup. YIG OFF				
10 Display Nonlinearity				
11 RF Attenuator Accuracy				

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 12 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

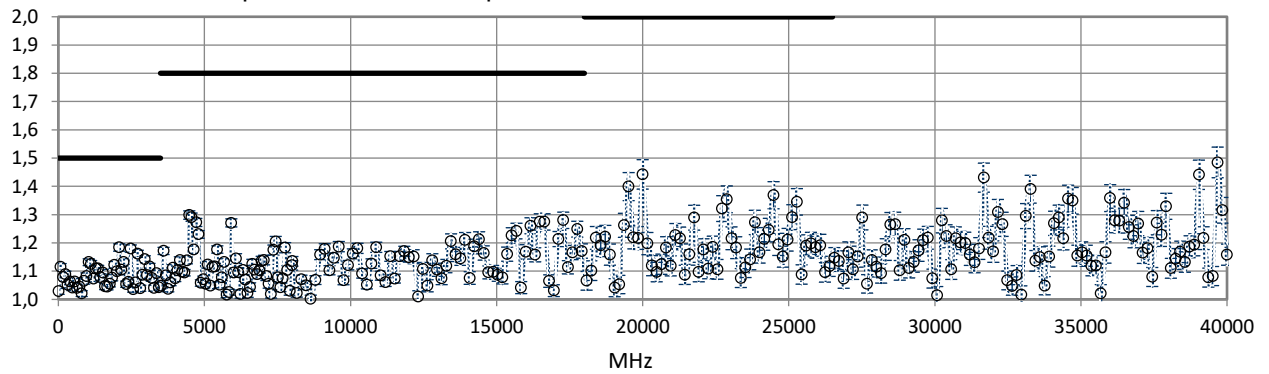
International Service

EXE-Vers: 3.1.10.0/MeaFsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/Enq/2012-01

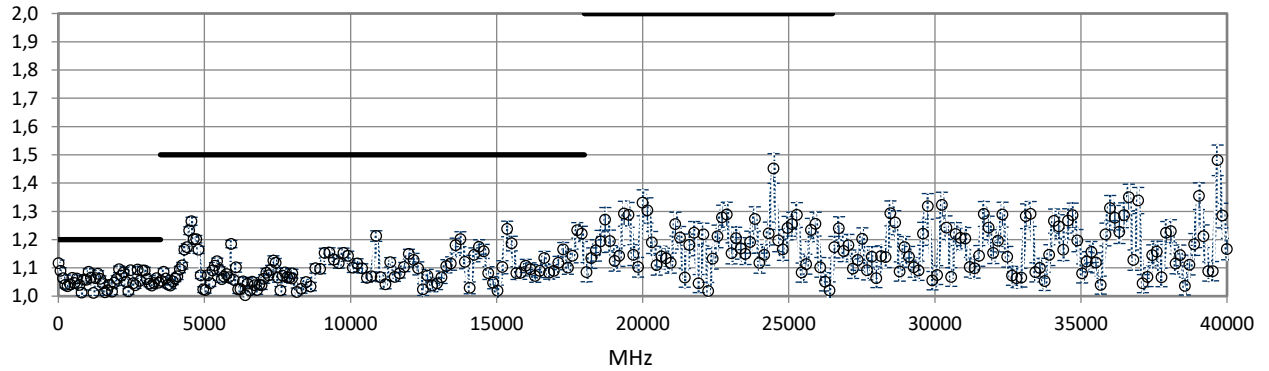
V1-08/Temp/Enq/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
12 Phase Noise				
referred to 1 Hz RBW				
1 kHz	--	1 -129,2 dBc	-126,0 dBc	0,5 dB
10 kHz	--	1 -137,8 dBc	-135,0 dBc	0,5 dB
100 kHz	--	1 -139,6 dBc	-137,0 dBc	0,5 dB
1 MHz	--	1 -148,5 dBc	-145,0 dBc	0,5 dB

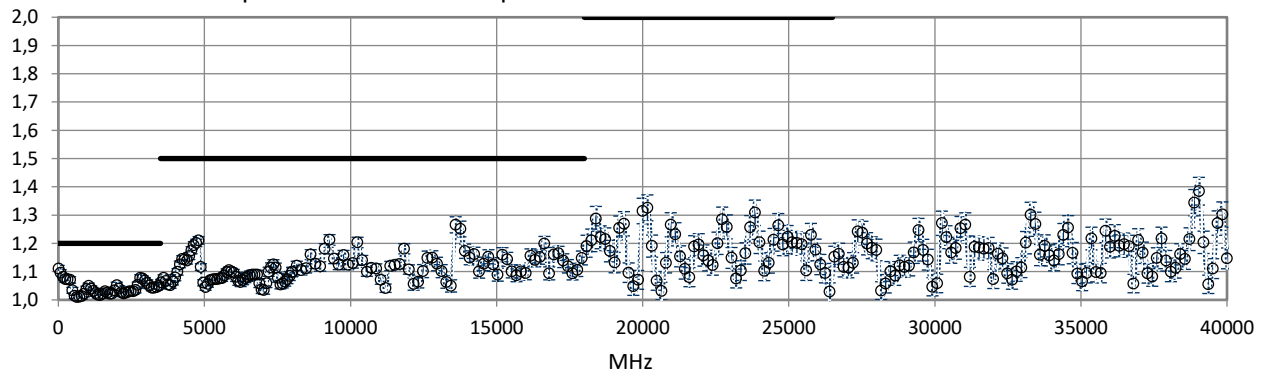
13.1.1 VSWR at RF Input Att 5 dB DC-Coup.



13.2.1 VSWR at RF Input Att 10 dB DC-Coup.



13.3.1 VSWR at RF Input Att 20 dB DC-Coup.



Object Signal & Spectrum Analyzer

Type FSW43

Date 2020-07-20

Page 13 of 18

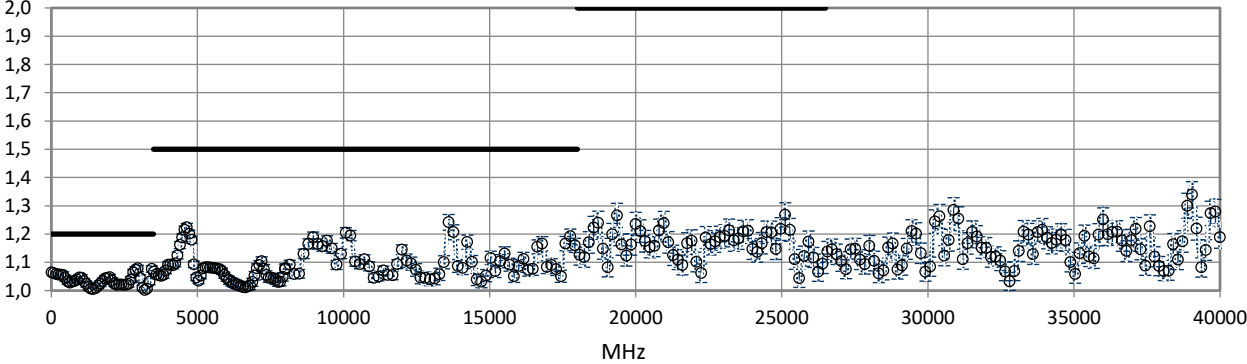
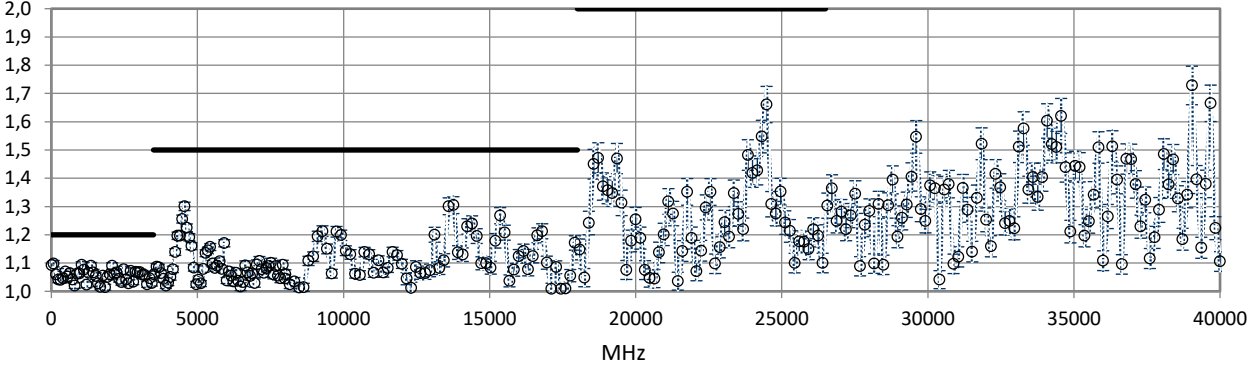
Serial No. 100560

Material No. 1312.8000K43

Calibration Mark 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/Meafsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/End/2012-01

V1-08/Temp/End/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
13.4.1 VSWR at RF Input Att 40 dB DC-Coup. 				
13.5.1 VSWR at RF Input Att 10 dB AC-Coup. 				

**Object** Signal & Spectrum Analyzer**Type** FSW43**Serial No.** 100560**Date** 2020-07-20**Material No.** 1312.8000K43**Page** 14 of 18**Calibration Mark** 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/MeaFsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/End/2012-01

V1-08/Temp/End/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
14 IQ Baseband Inputs FSW-B71				
14.1 Baseband Inputs abs. Amplitude Accuracy				
input: I (freq = 1 MHz)				
input level: full scale level:				
10 dBm 2 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
4 dBm 1 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-2 dBm 0,5 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-8 dBm 0,25 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
input: Q (freq = 1 MHz)				
input level: full scale level:				
10 dBm 2 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
4 dBm 1 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-2 dBm 0,5 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-8 dBm 0,25 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
input: I/ (freq = 1 MHz)				
input level: full scale level:				
10 dBm 2 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
4 dBm 1 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-2 dBm 0,5 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-8 dBm 0,25 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
input: Q/ (freq = 1 MHz)				
input level: full scale level:				
10 dBm 2 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
4 dBm 1 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-2 dBm 0,5 V	-0,15 dB	n. i.	0,15 dB	0,03 dB
-8 dBm 0,25 V	-0,15 dB	n. i.	0,15 dB	0,03 dB

Object Signal & Spectrum Analyzer
Type FSW43
Date 2020-07-20
Page 15 of 18

Serial No. 100560
Material No. 1312.8000K43
Calibration Mark 560982-D-K-15012-01-00-2020-07

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
14.2 Baseband Inputs Frequency Response				
input: I (referred to 1 MHz 0,25 V)				
input freq:				
2,5 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
5 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
10 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
20 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
30 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
40 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
50 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
60 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
70 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
80 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
input: Q (referred to 1 MHz 0,25 V)				
input freq:				
2,5 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
5 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
10 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
20 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
30 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
40 MHz	-0,15 dB	n. i.	0,15 dB	0,03 dB
50 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
60 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
70 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB
80 MHz (only FSW-B71E)	-0,25 dB	n. i.	0,25 dB	0,03 dB



Object Signal & Spectrum Analyzer

Type FSW43

Serial No. 100560

Date 2020-07-20

Material No. 1312.8000K43

Page 16 of 18

Calibration Mark 560982-D-K-15012-01-00-2020-07

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
15 External Mixing FSW-B21				
15.1 Ext Mixer LO Level Acc. of 13 dBm nominal Power				
mode: upper sideband				
fc = 16,88 GHz	12,00 dBm	12,88 dBm	14,00 dBm	0,20 dB
17,38 GHz	12,00 dBm	12,80 dBm	14,00 dBm	0,20 dB
17,88 GHz	12,00 dBm	12,81 dBm	14,00 dBm	0,20 dB
18,38 GHz	12,00 dBm	13,06 dBm	14,00 dBm	0,20 dB
18,88 GHz	12,00 dBm	12,46 dBm	14,00 dBm	0,20 dB
19,38 GHz	12,00 dBm	12,86 dBm	14,00 dBm	0,20 dB
19,88 GHz	12,00 dBm	12,63 dBm	14,00 dBm	0,20 dB
20,38 GHz	12,00 dBm	12,44 dBm	14,00 dBm	0,20 dB
20,88 GHz	12,00 dBm	12,92 dBm	14,00 dBm	0,20 dB
21,38 GHz	12,00 dBm	12,25 dBm	14,00 dBm	0,20 dB
21,88 GHz	12,00 dBm	12,75 dBm	14,00 dBm	0,20 dB
22,38 GHz	12,00 dBm	12,56 dBm	14,00 dBm	0,20 dB
22,88 GHz	12,00 dBm	12,47 dBm	14,00 dBm	0,20 dB
23,38 GHz	12,00 dBm	12,68 dBm	14,00 dBm	0,20 dB
23,88 GHz	12,00 dBm	12,38 dBm	14,00 dBm	0,20 dB
24,38 GHz	12,00 dBm	12,49 dBm	14,00 dBm	0,20 dB
24,88 GHz	12,00 dBm	12,60 dBm	14,00 dBm	0,20 dB
25,38 GHz	12,00 dBm	12,32 dBm	14,00 dBm	0,20 dB
25,88 GHz	12,00 dBm	12,57 dBm	14,00 dBm	0,20 dB
26,38 GHz	12,00 dBm	12,30 dBm	14,00 dBm	0,20 dB
26,88 GHz	12,00 dBm	12,36 dBm	14,00 dBm	0,20 dB
mode: lower sideband				
fc = 23,82 GHz	12,00 dBm	12,35 dBm	14,00 dBm	0,20 dB
24,32 GHz	12,00 dBm	12,37 dBm	14,00 dBm	0,20 dB
24,82 GHz	12,00 dBm	12,46 dBm	14,00 dBm	0,20 dB
25,32 GHz	12,00 dBm	12,91 dBm	14,00 dBm	0,20 dB
25,82 GHz	12,00 dBm	12,81 dBm	14,00 dBm	0,20 dB
26,32 GHz	12,00 dBm	12,81 dBm	14,00 dBm	0,20 dB
26,82 GHz	12,00 dBm	12,80 dBm	14,00 dBm	0,20 dB
27,32 GHz	12,00 dBm	12,71 dBm	14,00 dBm	0,20 dB
27,82 GHz	12,00 dBm	12,63 dBm	14,00 dBm	0,20 dB
28,32 GHz	12,00 dBm	12,73 dBm	14,00 dBm	0,20 dB
28,82 GHz	12,00 dBm	12,40 dBm	14,00 dBm	0,20 dB
29,32 GHz	12,00 dBm	12,50 dBm	14,00 dBm	0,20 dB
29,82 GHz	12,00 dBm	12,28 dBm	14,00 dBm	0,20 dB
30,32 GHz	12,00 dBm	12,80 dBm	14,00 dBm	0,20 dB
30,82 GHz	12,00 dBm	13,15 dBm	14,00 dBm	0,20 dB
31,32 GHz	12,00 dBm	12,66 dBm	14,00 dBm	0,20 dB
31,82 GHz	12,00 dBm	12,91 dBm	14,00 dBm	0,20 dB
32,32 GHz	12,00 dBm	12,66 dBm	14,00 dBm	0,20 dB
32,82 GHz	12,00 dBm	12,36 dBm	14,00 dBm	0,20 dB
33,32 GHz	12,00 dBm	12,52 dBm	14,00 dBm	0,20 dB



Object Signal & Spectrum Analyzer

Type FSW43

Serial No. 100560

Date 2020-07-20

Material No. 1312.8000K43

Page 17 of 18

Calibration Mark 560982-D-K-15012-01-00-2020-07

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
15.2 Ext Mixer LO Level Acc. of 15.5 dBm nominal Power				
mode: upper sideband				
fc = 16,88 GHz	14,50 dBm	15,67 dBm	16,50 dBm	0,20 dB
17,38 GHz	14,50 dBm	15,53 dBm	16,50 dBm	0,20 dB
17,88 GHz	14,50 dBm	15,62 dBm	16,50 dBm	0,20 dB
18,38 GHz	14,50 dBm	15,91 dBm	16,50 dBm	0,20 dB
18,88 GHz	14,50 dBm	15,20 dBm	16,50 dBm	0,20 dB
19,38 GHz	14,50 dBm	15,78 dBm	16,50 dBm	0,20 dB
19,88 GHz	14,50 dBm	15,54 dBm	16,50 dBm	0,20 dB
20,38 GHz	14,50 dBm	15,23 dBm	16,50 dBm	0,20 dB
20,88 GHz	14,50 dBm	15,82 dBm	16,50 dBm	0,20 dB
21,38 GHz	14,50 dBm	14,86 dBm	16,50 dBm	0,20 dB
21,88 GHz	14,50 dBm	15,50 dBm	16,50 dBm	0,20 dB
22,38 GHz	14,50 dBm	15,14 dBm	16,50 dBm	0,20 dB
22,88 GHz	14,50 dBm	15,25 dBm	16,50 dBm	0,20 dB
23,38 GHz	14,50 dBm	15,33 dBm	16,50 dBm	0,20 dB
23,88 GHz	14,50 dBm	15,04 dBm	16,50 dBm	0,20 dB
24,38 GHz	14,50 dBm	15,28 dBm	16,50 dBm	0,20 dB
24,88 GHz	14,50 dBm	15,42 dBm	16,50 dBm	0,20 dB
25,38 GHz	14,50 dBm	14,97 dBm	16,50 dBm	0,20 dB
25,88 GHz	14,50 dBm	15,50 dBm	16,50 dBm	0,20 dB
26,38 GHz	14,50 dBm	14,93 dBm	16,50 dBm	0,20 dB
26,88 GHz	14,50 dBm	15,23 dBm	16,50 dBm	0,20 dB
mode: lower sideband				
fc = 23,82 GHz	14,50 dBm	15,13 dBm	16,50 dBm	0,20 dB
24,32 GHz	14,50 dBm	15,17 dBm	16,50 dBm	0,20 dB
24,82 GHz	14,50 dBm	15,20 dBm	16,50 dBm	0,20 dB
25,32 GHz	14,50 dBm	15,81 dBm	16,50 dBm	0,20 dB
25,82 GHz	14,50 dBm	15,46 dBm	16,50 dBm	0,20 dB
26,32 GHz	14,50 dBm	15,50 dBm	16,50 dBm	0,20 dB
26,82 GHz	14,50 dBm	15,64 dBm	16,50 dBm	0,20 dB
27,32 GHz	14,50 dBm	15,40 dBm	16,50 dBm	0,20 dB
27,82 GHz	14,50 dBm	15,57 dBm	16,50 dBm	0,20 dB
28,32 GHz	14,50 dBm	15,66 dBm	16,50 dBm	0,20 dB
28,82 GHz	14,50 dBm	15,27 dBm	16,50 dBm	0,20 dB
29,32 GHz	14,50 dBm	15,37 dBm	16,50 dBm	0,20 dB
29,82 GHz	14,50 dBm	15,26 dBm	16,50 dBm	0,20 dB
30,32 GHz	14,50 dBm	15,46 dBm	16,50 dBm	0,20 dB
30,82 GHz	14,50 dBm	16,03 dBm	16,50 dBm	0,20 dB
31,32 GHz	14,50 dBm	15,42 dBm	16,50 dBm	0,20 dB
31,82 GHz	14,50 dBm	15,74 dBm	16,50 dBm	0,20 dB
32,32 GHz	14,50 dBm	15,72 dBm	16,50 dBm	0,20 dB
32,82 GHz	14,50 dBm	15,26 dBm	16,50 dBm	0,20 dB
33,32 GHz	14,50 dBm	15,76 dBm	16,50 dBm	0,20 dB

**Object** Signal & Spectrum Analyzer**Type** FSW43**Serial No.** 100560**Date** 2020-07-20**Material No.** 1312.8000K43**Page** 18 of 18**Calibration Mark** 560982-D-K-15012-01-00-2020-07

EXE-Vers: 3.1.10.0/MeaFsw1.01/2020-07-16 11:00 INI-Vers: V1-22/504403/2020-05-20 V1-01/FSW1/Enq/2012-01

V1-08/Temp/Enq/2016-01

Test Description	Lower Limit	Result Measured	Upper Limit	Uncertainty
15.3 Ext Mixer LO Level Acc. of 17 dBm nominal Power				
mode: upper sideband				
fc = 16,88 GHz	16,00 dBm	17,12 dBm	18,00 dBm	0,20 dB
17,38 GHz	16,00 dBm	17,08 dBm	18,00 dBm	0,20 dB
17,88 GHz	16,00 dBm	17,00 dBm	18,00 dBm	0,20 dB
18,38 GHz	16,00 dBm	17,29 dBm	18,00 dBm	0,20 dB
18,88 GHz	16,00 dBm	16,69 dBm	18,00 dBm	0,20 dB
19,38 GHz	16,00 dBm	17,25 dBm	18,00 dBm	0,20 dB
19,88 GHz	16,00 dBm	17,08 dBm	18,00 dBm	0,20 dB
20,38 GHz	16,00 dBm	16,78 dBm	18,00 dBm	0,20 dB
20,88 GHz	16,00 dBm	17,33 dBm	18,00 dBm	0,20 dB
21,38 GHz	16,00 dBm	16,45 dBm	18,00 dBm	0,20 dB
21,88 GHz	16,00 dBm	17,06 dBm	18,00 dBm	0,20 dB
22,38 GHz	16,00 dBm	16,73 dBm	18,00 dBm	0,20 dB
22,88 GHz	16,00 dBm	16,84 dBm	18,00 dBm	0,20 dB
23,38 GHz	16,00 dBm	16,89 dBm	18,00 dBm	0,20 dB
23,88 GHz	16,00 dBm	16,67 dBm	18,00 dBm	0,20 dB
24,38 GHz	16,00 dBm	16,82 dBm	18,00 dBm	0,20 dB
24,88 GHz	16,00 dBm	16,97 dBm	18,00 dBm	0,20 dB
25,38 GHz	16,00 dBm	16,44 dBm	18,00 dBm	0,20 dB
25,88 GHz	16,00 dBm	17,14 dBm	18,00 dBm	0,20 dB
26,38 GHz	16,00 dBm	16,51 dBm	18,00 dBm	0,20 dB
26,88 GHz	16,00 dBm	16,90 dBm	18,00 dBm	0,20 dB
mode: lower sideband				
fc = 23,82 GHz	16,00 dBm	16,65 dBm	18,00 dBm	0,20 dB
24,32 GHz	16,00 dBm	17,03 dBm	18,00 dBm	0,20 dB
24,82 GHz	16,00 dBm	16,62 dBm	18,00 dBm	0,20 dB
25,32 GHz	16,00 dBm	17,39 dBm	18,00 dBm	0,20 dB
25,82 GHz	16,00 dBm	16,91 dBm	18,00 dBm	0,20 dB
26,32 GHz	16,00 dBm	17,02 dBm	18,00 dBm	0,20 dB
26,82 GHz	16,00 dBm	17,23 dBm	18,00 dBm	0,20 dB
27,32 GHz	16,00 dBm	16,91 dBm	18,00 dBm	0,20 dB
27,82 GHz	16,00 dBm	17,18 dBm	18,00 dBm	0,20 dB
28,32 GHz	16,00 dBm	17,18 dBm	18,00 dBm	0,20 dB
28,82 GHz	16,00 dBm	16,89 dBm	18,00 dBm	0,20 dB
29,32 GHz	16,00 dBm	16,97 dBm	18,00 dBm	0,20 dB
29,82 GHz	16,00 dBm	17,10 dBm	18,00 dBm	0,20 dB
30,32 GHz	16,00 dBm	16,80 dBm	18,00 dBm	0,20 dB
30,82 GHz	16,00 dBm	17,53 dBm	18,00 dBm	0,20 dB
31,32 GHz	16,00 dBm	16,85 dBm	18,00 dBm	0,20 dB
31,82 GHz	16,00 dBm	17,16 dBm	18,00 dBm	0,20 dB
32,32 GHz	16,00 dBm	17,38 dBm	18,00 dBm	0,20 dB
32,82 GHz	16,00 dBm	16,67 dBm	18,00 dBm	0,20 dB
33,32 GHz	16,00 dBm	17,53 dBm	18,00 dBm	0,20 dB
15.4 Ext Mixer Level Display				
2-port-mixer	-1,00 dBm	0,58 dBm	1,00 dBm	0,20 dB
3-port-mixer	-1,00 dBm	0,51 dBm	1,00 dBm	0,20 dB